CONICAL™

CHAMFER CUTTERS

AMERICAN MADE

GLOBALLY RENOWNED

SPECIALTY END MILLS

FOR EDGE BREAK, FULL CHAMFER & DEBURRING IN ALL MATERIALS

CONICAL™ CUTTING TOOLS

CONICAL™
CHAMFER CUTTERS

FOR EDGE BREAK & FULL CHAMFER MILLING
IN ALL MATERIALS

FEATURES & BENEFITS

Our Conical Chamfer Cutters are manufactured from premium micro-grain carbide for use with all materials. There are four standard combinations of flutes and coating, in multiple variations of angle and length of cut. Softer material benefit from the two flute design for aggressive chip removal and clearance, while harder materials are better suited to a coated end mill with our four flute, high strength design. Whether performing an edge break, full chamfer, or eliminating costly hand deburring operations, this tool does the work you need done now.

General Inquiries:
3890 Buchanan Ave SW
Grand Rapids, MI 49548

P: (616) 531-8500
F: (616) 531-7742
E: info@conicaltool.com

Sales & Distribution:
T: (888) 531-8500
E: sales@conicaltool.com

Custom Tooling:
E: quotes@conicaltool.com
W: conicalendmills.com/custom-tool-ordering

CONICAL™
CUTTING TOOLS

SERIES: CFX

For milling full chamfers, edge breaks or deburring in most materials; wet or dry; from easy to difficult machinability materials.

Two flute design with positive rake and clearance for aggressive machining in easy to machine materials

Four high strength flutes, designed with neutral rake and clearance for difficult to machine materials

Optional coating for heat resistance, wear resistance and increased lubricity

Premium micro-grain carbide substrate resists chipping, tool deflection, and has a high transverse rupture strength for greater feeds and speeds

Excellent alternative to hand deburring operations

TIP & END

SHANK & LENGTH

S R L X N

FLUTE CONFIGURATION

MATERIAL

CB SUB-MICRO GRAIN CARBIDE

COATING

AlTiN Si3N4 UNC

RESULTS

The Conical Chamfer Cutter is an excellent alternative for hand deburring processes, as well as traditional chamfering. Improving the part finish and speed of operation will improve output and quality standards. Multiple configurations make the Conical Chamfer Cutter versatile in the full range of materials. Softer materials benefit from the positive rake and two flute design for proper clearance. Hard ferrous materials are better suited for the four flute, AlTiN-X Nano coated design, to protect against heat and wear.

Series: CFX2 & CFX4: Micro-Grain Carbide, 2 & 4 Flute, 15 - 75°
Subseries: CF15D, CF20D, CF22D, CF25D, CF30D, CF35D, CF40D, CF45D, CF50D, CF55D, CF60D, CF65D, CF70D
Configuration: Varying Angles; Varying Diameters; Stub, Regular & Long Lengths ; Pointed Ends

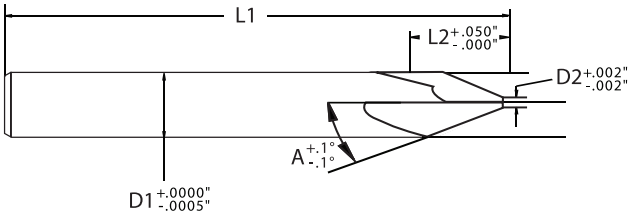
CHAMFER CUTTERS CONICAL™

SERIES CFX - *CARBIDE, 2 & 4 FLUTE, ALTIN-X COATED & UNCOATED*

FOR ANY APPLICATION AND MATERIAL

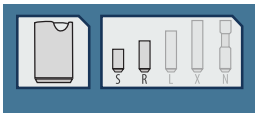
Developed to mill edge breaks and full chamfers, but also function well for replacing expensive hand deburring operations. Two primary designs were created to provide customers with the exact tool they need, for any application and material.

- Two flute design with positive rake and clearance for aggressive machining in easy to machine materials
- Four high strength flutes, designed with neutral rake and clearance for difficult to machine materials
- Eccentric relief for enhanced edge strength along the flute

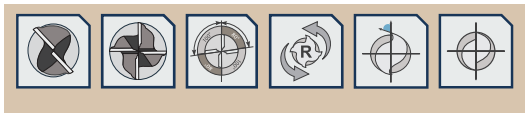


TIP & END

SHANK & LENGTH



FLUTE CONFIGURATION



MATERIAL

COATING

SERIES CF15D -15 *DEGREE, VARYING LENGTHS*

ANGLE PER SIDE (A)	TIP DIAMETER (D2)	SHANK DIAMETER (D1)		FLUTE LENGTH (L2)	OVERALL LENGTH (L1)		# OF FLUTES	UNCOATED PART #	UNCOATED EDP #	ALTIN/SI3N4 COATED PART #	ALTIN/SI3N4 COATED EDP #
15°	0.010	3/16	0.188	0.350	2	2.000	2	CF2-1503	7P010	CF2-1503-C4	7P050
	0.010	1/4	0.250	0.466	2 1/2	2.500		CF2-1504	7P020	CF2-1504-C4	7P060
	0.010	3/8	0.375	0.699	2 1/2	2.500		CF2-1506	7P030	CF2-1506-C4	7P070
	0.010	1/2	0.500	0.933	3	3.000		CF2-1508	7P040	CF2-1508-C4	7P080
15°	0.010	3/16	0.188	0.350	2	2.000	4	CF4-1503	8P010	CF4-1503-C4	8P050
	0.010	1/4	0.250	0.466	2 1/2	2.500		CF4-1504	8P020	CF4-1504-C4	8P060
	0.010	3/8	0.375	0.699	2 1/2	2.500		CF4-1506	8P030	CF4-1506-C4	8P070
	0.010	1/2	0.500	0.933	3	3.000		CF4-1508	8P040	CF4-1508-C4	8P080

