VALOR™ HOLEMAKING

Product Table: High Performance Chamfer Cutters - Helically Fluted
Characteristics: 5 Flute

Product Notes:
Due to a varying diameter, an Effective Cutter Diameter is needed for Chip Load selection and RPM calculation:
Effective Cutter Diameter = (Major Diameter + Minor Diameter)/2.
Or consider the actual diameter along the angle that is engaged with the workpiece.

Depth of Cut is shown as number of Passes with each pass resulting in a descending stepover

Chip Loads are given 3 ways:
Traditional Edge Break of .010"-.015"
Full Chamfer engagement for cutters with angles GREATER than 25° per side (50° included)
Full Chamfer engagement for cutters with angles LESS than 25° per side (50° included)

Chip Loads within table pertain to machining on one side of workpiece.
For machining on two sides, reduce Chip Loads to 60%-80% depending on contact length and finish
For vertical plunging, reduce Chip Loads to 40%-50% depending on finish

Material Guide		Hardness	SFM	Operation	Chip Load (IPT) By Effective Cutter Diameter												Depth of Cut
					1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	Passes
Carbon Steel	10XX, 11XX, 12XX, 12LXX, ASTM A27, ASTM A36	29-37 Rc (279-344 HBn)	600	Edge Break	.00026	.00033	.00039	.00052	.00078	.00104	.00130	.00156	.00209	.00261	.00313	.00417	1
				Full Chamfer (≥ 25°)	.00022	.00027	.00032	.00043	.00065	.00087	.00109	.00130	.00174	.00217	.00261	.00348	3
				Full Chamfer (< 25°)	.00016	.00020	.00024	.00033	.00049	.00065	.00081	.00098	.00130	.00163	.00196	.00261	4
Low Alloy Steel	13XX, 41XX, 43XX, 51XX, 86XX, 93XX	29-37 Rc (279-344 HBn)	200	Edge Break	.00028	.00036	.00042	.00057	.00085	.00114	.00142	.00171	.00228	.00285	.00342	.00456	1
				Full Chamfer (≥ 25°)	.00024	.00030	.00035	.00048	.00071	.00095	.00119	.00143	.00190	.00238	.00285	.00380	3
				Full Chamfer (< 25°)	.00018	.00022	.00027	.00036	.00053	.00071	.00089	.00107	.00143	.00178	.00214	.00285	4
Tool Steel	A, L, O, P, W series	29-37 Rc (279-344 HBn)	200	Edge Break	.00026	.00033	.00039	.00052	.00078	.00104	.00130	.00156	.00209	.00261	.00313	.00417	1
				Full Chamfer (≥ 25°)	.00022	.00027	.00032	.00043	.00065	.00087	.00109	.00130	.00174	.00217	.00261	.00348	3
				Full Chamfer (< 25°)	.00016	.00020	.00024	.00033	.00049	.00065	.00081	.00098	.00130	.00163	.00196	.00261	4
		38-45 Rc (353-421 HBn)	100	Edge Break	.00026	.00033	.00039	.00052	.00078	.00104	.00130	.00156	.00209	.00261	.00313	.00417	1
				Full Chamfer (≥ 25°)	.00022	.00027	.00032	.00043	.00065	.00087	.00109	.00130	.00174	.00217	.00261	.00348	4
				Full Chamfer (< 25°)	.00016	.00020	.00024	.00033	.00049	.00065	.00081	.00098	.00130	.00163	.00196	.00261	5
	D, H, M, T, S series	29-37 Rc (279-344 HBn)	150	Edge Break	.00016	.00020	.00024	.00033	.00049	.00065	.00081	.00098	.00130	.00163	.00196	.00261	1
				Full Chamfer (≥ 25°)	.00013	.00017	.00020	.00027	.00041	.00054	.00068	.00082	.00109	.00136	.00163	.00217	3
				Full Chamfer (< 25°)	.00010	.00013	.00015	.00020	.00030	.00041	.00051	.00061	.00082	.00102	.00122	.00163	4
		38-45 Rc (353-421 HBn)	75	Edge Break	.00016	.00020	.00024	.00033	.00049	.00065	.00081	.00098	.00130	.00163	.00196	.00261	1
				Full Chamfer (≥ 25°)	.00013	.00017	.00020	.00027	.00041	.00054	.00068	.00082	.00109	.00136	.00163	.00217	4
