VALOR™ HOLEMAKING

Product Table: High Performance Chamfer Cutters - Straight Fluted
Characteristics: 3 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
					1/64	1/32	3/64	1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	1/2	Passes
Carbon Steel	10XX, 11XX, 12XX, 12LXX, ASTM A27, ASTM A36	29-37 Rc (279-344 HBn)	600	Edge Break	.00008	.00016	.00024	.00032	.00040	.00047	.00064	.00095	.00128	.00159	.00191	.00255	1
				Full Chamfer (≥ 25°)	.00006	.00013	.00020	.00026	.00033	.00040	.00053	.00080	.00106	.00133	.00159	.00213	3
				Full Chamfer (< 25°)	.00005	.00010	.00015	.00020	.00025	.00030	.00040	.00060	.00080	.00100	.00120	.00159	4
Low Alloy Steel	13XX, 41XX, 43XX, 51XX, 86XX, 93XX	29-37 Rc (279-344 HBn)	200	Edge Break	.00007	.00014	.00022	.00029	.00036	.00043	.00058	.00087	.00117	.00146	.00175	.00233	1
				Full Chamfer (≥ 25°)	.00006	.00012	.00018	.00024	.00030	.00036	.00049	.00073	.00097	.00121	.00146	.00194	3
				Full Chamfer (< 25°)	.00004	.00009	.00014	.00018	.00023	.00027	.00036	.00055	.00073	.00091	.00109	.00146	4
Tool Steel	A, L, O, P, W series	29-37 Rc (279-344 HBn)	200	Edge Break	.00007	.00014	.00022	.00029	.00036	.00043	.00058	.00087	.00117	.00146	.00175	.00233	1
				Full Chamfer (≥ 25°)	.00006	.00012	.00018	.00024	.00030	.00036	.00049	.00073	.00097	.00121	.00146	.00194	3
				Full Chamfer (< 25°)	.00004	.00009	.00014	.00018	.00023	.00027	.00036	.00055	.00073	.00091	.00109	.00146	4
		38-45 Rc (353-421 HBn)	100	Edge Break	.00007	.00014	.00022	.00029	.00036	.00043	.00058	.00087	.00117	.00146	.00175	.00233	1
				Full Chamfer (≥ 25°)	.00006	.00012	.00018	.00024	.00030	.00036	.00049	.00073	.00097	.00121	.00146	.00194	4
				Full Chamfer (< 25°)	.00004	.00009	.00014	.00018	.00023	.00027	.00036	.00055	.00073	.00091	.00109	.00146	5
	D, H, M, T, S series	29-37 Rc (279-344 HBn)	150	Edge Break	.00004	.00009	.00014	.00018	.00023	.00027	.00036	.00055	.00073	.00091	.00109	.00146	1
				Full Chamfer (≥ 25°)	.00004	.00008	.00011	.00015	.00019	.00023	.00030	.00045	.00061	.00076	.00091	.00122	3
				Full Chamfer (< 25°)	.00003	.00006	.00009	.00011	.00014	.00017	.00023	.00034	.00046	.00057	.00068	.00091	4
		38-45 Rc (353-421 HBn)	75	Edge Break	.00004	.00009	.00014	.00018	.00023	.00027	.00036	.00055	.00073	.00091	.00109	.00146	1
				Full Chamfer (≥ 25°)	.00004	.00008	.00011	.00015	.00019	.00023	.00030	.00045	.00061	.00076	.00091	.00122	4
				Full Chamfer (< 25°)	.00003	.00006	.00009	.00011	.00014	.00017	.00023	.00034	.00046	.00057	.00068	.00091	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	.00008	.00016	.00024	.00032	.00040	.00047	.00064	.00095	.00128	.00159	.00191	.00255	1
				Full Chamfer (≥ 25°)	.00006	.00013	.00020	.00026	.00033	.00040	.00053	.00080	.00106	.00133	.00159	.00213	3
				Full Chamfer (< 25°)	.00005	.00010	.00015	.00020	.00025	.00030	.00040	.00060	.00080	.00100	.00120	.00159	4