SERIES CF20D - *20 DEGREE, VARYING LENGTHS*

ANGLE PER SIDE (A)	TIP DIAMETER (D2)	SHANK DIAMETER (D1)		FLUTE LENGTH (L2)	OVERALL LENGTH (L1)		# OF FLUTES	UNCOATED PART #	UNCOATED EDP #	ALTIN/SI3N4 COATED PART #	ALTIN/SI3N4 COATED EDP #
20°	0.010	3/16	0.188	0.258	2	2.000	2	CF2-2003	7T010	CF2-2003-C4	7T050
	0.010	1/4	0.250	0.343	2 1/2	2.500		CF2-2004	7T020	CF2-2004-C4	7T060
	0.010	3/8	0.375	0.515	2 1/2	2.500		CF2-2006	7T030	CF2-2006-C4	7T070
	0.010	1/2	0.500	0.687	3	3.000		CF2-2008	7T040	CF2-2008-C4	7T080
20°	0.010	3/16	0.188	0.258	2	2.000	4	CF4-2003	8T010	CF4-2003-C4	8T050
	0.010	1/4	0.250	0.343	2 1/2	2.500		CF4-2004	8T020	CF4-2004-C4	8T060
	0.010	3/8	0.375	0.515	2 1/2	2.500		CF4-2006	8T030	CF4-2006-C4	8T070
	0.010	1/2	0.500	0.687	3	3.000		CF4-2008	8T040	CF4-2008-C4	8T080

SERIES CF22D - *22 ½ DEGREE, VARYING LENGTHS*

ANGLE PER SIDE (A)	TIP DIAMETER (D2)	SHANK DIAMETER (D1)		FLUTE LENGTH (L2)	OVERALL LENGTH (L1)		# OF FLUTES	UNCOATED PART #	UNCOATED EDP #	ALTIN/SI3N4 COATED PART #	ALTIN/SI3N4 COATED EDP #
22.5°	0.010	3/16	0.188	0.227	2	2.000	2	CF2-2203	7S010	CF2-2203-C4	7S060
	0.010	1/4	0.250	0.302	2 1/2	2.500		CF2-2204	7S020	CF2-2204-C4	7S070
	0.010	3/8	0.375	0.453	2 1/2	2.500		CF2-2206	7S030	CF2-2206-C4	7S080
	0.010	1/2	0.500	0.603	3	3.000		CF2-2208	7S040	CF2-2208-C4	7S090
	0.010	3/4	0.750	0.905	3	3.000		CF2-2212	7S050	CF2-2212-C4	7S100
22.5°	0.010	3/16	0.188	0.227	2	2.000	4	CF4-2203	8S010	CF4-2203-C4	8S060
	0.010	1/4	0.250	0.302	2 1/2	2.500		CF4-2204	8S020	CF4-2204-C4	8S070
	0.010	3/8	0.375	0.453	2 1/2	2.500		CF4-2206	8S030	CF4-2206-C4	8S080
	0.010	1/2	0.500	0.603	3	3.000		CF4-2208	8S040	CF4-2208-C4	8S090
	0.010	3/4	0.750	0.905	3	3.000		CF4-2212	8S050	CF4-2212-C4	8S100

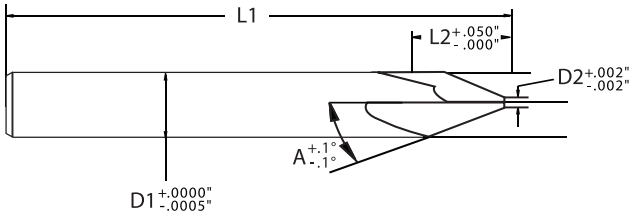
CHAMFER CUTTERS CONICAL™

SERIES CFX - *CARBIDE, 2 & 4 FLUTE, ALTIN-X COATED & UNCOATED*

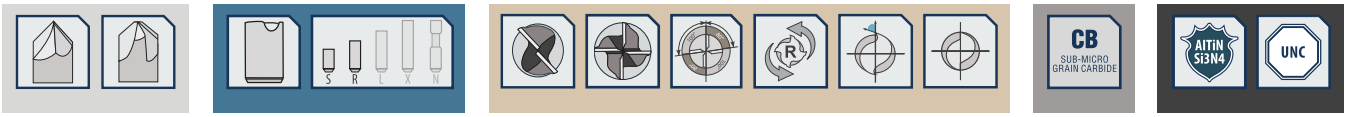
AGGRESSIVE CHIP REMOVAL

The two flute design features a positive rake for aggressive chip removal in easy to machine materials and the four flute design combines a neutral rake with an eccentric relief for improved edge strength in difficult to machine materials.

