M223 Series Application Guide – Speed & Feed (inch)

ISO Code	Work Material	Type of Cut	Axial DOC	Radial DOC	Number of Flutes	Speed (SFM)	Feed (Inch per Tooth) 1/8	3/16	1/4	3/8	1/2	5/8	3/4	1
N	Aluminum Alloys 6061, 7075, 2024	Slotting	1 x D	1 x D	3	800	.0015	.0030	.0038	.0045	.0060	.0075	.0090	.0120
		Peripheral - Rough	≤ 2 x D	.5 x D	3	1000	.0020	.0040	.0050	.0060	.0080	.0100	.0120	.0160
		Peripheral - Rough	> 2 - 3 x D	.5 x D	3	1000	.0019	.0038	.0047	.0056	.0075	.0094	.0113	.0150
		Peripheral - Rough	> 3 - 4 x D	.45 x D	3	900	.0016	.0033	.0041	.0049	.0065	.0081	.0098	.0130
		Peripheral - Rough	> 4 - 5 x D	.4 x D	3	800	.0015	.0029	.0036	.0044	.0058	.0073	.0087	.0116
		Finish	2.5 x D	.015 x D	3	1200	.0007	.0014	.0017	.0020	.0027	.0034	.0041	.0054
		*Helical Ramp Angle	3.0 deg.	1 x D	3	800	.0012	.0024	.0030	.0036	.0048	.0060	.0072	.0096
	High Silicon Aluminum A380, A390	Slotting	.75 x D	1 x D	3	500	.0011	.0023	.0028	.0034	.0045	.0056	.0068	.0090
		Peripheral - Rough	≤ 2 x D	.4 x D	3	700	.0014	.0029	.0036	.0043	.0057	.0071	.0086	.0114
		Peripheral - Rough	> 2 - 3 x D	.4 x D	3	700	.0014	.0028	.0034	.0041	.0055	.0069	.0083	.0110
		Peripheral - Rough	> 3 - 4 x D	.375 x D	3	600	.0012	.0024	.0030	.0036	.0048	.0060	.0072	.0096
		Peripheral - Rough	> 4 - 5 x D	.35 x D	3	500	.0010	.0020	.0025	.0030	.0040	.0050	.0060	.0080
		Finish	2.5 x D	.015 x D	3	900	.0006	.0013	.0016	.0019	.0025	.0031	.0038	.0050
		*Helical Ramp Angle	2.5 deg.	1 x D	3	500	.0009	.0018	.0023	.0027	.0036	.0045	.0054	.0072
	Magnesium Alloys	Slotting	1 x D	1 x D	3	800	.0015	.0030	.0038	.0045	.0060	.0075	.0090	.0120
		Peripheral - Rough	≤ 2 x D	.5 x D	3	1000	.0020	.0040	.0050	.0060	.0080	.0100	.0120	.0160
		Peripheral - Rough	> 2 - 3 x D	.5 x D	3	1000	.0019	.0038	.0047	.0056	.0075	.0094	.0113	.0150
		Peripheral - Rough	> 3 - 4 x D	.45 x D	3	900	.0016	.0033	.0041	.0049	.0065	.0081	.0098	.0130
		Peripheral - Rough	> 4 - 5 x D	.4 x D	3	800	.0015	.0029	.0036	.0044	.0058	.0073	.0087	.0116
		Finish	2.5 x D	.015 x D	3	1200	.0007	.0014	.0017	.0020	.0027	.0034	.0041	.0054
		*Helical Ramp Angle	3.0 deg.	1 x D	3	800	.0012	.0024	.0030	.0036	.0048	.0060	.0072	.0096
	Copper Alloys, Brass	Slotting	.75 x D	1 x D	3	500	.0009	.0019	.0023	.0028	.0037	.0046	.0056	.0074
		Peripheral - Rough	≤ 2 x D	.4 x D	3	600	.0012	.0023	.0029	.0035	.0046	.0058	.0069	.0092
		Peripheral - Rough	> 2 - 3 x D	.4 x D	3	600	.0011	.0023	.0028	.0034	.0045	.0056	.0068	.0090
		Peripheral - Rough	> 3 - 4 x D	.375 x D	3	500	.0010	.0020	.0024	.0029	.0039	.0049	.0059	.0078
		Peripheral - Rough	> 4 - 5 x D	.35 x D	3	450	.0008	.0017	.0021	.0025	.0033	.0041	.0050	.0066
		Finish	2.5 x D	.015 x D	3	650	.0005	.0011	.0013	.0016	.0021	.0026	.0032	.0042
		*Helical Ramp Angle	2.5 deg.	1 x D	3	500	.0007	.0015	.0019	.0022	.0030	.0037	.0044	.0059
	Bronze	Slotting	.75 x D	1 x D	3	500	.0009	.0018	.0022	.0026	.0035	.0044	.0053	.0070
		Peripheral - Rough	≤ 2 x D	.4 x D	3	600	.0011	.0022	.0028	.0033	.0044	.0055	.0066	.0088
		Peripheral - Rough	> 2 - 3 x D	.4 x D	3	600	.0011	.0021	.0026	.0032	.0042	.0053	.0063	.0084
		Peripheral - Rough	> 3 - 4 x D	.375 x D	3	500	.0009	.0018	.0022	.0026	.0035	.0044	.0053	.0070
		Peripheral - Rough	> 4 - 5 x D	.35 x D	3	450	.0007	.0015	.0018	.0022	.0029	.0036	.0044	.0058
		Finish	2.5 x D	.015 x D	3	650	.0005	.0010	.0012	.0014	.0019	.0024	.0029	.0038
		*Helical Ramp Angle	2.0 deg.	1 x D	3	500	.0007	.0014	.0018	.0021	.0028	.0035	.0042	.0056
	Composites, Plastic, Fiberglass	Slotting	.75 x D	1 x D	3	500	.0011	.0023	.0028	.0034	.0045	.0056	.0068	.0090
		Peripheral - Rough	≤ 2 x D	.4 x D	3	700	.0014	.0029	.0036	.0043	.0057	.0071	.0086	.0114
		Peripheral - Rough	> 2 - 3 x D	.4 x D	3	700	.0014	.0028	.0034	.0041	.0055	.0069	.0083	.0110
		Peripheral - Rough	> 3 - 4 x D	.375 x D	3	600	.0012	.0024	.0030	.0036	.0048	.0060	.0072	.0096
		Peripheral - Rough	> 4 - 5 x D	.35 x D	3	500	.0010	.0020	.0025	.0030	.0040	.0050	.0060	.0080
		Finish	2.5 x D	.015 x D	3	900	.0006	.0013	.0016	.0019	.0025	.0031	.0038	.0050
		*Helical Ramp Angle	3.0 deg.	1 x D	3	500	.0009	.0018	.0023	.0027	.0036	.0045	.0054	.0072

