MATERIAL	SFM	Hardness: ≤ 28 Rc (≤ 271 HBn)														
		Chip Load (IPT) By Cutter Diameter														
			.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.437	.500	.625	.750
ALUMINUM ALLOYS Casting (2xx, 5xx, 7xx, 8xx)	750	Full Plunge	.00012	.00018	.00023	.00029	.00035	.00047	.00070	.00094	.00117	.00140	.00163	.00187	.00234	.00281
Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	1000	Finishing	.00018	.00028	.00037	.00046	.00055	.00074	.00111	.00148	.00184	.00222	.00258	.00295	.00369	.00443
Casting - 3%-5% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	750	Full Plunge	.00010	.00016	.00021	.00026	.00031	.00042	.00063	.00084	.00105	.00126	.00147	.00168	.00210	.00252
Casting - 5%-8% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	700															
Casting - 8%-12% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	650	Finishing	.00016	.00025	.00033	.00041	.00049	.00066	.00099	.00133	.00166	.00199	.00232	.00266	.00332	.00399
Casting - 12%-16% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	475															
Wrought - 5%-8% Si (4xxx)	1000															
Wrought - 8%-12% Si (4xxx)	800															
MAGNESIUM ALLOYS	1500	Full Plunge	.00012	.00018	.00023	.00029	.00035	.00047	.00070	.00094	.00117	.00140	.00163	.00187	.00234	.00281
ZINC ALLOYS	800	Finishing	.00018	.00028	.00037	.00046	.00055	.00074	.00111	.00148	.00184	.00222	.00258	.00295	.00369	.00443
COPPER ALLOYS High Coppers - 90%+ (C1xxxx)	225	Full Plunge	.00009	.00014	.00019	.00023	.00028	.00037	.00056	.00075	.00093	.00112	.00131	.00150	.00187	.00224
Brass (Copper Zinc alloys, C2xxxx, C3xxxx, C4xxxx, C66400-C69800)	500															
Phosphor Bronzes (Copper Tin alloys, C5xxxx)	225															
Aluminum Bronzes (Copper Aluminum alloys, C60600-C64200)	500															
Silicon Bronzes (Copper Silicon alloys, C64700-C66100)	500	Finishing	.00015	.00022	.00029	.00037	.00044	.00059	.00088	.00118	.00147	.00177	.00207	.00236	.00295	.00355
Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxxx)	225															
Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)	550															

MATERIAL	SFM	Hardness: 29-37 Rc (279-344 HBn)														
		Chip Load (IPT) By Cutter Diameter														
			.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.437	.500	.625	.750
CARBON STEELS Free-Machining/Low Carbon steels, 10xx - 1029 & all 10Lxx, 11xx - 1139 & all 11Lxx, 12xx - 1215 & all 12Lxx	600	Full Plunge	.00004	.00006	.00008	.00010	.00012	.00016	.00024	.00032	.00040	.00048	.00056	.00064	.00080	.00096
		Finishing	.00006	.00009	.00011	.00014	.00017	.00023	.00035	.00046	.00058	.00069	.00081	.00092	.00115	.00139
1030 - 1095, 1140 - 1151, 13xx, 15xx, 2xxx, 3xxx, 4xxx & 4xLxx, 5xxx & 5xLxx, 50xxx & 50Lxxx, 51xxx & 51Lxxx, 52xxx & 52Lxxx, 6xxx, 8xxx, 9xxx	200	Full Plunge	.00004	.00006	.00007	.00009	.00011	.00015	.00022	.00029	.00037	.00044	.00051	.00059	.00073	.00088
		Finishing	.00005	.00008	.00010	.00013	.00016	.00021	.00032	.00042	.00053	.00063	.00074	.00084	.00106	.00127
STAINLESS STEELS 203 EZ, 303 (all types), 416, 416Se, 416 Plus X, 420F, 420FSe, 430F, 430FSe, 440F, 440FSe	450	Full Plunge	.00004	.00006	.00008	.00010	.00012	.00016	.00024	.00032	.00040	.00048	.00056	.00064	.00080	.00096
		Finishing	.00006	.00009	.00011	.00014	.00017	.00023	.00035	.00046	.00058	.00069	.00081	.00092	.00115	.00139
201, 202, 203, 205, 301, 302, 304, 304L, 308, 309, 310, 314, 316, 316L, 317, 321, 329, 330, 347, 348, 385, 403, 405, 409, 410, 413, 420, 429, 430, 434, 436, 442, 446, 501, 502	200	Full Plunge	.00004	.00006	.00007	.00009	.00011	.00015	.00022	.00029	.00037	.00044	.00051	.00059	.00073	.00088
		Finishing	.00005	.00008	.00010	.00013	.00016	.00021	.00032	.00042	.00053	.00063	.00074	.00084	.00106	.00127
414, 431, 440A, 440B, 440C, 13-8, 15-5, 15-7, 17-4, 17-7	150	Full Plunge	.00002	.00003	.00005	.00006	.00007	.00009	.00014	.00018	.00023	.00028	.00032	.00037	.00046	.00055
		Finishing	.00003	.00005	.00007	.00008	.00010	.00013	.00020	.00026	.00033	.00040	.00046	.00053	.00066	.00079
TOOL STEELS A, L, O, P, W series	200	Full Plunge	.00004	.00006	.00007	.00009	.00011	.00015	.00022	.00029	.00037	.00044	.00051	.00059	.00073	.00088
		Finishing	.00005	.00008	.00010	.00013	.00016	.00021	.00032	.00042	.00053	.00063	.00074	.00084	.00106	.00127
D, H, M, T, S series	150	Full Plunge	.00002	.00003	.00005	.00006	.00007	.00009	.00014	.00018	.00023	.00028	.00032	.00037	.00046	.00055
		Finishing	.00003	.00005	.00007	.00008	.00010	.00013	.00020	.00026	.00033	.00040	.00046	.00053	.00066	.00079
TITANIUM ALLOYS	150	Full Plunge	.00002	.00003	.00005	.00006	.00007	.00009	.00014	.00018	.00023	.00028	.00032	.00037	.00046	.00055
		Finishing	.00003	.00005	.00007	.00008	.00010	.00013	.00020	.00026	.00033	.00040	.00046	.00053	.00066	.00079
HIGH TEMP ALLOYS Inconel, Hastelloy, Waspalloy, Monel, Nimonic, Haynes, Discoloy, Incoloy	70	Full Plunge	.00002	.00003	.00005	.00006	.00007	.00009	.00014	.00018	.00023	.00028	.00032	.00037	.00046	.00055
		Finishing	.00003	.00005	.00007	.00008	.00010	.00013	.00020	.00026	.00033	.00040	.00046	.00053	.00066	.00079