- Optional coating for heat resistance, wear resistance and increased lubricity
- Premium micro-grain carbide substrate resists chipping, tool deflection, and has a high transverse rupture strength for greater feeds and speeds
- Excellent alternative to hand deburring operations



TIP & END | SHANK & LENGTH | FLUTE CONFIGURATION | MATERIAL | COATING



SERIES CF25D - *25 DEGREE, VARYING LENGTHS*

ANGLE PER SIDE (A)	TIP DIAMETER (D2)	SHANK DIAMETER (D1)		FLUTE LENGTH (L2)	OVERALL LENGTH (L1)		# OF FLUTES	UNCOATED PART #	UNCOATED EDP #	ALTIN/SI3N4 COATED PART #	ALTIN/SI3N4 COATED EDP #
25°	0.010	3/16	0.188	0.202	2	2.000	2	CF2-2503	7R010	CF2-2503-C4	7R060
	0.010	1/4	0.250	0.268	2 1/2	2.500		CF2-2504	7R020	CF2-2504-C4	7R070
	0.010	3/8	0.375	0.402	2 1/2	2.500		CF2-2506	7R030	CF2-2506-C4	7R080
	0.010	1/2	0.500	0.536	3	3.000		CF2-2508	7R040	CF2-2508-C4	7R090
	0.010	3/4	0.750	0.804	3	3.000		CF2-2512	7R050	CF2-2512-C4	7R100
25°	0.010	3/16	0.188	0.202	2	2.000	4	CF4-2503	8R010	CF4-2503-C4	8R060
	0.010	1/4	0.250	0.268	2 1/2	2.500		CF4-2504	8R020	CF4-2504-C4	8R070
	0.010	3/8	0.375	0.402	2 1/2	2.500		CF4-2506	8R030	CF4-2506-C4	8R080
	0.010	1/2	0.500	0.536	3	3.000		CF4-2508	8R040	CF4-2508-C4	8R090
	0.010	3/4	0.750	0.804	3	3.000		CF4-2512	8R050	CF4-2512-C4	8R100

SERIES CF30D - *30 DEGREE, VARYING LENGTHS*

ANGLE PER SIDE (A)	TIP DIAMETER (D2)	SHANK DIAMETER (D1)		FLUTE LENGTH (L2)	OVERALL LENGTH (L1)		# OF FLUTES	UNCOATED PART #	UNCOATED EDP #	ALTIN/SI3N4 COATED PART #	ALTIN/SI3N4 COATED EDP #
30°	0.010	3/16	0.188	0.162	2	2.000	2	CF2-3003	7U010	CF2-3003-C4	7U060
	0.010	1/4	0.250	0.216	2 1/2	2.500		CF2-3004	7U020	CF2-3004-C4	7U070
	0.010	3/8	0.375	0.324	2 1/2	2.500		CF2-3006	7U030	CF2-3006-C4	7U080
	0.010	1/2	0.500	0.433	3	3.000		CF2-3008	7U040	CF2-3008-C4	7U090
	0.010	3/4	0.750	0.649	3	3.000		CF2-3012	7U050	CF2-3012-C4	7U100
30°	0.010	3/16	0.188	0.162	2	2.000	4	CF4-3003	8U010	CF4-3003-C4	8U060
	0.010	1/4	0.250	0.216	2 1/2	2.500		CF4-3004	8U020	CF4-3004-C4	8U070
	0.010	3/8	0.375	0.324	2 1/2	2.500		CF4-3006	8U030	CF4-3006-C4	8U080
	0.010	1/2	0.500	0.433	3	3.000		CF4-3008	8U040	CF4-3008-C4	8U090
	0.010	3/4	0.750	0.649	3	3.000		CF4-3012	8U050	CF4-3012-C4	8U100

SERIES CF35D - *35 DEGREE, VARYING LENGTHS*

ANGLE PER SIDE (A)	TIP DIAMETER (D2)	SHANK DIAMETER (D1)		FLUTE LENGTH (L2)	OVERALL LENGTH (L1)		# OF FLUTES	UNCOATED PART #	UNCOATED EDP #	ALTIN/SI3N4 COATED PART #	ALTIN/SI3N4 COATED EDP #
35°	0.010	1/4	0.250	0.178	2 1/2	2.500	2	CF2-3504	7V010	CF2-3504-C4	7V030
	0.010	3/8	0.375	0.268	2 1/2	2.500		CF2-3506	7V020	CF2-3506-C4	7V040
35°	0.010	1/4	0.250	0.178	2 1/2	2.500	4	CF4-3504	8V010	CF4-3504-C4	8V030
	0.010	3/8	0.375	0.268	2 1/2	2.500		CF4-3506	8V020	CF4-3506-C4	8V040

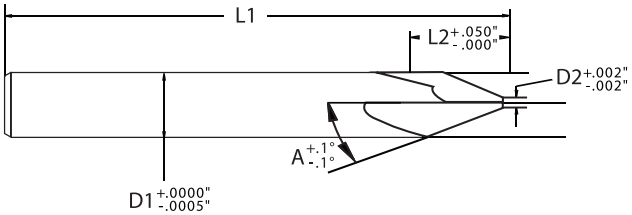
CHAMFER CUTTERS CONICAL™

SERIES CFX - *CARBIDE, 2 & 4 FLUTE, ALTIN-X COATED & UNCOATED*

2 & 4 FLUTE CONFIGURATIONS

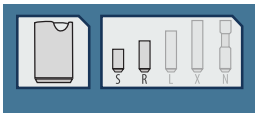
Softer material benefit from the two flute design for aggressive chip removal and clearance, while harder materials are better suited to a coated end mill with our four flute, high strength design.

