MATERIAL	SFM		Hardness: ≤ 28 Rc (≤ 271 HBn)													
			Chip Load (IPT) By Cutter Diameter												Depth of Cut	
			.062	.078	.093	.125	.187	.250	.312	.375	.500	.625	.750	1.000	Radial	Axial
ALUMINUM ALLOYS		Slotting	.00056	.00070	.00083	.00112	.00168	.00224	.00280	.00337	.00449	.00561	.00673	.00898	1.00 x Dia	.35 x Dia
Casting (2xx, 5xx, 7xx, 8xx)	750	Roughing	.00070	.00088	.00104	.00140	.00210	.00281	.00350	.00421	.00561	.00701	.00842	.01122	.65 x Dia	.45 x Dia
Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	1000	Finishing	.00103	.00129	.00154	.00207	.00309	.00414	.00516	.00620	.00827	.01034	.01241	.01655	.15 x Dia	1.50 x Dia
Casting - 3%-5% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	750	Slotting	.00050	.00063	.00075	.00101	.00151	.00202	.00252	.00303	.00404	.00505	.00606	.00808	1.00 x Dia	.35 x Dia
Casting - 5%-8% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	700															
Casting - 8%-12% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	650	Roughing	.00063	.00079	.00094	.00126	.00189	.00252	.00315	.00379	.00505	.00631	.00757	.01010	.65 x Dia	.45 x Dia
Casting - 12%-16% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	475															
Wrought - 5%-8% Si (4xxx)	1000	Finishing	.00092	.00116	.00138	.00186	.00278	.00372	.00465	.00558	.00745	.00931	.01117	.01489	.15 x Dia	1.50 x Dia
Wrought - 8%-12% Si (4xxx)	800															
MAGNESIUM ALLOYS	1500	Slotting	.00056	.00070	.00083	.00112	.00168	.00224	.00280	.00337	.00449	.00561	.00673	.00898	1.00 x Dia	.35 x Dia
		Roughing	.00070	.00088	.00104	.00140	.00210	.00281	.00350	.00421	.00561	.00701	.00842	.01122	.65 x Dia	.45 x Dia
ZINC ALLOYS	800	Finishing	.00103	.00129	.00154	.00207	.00309	.00414	.00516	.00620	.00827	.01034	.01241	.01655	.15 x Dia	1.50 x Dia
COPPER ALLOYS																
High Coppers - 90%+ (C1xxxx)	225	Slotting	.00045	.00056	.00067	.00090	.00134	.00180	.00224	.00269	.00359	.00449	.00539	.00718	1.00 x Dia	.35 x Dia
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	Roughing	.00056	.00070	.00083	.00112	.00168	.00224	.00280	.00337	.00449	.00561	.00673	.00898	.65 x Dia	.45 x Dia
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	Finishing	.00082	.00103	.00123	.00165	.00248	.00331	.00496	.00496	.00662	.00827	.00993	.01324	.15 x Dia	1.50 x Dia

HARVEY TOOL

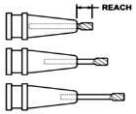
Speeds & Feeds

Product Table: End Mills - Square - Reduced Shank
Characteristics: 4 Flutes
Series: 9206xx, 9432xx

Product Notes:

Reduced shank end mills can be chucked at a variety of reach lengths. Posted values reflect a 3x reach length (ex. a 1/8 diameter mill chucked at a 3/8 reach). When chucking at longer reach lengths, use the table below for Chip Load and Depth of Cut adjustment multipliers.

Reach Multiple	Slotting			Roughing			Finishing		
	Chip Load	Depth of Cut		Chip Load	Depth of Cut		Chip Load	Depth of Cut	
		Radial	Axial		Radial	Axial		Radial	Axial
3x	100%	100%	100%	100%	100%	100%	100%	100%	100%
5x	83%	100%	57%	83%	92%	78%	86%	100%	100%
8x	63%	100%	51%	63%	85%	67%	71%	67%	100%
12x	50%	100%	43%	50%	69%	56%	64%	67%	100%
15x	42%	100%	43%	42%	46%	56%	57%	53%	100%
18x	38%	100%	34%	38%	46%	44%	54%	40%	100%
20x	33%	100%	29%	33%	38%	44%	50%	33%	100%