				Full Chamfer (< 25°)	.00010	.00013	.00015	.00020	.00030	.00041	.00051	.00061	.00082	.00102	.00122	.00163	5
Austenitic Stainless Steel	Nitronic 50, Nitronic 60, 301, 303, 304, 304L, Incoloy 27-7MO, 316, 316L, 321, 347	29-37 Rc (279-344 HBn)	450	Edge Break	.00028	.00036	.00042	.00057	.00085	.00114	.00142	.00171	.00228	.00285	.00342	.00456	1
				Full Chamfer (≥ 25°)	.00024	.00030	.00035	.00048	.00071	.00095	.00119	.00143	.00190	.00238	.00285	.00380	3
				Full Chamfer (< 25°)	.00018	.00022	.00027	.00036	.00053	.00071	.00089	.00107	.00143	.00178	.00214	.00285	4
Martensitic & Ferritic Stainless Steel	403, 410, 416, 420, 440, 430, 446	29-37 Rc (279-344 HBn)	200	Edge Break	.00026	.00033	.00039	.00052	.00078	.00104	.00130	.00156	.00209	.00261	.00313	.00417	1
				Full Chamfer (≥ 25°)	.00022	.00027	.00032	.00043	.00065	.00087	.00109	.00130	.00174	.00217	.00261	.00348	3
				Full Chamfer (< 25°)	.00016	.00020	.00024	.00033	.00049	.00065	.00081	.00098	.00130	.00163	.00196	.00261	4
		38-45 Rc (353-421 HBn)	100	Edge Break	.00026	.00033	.00039	.00052	.00078	.00104	.00130	.00156	.00209	.00261	.00313	.00417	1
				Full Chamfer (≥ 25°)	.00022	.00027	.00032	.00043	.00065	.00087	.00109	.00130	.00174	.00217	.00261	.00348	4
				Full Chamfer (< 25°)	.00016	.00020	.00024	.00033	.00049	.00065	.00081	.00098	.00130	.00163	.00196	.00261	5
PH Stainless Steel	15-5, 17-4, Carpenter 450, Carpenter 465	29-37 Rc (279-344 HBn)	150	Edge Break	.00016	.00020	.00024	.00033	.00049	.00065	.00081	.00098	.00130	.00163	.00196	.00261	1
				Full Chamfer (≥ 25°)	.00013	.00017	.00020	.00027	.00041	.00054	.00068	.00082	.00109	.00136	.00163	.00217	3
				Full Chamfer (< 25°)	.00010	.00013	.00015	.00020	.00030	.00041	.00051	.00061	.00082	.00102	.00122	.00163	4
		38-45 Rc (353-421 HBn)	90	Edge Break	.00016	.00020	.00024	.00033	.00049	.00065	.00081	.00098	.00130	.00163	.00196	.00261	1
				Full Chamfer (≥ 25°)	.00013	.00017	.00020	.00027	.00041	.00054	.00068	.00082	.00109	.00136	.00163	.00217	4
				Full Chamfer (< 25°)	.00010	.00013	.00015	.00020	.00030	.00041	.00051	.00061	.00082	.00102	.00122	.00163	5
Nickel Alloy	Hastelloy C-22, Inconel 625, Waspaloy, René 41, Inconel 718, Incoloy 20	29-37 Rc (279-344 HBn)	70	Edge Break	.00016	.00020	.00024	.00033	.00049	.00065	.00081	.00098	.00130	.00163	.00196	.00261	1
				Full Chamfer (≥ 25°)	.00013	.00017	.00020	.00027	.00041	.00054	.00068	.00082	.00109	.00136	.00163	.00217	3
				Full Chamfer (< 25°)	.00010	.00013	.00015	.00020	.00030	.00041	.00051	.00061	.00082	.00102	.00122	.00163	4
		38-45 Rc (353-421 HBn)	50	Edge Break	.00016	.00020	.00024	.00033	.00049	.00065	.00081	.00098	.00130	.00163	.00196	.00261	1
				Full Chamfer (≥ 25°)	.00013	.00017	.00020	.00027	.00041	.00054	.00068	.00082	.00109	.00136	.00163	.00217	4
				Full Chamfer (< 25°)	.00010	.00013	.00015	.00020	.00030	.00041	.00051	.00061	.00082	.00102	.00122	.00163	5
Titanium Alloy	Ti 3Al-2.5V, Ti 6Al-4V, Ti 10V-2Fe-3Al	29-37 Rc (279-344 HBn)	150	Edge Break	.00016	.00020	.00024	.00033	.00049	.00065	.00081	.00098	.00130	.00163	.00196	.00261	1
				Full Chamfer (≥ 25°)	.00013	.00017	.00020	.00027	.00041	.00054	.00068	.00082	.00109	.00136	.00163	.00217	3
				Full Chamfer (< 25°)	.00010	.00013	.00015	.00020	.00030	.00041	.00051	.00061	.00082	.00102	.00122	.00163	4
		38-45 Rc (353-421 HBn)	75	Edge Break	.00016	.00020	.00024	.00033	.00049	.00065	.00081	.00098	.00130	.00163	.00196	.00261	1