- Two flute design with positive rake and clearance for aggressive machining in easy to machine materials
- Four high strength flutes, designed with neutral rake and clearance for difficult to machine materials
- Eccentric relief for enhanced edge strength along the flute

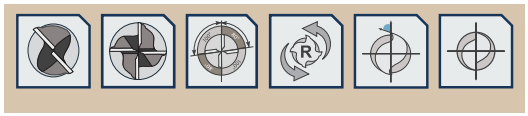


TIP & END

SHANK & LENGTH



FLUTE CONFIGURATION



MATERIAL

COATING

SERIES CF40D - *40 DEGREE, VARYING LENGTHS*

ANGLE PER SIDE (A)	TIP DIAMETER (D2)	SHANK DIAMETER (D1)		FLUTE LENGTH (L2)	OVERALL LENGTH (L1)		# OF FLUTES	UNCOATED PART #	UNCOATED EDP #	ALTIN/SI3N4 COATED PART #	ALTIN/SI3N4 COATED EDP #
40°	0.010	1/4	0.250	0.149	2 1/2	2.500	2	CF2-4004	7X010	CF2-4004-C4	7X030
	0.010	3/8	0.375	0.223	2 1/2	2.500		CF2-4006	7X020	CF2-4006-C4	7X040
40°	0.010	1/4	0.250	0.149	2 1/2	2.500	4	CF4-4004	8X010	CF4-4004-C4	8X030
	0.010	3/8	0.375	0.223	2 1/2	2.500		CF4-4006	8X020	CF4-4006-C4	8X040

SERIES CF45D - *45 DEGREE, VARYING LENGTHS*

ANGLE PER SIDE (A)	TIP DIAMETER (D2)	SHANK DIAMETER (D1)		FLUTE LENGTH (L2)	OVERALL LENGTH (L1)		# OF FLUTES	UNCOATED PART #	UNCOATED EDP #	ALTIN/SI3N4 COATED PART #	ALTIN/SI3N4 COATED EDP #
45°	0.010	3/16	0.188	0.093	2	2.000	2	CF2-4503	7W010	CF2-4503-C4	7W060
	0.010	1/4	0.250	0.125	2 1/2	2.500		CF2-4504	7W020	CF2-4504-C4	7W070
	0.010	3/8	0.375	0.187	2 1/2	2.500		CF2-4506	7W030	CF2-4506-C4	7W080
	0.010	1/2	0.500	0.250	3	3.000		CF2-4508	7W040	CF2-4508-C4	7W090
	0.010	3/4	0.750	0.375	3	3.000		CF2-4512	7W050	CF2-4512-C4	7W100
45°	0.010	3/16	0.188	0.093	2	2.000	4	CF4-4503	8W010	CF4-4503-C4	8W060
	0.010	1/4	0.250	0.125	2 1/2	2.500		CF4-4504	8W020	CF4-4504-C4	8W070
	0.010	3/8	0.375	0.187	2 1/2	2.500		CF4-4506	8W030	CF4-4506-C4	8W080
	0.010	1/2	0.500	0.250	3	3.000		CF4-4508	8W040	CF4-4508-C4	8W090
	0.010	3/4	0.750	0.375	3	3.000		CF4-4512	8W050	CF4-4512-C4	8W100

SERIES CF50D - *50 DEGREE, VARYING LENGTHS*

ANGLE PER SIDE (A)	TIP DIAMETER (D2)	SHANK DIAMETER (D1)		FLUTE LENGTH (L2)	OVERALL LENGTH (L1)		# OF FLUTES	UNCOATED PART #	UNCOATED EDP #	ALTIN/SI3N4 COATED PART #	ALTIN/SI3N4 COATED EDP #
50°	0.010	1/4	0.250	0.075	2 1/2	2.500	2	CF2-5004	7A010	CF2-5004-C4	7A040
	0.010	3/8	0.375	0.112	2 1/2	2.500		CF2-5006	7A020	CF2-5006-C4	7A050
	0.010	1/2	0.500	0.150	3	3.000		CF2-5008	7A030	CF2-5008-C4	7A060
50°	0.010	1/4	0.250	0.075	2 1/2	2.500	4	CF4-5004	8A010	CF4-5004-C4	8A040
	0.010	3/8	0.375	0.112	2 1/2	2.500		CF4-5006	8A020	CF4-5006-C4	8A050
	0.010	1/2	0.500	0.150	3	3.000		CF4-5008	8A030	CF4-5008-C4	8A060

CHAMFER CUTTERS

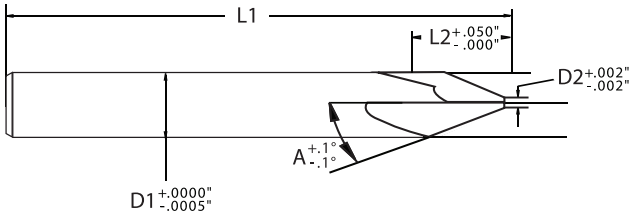
CONICAL™

SERIES CFX - *CARBIDE, 2 & 4 FLUTE, ALTIN-X COATED & UNCOATED*

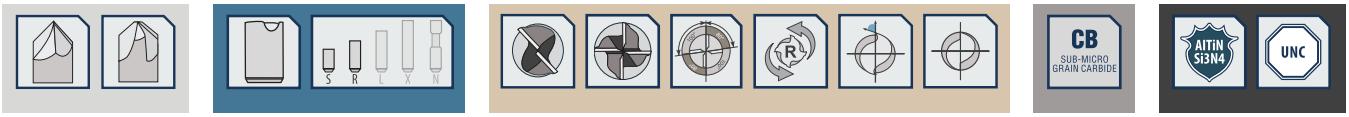
ELIMINATE COSTS

Whether performing an edge break, full chamfer, or eliminating costly hand deburring operations, this tool does the work you need done now.