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

MATERIAL	SFM		Hardness: 29-37 Rc (279-344 HBn)													
			Chip Load (IPT) By Cutter Diameter												Depth of Cut	
			0.062	0.078	0.093	0.125	0.187	0.250	0.312	0.375	0.500	0.625	0.750	1.000	Radial	Axial
CARBON STEELS		Slotting	.00019	.00024	.00029	.00039	.00058	.00077	.00096	.00116	.00154	.00193	.00231	.00308	1.00 x Dia	.35 x Dia
Free-Machining/Low Carbon steels, 10xx - 1029 & all 10Lxx, 11xx - 1139 & all 11Lxx, 12xx - 1215 & all 12Lxx	600	Roughing	.00022	.00027	.00032	.00043	.00065	.00087	.00108	.00130	.00174	.00217	.00260	.00347	.65 x Dia	.45 x Dia
		Finishing	.00032	.00040	.00048	.00065	.00097	.00129	.00161	.00194	.00259	.00323	.00388	.00517	.15 x Dia	1.50 x Dia
1030 - 1095, 1140 - 1151, 13xx, 15xx, 2xxx, 3xxx, 4xxx & 4xLxx, 5xxx & 5xLxx, 50xxx & 50Lxxx, 51xxx & 51Lxxx, 52xxx & 52Lxxx, 6xxx, 8xxx, 9xxx	200	Slotting	.00017	.00022	.00026	.00035	.00053	.00071	.00088	.00106	.00141	.00176	.00212	.00282	1.00 x Dia	.35 x Dia
		Roughing	.00020	.00025	.00030	.00040	.00059	.00079	.00099	.00119	.00159	.00198	.00238	.00317	.65 x Dia	.45 x Dia
		Finishing	.00029	.00037	.00044	.00059	.00088	.00118	.00148	.00177	.00236	.00296	.00355	.00473	.15 x Dia	1.50 x Dia
STAINLESS STEELS		Slotting	.00019	.00024	.00029	.00039	.00058	.00077	.00096	.00116	.00154	.00193	.00231	.00308	1.00 x Dia	.35 x Dia
203 EZ, 303 (all types), 416, 416Se, 416 Plus X, 420F, 420FSe, 430F, 430FSe, 440F, 440FSe	450	Roughing	.00022	.00027	.00032	.00043	.00065	.00087	.00108	.00130	.00174	.00217	.00260	.00347	.65 x Dia	.45 x Dia
		Finishing	.00032	.00040	.00048	.00065	.00097	.00129	.00161	.00194	.00259	.00323	.00388	.00517	.15 x Dia	1.50 x Dia
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	Slotting	.00017	.00022	.00026	.00035	.00053	.00071	.00088	.00106	.00141	.00176	.00212	.00282	1.00 x Dia	.35 x Dia
		Roughing	.00020	.00025	.00030	.00040	.00059	.00079	.00099	.00119	.00159	.00198	.00238	.00317	.65 x Dia	.45 x Dia
		Finishing	.00029	.00037	.00044	.00059	.00088	.00118	.00148	.00177	.00236	.00296	.00355	.00473	.15 x Dia	1.50 x Dia
414, 431, 440A, 440B, 440C, 13-8, 15-5, 15-7, 17-4, 17-7	150	Slotting	.00011	.00014	.00016	.00022	.00033	.00044	.00055	.00066	.00088	.00110	.00132	.00176	1.00 x Dia	.35 x Dia
		Roughing	.00012	.00015	.00018	.00025	.00037	.00050	.00062	.00074	.00099	.00124	.00149	.00198	.65 x Dia	.45 x Dia
		Finishing	.00018	.00023	.00027	.00037	.00055	.00074	.00092	.00111	.00148	.00185	.00222	.00296	.15 x Dia	1.50 x Dia
TOOL STEELS		Slotting	.00017	.00022	.00026	.00035	.00053	.00071	.00088	.00106	.00141	.00176	.00212	.00282	1.00 x Dia	.35 x Dia
A, L, O, P, W series	200	Roughing	.00020	.00025	.00030	.00040	.00059	.00079	.00099	.00119	.00159	.00198	.00238	.00317	.65 x Dia	.45 x Dia
		Finishing	.00029	.00037	.00044	.00059	.00088	.00118	.00148	.00177	.00236	.00296	.00355	.00473	.15 x Dia	1.50 x Dia
D, H, M, T, S series	150	Slotting	.00011	.00014	.00016	.00022	.00033	.00044	.00055	.00066	.00088	.00110	.00132	.00176	1.00 x Dia	.35 x Dia
		Roughing	.00012	.00015	.00018	.00025	.00037	.00050	.00062	.00074	.00099	.00124	.00149	.00198	.65 x Dia	.45 x Dia
		Finishing	.00018	.00023	.00027	.00037	.00055	.00074	.00092	.00111	.00148	.00185	.00222	.00296	.15 x Dia	1.50 x Dia
TITANIUM ALLOYS	150	Slotting	.00011	.00014	.00016	.00022	.00033	.00044	.00055	.00066	.00088	.00110	.00132	.00176	1.00 x Dia	.35 x Dia
		Roughing	.00012	.00015	.00018	.00025	.00037	.00050	.00062	.00074	.00099	.00124	.00149	.00198	.65 x Dia	.45 x Dia
		Finishing	.00018	.00023	.00027	.00037	.00055	.00074	.00092	.00111	.00148	.00185	.00222	.00296	.15 x Dia	1.50 x Dia
HIGH TEMP ALLOYS		Slotting	.00011	.00014	.00016	.00022	.00033	.00044	.00066	.00088	.00110	.00132	.00176	.00176	1.00 x Dia	.35 x Dia
Inconel, Hastelloy, Waspalloy, Monel, Nimonic, Haynes, Discoloy, Incoloy	70	Roughing	.00012	.00015	.00018	.00025	.00037	.00050	.00062	.00074	.00099	.00124	.00149	.00198	.65 x Dia	.45 x Dia
		Finishing	.00018	.00023	.00027	.00037	.00055	.00074	.00092	.00111	.00148	.00185	.00222	.00296	.15 x Dia	1.50 x Dia

