



Speeds & Feeds

Product Table: Miniature End Mills - Ball - Long Reach, Stub Flute
Characteristics: 25x Reach Multiple
Series: 401xx

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	750	Slotting	.00005	.00011	.00016	1 x Dia	.04 x Dia	.00018	.00023	.00028	.00037	.00056	.00074	.00111	.00149	1 x Dia	.10 x Dia
		Roughing	.00006	.00013	.00020	.13 x Dia	.20 x Dia	.00023	.00029	.00035	.00046	.00069	.00093	.00139	.00186	.25 x Dia	.20 x Dia
	1000	Finishing	.00016	.00033	.00051	.02 x Dia	1.5 x Dia	.00058	.00073	.00087	.00117	.00176	.00235	.00352	.00469	.05 x Dia	1.5 x Dia
		Slotting	.00005	.00010	.00014	1 x Dia	.04 x Dia	.00017	.00021	.00025	.00033	.00050	.00067	.00100	.00134	1 x Dia	.10 x Dia
MAGNESIUM ALLOYS	1500	Finishing	.00006	.00012	.00018	.13 x Dia	.20 x Dia	.00021	.00026	.00031	.00042	.00062	.00084	.00125	.00167	.25 x Dia	.20 x Dia
		Slotting	.00005	.00011	.00016	1 x Dia	.04 x Dia	.00018	.00023	.00028	.00037	.00056	.00074	.00111	.00149	1 x Dia	.10 x Dia
	800	Roughing	.00006	.00013	.00020	.13 x Dia	.20 x Dia	.00023	.00029	.00035	.00046	.00069	.00093	.00139	.00186	.25 x Dia	.20 x Dia
		Finishing	.00016	.00033	.00051	.02 x Dia	1.5 x Dia	.00058	.00073	.00087	.00117	.00176	.00235	.00352	.00469	.05 x Dia	1.5 x Dia
ZINC ALLOYS	225	Slotting	.00004	.00008	.00013	1 x Dia	.04 x Dia	.00015	.00019	.00022	.00030	.00044	.00059	.00089	.00119	1 x Dia	.10 x Dia
		Roughing	.00005	.00010	.00016	.13 x Dia	.20 x Dia	.00018	.00023	.00028	.00037	.00056	.00074	.00111	.00149	.25 x Dia	.20 x Dia
	500	Finishing	.00016	.00033	.00051	.02 x Dia	1.5 x Dia	.00058	.00073	.00087	.00117	.00176	.00235	.00352	.00469	.05 x Dia	1.5 x Dia
		Slotting	.00005	.00010	.00014	1 x Dia	.04 x Dia	.00017	.00021	.00025	.00033	.00050	.00067	.00100	.00134	1 x Dia	.10 x Dia
COPPER ALLOYS	225	Finishing	.00015	.00030	.00046	.02 x Dia	1.5 x Dia	.00052	.00066	.00079	.00106	.00158	.00211	.00317	.0422	.05 x Dia	1.5 x Dia
		Slotting	.00005	.00011	.00016	1 x Dia	.04 x Dia	.00018	.00023	.00028	.00037	.00056	.00074	.00111	.00149	1 x Dia	.10 x Dia
	500	Roughing	.00006	.00013	.00020	.13 x Dia	.20 x Dia	.00023	.00029	.00035	.00046	.00069	.00093	.00139	.00186	.25 x Dia	.20 x Dia
		Finishing	.00016	.00033	.00051	.02 x Dia	1.5 x Dia	.00058	.00073	.00087	.00117	.00176	.00235	.00352	.00469	.05 x Dia	1.5 x Dia
COPPER ALLOYS	225	Slotting	.00004	.00008	.00013	1 x Dia	.04 x Dia	.00015	.00019	.00022	.00030	.00044	.00059	.00089	.00119	1 x Dia	.10 x Dia
		Roughing	.00005	.00010	.00016	.13 x Dia	.20 x Dia	.00018	.00023	.00028	.00037	.00056	.00074	.00111	.00149	.25 x Dia	.20 x Dia
	500	Finishing	.00016	.00033	.00051	.02 x Dia	1.5 x Dia	.00058	.00073	.00087	.00117	.00176	.00235	.00352	.00469	.05 x Dia	1.5 x Dia
		Slotting	.00005	.00010	.00014	1 x Dia	.04 x Dia	.00017	.00021	.00025	.00033	.00050	.00067	.00100	.00134	1 x Dia	.10 x Dia
COPPER ALLOYS	225	Finishing	.00013	.00027	.00041	.02 x Dia	1.5 x Dia	.00047	.00059	.00070	.00094	.00140	.00188	.00282	.00375	.05 x Dia	1.5 x Dia
		Slotting	.00005	.00011	.00016	1 x Dia	.04 x Dia	.00018	.00023	.00028	.00037	.00056	.00074	.00111	.00149	1 x Dia	.10 x Dia
	500	Roughing	.00006	.00013	.00020	.13 x Dia	.20 x Dia	.00023	.00029	.00035	.00046	.00069	.00093	.00139	.00186	.25 x Dia	.20 x Dia
		Finishing	.00016	.00033	.00051	.02 x Dia	1.5 x Dia	.00058	.00073	.00087	.00117	.00176	.00235	.00352	.00469	.05 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.