- Optional coating for heat resistance, wear resistance and increased lubricity
- Premium micro-grain carbide substrate resists chipping, tool deflection, and has a high transverse rupture strength for greater feeds and speeds
- Excellent alternative to hand deburring operations



TIP & END | SHANK & LENGTH | FLUTE CONFIGURATION | MATERIAL | COATING



SERIES CF55D - *55 DEGREE, VARYING LENGTHS*

ANGLE PER SIDE (A)	TIP DIAMETER (D2)	SHANK DIAMETER (D1)		FLUTE LENGTH (L2)	OVERALL LENGTH (L1)		# OF FLUTES	UNCOATED PART #	UNCOATED EDP #	ALTIN/SI3N4 COATED PART #	ALTIN/SI3N4 COATED EDP #
55°	0.010	1/4	0.250	0.088	2 1/2	2.500	2	CF2-5504	7B010	CF2-5504-C4	7B030
	0.010	3/8	0.375	0.131	2 1/2	2.500		CF2-5506	7B020	CF2-5506-C4	7B040
55°	0.010	1/4	0.250	0.088	2 1/2	2.500	4	CF4-5504	8B010	CF4-5504-C4	8B030
	0.010	3/8	0.375	0.131	2 1/2	2.500		CF4-5506	8B020	CF4-5506-C4	8B040

SERIES CF60D - *60 DEGREE, VARYING LENGTHS*

ANGLE PER SIDE (A)	TIP DIAMETER (D2)	SHANK DIAMETER (D1)		FLUTE LENGTH (L2)	OVERALL LENGTH (L1)		# OF FLUTES	UNCOATED PART #	UNCOATED EDP #	ALTIN/SI3N4 COATED PART #	ALTIN/SI3N4 COATED EDP #
60°	0.010	3/16	0.188	0.056	2	2.000	2	CF2-6003	7C010	CF2-6003-C4	7C060
	0.010	1/4	0.250	0.075	2 1/2	2.500		CF2-6004	7C020	CF2-6004-C4	7C070
	0.010	3/8	0.375	0.112	2 1/2	2.500		CF2-6006	7C030	CF2-6006-C4	7C080
	0.010	1/2	0.500	0.150	3	3.000		CF2-6008	7C040	CF2-6008-C4	7C090
	0.010	3/4	0.750	0.225	3	3.000		CF2-6012	7C050	CF2-6012-C4	7C100
60°	0.010	3/16	0.188	0.056	2	2.000	4	CF4-6003	8C010	CF4-6003-C4	8C060
	0.010	1/4	0.250	0.075	2 1/2	2.500		CF4-6004	8C020	CF4-6004-C4	8C070
	0.010	3/8	0.375	0.112	2 1/2	2.500		CF4-6006	8C030	CF4-6006-C4	8C080
	0.010	1/2	0.500	0.150	3	3.000		CF4-6008	8C040	CF4-6008-C4	8C090
	0.010	3/4	0.750	0.225	3	3.000		CF4-6012	8C050	CF4-6012-C4	8C100

SERIES CF65D - *65 DEGREE, VARYING LENGTHS*

ANGLE PER SIDE (A)	TIP DIAMETER (D2)	SHANK DIAMETER (D1)		FLUTE LENGTH (L2)	OVERALL LENGTH (L1)		# OF FLUTES	UNCOATED PART #	UNCOATED EDP #	ALTIN/SI3N4 COATED PART #	ALTIN/SI3N4 COATED EDP #
65°	0.010	1/4	0.250	0.058	2 1/2	2.500	2	CF2-6504	7D010	CF2-6504-C4	7D030
	0.010	3/8	0.375	0.087	2 1/2	2.500		CF2-6506	7D020	CF2-6506-C4	7D040
65°	0.010	1/4	0.250	0.058	2 1/2	2.500	4	CF4-6504	8D010	CF4-6504-C4	8D030
	0.010	3/8	0.375	0.087	2 1/2	2.500		CF4-6506	8D020	CF4-6506-C4	8D040

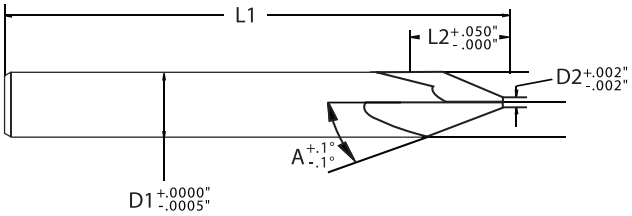
CHAMFER CUTTERS CONICAL™

SERIES CFX - *CARBIDE, 2 & 4 FLUTE, ALTIN-X COATED & UNCOATED*

IMPROVED FINISHES AND SPEEDS

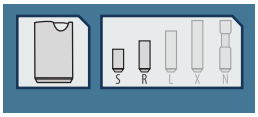
Improving the part finish and speed of operation will improve output and quality standards. Multiple configurations make the Conical Chamfer Cutter versatile in the full range of materials.

