



Speeds & Feeds

Product Table: Miniature End Mills - Ball - Long Reach, Long Flute
Characteristics: 8x, 10x, 13x, 14x, 16x Reach Multiple, 5x, 6x, 7x, 8x Length of Cut, 3 Flutes
Series: 102xx, 103xx, 138xx, 148xx, 7240xx, 7504xx, 8033xx, 8035xx

Please note:

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.

MATERIAL	SFM	Hardness: ≤ 28 Rc (≤ 271 HBn)														
		Chip Load (IPT) by Dia			Depth of Cut		Chip Load (IPT) by Cutter Dia						Depth of Cut			
		0.015	0.031	0.047	Radial	Axial	0.062	0.078	0.093	0.125	0.187	0.250	0.375	0.500	Radial	Axial
ALUMINUM ALLOYS																
Casting (2xx, 5xx, 7xx, 8xx)	750	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Roughing	.00011	.00022	.00033	.20 x Dia	.30 x Dia	.00038	.00048	.00058	.00077	.00116	.00155	.00232	.00309	.40 x Dia .30 x Dia
Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	1000	Finishing	.00013	.00026	.00040	.04 x Dia	5 x Dia	.00046	.00057	.00068	.00092	.00137	.00184	.00276	.00368	.08 x Dia 5 x Dia
Casting - 3%-5% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	750	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Casting - 5%-8% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	700	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Casting - 8%-12% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	650	Roughing	.00010	.00020	.00030	.20 x Dia	.30 x Dia	.00035	.00043	.00052	.00070	.00104	.00139	.00209	.00278	.40 x Dia .30 x Dia
Casting - 12%-16% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	475	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wrought - 5%-8% Si (4xxx)	1000	Finishing	.00011	.00024	.00036	.04 x Dia	5 x Dia	.00041	.00052	.00062	.00083	.00124	.00165	.00248	.00331	.08 x Dia 5 x Dia
Wrought - 8%-12% Si (4xxx)	800	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAGNESIUM ALLOYS	1500	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Roughing	.00011	.00022	.00033	.20 x Dia	.30 x Dia	.00038	.00048	.00058	.00077	.00116	.00155	.00232	.00309	.40 x Dia .30 x Dia
ZINC ALLOYS	800	Finishing	.00013	.00026	.00040	.04 x Dia	5 x Dia	.00046	.00057	.00068	.00092	.00137	.00184	.00276	.00368	.08 x Dia 5 x Dia
COPPER ALLOYS																
High Coppers - 90%+ (C1xxx)	225	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brass (Copper Zinc alloys, C2xxx, C3xxx, C4xxx, C6400-C69800)	500	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphor Bronzes (Copper Tin alloys, C5xxx)	225	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum Bronzes (Copper Aluminum alloys, C6060-C64200)	500	Roughing	.00009	.00018	.00027	.20 x Dia	.30 x Dia	.00031	.00039	.00046	.00062	.00093	.00124	.00186	.00248	.40 x Dia .30 x Dia
Silicon Bronzes (Copper Silicon alloys, C64700-C65100)	500	Roughing	.00009	.00018	.00027	.20 x Dia	.30 x Dia	.00031	.00039	.00046	.00062	.00093	.00124	.00186	.00248	.40 x Dia .30 x Dia
Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxx)	225	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)	550	Finishing	.00010	.00021	.00032	.04 x Dia	5 x Dia	.00036	.00046	.00055	.00074	.00110	.00147	.00221	.00294	.08 x Dia 5 x Dia

