VALOR™ HOLEMAKING

Product Table: High Performance Chamfer Cutters - Helically Fluted
Characteristics: 2 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	.00037	.00047	.00055	.00075	.00111	.00149	.00186	.00224	.00298	.00373	.00447	.00596	1
				Full Chamfer (≥ 25°)	.00031	.00039	.00046	.00062	.00093	.00124	.00155	.00186	.00248	.00311	.00373	.00497	3
				Full Chamfer (< 25°)	.00023	.00029	.00035	.00047	.00070	.00093	.00116	.00140	.00186	.00233	.00279	.00373	4
Low Alloy Steel	13XX, 41XX, 43XX, 51XX, 86XX, 93XX	29-37 Rc (279-344 HBn)	200	Edge Break	.00040	.00051	.00061	.00082	.00122	.00163	.00203	.00245	.00326	.00408	.00489	.00652	1
				Full Chamfer (≥ 25°)	.00034	.00042	.00051	.00068	.00102	.00136	.00170	.00204	.00272	.00340	.00408	.00543	3
				Full Chamfer (< 25°)	.00025	.00032	.00038	.00051	.00076	.00102	.00127	.00153	.00204	.00255	.00306	.00408	4
Tool Steel	A, L, O, P, W series	29-37 Rc (279-344 HBn)	200	Edge Break	.00037	.00047	.00055	.00075	.00111	.00149	.00186	.00224	.00298	.00373	.00447	.00596	1
				Full Chamfer (≥ 25°)	.00031	.00039	.00046	.00062	.00093	.00124	.00155	.00186	.00248	.00311	.00373	.00497	3
				Full Chamfer (< 25°)	.00023	.00029	.00035	.00047	.00070	.00093	.00116	.00140	.00186	.00233	.00279	.00373	4
		38-45 Rc (353-421 HBn)	100	Edge Break	.00037	.00047	.00055	.00075	.00111	.00149	.00186	.00224	.00298	.00373	.00447	.00596	1
				Full Chamfer (≥ 25°)	.00031	.00039	.00046	.00062	.00093	.00124	.00155	.00186	.00248	.00311	.00373	.00497	4
				Full Chamfer (< 25°)	.00023	.00029	.00035	.00047	.00070	.00093	.00116	.00140	.00186	.00233	.00279	.00373	5
	D, H, M, T, S series	29-37 Rc (279-344 HBn)	150	Edge Break	.00023	.00029	.00035	.00047	.00070	.00093	.00116	.00140	.00186	.00233	.00279	.00373	1
				Full Chamfer (≥ 25°)	.00019	.00024	.00029	.00039	.00058	.00078	.00097	.00116	.00155	.00194	.00233	.00311	3
				Full Chamfer (< 25°)	.00014	.00018	.00022	.00029	.00044	.00058	.00073	.00087	.00116	.00146	.00175	.00233	4
		38-45 Rc (353-421 HBn)	75	Edge Break	.00023	.00029	.00035	.00047	.00070	.00093	.00116	.00140	.00186	.00233	.00279	.00373	1
				Full Chamfer (≥ 25°)	.00019	.00024	.00029	.00039	.00058	.00078	.00097	.00116	.00155	.00194	.00233	.00311	4
				Full Chamfer (< 25°)	.00014	.00018	.00022	.00029	.00044	.00058	.00073	.00087	.00116	.00146	.00175	.00233	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	.00040	.00051	.00061	.00082	.00122	.00163	.00203	.00245	.00326	.00408	.00489	.00652	1
				Full Chamfer (≥ 25°)	.00034	.00042	.00051	.00068	.00102	.00136	.00170	.00204	.00272	.00340	.00408	.00543	3
				Full Chamfer (< 25°)	.00025	.00032	.00038	.00051	.00076	.00102	.00127	.00153	.00204	.00255	.00306	.00408	4
