



Speeds & Feeds

Product Table: Miniature End Mills - Ball - Long Reach, Stub Flute
Characteristics: 18x Reach Multiple
Series: 9707xx, 9708xx

Hardness: ≤ 28 Rc (≤ 271 HBn)																	
MATERIAL	SFM	Chip Load (IPT) by Dia						Depth of Cut									
		Radial			Axial			Radial			Axial						
		0.015	0.031	0.047	0.062	0.078	0.093	0.125	0.187	0.250	0.375	0.500	0.093	0.125	0.187	0.250	0.375
ALUMINUM ALLOYS	750	Slotting	.00008	.00016	.00024	1 x Dia	.05 x Dia	.00028	.00035	.00041	.00056	.00063	.00111	.00167	.00223	1 x Dia	.12 x Dia
		Roughing	.00010	.00020	.00030	.14 x Dia	.22 x Dia	.00035	.00043	.00052	.00070	.00104	.00139	.00209	.00278	.30 x Dia	.20 x Dia
Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	1000	Finishing	.00020	.00042	.00063	.03 x Dia	1.5 x Dia	.00073	.00092	.00109	.00147	.00219	.00293	.00440	.00587	.06 x Dia	1.5 x Dia
		Slotting	.00007	.00014	.00022	1 x Dia	.05 x Dia	.00025	.00031	.00037	.00050	.00075	.00100	.00150	.00200	1 x Dia	.12 x Dia
Casting - 3%-5% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	750	Slotting	.00007	.00014	.00022	1 x Dia	.05 x Dia	.00025	.00031	.00037	.00050	.00075	.00100	.00150	.00200	1 x Dia	.12 x Dia
Casting - 5%-8% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	700	Slotting	.00009	.00018	.00027	1 x Dia	.05 x Dia	.00028	.00034	.00041	.00056	.00083	.00125	.00188	.00251	.30 x Dia	.20 x Dia
Casting - 8%-12% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	650	Roughing	.00009	.00018	.00027	.14 x Dia	.22 x Dia	.00031	.00039	.00047	.00063	.00094	.00125	.00188	.00251	.30 x Dia	.20 x Dia
Casting - 12%-16% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	475	Slotting	.00008	.00016	.00024	1 x Dia	.05 x Dia	.00028	.00035	.00041	.00056	.00083	.00111	.00167	.00223	1 x Dia	.12 x Dia
Wrought - 5%-8% Si (4xxx)	1000	Finishing	.00018	.00038	.00057	.03 x Dia	1.5 x Dia	.00065	.00082	.00098	.00132	.00197	.00264	.00396	.00528	.06 x Dia	1.5 x Dia
Wrought - 8%-12% Si (4xxx)	800	Slotting	.00008	.00016	.00024	1 x Dia	.05 x Dia	.00028	.00035	.00041	.00056	.00083	.00111	.00167	.00223	1 x Dia	.12 x Dia
MAGNESIUM ALLOYS	1500	Roughing	.00010	.00020	.00030	.14 x Dia	.22 x Dia	.00035	.00043	.00052	.00070	.00104	.00139	.00209	.00278	.30 x Dia	.20 x Dia
		Finishing	.00020	.00042	.00063	.03 x Dia	1.5 x Dia	.00073	.00092	.00109	.00147	.00219	.00293	.00440	.00587	.06 x Dia	1.5 x Dia
ZINC ALLOYS	800	Slotting	.00008	.00016	.00024	1 x Dia	.05 x Dia	.00028	.00035	.00041	.00056	.00083	.00111	.00167	.00223	1 x Dia	.12 x Dia
		Roughing	.00010	.00020	.00030	.14 x Dia	.22 x Dia	.00035	.00043	.00052	.00070	.00104	.00139	.00209	.00278	.30 x Dia	.20 x Dia
COPPER ALLOYS	225	Slotting	.00006	.00013	.00019	1 x Dia	.05 x Dia	.00022	.00028	.00033	.00045	.00067	.00089	.00134	.00178	1 x Dia	.12 x Dia
		Roughing	.00008	.00016	.00024	.14 x Dia	.22 x Dia	.00028	.00035	.00041	.00056	.00083	.00111	.00167	.00223	.30 x Dia	.20 x Dia
High Coppers - 90%+ (C1xxx)	500	Slotting	.00006	.00013	.00019	1 x Dia	.05 x Dia	.00022	.00028	.00033	.00045	.00067	.00089	.00134	.00178	1 x Dia	.12 x Dia
Brass (Copper Zinc alloys, C2xxx, C3xxx, C4xxx, C66400-C69800)	225	Slotting	.00006	.00013	.00019	1 x Dia	.05 x Dia	.00022	.00028	.00033	.00045	.00067	.00089	.00134	.00178	1 x Dia	.12 x Dia
Phosphor Bronzes (Copper Tin alloys, C5xxx)	500	Slotting	.00006	.00013	.00019	1 x Dia	.05 x Dia	.00022	.00028	.00033	.00045	.00067	.00089	.00134	.00178	1 x Dia	.12 x Dia
Aluminum Bronzes (Copper Aluminum alloys, C60600-C64200)	500	Roughing	.00008	.00016	.00024	.14 x Dia	.22 x Dia	.00028	.00035	.00041	.00056	.00083	.00111	.00167	.00223	.30 x Dia	.20 x Dia
Silicon Bronzes (Copper Silicon alloys, C64700-C66100)	500	Roughing	.00008	.00016	.00024	.14 x Dia	.22 x Dia	.00028	.00035	.00041	.00056	.00083	.00111	.00167	.00223	.30 x Dia	.20 x Dia
Copper Nicksels, Nickel Silvers (Copper Nickel alloys, C7xxx)	225	Slotting	.00006	.00013	.00019	1 x Dia	.05 x Dia	.00022	.00028	.00033	.00045	.00067	.00089	.00134	.00178	1 x Dia	.12 x Dia
Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)	550	Finishing	.00016	.00033	.00051	.03 x Dia	1.5 x Dia	.00058	.00073	.00087	.00117	.00176	.00235	.00352	.00469	.06 x Dia	1.5 x Dia