SFM		Hardness: 38-45 Rc (353-421 HBn)														
		Chip Load (IPT) By Cutter Diameter													Depth of Cut	
		0.062	0.078	0.093	0.125	0.187	0.250	0.312	0.375	0.500	0.625	0.750	1.000	Radial	Axial
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
100	Slotting	.00009	.00011	.00013	.00018	.00026	.00035	.00044	.00053	.00071	.00088	.00106	.00141	1.00 x Dia	.35 x Dia
	Roughing	.00010	.00012	.00015	.00020	.00030	.00040	.00049	.00059	.00079	.00099	.00119	.00159	.65 x Dia	.45 x Dia
	Finishing	.00015	.00019	.00022	.00030	.00045	.00060	.00074	.00089	.00119	.00149	.00179	.00239	.15 x Dia	1.50 x Dia
90	Slotting	.00005	.00007	.00008	.00011	.00016	.00022	.00027	.00033	.00044	.00055	.00066	.00088	1.00 x Dia	.35 x Dia
	Roughing	.00006	.00008	.00009	.00012	.00019	.00025	.00031	.00037	.00050	.00062	.00074	.00099	.65 x Dia	.45 x Dia
	Finishing	.00009	.00012	.00014	.00019	.00028	.00037	.00047	.00056	.00075	.00093	.00112	.00149	.15 x Dia	1.50 x Dia
100	Slotting	.00009	.00011	.00013	.00018	.00026	.00035	.00044	.00053	.00071	.00088	.00106	.00141	1.00 x Dia	.35 x Dia
	Roughing	.00010	.00012	.00015	.00020	.00030	.00040	.00049	.00059	.00079	.00099	.00119	.00159	.65 x Dia	.45 x Dia
	Finishing	.00015	.00019	.00022	.00030	.00045	.00060	.00074	.00089	.00119	.00149	.00179	.00239	.15 x Dia	1.50 x Dia
90	Slotting	.00005	.00007	.00008	.00011	.00016	.00022	.00027	.00033	.00044	.00055	.00066	.00088	1.00 x Dia	.35 x Dia
	Roughing	.00006	.00008	.00009	.00012	.00019	.00025	.00031	.00037	.00050	.00062	.00074	.00099	.65 x Dia	.45 x Dia
	Finishing	.00009	.00012	.00014	.00019	.00028	.00037	.00047	.00056	.00075	.00093	.00112	.00149	.15 x Dia	1.50 x Dia
75	Slotting	.00005	.00007	.00008	.00011	.00016	.00022	.00027	.00033	.00044	.00055	.00066	.00088	1.00 x Dia	.35 x Dia
	Roughing	.00006	.00008	.00009	.00012	.00019	.00025	.00031	.00037	.00050	.00062	.00074	.00099	.65 x Dia	.45 x Dia
	Finishing	.00009	.00012	.00014	.00019	.00028	.00037	.00047	.00056	.00075	.00093	.00112	.00149	.15 x Dia	1.50 x Dia
50	Slotting	.00005	.00007	.00008	.00011	.00016	.00022	.00027	.00033	.00044	.00055	.00066	.00088	1.00 x Dia	.35 x Dia
	Roughing	.00006	.00008	.00009	.00012	.00019	.00025	.00031	.00037	.00050	.00062	.00074	.00099	.65 x Dia	.45 x Dia
	Finishing	.00009	.00012	.00014	.00019	.00028	.00037	.00047	.00056	.00075	.00093	.00112	.00149	.15 x Dia	1.50 x Dia