Martensitic & Ferritic Stainless Steel	403, 410, 416, 420, 440, 430, 446	29-37 Rc (279-344 HBn)	200	Edge Break	.00037	.00047	.00055	.00075	.00111	.00149	.00186	.00224	.00298	.00373	.00447	.00596	1
				Full Chamfer (≥ 25°)	.00031	.00039	.00046	.00062	.00093	.00124	.00155	.00186	.00248	.00311	.00373	.00497	3
				Full Chamfer (< 25°)	.00023	.00029	.00035	.00047	.00070	.00093	.00116	.00140	.00186	.00233	.00279	.00373	4
		38-45 Rc (353-421 HBn)	100	Edge Break	.00037	.00047	.00055	.00075	.00111	.00149	.00186	.00224	.00298	.00373	.00447	.00596	1
				Full Chamfer (≥ 25°)	.00031	.00039	.00046	.00062	.00093	.00124	.00155	.00186	.00248	.00311	.00373	.00497	4
				Full Chamfer (< 25°)	.00023	.00029	.00035	.00047	.00070	.00093	.00116	.00140	.00186	.00233	.00279	.00373	5
PH Stainless Steel	15-5, 17-4, Carpenter 450, Carpenter 465	29-37 Rc (279-344 HBn)	150	Edge Break	.00023	.00029	.00035	.00047	.00070	.00093	.00116	.00140	.00186	.00233	.00279	.00373	1
				Full Chamfer (≥ 25°)	.00019	.00024	.00029	.00039	.00058	.00078	.00097	.00116	.00155	.00194	.00233	.00311	3
				Full Chamfer (< 25°)	.00014	.00018	.00022	.00029	.00044	.00058	.00073	.00087	.00116	.00146	.00175	.00233	4
		38-45 Rc (353-421 HBn)	90	Edge Break	.00023	.00029	.00035	.00047	.00070	.00093	.00116	.00140	.00186	.00233	.00279	.00373	1
				Full Chamfer (≥ 25°)	.00019	.00024	.00029	.00039	.00058	.00078	.00097	.00116	.00155	.00194	.00233	.00311	4
				Full Chamfer (< 25°)	.00014	.00018	.00022	.00029	.00044	.00058	.00073	.00087	.00116	.00146	.00175	.00233	5
Nickel Alloy	Hastelloy C-22, Inconel 625, Waspaloy, René 41, Inconel 718, Incoloy 20	29-37 Rc (279-344 HBn)	70	Edge Break	.00023	.00029	.00035	.00047	.00070	.00093	.00116	.00140	.00186	.00233	.00279	.00373	1
				Full Chamfer (≥ 25°)	.00019	.00024	.00029	.00039	.00058	.00078	.00097	.00116	.00155	.00194	.00233	.00311	3
				Full Chamfer (< 25°)	.00014	.00018	.00022	.00029	.00044	.00058	.00073	.00087	.00116	.00146	.00175	.00233	4
		38-45 Rc (353-421 HBn)	50	Edge Break	.00023	.00029	.00035	.00047	.00070	.00093	.00116	.00140	.00186	.00233	.00279	.00373	1
				Full Chamfer (≥ 25°)	.00019	.00024	.00029	.00039	.00058	.00078	.00097	.00116	.00155	.00194	.00233	.00311	4
				Full Chamfer (< 25°)	.00014	.00018	.00022	.00029	.00044	.00058	.00073	.00087	.00116	.00146	.00175	.00233	5
Titanium Alloy	Ti 3Al-2.5V, Ti 6Al-4V, Ti 10V-2Fe-3Al	29-37 Rc (279-344 HBn)	150	Edge Break	.00023	.00029	.00035	.00047	.00070	.00093	.00116	.00140	.00186	.00233	.00279	.00373	1
				Full Chamfer (≥ 25°)	.00019	.00024	.00029	.00039	.00058	.00078	.00097	.00116	.00155	.00194	.00233	.00311	3
				Full Chamfer (< 25°)	.00014	.00018	.00022	.00029	.00044	.00058	.00073	.00087	.00116	.00146	.00175	.00233	4
		38-45 Rc (353-421 HBn)	75	Edge Break	.00023	.00029	.00035	.00047	.00070	.00093	.00116	.00140	.00186	.00233	.00279	.00373	1