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	600	Slotting	.00002	.00004	.00006	1 x Dia	.04 x Dia	.00006	.00008	.00009	.00013	.00019	.00026	.00038	.00051	1 x Dia	.10 x Dia
		Roughing	.00002	.00004	.00006	.13 x Dia	.20 x Dia	.00007	.00009	.00011	.00014	.00021	.00029	.00043	.00057	.25 x Dia	.20 x Dia
	200	Finishing	.00005	.00010	.00016	.02 x Dia	1.5 x Dia	.00018	.00023	.00027	.00037	.00055	.00073	.00110	.00147	.05 x Dia	1.5 x Dia
		Slotting	.00002	.00003	.00005	1 x Dia	.04 x Dia	.00006	.00007	.00009	.00012	.00017	.00023	.00035	.00047	1 x Dia	.10 x Dia
STAINLESS STEELS	450	Roughing	.00002	.00004	.00006	.13 x Dia	.20 x Dia	.00007	.00009	.00011	.00014	.00021	.00029	.00043	.00057	.25 x Dia	.20 x Dia
		Finishing	.00005	.00010	.00016	.02 x Dia	1.5 x Dia	.00018	.00023	.00027	.00037	.00055	.00073	.00110	.00147	.05 x Dia	1.5 x Dia
	200	Slotting	.00002	.00003	.00005	1 x Dia	.04 x Dia	.00006	.00007	.00009	.00012	.00017	.00023	.00035	.00047	1 x Dia	.10 x Dia
		Roughing	.00002	.00004	.00006	.13 x Dia	.20 x Dia	.00007	.00008	.00010	.00013	.00020	.00026	.00039	.00052	.25 x Dia	.20 x Dia
TOOL STEELS	150	Finishing	.00005	.00010	.00015	.02 x Dia	1.5 x Dia	.00017	.00021	.00025	.00034	.00050	.00067	.00101	.00134	.05 x Dia	1.5 x Dia
		Slotting	.00001	.00002	.00003	1 x Dia	.04 x Dia	.00004	.00005	.00005	.00007	.00011	.00015	.00022	.00029	1 x Dia	.10 x Dia
	200	Roughing	.00001	.00002	.00004	.13 x Dia	.20 x Dia	.00004	.00005	.00006	.00008	.00012	.00016	.00025	.00033	.25 x Dia	.20 x Dia
		Finishing	.00005	.00010	.00015	.02 x Dia	1.5 x Dia	.00017	.00021	.00025	.00034	.00050	.00067	.00101	.00134	.05 x Dia	1.5 x Dia
TITANIUM ALLOYS	150	Slotting	.00001	.00002	.00003	1 x Dia	.04 x Dia	.00004	.00005	.00005	.00007	.00011	.00015	.00022	.00029	1 x Dia	.10 x Dia
		Roughing	.00001	.00002	.00004	.13 x Dia	.20 x Dia	.00004	.00005	.00006	.00008	.00012	.00016	.00025	.00033	.25 x Dia	.20 x Dia
	70	Finishing	.00003	.00006	.00009	.02 x Dia	1.5 x Dia	.00010	.00013	.00016	.00021	.00031	.00042	.00063	.00084	.05 x Dia	1.5 x Dia
		Slotting	.00001	.00002	.00003	1 x Dia	.04 x Dia	.00004	.00005	.00005	.00007	.00011	.00015	.00022	.00029	1 x Dia	.10 x Dia
HIGH TEMP ALLOYS	70	Roughing	.00001	.00002	.00004	.13 x Dia	.20 x Dia	.00004	.00005	.00006	.00008	.00012	.00016	.00025	.00033	.25 x Dia	.20 x Dia