HARVEY TOOL

Speeds & Feeds

Product Table: Counterbores - Flat Bottom - Long Reach
Characteristics: 4 Flutes
Series: 254xx, 255xx

Product Notes:

Chip Loads are given 2 ways:

Full Plunge refers to vertically machining into solid material with no pilot hole
Finishing refers to vertically machining with an existing pilot hole greater than or equal to 50% of the Counterbore cutter diameter (≤ 25% on wall)

Full Plunge machining may require a peck cycle for proper chip evacuation
For Ferrous materials, pecking to a depth of 2x diameter is advised
For Non-Ferrous materials, pecking to a depth of 3x diameter is advised

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, Harvey Tool has a team of technical experts available to assist you through even the most challenging applications. Please contact us at **800-645-5609** or **Harveytech@harveyperformance.com**.

WARNING: Cutting tools may shatter under improper use. Government regulations require use of safety glasses and other appropriate safety equipment in the vicinity of use.

SFM	Hardness: 38-45 Rc (353-421 HBn)															
	Chip Load (IPT) By Cutter Diameter															
		.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.437	.500	.625	.750
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
100	Full Plunge	.00002	.00003	.00004	.00005	.00005	.00007	.00011	.00015	.00018	.00022	.00026	.00029	.00037	.00044
	Finishing	.00003	.00004	.00005	.00007	.00008	.00011	.00016	.00021	.00027	.00032	.00037	.00043	.00053	.00064
90	Full Plunge	.00001	.00002	.00002	.00003	.00003	.00005	.00007	.00009	.00011	.00014	.00016	.00018	.00023	.00028
	Finishing	.00002	.00003	.00003	.00004	.00005	.00007	.00010	.00013	.00017	.00020	.00023	.00027	.00033	.00040
100	Full Plunge	.00002	.00003	.00004	.00005	.00005	.00007	.00011	.00015	.00018	.00022	.00026	.00029	.00037	.00044
	Finishing	.00003	.00004	.00005	.00007	.00008	.00011	.00016	.00021	.00027	.00032	.00037	.00043	.00053	.00064
90	Full Plunge	.00001	.00002	.00002	.00003	.00003	.00005	.00007	.00009	.00011	.00014	.00016	.00018	.00023	.00028
	Finishing	.00002	.00003	.00003	.00004	.00005	.00007	.00010	.00013	.00017	.00020	.00023	.00027	.00033	.00040
75	Full Plunge	.00001	.00002	.00002	.00003	.00003	.00005	.00007	.00009	.00011	.00014	.00016	.00018	.00023	.00028
	Finishing	.00002	.00003	.00003	.00004	.00005	.00007	.00010	.00013	.00017	.00020	.00023	.00027	.00033	.00040
50	Full Plunge	.00001	.00002	.00002	.00003	.00003	.00005	.00007	.00009	.00011	.00014	.00016	.00018	.00023	.00028
	Finishing	.00002	.00003	.00003	.00004	.00005	.00007	.00010	.00013	.00017	.00020	.00023	.00027	.00033	.00040