				Full Chamfer (≥ 25°)	.00019	.00024	.00029	.00039	.00058	.00078	.00097	.00116	.00155	.00194	.00233	.00311	4
				Full Chamfer (< 25°)	.00014	.00018	.00022	.00029	.00044	.00058	.00073	.00087	.00116	.00146	.00175	.00233	5
Wrought Aluminum Alloy	2014, 5062, 6061, 7050, 7075, 7475	≤ 28 Rc (≤ 271 HBn)	1000	Edge Break	.00107	.00135	.00160	.00216	.00323	.00431	.00538	.00647	.00863	.01078	.01294	.01725	1
				Full Chamfer (≥ 25°)	.00089	.00112	.00134	.00180	.00269	.00359	.00449	.00539	.00719	.00898	.01078	.01438	2
				Full Chamfer (< 25°)	.00067	.00084	.00100	.00135	.00202	.00270	.00336	.00404	.00539	.00674	.00809	.01078	3
	5% - 8% Si (4XXX)		1000	Edge Break	.00096	.00121	.00144	.00194	.00290	.00388	.00484	.00582	.00776	.00970	.01164	.01553	1
	8% - 12% Si (4XXX)		800	Full Chamfer (≥ 25°)	.00080	.00101	.00120	.00162	.00242	.00323	.00404	.00485	.00647	.00809	.00970	.01294	2
				Full Chamfer (< 25°)	.00060	.00076	.00090	.00121	.00181	.00243	.00303	.00364	.00485	.00606	.00728	.00970	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	.00107	.00135	.00160	.00216	.00323	.00431	.00538	.00647	.00863	.01078	.01294	.01725	1
				Full Chamfer (≥ 25°)	.00089	.00112	.00134	.00180	.00269	.00359	.00449	.00539	.00719	.00898	.01078	.01438	2
				Full Chamfer (< 25°)	.00067	.00084	.00100	.00135	.00202	.00270	.00336	.00404	.00539	.00674	.00809	.01078	3
	3% - 5% Si (3XX, A3XX, C3XX, 4XX, A4XX, B4XX)		750	Edge Break	.00096	.00121	.00144	.00194	.00290	.00388	.00484	.00582	.00776	.00970	.01164	.01553	1
	5% - 8% Si (3XX, A3XX, C3XX, 4XX, A4XX, B4XX)		700	Full Chamfer (≥ 25°)	.00080	.00101	.00120	.00162	.00242	.00323	.00404	.00485	.00647	.00809	.00970	.01294	2
	8% - 12% Si (3XX, A3XX, C3XX, 4XX, A4XX, B4XX)		650														
	12% - 16% Si (3XX, A3XX, C3XX, 4XX, A4XX, B4XX)		475	Full Chamfer (< 25°)	.00060	.00076	.00090	.00121	.00181	.00243	.00303	.00364	.00485	.00606	.00728	.00970	3
Copper Alloy	Cu-ETP, CuBe2, CuZn30, CuZn36Pb3, CuZn10, CuSn5	≤ 28 Rc (≤ 271 HBn)	225-500	Edge Break	.00086	.00108	.00128	.00173	.00258	.00345	.00431	.00518	.00690	.00863	.01035	.01380	1
				Full Chamfer (≥ 25°)	.00071	.00090	.00107	.00144	.00215	.00288	.00359	.00431	.00575	.00719	.00863	.01150	2
				Full Chamfer (< 25°)	.00053	.00067	.00080	.00108	.00161	.00216	.00269	.00323	.00431	.00539	.00647	.00863	3
Magnesium Alloys		≤ 28 Rc (≤ 271 HBn)	1500	Edge Break	.00107	.00135	.00160	.00216	.00323	.00431	.00538	.00647	.00863	.01078	.01294	.01725	1
Zinc Alloys			800	Full Chamfer (≥ 25°)	.00089	.00112	.00134	.00180	.00269	.00359	.00449	.00539	.00719	.00898	.01078	.01438	2
				Full Chamfer (< 25°)	.00067	.00084	.00100	.00135	.00202	.00270	.00336	.00404	.00539	.00674	.00809	.01078	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**.