MATERIAL	SFM	Hardness: ≤ 28 Rc (≤ 271 HBn) Chip Load (IPT) By Effective Cutter Diameter												Depth of Cut	
		0.015	0.031	0.047	0.062	0.078	0.093	0.125	0.187	0.250	0.312	0.375	0.500	Radial Passes	Axial Passes
ALUMINUM ALLOYS															
Casting (2xx, 5xx, 7xx, 8xx)	750	.00015	.00031	.00047	.00062	.00078	.00093	.00125	.00187	.00250	.00312	.00375	.00501	1	2
Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	1000														
Casting - 3%-5% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	750	.00014	.00028	.00042	.00056	.00070	.00084	.00113	.00168	.00225	.00281	.00338	.00450	1	2
Casting - 5%-8% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	700														
Casting - 8%-12% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	650														
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	.00015	.00031	.00047	.00062	.00078	.00093	.00125	.00187	.00250	.00312	.00375	.00501	1	2
ZINC ALLOYS	800														
COPPER ALLOYS		.00012	.00025	.00038	.00050	.00062	.00074	.00100	.00150	.00200	.00250	.00300	.00400	1	2
High Coppers - 90%+ (C1xxxx)	225														
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														
Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxxx)	225														
Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)	550														

HARVEY TOOL

Speeds & Feeds

Product Table: Corner Rounding End Mills - Long Reach - Flared
Characteristics: 5x Reach Multiple, 2 Flutes
Series: 9909xx, 9922xx, 9946xx

Product notes:

Due to a varying diameter, an Effective Cutter Diameter must be determined for Chip Load selection and RPM calculation:
For a Radius/Pilot ratio < 2.5, Effective Cutter Diameter = Pilot Diameter + Radius
For a Radius/Pilot ratio ≥ 2.5, Effective Cutter Diameter = Pilot Diameter + .7x Radius

Depth of Cut is shown as a full Radial stepover with multiple, descending Axial passes with following breakdown (same progression works for full Axial depth with multiple, descending Radial passes):
1 pass = 1x Radius
2 passes = .7x Radius, .3x Radius
3 passes = .4x Radius, .4x Radius, .2x Radius
4 passes = .4x Radius, .3x Radius, .2x Radius, .1x Radius
5 passes = .3x Radius, .3x Radius, .2x Radius, .1x Radius, .1x Radius

Chip Loads (IPT) within table pertain to rounding a corner on one side of existing slot.
For rounding on both sides, reduce Chip Loads to 60%-80% depending on contact length and finish

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

MATERIAL	SFM	Hardness: 29-37 Rc (279-344 HBn) Chip Load (IPT) By Effective Cutter Diameter												Depth of Cut	
		0.015	0.031	0.047	0.062	0.078	0.093	0.125	0.187	0.250	0.312	0.375	0.500	Radial Passes	Axial Passes
CARBON STEELS															
Free-Machining/Low Carbon steels, 10xx - 1029 & all 10Lxx, 11xx - 1139 & all 11Lxx, 12xx - 1215 & all 12Lxx	600	.00006	.00013	.00020	.00027	.00034	.00040	.00054	.00080	.00107	.00134	.00161	.00215	1	3
1030 - 1095, 1140 - 1151, 13xx, 15xx, 2xxx, 3xxx, 4xxx & 4xLxx, 5xxx & 5xLxx, 50xxx & 50Lxxx, 51xxx & 51Lxxx, 52xxx & 52Lxxx, 6xxx, 8xxx, 9xxx	200	.00006	.00012	.00018	.00024	.00031	.00037	.00049	.00074	.00098	.00123	.00147	.00197	1	3
STAINLESS STEELS															
203 EZ, 303 (all types), 416, 416Se, 416 Plus X, 420F, 420FSe, 430F, 430FSe, 440F, 440FSe	450	.00006	.00013	.00020	.00027	.00034	.00040	.00054	.00080	.00107	.00134	.00161	.00215	1	3
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	.00006	.00012	.00018	.00024	.00031	.00037	.00049	.00074	.00098	.00123	.00147	.00197	1	3
414, 431, 440A, 440B, 440C, 13-8, 15-5, 15-7, 17-4, 17-7	150	.00004	.00008	.00012	.00015	.00019	.00023	.00031	.00046	.00061	.00077	.00092	.00123	1	3
TOOL STEELS															
A, L, O, P, W series	200	.00006	.00012	.00018	.00024	.00031	.00037	.00049	.00074	.00098	.00123	.00147	.00197	1	3
D, H, M, T, S series	150	.00004	.00008	.00012	.00015	.00019	.00023	.00031	.00046	.00061	.00077	.00092	.00123	1	3
TITANIUM ALLOYS	150	.00004	.00008	.00012	.00015	.00019	.00023	.00031	.00046	.00061	.00077	.00092	.00123	1	3
HIGH TEMP ALLOYS															
Inconel, Hastelloy, Waspalloy, Monel, Nimonic, Haynes, Discoloy, Incoloy	70	.00004	.00008	.00012	.00015	.00019	.00023	.00031	.00046	.00061	.00077	.00092	.00123	1	3

MATERIAL	SFM	Hardness: 38-45 Rc (353-421 HBn) Chip Load (IPT) By Effective Cutter Diameter												Depth of Cut	
		0.015	0.031	0.047	0.062	0.078	0.093	0.125	0.187	0.250	0.312	0.375	0.500	Radial Passes	Axial Passes
CARBON STEELS															
Free-Machining/Low Carbon steels, 10xx - 1029 & all 10Lxx, 11xx - 1139 & all 11Lxx, 12xx - 1215 & all 12Lxx	-	-	-	-	-	-	-	-	-	-		-	-	-	-
1030 - 1095, 1140 - 1151, 13xx, 15xx, 2xxx, 3xxx, 4xxx & 4xLxx, 5xxx & 5xLxx, 50xxx & 50Lxxx, 51xxx & 51Lxxx, 52xxx & 52Lxxx, 6xxx, 8xxx, 9xxx	-	-	-	-	-	-	-	-	-	-		-	-	-	-
STAINLESS STEELS															
203 EZ, 303 (all types), 416, 416Se, 416 Plus X, 420F, 420FSe, 430F, 430FSe, 440F, 440FSe	-	-	-	-	-	-	-	-	-	-		-	-	-	-
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	100	.00006	.00012	.00018	.00024	.00031	.00037	.00049	.00074	.00098	.00123	.00147	.00197	1	4
414, 431, 440A, 440B, 440C, 13-8, 15-5, 15-7, 17-4, 17-7	90	.00004	.00008	.00012	.00015	.00019	.00023	.00031	.00046	.00061	.00077	.00092	.00123	1	4
TOOL STEELS															
A, L, O, P, W series	100	.00006	.00012	.00018	.00024	.00031	.00037	.00049	.00074	.00098	.00123	.00147	.00197	1	4
D, H, M, T, S series	90	.00004	.00008	.00012	.00015	.00019	.00023	.00031	.00046	.00061	.00077	.00092	.00123	1	4
TITANIUM ALLOYS	75	.00004	.00008	.00012	.00015	.00019	.00023	.00031	.00046	.00061	.00077	.00092	.00123	1	4
HIGH TEMP ALLOYS															
Inconel, Hastelloy, Waspalloy, Monel, Nimonic, Haynes, Discoloy, Incoloy	50	.00004	.00008	.00012	.00015	.00019	.00023	.00031	.00046	.00061	.00077	.00092	.00123	1	4