- Two flute design with positive rake and clearance for aggressive machining in easy to machine materials
- Four high strength flutes, designed with neutral rake and clearance for difficult to machine materials
- Eccentric relief for enhanced edge strength along the flute

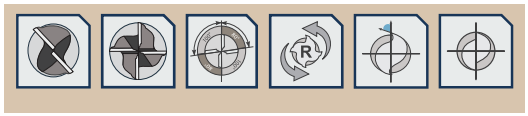


TIP & END

SHANK & LENGTH



FLUTE CONFIGURATION



MATERIAL

COATING

SERIES CF70D - *70 DEGREE, VARYING LENGTHS*

ANGLE PER SIDE (A)	TIP DIAMETER (D2)	SHANK DIAMETER (D1)		FLUTE LENGTH (L2)	OVERALL LENGTH (L1)		# OF FLUTES	UNCOATED		ALTIN/SI3N4 COATED	
								PART #	EDP #	PART #	EDP #
70°	0.010	1/4	0.250	0.046	2 1/2	2.500	2	CF2-7004	7E010	CF2-7004-C4	7E030
	0.010	3/8	0.375	0.068	2 1/2	2.500		CF2-7006	7E020	CF2-7006-C4	7E040
70°	0.010	1/4	0.250	0.046	2 1/2	2.500	4	CF4-7004	8E010	CF4-7004-C4	8E030
	0.010	3/8	0.375	0.068	2 1/2	2.500		CF4-7006	8E020	CF4-7006-C4	8E040

SERIES CF75D - *75 DEGREE, VARYING LENGTHS*

ANGLE PER SIDE (A)	TIP DIAMETER (D2)	SHANK DIAMETER (D1)		FLUTE LENGTH (L2)	OVERALL LENGTH (L1)		# OF FLUTES	UNCOATED		ALTIN/SI3N4 COATED	
								PART #	EDP #	PART #	EDP #
75°	0.010	1/4	0.250	0.033	2 1/2	2.500	2	CF2-7504	7F010	CF2-7504-C4	7F030
	0.010	3/8	0.375	0.050	2 1/2	2.500		CF2-7506	7F020	CF2-7506-C4	7F040
75°	0.010	1/4	0.250	0.033	2 1/2	2.500	4	CF4-7504	8F010	CF4-7504-C4	8F030
	0.010	3/8	0.375	0.050	2 1/2	2.500		CF4-7506	8F020	CF4-7506-C4	8F040