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.

Hardness: 29-37 Rc (279-344 HBn)																	
MATERIAL	SFM	Chip Load (IPT) by Dia						Depth of Cut									
		Radial			Axial			Radial			Axial						
		0.015	0.031	0.047	0.062	0.078	0.093	0.125	0.187	0.250	0.375	0.500	0.093	0.125	0.187	0.250	0.375
CARBON STEELS	600	Slotting	.00003	.00005	.00008	1 x Dia	.05 x Dia	.00009	.00012	.00014	.00019	.00029	.00038	.00057	.00077	1 x Dia	.12 x Dia
		Roughing	.00003	.00006	.00009	.14 x Dia	.22 x Dia	.00011	.00013	.00016	.00022	.00032	.00043	.00065	.00086	.30 x Dia	.20 x Dia
		Finishing	.00006	.00013	.00020	.03 x Dia	1.5 x Dia	.00023	.00029	.00034	.00046	.00069	.00092	.00138	.00183	.06 x Dia	1.5 x Dia
1030 - 1095, 1140 - 1151, 13xx, 15xx, 2xxx, 3xxx, 4xxx & 4Lxx, 5xxx & 5Lxx, 50xxx & 50Lxx, 51xxx & 51Lxx, 52xxx & 52Lxx, 6xxx, 8xx, 9xxx	200	Slotting	.00002	.00005	.00008	1 x Dia	.05 x Dia	.00009	.00011	.00013	.00017	.00026	.00035	.00052	.00070	1 x Dia	.12 x Dia
		Roughing	.00003	.00006	.00009	.14 x Dia	.22 x Dia	.00010	.00012	.00015	.00020	.00029	.00039	.00059	.00079	.30 x Dia	.20 x Dia
		Finishing	.00006	.00012	.00018	.03 x Dia	1.5 x Dia	.00021	.00026	.00031	.00042	.00063	.00084	.00126	.00168	.06 x Dia	1.5 x Dia
STAINLESS STEELS	450	Slotting	.00003	.00005	.00008	1 x Dia	.05 x Dia	.00009	.00012	.00014	.00019	.00029	.00038	.00057	.00077	1 x Dia	.12 x Dia
		Roughing	.00003	.00006	.00009	.14 x Dia	.22 x Dia	.00011	.00013	.00016	.00022	.00032	.00043	.00065	.00086	.30 x Dia	.20 x Dia
		Finishing	.00006	.00013	.00020	.03 x Dia	1.5 x Dia	.00023	.00029	.00034	.00046	.00069	.00092	.00138	.00183	.06 x Dia	1.5 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	.00002	.00005	.00008	1 x Dia	.05 x Dia	.00009	.00011	.00013	.00017	.00026	.00035	.00052	.00070	1 x Dia	.12 x Dia
		Roughing	.00003	.00006	.00009	.14 x Dia	.22 x Dia	.00010	.00012	.00015	.00020	.00029	.00039	.00059	.00079	.30 x Dia	.20 x Dia
		Finishing	.00006	.00012	.00018	.03 x Dia	1.5 x Dia	.00021	.00026	.00031	.00042	.00063	.00084	.00126	.00168	.06 x Dia	1.5 x Dia
414, 431, 440A, 440B, 440C, 13-8, 15-5, 15-7, 17-4, 17-7	150	Slotting	.00002	.00003	.00005	1 x Dia	.05 x Dia	.00005	.00007	.00008	.00011	.00016	.00022	.00033	.00044	1 x Dia	.12 x Dia
		Roughing	.00002	.00004	.00005	.14 x Dia	.22 x Dia	.00006	.00008	.00009	.00012	.00018	.00025	.00037	.00049	.30 x Dia	.20 x Dia