		Finishing	.00003	.00006	.00009	.02 x Dia	1.5 x Dia	.00010	.00013	.00016	.00021	.00031	.00042	.00063	.00084	.05 x Dia	1.5 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	
CARBON STEELS	600	Slotting	.00002	.00004	.00006	1 x Dia	.04 x Dia	.00006	.00008	.00009	.00013	.00019	.00026	.00038	.00051	1 x Dia	.10 x Dia
		Roughing	.00002	.00004	.00006	.13 x Dia	.20 x Dia	.00007	.00009	.00011	.00014	.00021	.00029	.00043	.00057	.25 x Dia	.20 x Dia
	200	Finishing	.00005	.00010	.00016	.02 x Dia	1.5 x Dia	.00018	.00023	.00027	.00037	.00055	.00073	.00110	.00147	.05 x Dia	1.5 x Dia
		Slotting	.00002	.00003	.00005	1 x Dia	.04 x Dia	.00006	.00007	.00009	.00012	.00017	.00023	.00035	.00047	1 x Dia	.10 x Dia
STAINLESS STEELS	450	Roughing	.00002	.00004	.00006	.13 x Dia	.20 x Dia	.00007	.00009	.00011	.00014	.00021	.00029	.00043	.00057	.25 x Dia	.20 x Dia
		Finishing	.00005	.00010	.00016	.02 x Dia	1.5 x Dia	.00018	.00023	.00027	.00037	.00055	.00073	.00110	.00147	.05 x Dia	1.5 x Dia
	200	Slotting	.00002	.00003	.00005	1 x Dia	.04 x Dia	.00006	.00007	.00009	.00012	.00017	.00023	.00035	.00047	1 x Dia	.10 x Dia
		Roughing	.00002	.00004	.00006	.13 x Dia	.20 x Dia	.00007	.00008	.00010	.00013	.00020	.00026	.00039	.00052	.25 x Dia	.20 x Dia
TOOL STEELS	150	Finishing	.00005	.00010	.00015	.02 x Dia	1.5 x Dia	.00017	.00021	.00025	.00034	.00050	.00067	.00101	.00134	.05 x Dia	1.5 x Dia
		Slotting	.00001	.00002	.00003	1 x Dia	.04 x Dia	.00004	.00005	.00005	.00007	.00011	.00015	.00022	.00029	1 x Dia	.10 x Dia
	200	Roughing	.00001	.00002	.00004	.13 x Dia	.20 x Dia	.00004	.00005	.00006	.00008	.00012	.00016	.00025	.00033	.25 x Dia	.20 x Dia
		Finishing	.00005	.00010	.00015	.02 x Dia	1.5 x Dia	.00017	.00021	.00025	.00034	.00050	.00067	.00101	.00134	.05 x Dia	1.5 x Dia
TITANIUM ALLOYS	150	Slotting	.00001	.00002	.00003	1 x Dia	.04 x Dia	.00004	.00005	.00005	.00007	.00011	.00015	.00022	.00029	1 x Dia	.10 x Dia
		Roughing	.00001	.00002	.00004	.13 x Dia	.20 x Dia	.00004	.00005	.00006	.00008	.00012	.00016	.00025	.00033	.25 x Dia	.20 x Dia
	70	Finishing	.00003	.00006	.00009	.02 x Dia	1.5 x Dia	.00010	.00013	.00016	.00021	.00031	.00042	.00063	.00084	.05 x Dia	1.5 x Dia
		Slotting	.00001	.00002	.00003	1 x Dia	.04 x Dia	.00004	.00005	.00005	.00007	.00011	.00015	.00022	.00029	1 x Dia	.10 x Dia
HIGH TEMP ALLOYS	70	Roughing	.00001	.00002	.00004	.13 x Dia	.20 x Dia	.00004	.00005	.00006	.00						