Martensitic & Ferritic Stainless Steel	403, 410, 416, 420, 440, 430, 446	29-37 Rc (279-344 HBn)	200	Edge Break	.00007	.00014	.00022	.00029	.00036	.00043	.00058	.00087	.00117	.00146	.00175	.00233	1
				Full Chamfer (≥ 25°)	.00006	.00012	.00018	.00024	.00030	.00036	.00049	.00073	.00097	.00121	.00146	.00194	3
				Full Chamfer (< 25°)	.00004	.00009	.00014	.00018	.00023	.00027	.00036	.00055	.00073	.00091	.00109	.00146	4
		38-45 Rc (353-421 HBn)	100	Edge Break	.00007	.00014	.00022	.00029	.00036	.00043	.00058	.00087	.00117	.00146	.00175	.00233	1
				Full Chamfer (≥ 25°)	.00006	.00012	.00018	.00024	.00030	.00036	.00049	.00073	.00097	.00121	.00146	.00194	4
				Full Chamfer (< 25°)	.00004	.00009	.00014	.00018	.00023	.00027	.00036	.00055	.00073	.00091	.00109	.00146	5
PH Stainless Steel	15-5, 17-4, Carpenter 450, Carpenter 465	29-37 Rc (279-344 HBn)	150	Edge Break	.00004	.00009	.00014	.00018	.00023	.00027	.00036	.00055	.00073	.00091	.00109	.00146	1
				Full Chamfer (≥ 25°)	.00004	.00008	.00011	.00015	.00019	.00023	.00030	.00045	.00061	.00076	.00091	.00122	3
				Full Chamfer (< 25°)	.00003	.00006	.00009	.00011	.00014	.00017	.00023	.00034	.00046	.00057	.00068	.00091	4
		38-45 Rc (353-421 HBn)	90	Edge Break	.00004	.00009	.00014	.00018	.00023	.00027	.00036	.00055	.00073	.00091	.00109	.00146	1
				Full Chamfer (≥ 25°)	.00004	.00008	.00011	.00015	.00019	.00023	.00030	.00045	.00061	.00076	.00091	.00122	4
				Full Chamfer (< 25°)	.00003	.00006	.00009	.00011	.00014	.00017	.00023	.00034	.00046	.00057	.00068	.00091	5
Nickel Alloy	Hastelloy C-22, Inconel 625, Waspaloy, René 41, Inconel 718, Incoloy 20	29-37 Rc (279-344 HBn)	70	Edge Break	.00004	.00009	.00014	.00018	.00023	.00027	.00036	.00055	.00073	.00091	.00109	.00146	1
				Full Chamfer (≥ 25°)	.00004	.00008	.00011	.00015	.00019	.00023	.00030	.00045	.00061	.00076	.00091	.00122	3
				Full Chamfer (< 25°)	.00003	.00006	.00009	.00011	.00014	.00017	.00023	.00034	.00046	.00057	.00068	.00091	4
		38-45 Rc (353-421 HBn)	50	Edge Break	.00004	.00009	.00014	.00018	.00023	.00027	.00036	.00055	.00073	.00091	.00109	.00146	1
				Full Chamfer (≥ 25°)	.00004	.00008	.00011	.00015	.00019	.00023	.00030	.00045	.00061	.00076	.00091	.00122	4
				Full Chamfer (< 25°)	.00003	.00006	.00009	.00011	.00014	.00017	.00023	.00034	.00046	.00057	.00068	.00091	5
Titanium Alloy	Ti 3Al-2.5V, Ti 6Al-4V, Ti 10V-2Fe-3Al	29-37 Rc (279-344 HBn)	150	Edge Break	.00004	.00009	.00014	.00018	.00023	.00027	.00036	.00055	.00073	.00091	.00109	.00146	1
				Full Chamfer (≥ 25°)	.00004	.00008	.00011	.00015	.00019	.00023	.00030	.00045	.00061	.00076	.00091	.00122	3
				Full Chamfer (< 25°)	.00003	.00006	.00009	.00011	.00014	.00017	.00023	.00034	.00046	.00057	.00068	.00091	4
