

# 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.

- D** Tool Diameter
- Z** Number of Flutes
- RPM** Revolutions per Minute
- SFM** Surface Feet per Minute
- M/min** Surface Meters per Minute
- IPM** Inches per Minute
- MPPM** Millimeters per Minute
- IPT** Inch per Tooth
- MMPT** Millimeters per Tooth
- MRR** Metal Removal Rate
- RDOC** Radial Depth of Cut
- ADOC** Axial Depth of Cut

## Technical Resources

Information on tips and adjustments for the following milling operations can be found in our Technical Resources section beginning on page 125.

- HEM slotting
- Face milling
- Helical entry ramping
- Straight line ramping
- Long tool projection adjustments
- Ball nose milling adjustments
- Other helpful tips and calculations