*Straight-Line Ramp Angle = Helical Ramp Angle x 5 for entry up to 1 x D.

≈ Approximately Equals
≤ Less Than or Equal To
≥ Greater Than or Equal To
× Multiply
< Less Than
> Greater Than
= Equals

M223 Series Application Guide – Speed & Feed (metric)

ISO Code	Work Material	Type of Cut	Axial DOC	Radial DOC	Number of Flutes	Speed (M/min)	Feed (MM per Tooth) 3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	20.0	25.0
N	Aluminum Alloys 6061, 7075, 2024	Slotting	1 x D	1 x D	3	244	.0360	.0479	.0600	.0720	.0960	.1195	.1440	.1915	.2390	.2995
		Peripheral - Rough	≤ 2 x D	.5 x D	3	305	.0480	.0639	.0800	.0960	.1280	.1593	.1920	.2553	.3187	.3993
		Peripheral - Rough	> 2 - 3 x D	.5 x D	3	305	.0450	.0599	.0750	.0900	.1200	.1494	.1800	.2394	.2988	.3744
		Peripheral - Rough	> 3 - 4 x D	.45 x D	3	274	.0390	.0519	.0650	.0780	.1040	.1295	.1560	.2075	.2589	.3245
		Peripheral - Rough	> 4 - 5 x D	.4 x D	3	244	.0348	.0463	.0580	.0696	.0928	.1155	.1392	.1851	.2311	.2895
		Finish	2.5 x D	.015 x D	3	366	.0162	.0216	.0270	.0324	.0432	.0538	.0648	.0862	.1076	.1348
		*Helical Ramp Angle	3.0 deg.	1 x D	3	244	.0288	.0384	.0480	.0576	.0768	.0956	.1152	.1532	.1912	.2396
	High Silicon Aluminum A380, A390	Slotting	.75 x D	1 x D	3	152	.0270	.0360	.0450	.0540	.0720	.0896	.1080	.1436	.1793	.2246
		Peripheral - Rough	≤ 2 x D	.4 x D	3	213	.0342	.0456	.0570	.0684	.0912	.1135	.1368	.1819	.2271	.2845
		Peripheral - Rough	> 2 - 3 x D	.4 x D	3	213	.0330	.0440	.0550	.0660	.0880	.1096	.1320	.1755	.2191	.2745
		Peripheral - Rough	> 3 - 4 x D	.375 x D	3	183	.0288	.0384	.0480	.0576	.0768	.0956	.1152	.1532	.1912	.2396
		Peripheral - Rough	> 4 - 5 x D	.35 x D	3	152	.0240	.0320	.0400	.0480	.0640	.0797	.0960	.1277	.1593	.1997
		Finish	2.5 x D	.015 x D	3	274	.0150	.0200	.0250	.0300	.0400	.0498	.0600	.0798	.0996	.1248
		*Helical Ramp Angle	2.5 deg.	1 x D	3	152	.0216	.0288	.0360	.0432	.0576	.0717	.0864	.1149	.1434	.1797
	Magnesium Alloys	Slotting	1 x D	1 x D	3	244	.0360	.0479	.0600	.0720	.0960	.1195	.1440	.1915	.2390	.2995
		Peripheral - Rough	≤ 2 x D	.5 x D	3	305	.0480	.0639	.0800	.0960	.1280	.1593	.1920	.2553	.3187	.3993
		Peripheral - Rough	> 2 - 3 x D	.5 x D	3	305	.0450	.0599	.0750	.0900	.1200	.1494	.1800	.2394	.2988	.3744
		Peripheral - Rough	> 3 - 4 x D	.45 x D	3	274	.0390	.0519	.0650	.0780	.1040	.1295	.1560	.2075	.2589	.3245
		Peripheral - Rough	> 4 - 5 x D	.4 x D	3	244	.0348	.0463	.0580	.0696	.0928	.1155	.1392	.1851	.2311	.2895