MATERIAL	SFM	Hardness: 29-37 Rc (279-344 HBn)														
		Chip Load (IPT) by Dia			Depth of Cut		Chip Load (IPT) by Cutter Dia						Depth of Cut			
		0.015	0.031	0.047	Radial	Axial	0.062	0.078	0.093	0.125	0.187	0.250	0.375	0.500	Radial	Axial
CARBON STEELS																
Free-Machining/Low Carbon steels, 10xx - 1029 & all 10Lxx, 11xx - 1139 & all 11Lxx, 12xx - 1215 & all 12Lxx	600	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Roughing	.00003	.00007	.00010	.20 x Dia	.30 x Dia	.00012	.00015	.00018	.00024	.00036	.00048	.00072	.00096	.40 x Dia .30 x Dia
		Finishing	.00004	.00008	.00012	.04 x Dia	5 x Dia	.00014	.00018	.00021	.00029	.00043	.00057	.00086	.00115	.08 x Dia 5 x Dia
1030 - 1095, 1140 - 1151, 13xx, 15xx, 2xxx, 3xxx, 4xxx & 4Lxx, 5xxx & 5Lxx, 50xx & 50Lxx, 51xx & 51Lxx, 52xx & 52Lxx, 6xx, 8xx, 9xx	200	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Roughing	.00003	.00006	.00009	.20 x Dia	.30 x Dia	.00011	.00014	.00016	.00022	.00033	.00044	.00066	.00087	.40 x Dia .30 x Dia
		Finishing	.00004	.00007	.00011	.04 x Dia	5 x Dia	.00013	.00016	.00020	.00026	.00039	.00053	.00079	.00105	.08 x Dia 5 x Dia
STAINLESS STEELS																
203 EZ, 303 (all types), 416, 416Se, 416 Plus X, 420F, 420FSe, 430F, 430FSe, 440F, 440FSe	450	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Roughing	.00003	.00007	.00010	.20 x Dia	.30 x Dia	.00012	.00015	.00018	.00024	.00036	.00048	.00072	.00096	.40 x Dia .30 x Dia
		Finishing	.00004	.00008	.00012	.04 x Dia	5 x Dia	.00014	.00018	.00021	.00029	.00043	.00057	.00086	.00115	.08 x Dia 5 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	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Roughing	.00003	.00006	.00009	.20 x Dia	.30 x Dia	.00011	.00014	.00016	.00022	.00033	.00044	.00066	.00087	.40 x Dia .30 x Dia
		Finishing	.00004	.00007	.00011	.04 x Dia	5 x Dia	.00013	.00016	.00020	.00026	.00039	.00053	.00079	.00105	.08 x Dia 5 x Dia
414, 431, 440A, 440B, 440C, 13-8, 15-5, 15-7, 17-4, 17-7	150	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Roughing	.00002	.00004	.00006	.20 x Dia	.30 x Dia	.00007	.00009	.00010	.00014	.00020	.00027	.00041	.00055	.40 x Dia .30 x Dia
		Finishing	.00002	.00005	.00007	.04 x Dia	5 x Dia	.00008	.00010	.00012	.00016	.00025	.00033	.00049	.00066	.08 x Dia 5 x Dia
TOOL STEELS																
A, L, O, P, W series	200	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Roughing	.00003	.00006	.00009	.20 x Dia	.30 x Dia	.00011	.00014	.00016	.00022	.00033	.00044	.00066	.00087	.40 x Dia .30 x Dia
		Finishing	.00004	.00007	.00011	.04 x Dia	5 x Dia	.00013	.00016	.00020	.00026	.00039	.00053	.00079	.00105	.08 x Dia 5 x Dia
D, H, M, T, S series	150	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Roughing	.00002	.00004	.00006	.20 x Dia	.30 x Dia	.00007	.00009	.00010	.00014	.00020	.00027	.00041	.00055	.40 x Dia .30 x Dia
		Finishing	.00002	.00005	.00007	.04 x Dia	5 x Dia	.00008	.00010	.00012	.00016	.00025	.00033	.00049	.00066	.08 x Dia 5 x Dia
TITANIUM ALLOYS	150	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Roughing	.00002	.00004	.00006	.20 x Dia	.30 x Dia	.00007	.00009	.00010	.00014	.00020	.00027	.00041	.00055	.40 x Dia .30 x Dia
		Finishing	.00002	.00005	.00007	.04 x Dia	5 x Dia	.00008	.00010	.00012	.00016	.00025	.00033	.00049	.00066	.08 x Dia 5 x Dia
HIGH TEMP ALLOYS	70	Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Inconel, Hastelloy, Waspalloy, Monel, Nimonic, Haynes, Discoloy, Incoloy		Roughing	.00002	.00004	.00006	.20 x Dia	.30 x Dia	.00007	.00009	.00010	.00014	.00020	.00027	.00041	.00055	.40 x Dia .30 x Dia
		Finishing	.00002	.00005	.00007	.04 x Dia	5 x Dia	.00008	.00010	.00012	.00016	.00025	.00033	.00049	.00066	.08 x Dia 5 x Dia

MATERIAL	SFM	Hardness: 38-45 Rc (353-421 HBn)														
		Chip Load (IPT) by Dia			Depth of Cut		Chip Load (IPT) by Cutter Dia						Depth of Cut			
		0.015	0.031	0.047	Radial	Axial	0.062	0.078	0.093	0.125	0.187	0.250	0.375	0.500	Radial	Axial
		Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Roughing	.00002	.00003	.00005	.20 x Dia	.30 x Dia	.00005	.00007	.00008	.00011	.00016	.00022	.00033	.00044	.40 x Dia .30 x Dia
		Finishing	.00002	.00004	.00006	.04 x Dia	5 x Dia	.00007	.00008	.00010	.00013	.00020	.00026	.00040	.00053	.08 x Dia 5 x Dia
		Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Roughing	.00001	.00002	.00003	.20 x Dia	.30 x Dia	.00003	.00004	.00005	.00007	.00010	.00014	.00021	.00027	.40 x Dia .30 x Dia
		Finishing	.00001	.00002	.00004	.04 x Dia	5 x Dia	.00004	.00005	.00006	.00008	.00012	.00017	.00025	.00033	.08 x Dia 5 x Dia
		Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Roughing	.00002	.00003	.00005	.20 x Dia	.30 x Dia	.00005	.00007	.00008	.00011	.00016	.00022	.00033	.00044	.40 x Dia .30 x Dia
		Finishing	.00002	.00004	.00006	.04 x Dia	5 x Dia	.00007	.00008	.00010	.00013	.00020	.00026	.00040	.00053	.08 x Dia 5 x Dia
		Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Roughing	.00001	.00002	.00003	.20 x Dia	.30 x Dia	.00003	.00004	.00005	.00007	.00010	.00014	.00021	.00027	.40 x Dia .30 x Dia
		Finishing	.00001	.00002	.00004	.04 x Dia	5 x Dia	.00004	.00005	.00006	.00008	.00012	.00017	.00025	.00033	.08 x Dia 5 x Dia
		Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Roughing	.00001	.00002	.00003	.20 x Dia	.30 x Dia	.00003	.00004	.00005	.00007	.00010	.00014	.00021	.00027	.40 x Dia .30 x Dia
		Finishing	.00001	.00002	.00004	.04 x Dia	5 x Dia	.00004	.00005	.00006	.00008					