CFX APPLICATION GUIDE • SPEED & FEED

	WORK MATERIAL	TYPE OF CUT	AXIAL DOC	RADIAL DOC	FLUTES	SPEED (SFM)	FEED (INCHES PER TOOTH) BASED ON EFFECTIVE CUTTING DIAMETER						
							1/64" (2 & 4 FL)	1/32" (2 & 4 FL)	1/16" (2 & 4 FL)	1/8" (2 & 4 FL)	1/4" (2 & 4 FL)	3/8" (2 & 4 FL)	1/2" (2 & 4 FL)
ALUMINUM	ALUMINUM ALLOYS Low Silicon Content 20xx; 50xx; 60xx; 70xx	Edge Break	1 x D	.3 x D	2 / 4	805 - 1045	0.00013 - 0.00018	0.00025 - 0.00035	0.00047 - 0.00062	0.00106 - 0.00131	0.00206 - 0.00246	0.00322 - 0.00387	0.00425 - 0.00525
		Full Chamfer	1 x D	.1 x D	2 / 4	725 - 940	0.00009 - 0.00014	0.00017 - 0.00027	0.00032 - 0.00047	0.00077 - 0.00102	0.00148 - 0.00188	0.00233 - 0.00298	0.00307 - 0.00407
	ALUMINUM DIE CAST ALLOY High Silicon Content A-38x; A-39x; B39x	Edge Break	1 x D	.3 x D	2 / 4	595 - 770	0.00016 - 0.00021	0.00031 - 0.00041	0.00057 - 0.00072	0.00127 - 0.00152	0.00249 - 0.00289	0.00389 - 0.00454	0.00514 - 0.00614
		Full Chamfer	1 x D	.1 x D	2 / 4	535 - 690	0.00013 - 0.00018	0.00025 - 0.00035	0.00047 - 0.00062	0.00106 - 0.00131	0.00206 - 0.00246	0.00322 - 0.00387	0.00425 - 0.00525
NONFERROUS	MAGNESIUM ALLOYS ≤ 38 HRc	Edge Break	1 x D	.3 x D	2 / 4	1275 - 1650	0.00018 - 0.00023	0.00035 - 0.00045	0.00065 - 0.00080	0.00142 - 0.00167	0.00278 - 0.00318	0.00434 - 0.00499	0.00574 - 0.00674
		Full Chamfer	1 x D	.1 x D	2 / 4	1145 - 1485	0.00015 - 0.00020	0.00029 - 0.00039	0.00054 - 0.00069	0.00120 - 0.00145	0.00235 - 0.00275	0.00367 - 0.00432	0.00485 - 0.00585
	COPPER ALLOYS, BRASS, BRONZE 39 to 48 HRc Manganese Bronze, Tin Bronze, Beryllium Copper	Edge Break	1 x D	.3 x D	2 / 4	380 - 495	0.00014 - 0.00019	0.00027 - 0.00037	0.00050 - 0.00065	0.00113 - 0.00138	0.00220 - 0.00260	0.00345 - 0.00410	0.00455 - 0.00555
		Full Chamfer	1 x D	.1 x D	2 / 4	340 - 445	0.00008 - 0.00013	0.00015 - 0.00025	0.00029 - 0.00044	0.00070 - 0.00095	0.00134 - 0.00174	0.00211 - 0.00276	0.00277 - 0.00377
	COMPOSITES, PLASTICS & FIBERGLASS ABS, Polycarbonate, PVC, Polypropylene	Edge Break	1 x D	.3 x D	2 / 4	645 - 835	0.00013 - 0.00018	0.00025 - 0.00035	0.00047 - 0.00062	0.00106 - 0.00131	0.00206 - 0.00246	0.00322 - 0.00387	0.00425 - 0.00525
		Full Chamfer	1 x D	.1 x D	2 / 4	580 - 750	0.00008 - 0.00013	0.00015 - 0.00025	0.00029 - 0.00044	0.00070 - 0.00095	0.00134 - 0.00174	0.00211 - 0.00276	0.00277 - 0.00377
CARBON STEEL	LOW CARBON STEELS ≤ 38 HRc 10xx; 11xx; 12xx; 12Lxx, 15xx	Edge Break	1 x D	.3 x D	2 / 4	510 - 660	0.00007 - 0.00012	0.00013 - 0.00023	0.00025 - 0.00040	0.00062 - 0.00087	0.00120 - 0.00160	0.00188 - 0.00253	0.00247 - 0.00347c
		Full Chamfer	1 x D	.1 x D	2 / 4	455 - 590	0.00004 - 0.00009	0.00007 - 0.00017	0.00014 - 0.00029	0.00041 - 0.00066	0.00076 - 0.00116	0.00121 - 0.00186	0.00158 - 0.00258
	MEDIUM CARBON STEELS ≤ 38 HRc 13xx; 41xx; 43xx; 86xx, 92xx; 93xx; Chromoly	Edge Break	1 x D	.3 x D	2 / 4	170 - 220	0.00006 - 0.00011	0.00011 - 0.00021	0.00021 - 0.00036	0.00055 - 0.00080	0.00105 - 0.00145	0.00166 - 0.00231	0.00217 - 0.00317
		Full Chamfer	1 x D	.1 x D	2 / 4	150 - 195	0.00003 - 0.00008	0.00006 - 0.00016	0.00012 - 0.00027	0.00037 - 0.00062	0.00069 - 0.00109	0.00110 - 0.00175	0.00143 - 0.00243
TOOL STEEL	TOOL & DIE STEELS ≤ 38 HRc A2; A3; D2; H11; H13; M1; O-1; S-7; NAK 55	Edge Break	1 x D	.3 x D	2 / 4	170 - 220	0.00007 - 0.00012	0.00013 - 0.00023	0.00025 - 0.00040	0.00062 - 0.00087	0.00120 - 0.00160	0.00188 - 0.00253	0.00247 - 0.00347
		Full Chamfer	1 x D	.1 x D	2 / 4	150 - 195	0.00004 - 0.00009	0.00007 - 0.00017	0.00014 - 0.00029	0.00041 - 0.00066	0.00076 - 0.00116	0.00121 - 0.00186	0.00158 - 0.00258
	TOOL & DIE STEELS 39 to 48 HRc P20; P21; S-136; PX-5; NAK 80	Edge Break	1 x D	.3 x D	2 / 4	125 - 165	0.00003 - 0.00008	0.00005 - 0.00015	0.00011 - 0.00026	0.00034 - 0.00059	0.00062 - 0.00102	0.00099 - 0.00164	0.00128 - 0.00228
		Full Chamfer	1 x D	.1 x D	2 / 4	110 - 145	0.00001 - 0.00006	0.00002 - 0.00012	0.00005 - 0.00020	0.00023 - 0.00048	0.00040 - 0.00080	0.00066 - 0.00131	0.00084 - 0.00184