		38-45 Rc (353-421 HBn)	75	Edge Break	.00004	.00009	.00014	.00018	.00023	.00027	.00036	.00055	.00073	.00091	.00109	.00146	1
				Full Chamfer (≥ 25°)	.00004	.00008	.00011	.00015	.00019	.00023	.00030	.00045	.00061	.00076	.00091	.00122	4
				Full Chamfer (< 25°)	.00003	.00006	.00009	.00011	.00014	.00017	.00023	.00034	.00046	.00057	.00068	.00091	5
Wrought Aluminum Alloy	2014, 5062, 6061, 7050, 7075, 7475	≤ 28 Rc (≤ 271 HBn)	750	Edge Break	.00020	.00042	.00063	.00084	.00105	.00126	.00169	.00252	.00338	.00421	.00506	.00675	1
				Full Chamfer (≥ 25°)	.00017	.00035	.00053	.00070	.00088	.00105	.00141	.00210	.00281	.00351	.00422	.00563	2
				Full Chamfer (< 25°)	.00013	.00026	.00040	.00052	.00066	.00078	.00105	.00158	.00211	.00263	.00316	.00422	3
	5% - 8% Si (4XXX)		1000	Edge Break	.00020	.00042	.00063	.00084	.00105	.00126	.00169	.00252	.00338	.00421	.00506	.00675	1
	8% - 12% Si (4XXX)			Full Chamfer (≥ 25°)	.00017	.00035	.00053	.00070	.00088	.00105	.00141	.00210	.00281	.00351	.00422	.00563	2
				Full Chamfer (< 25°)	.00013	.00026	.00040	.00052	.00066	.00078	.00105	.00158	.00211	.00263	.00316	.00422	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	.00018	.00038	.00057	.00075	.00095	.00113	.00152	.00227	.00304	.00379	.00456	.00608	1
				Full Chamfer (≥ 25°)	.00015	.00031	.00048	.00063	.00079	.00094	.00127	.00189	.00253	.00316	.00380	.00506	2
				Full Chamfer (< 25°)	.00011	.00024	.00036	.00047	.00059	.00071	.00095	.00142	.00190	.00237	.00285	.00380	3
	3% - 5% Si (3XX, A3XX, C3XX, 4XX, A4XX, B4XX)		750	Edge Break	.00018	.00038	.00057	.00075	.00095	.00113	.00152	.00227	.00304	.00379	.00456	.00608	1
	5% - 8% Si (3XX, A3XX, C3XX, 4XX, A4XX, B4XX)		700	Full Chamfer (≥ 25°)	.00015	.00031	.00048	.00063	.00079	.00094	.00127	.00189	.00253	.00316	.00380	.00506	2
	8% - 12% Si (3XX, A3XX, C3XX, 4XX, A4XX, B4XX)		650														
	12% - 16% Si (3XX, A3XX, C3XX, 4XX, A4XX, B4XX)		475	Full Chamfer (< 25°)	.00011	.00024	.00036	.00047	.00059	.00071	.00095	.00142	.00190	.00237	.00285	.00380	3
Copper Alloy	Cu-ETP, CuBe2, CuZn30, CuZn36Pb3, CuZn10, CuSn5	≤ 28 Rc (≤ 271 HBn)	225-500	Edge Break	.00016	.00033	.00051	.00067	.00084	.00100	.00135	.00202	.00270	.00337	.00405	.00540	1
				Full Chamfer (≥ 25°)	.00014	.00028	.00042	.00056	.00070	.00084	.00113	.00168	.00225	.00281	.00338	.00450	2
				Full Chamfer (< 25°)	.00010	.00021	.00032	.00042	.00053	.00063	.00084	.00126	.00169	.00211	.00253	.00338	93
Magnesium Alloys		≤ 28 Rc (≤ 271 HBn)	1500	Edge Break	.00020	.00042	.00063	.00084	.00105	.00126	.00169	.00252	.00380	.00421	.00506	.00675	1
Zinc Alloys			800	Full Chamfer (≥ 25°)	.00017	.00035	.00053	.00070	.00088	.00105	.00141	.00210	.00281	.00351	.00422	.00563	2
				Full Chamfer (< 25°)	.00013	.00026	.00040	.00052	.00066	.00078	.00105	.00158	.00211	.00263	.00316	.00422	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**.