		Finish	2.5 x D	.015 x D	3	366	.0162	.0216	.0270	.0324	.0432	.0538	.0648	.0862	.1076	.1348
		*Helical Ramp Angle	3.0 deg.	1 x D	3	244	.0288	.0384	.0480	.0576	.0768	.0956	.1152	.1532	.1912	.2396
	Copper Alloys, Brass	Slotting	.75 x D	1 x D	3	152	.0222	.0296	.0370	.0444	.0592	.0737	.0888	.1181	.1474	.1847
		Peripheral - Rough	≤ 2 x D	.4 x D	3	183	.0276	.0368	.0460	.0552	.0736	.0916	.1104	.1468	.1832	.2296
		Peripheral - Rough	> 2 - 3 x D	.4 x D	3	183	.0270	.0360	.0450	.0540	.0720	.0896	.1080	.1436	.1793	.2246
		Peripheral - Rough	> 3 - 4 x D	.375 x D	3	152	.0234	.0312	.0390	.0468	.0624	.0777	.0936	.1245	.1554	.1947
		Peripheral - Rough	> 4 - 5 x D	.35 x D	3	137	.0198	.0264	.0330	.0396	.0528	.0657	.0792	.1053	.1315	.1647
		Finish	2.5 x D	.015 x D	3	198	.0126	.0168	.0210	.0252	.0336	.0418	.0504	.0670	.0837	.1048
		*Helical Ramp Angle	2.5 deg.	1 x D	3	152	.0178	.0237	.0296	.0355	.0474	.0590	.0710	.0945	.1179	.1478
	Bronze	Slotting	.75 x D	1 x D	3	152	.0210	.0280	.0350	.0420	.0560	.0697	.0840	.1117	.1394	.1747
		Peripheral - Rough	≤ 2 x D	.4 x D	3	183	.0264	.0352	.0440	.0528	.0704	.0876	.1056	.1404	.1753	.2196
		Peripheral - Rough	> 2 - 3 x D	.4 x D	3	183	.0252	.0336	.0420	.0504	.0672	.0837	.1008	.1341	.1673	.2096
		Peripheral - Rough	> 3 - 4 x D	.375 x D	3	152	.0210	.0280	.0350	.0420	.0560	.0697	.0840	.1117	.1394	.1747
		Peripheral - Rough	> 4 - 5 x D	.35 x D	3	137	.0174	.0232	.0290	.0348	.0464	.0578	.0696	.0926	.1155	.1448
		Finish	2.5 x D	.015 x D	3	198	.0114	.0152	.0190	.0228	.0304	.0378	.0456	.0606	.0757	.0948
		*Helical Ramp Angle	2.0 deg.	1 x D	3	152	.0168	.0224	.0280	.0336	.0448	.0558	.0672	.0894	.1115	.1398
	Composites, Plastic, Fiberglass	Slotting	.75 x D	1 x D	3	152	.0270	.0360	.0450	.0540	.0720	.0896	.1080	.1436	.1793	.2246
		Peripheral - Rough	≤ 2 x D	.4 x D	3	213	.0342	.0456	.0570	.0684	.0912	.1135	.1368	.1819	.2271	.2845
		Peripheral - Rough	> 2 - 3 x D	.4 x D	3	213	.0330	.0440	.0550	.0660	.0880	.1096	.1320	.1755	.2191	.2745
		Peripheral - Rough	> 3 - 4 x D	.375 x D	3	183	.0288	.0384	.0480	.0576	.0768	.0956	.1152	.1532	.1912	.2396
		Peripheral - Rough	> 4 - 5 x D	.35 x D	3	152	.0240	.0320	.0400	.0480	.0640	.0797	.0960	.1277	.1593	.1997
		Finish	2.5 x D	.015 x D	3	274	.0150	.0200	.0250	.0300	.0400	.0498	.0600	.0798	.0996	.1248
		*Helical Ramp Angle	3.0 deg.	1 x D	3	152	.0216	.0288	.0360	.0432	.0576	.0717	.0864	.1149	.1434	.1797

*Straight-Line Ramp Angle = Helical Ramp Angle x 5 for entry up to 1 x D.