HARDENED STEEL	HARDENED STEELS 48 to 57 HRc	Edge Break	1 x D	.3 x D	2 / 4	85 - 110	0.00006 - 0.00011	0.00011 - 0.00021	0.00021 - 0.00036	0.00055 - 0.00080	0.00105 - 0.00145	0.00166 - 0.00231	0.00217 - 0.00317
		Full Chamfer	1 x D	.1 x D	2 / 4	75 - 95	0.00003 - 0.00008	0.00006 - 0.00016	0.00012 - 0.00027	0.00037 - 0.00062	0.00069 - 0.00109	0.00110 - 0.00175	0.00143 - 0.00243
	HARDENED STEELS 58 to 65HRc	Edge Break	1 x D	.3 x D	2 / 4	75 - 95	0.00003 - 0.00008	0.00005 - 0.00015	0.00011 - 0.00026	0.00034 - 0.00059	0.00062 - 0.00102	0.00099 - 0.00164	0.00128 - 0.00228
		Full Chamfer	1 x D	.1 x D	2 / 4	65 - 85	0.00001 - 0.00006	0.00002 - 0.00012	0.00005 - 0.00020	0.00023 - 0.00048	0.00040 - 0.00080	0.00066 - 0.00131	0.00084 - 0.00184
STAINLESS STEEL	EASY TO MACHINE 72 - 85 HRb 410; 416; 420; 430F; 440C; 302; 303	Edge Break	1 x D	.3 x D	2 / 4	380 - 495	0.00007 - 0.00012	0.00013 - 0.00023	0.00025 - 0.00040	0.00062 - 0.00087	0.00120 - 0.00160	0.00188 - 0.00253	0.00247 - 0.00347
		Full Chamfer	1 x D	.1 x D	2 / 4	340 - 445	0.00004 - 0.00009	0.00007 - 0.00017	0.00014 - 0.00029	0.00041 - 0.00066	0.00076 - 0.00116	0.00121 - 0.00186	0.00158 - 0.00258
	MODERATELY DIFFICULT 79 - 85 HRb; 25 - 41 HRc 304; 304L; 316; 316L; 320; 321; 347; Invar 36; Kovar	Edge Break	1 x D	.3 x D	2 / 4	170 - 220	0.00006 - 0.00011	0.00011 - 0.00021	0.00021 - 0.00036	0.00055 - 0.00080	0.00105 - 0.00145	0.00166 - 0.00231	0.00217 - 0.00317
		Full Chamfer	1 x D	.1 x D	2 / 4	150 - 195	0.00003 - 0.00008	0.00006 - 0.00016	0.00012 - 0.00027	0.00037 - 0.00062	0.00069 - 0.00109	0.00110 - 0.00175	0.00143 - 0.00243
	DIFFICULT TO MACHINE 31 - 50 HRc 13-8 PH; 15-5 PH; 17-4 PH; Carpenter; Custo 465; Invar	Edge Break	1 x D	.3 x D	2 / 4	125 - 165	0.00004 - 0.00009	0.00007 - 0.00017	0.00014 - 0.00029	0.00041 - 0.00066	0.00076 - 0.00116	0.00121 - 0.00186	0.00158 - 0.00258
		Full Chamfer	1 x D	.1 x D	2 / 4	110 - 145	0.00001 - 0.00006	0.00002 - 0.00012	0.00005 - 0.00020	0.00023 - 0.00048	0.00040 - 0.00080	0.00066 - 0.00131	0.00084 - 0.00184
CAST IRON	GRAY 100 - 200 HRb	Edge Break	1 x D	.3 x D	2 / 4	425 - 550	0.00007 - 0.00012	0.00013 - 0.00023	0.00025 - 0.00040	0.00062 - 0.00087	0.00120 - 0.00160	0.00188 - 0.00253	0.00247 - 0.00347
		Full Chamfer	1 x D	.1 x D	2 / 4	380 - 495	0.00004 - 0.00009	0.00007 - 0.00017	0.00014 - 0.00029	0.00041 - 0.00066	0.00076 - 0.00116	0.00121 - 0.00186	0.00158 - 0.00258
	DUCTILE 150 - 300 HRb	Edge Break	1 x D	.3 x D	2 / 4	380 - 495	0.00007 - 0.00012	0.00013 - 0.00023	0.00025 - 0.00040	0.00062 - 0.00087	0.00120 - 0.00160	0.00188 - 0.00253	0.00247 - 0.00347
		Full Chamfer	1 x D	.1 x D	2 / 4	340 - 445	0.00004 - 0.00009	0.00007 - 0.00017	0.00014 - 0.00029	0.00041 - 0.00066	0.00076 - 0.00116	0.00121 - 0.00186	0.00158 - 0.00258
	MALLEABLE 150 - 310 HRb	Edge Break	1 x D	.3 x D	2 / 4	315 - 410	0.00006 - 0.00011	0.00011 - 0.00021	0.00021 - 0.00036	0.00055 - 0.00080	0.00105 - 0.00145	0.00166 - 0.00231	0.00217 - 0.00317
		Full Chamfer	1 x D	.1 x D	2 / 4	285 - 370	-0.00003 - 0.00003	-0.00005 - 0.00005	-0.00008 - 0.00008	-0.00003 - 0.00023	-0.00010 - 0.00030	-0.00013 - 0.00053	-0.00020 - 0.00080
ALLOYS	TITANIUM ALLOYS 70 - 100 HRb; 25 - 36 HRc Ti61AL4V; Grades 5-38	Edge Break	1 x D	.3 x D	2 / 4	100 - 130	0.00003 - 0.00008	0.00005 - 0.00015	0.00011 - 0.00026	0.00034 - 0.00059	0.00062 - 0.00102	0.00099 - 0.00164	0.00128 - 0.00228
		Full Chamfer	1 x D	.1 x D	2 / 4	90 - 115	0.00001 - 0.00006	0.00002 - 0.00012	0.00005 - 0.00020	0.00023 - 0.00048	0.00040 - 0.00080	0.00066 - 0.00131	0.00084 - 0.00184
	HIGH TEMP ALLOYS 83 - 99 HRb; 30 - 52 HRc Inconel; Monel; A286; Rene; Stelite; Haynes; Waspalloy	Edge Break	1 x D	.3 x D	2 / 4	55 - 75	0.00003 - 0.00008	0.00005 - 0.00015	0.00011 - 0.00026	0.00034 - 0.00059	0.00062 - 0.00102	0.00099 - 0.00164	0.00128 - 0.00228
		Full Chamfer	1 x D	.1 x D	2 / 4	50 - 65	0.00001 - 0.00006	0.00002 - 0.00012	0.00005 - 0.00020	0.00023 - 0.00048	0.00040 - 0.00080	0.00066 - 0.00131	0.00084 - 0.00184