		Finishing	.00004	.00007	.00011	.03 x Dia	1.5 x Dia	.00013	.00016	.00019	.00026	.00039	.00052	.00079	.00105	.06 x Dia	1.5 x Dia
TOOL STEELS	200	Slotting	.00002	.00005	.00008	1 x Dia	.05 x Dia	.00009	.00011	.00013	.00017	.00026	.00035	.00052	.00070	1 x Dia	.12 x Dia
		Roughing	.00003	.00006	.00009	.14 x Dia	.22 x Dia	.00010	.00012	.00015	.00020	.00029	.00039	.00059	.00079	.30 x Dia	.20 x Dia
		Finishing	.00006	.00012	.00018	.03 x Dia	1.5 x Dia	.00021	.00026	.00031	.00042	.00063	.00084	.00126	.00168	.06 x Dia	1.5 x Dia
A, L, O, P, W series	150	Slotting	.00002	.00003	.00005	1 x Dia	.05 x Dia	.00005	.00007	.00008	.00011	.00016	.00022	.00033	.00044	1 x Dia	.12 x Dia
		Roughing	.00002	.00004	.00005	.14 x Dia	.22 x Dia	.00006	.00008	.00009	.00012	.00018	.00025	.00037	.00049	.30 x Dia	.20 x Dia
		Finishing	.00004	.00007	.00011	.03 x Dia	1.5 x Dia	.00013	.00016	.00019	.00026	.00039	.00052	.00079	.00105	.06 x Dia	1.5 x Dia
D, H, M, T, S series	150	Slotting	.00002	.00003	.00005	1 x Dia	.05 x Dia	.00005	.00007	.00008	.00011	.00016	.00022	.00033	.00044	1 x Dia	.12 x Dia
		Roughing	.00002	.00004	.00005	.14 x Dia	.22 x Dia	.00006	.00008	.00009	.00012	.00018	.00025	.00037	.00049	.30 x Dia	.20 x Dia
		Finishing	.00004	.00007	.00011	.03 x Dia	1.5 x Dia	.00013	.00016	.00019	.00026	.00039	.00052	.00079	.00105	.06 x Dia	1.5 x Dia
TITANIUM ALLOYS	150	Slotting	.00002	.00003	.00005	1 x Dia	.05 x Dia	.00005	.00007	.00008	.00011	.00016	.00022	.00033	.00044	1 x Dia	.12 x Dia
		Roughing	.00002	.00004	.00005	.14 x Dia	.22 x Dia	.00006	.00008	.00009	.00012	.00018	.00025	.00037	.00049	.30 x Dia	.20 x Dia
		Finishing	.00004	.00007	.00011	.03 x Dia	1.5 x Dia	.00013	.00016	.00019	.00026	.00039	.00052	.00079	.00105	.06 x Dia	1.5 x Dia
HIGH TEMP ALLOYS	70	Slotting	.00002	.00003	.00005	1 x Dia	.05 x Dia	.00005	.00007	.00008	.00011	.00016	.00022	.00033	.00044	1 x Dia	.12 x Dia
		Roughing	.00002	.00004	.00005	.14 x Dia	.22 x Dia	.00006	.00008	.00009	.00012	.00018	.00025	.00037	.00049	.30 x Dia	.20 x Dia
		Finishing	.00004	.00007	.00011	.03 x Dia	1.5 x Dia	.00013	.00016	.00019	.00026	.00039	.00052	.00079	.00105	.06 x Dia	1.5 x Dia

Hardness: 38-45 Rc (353-421 HBn)																
MATERIAL	SFM	Chip Load (IPT) by Dia						Depth of Cut								
		Radial			Axial			Radial			Axial					
		0.015	0.031	0.047	0.062	0.078	0.093	0.125	0.187	0.250	0.375	0.500	0.093	0.125	0.187	0.250
CARBON STEELS	600	Slotting	.00003	.00005	.00008	1 x Dia	.05 x Dia	.00009	.00012							