				Full Chamfer (≥ 25°)	.00013	.00017	.00020	.00027	.00041	.00054	.00068	.00082	.00109	.00136	.00163	.00217	4
				Full Chamfer (< 25°)	.00010	.00013	.00015	.00020	.00030	.00041	.00051	.00061	.00082	.00102	.00122	.00163	5
Wrought Aluminum Alloy	2014, 5062, 6061, 7050, 7075, 7475	≤ 28 Rc (≤ 271 HBn)	1000	Edge Break	.00075	.00094	.00112	.00151	.00226	.00302	.00377	.00453	.00604	.00755	.00906	.01208	1
				Full Chamfer (≥ 25°)	.00062	.00078	.00094	.00126	.00188	.00252	.00314	.00377	.00503	.00629	.00755	.01006	2
				Full Chamfer (< 25°)	.00047	.00059	.00070	.00094	.00141	.00189	.00235	.00283	.00377	.00472	.00566	.00755	3
	5% - 8% Si (4XXX)		1000	Edge Break	.00067	.00085	.00101	.00136	.00203	.00272	.00339	.00408	.00543	.00679	.00815	.01087	1
	8% - 12% Si (4XXX)		800	Full Chamfer (≥ 25°)	.00056	.00071	.00084	.00113	.00169	.00226	.00283	.00340	.00453	.00566	.00679	.00906	2
				Full Chamfer (< 25°)	.00042	.00053	.00063	.00085	.00127	.00170	.00212	.00255	.00340	.00425	.00509	.00679	3
Cast Aluminum Alloy	319.0, 328.0, 355.0, 360.0, 380.0, 383.0, 390.0, 520.0, 535.0	≤ 28 Rc (≤ 271 HBn)	750	Edge Break	.00075	.00094	.00112	.00151	.00226	.00302	.00377	.00453	.00604	.00755	.00906	.01208	1
				Full Chamfer (≥ 25°)	.00062	.00078	.00094	.00126	.00188	.00252	.00314	.00377	.00503	.00629	.00755	.01006	2
				Full Chamfer (< 25°)	.00047	.00059	.00070	.00094	.00141	.00189	.00235	.00283	.00377	.00472	.00566	.00755	3
	3% - 5% Si (3XX, A3XX, C3XX, 4XX, A4XX, B4XX)		750	Edge Break	.00067	.00085	.00101	.00136	.00203	.00272	.00339	.00408	.00543	.00679	.00815	.01087	1
	5% - 8% Si (3XX, A3XX, C3XX, 4XX, A4XX, B4XX)		700	Full Chamfer (≥ 25°)	.00056	.00071	.00084	.00113	.00169	.00226	.00283	.00340	.00453	.00566	.00679	.00906	2
	8% - 12% Si (3XX, A3XX, C3XX, 4XX, A4XX, B4XX)		650														
	12% - 16% Si (3XX, A3XX, C3XX, 4XX, A4XX, B4XX)		475	Full Chamfer (< 25°)	.00042	.00053	.00063	.00085	.00127	.00170	.00212	.00255	.00340	.00425	.00509	.00679	3
Copper Alloy	Cu-ETP, CuBe2, CuZn30, CuZn36Pb3, CuZn10, CuSn5	≤ 28 Rc (≤ 271 HBn)	225-500	Edge Break	.00060	.00075	.00090	.00121	.00181	.00242	.00301	.00362	.00483	.00604	.00725	.00966	1
				Full Chamfer (≥ 25°)	.00050	.00063	.00075	.00101	.00151	.00201	.00251	.00302	.00403	.00503	.00604	.00805	2
				Full Chamfer (< 25°)	.00037	.00047	.00056	.00075	.00113	.00151	.00188	.00226	.00302	.00377	.00453	.00604	3
Magnesium Alloys		≤ 28 Rc (≤ 271 HBn)	1500	Edge Break	.00075	.00094	.00112	.00151	.00226	.00302	.00377	.00453	.00604	.00755	.00906	.01208	1
Zinc Alloys			800	Full Chamfer (≥ 25°)	.00062	.00078	.00094	.00126	.00188	.00252	.00314	.00377	.00503	.00629	.00755	.01006	2
				Full Chamfer (< 25°)	.00047	.00059	.00070	.00094	.00141	.00189	.00235	.00283	.00377	.00472	.00566	.00755	3

General Notes:
All posted speed and feed parameters are suggested starting values that may be increased given optimal setup conditions. Chip loads reflect uncoated cutters and may be increased 10%-20% if coated. For ferrous materials with hardness ≤ 28 Rc, chip loads can be increased 10%-20%.
If you require additional information, Valor Holemaking has a team of technical experts available to assist you through even the most challenging applications. Please contact us at **866-840-1505** or **Valortech@harveyperformance.com**.