



# Speed & Feed Recommendations

Z1M, Z1MB Metric	HARDNESS BRINELL	CUT Type	SPEED m/min	FEED (mm/flute)					
				3	6	10	12	20	25
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	Slot	154	0.0091	0.024	0.051	0.060	0.080	0.088
		Profile	192	0.0091	0.024	0.051	0.060	0.080	0.088
		Light	317	0.0206	0.055	0.115	0.137	0.184	0.200
	> 175 ≤ 275	Slot	134	0.0091	0.024	0.051	0.060	0.080	0.088
		Profile	168	0.0091	0.024	0.051	0.060	0.080	0.088
		Light	278	0.0206	0.055	0.115	0.137	0.184	0.200
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	Slot	113	0.0067	0.019	0.037	0.046	0.061	0.065
		Profile	141	0.0067	0.019	0.037	0.046	0.061	0.065
		Light	233	0.0156	0.041	0.085	0.103	0.139	0.150
	> 275 ≤ 375	Slot	77	0.0067	0.019	0.037	0.046	0.061	0.065
		Profile	96	0.0067	0.019	0.037	0.046	0.061	0.065
		Light	158	0.0156	0.041	0.085	0.103	0.139	0.150
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	Slot	73	0.0060	0.017	0.032	0.041	0.053	0.058
		Profile	91	0.0060	0.017	0.032	0.041	0.053	0.058
		Light	151	0.0137	0.036	0.075	0.091	0.120	0.133
	> 250 ≤ 375	Slot	45	0.0048	0.012	0.027	0.031	0.043	0.045
		Profile	56	0.0048	0.012	0.027	0.031	0.043	0.045
		Light	93	0.0108	0.029	0.061	0.072	0.096	0.105
CAST IRON Gray, Malleable, Ductile	≤ 220	Slot	108	0.0084	0.022	0.048	0.058	0.075	0.083
		Profile	135	0.0084	0.022	0.048	0.058	0.075	0.083
		Light	223	0.0194	0.053	0.109	0.130	0.173	0.190
	> 220 ≤ 260	Slot	80	0.0084	0.022	0.048	0.058	0.075	0.083
		Profile	101	0.0084	0.022	0.048	0.058	0.075	0.083
		Light	166	0.0194	0.053	0.109	0.130	0.173	0.190
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 275	Slot	138	0.0065	0.017	0.037	0.043	0.059	0.063
		Profile	173	0.0065	0.017	0.037	0.043	0.059	0.063
		Light	286	0.0149	0.041	0.083	0.098	0.133	0.145
STAINLESS (difficult) 304, 304L, 316, 316L	≤ 275	Slot	96	0.0053	0.014	0.029	0.034	0.045	0.050
		Profile	120	0.0053	0.014	0.029	0.034	0.045	0.050
		Light	198	0.0120	0.031	0.067	0.079	0.107	0.115
STAINLESS (PH) 17-4PH, 15-5PH, Custom 450, 16- 6PH, PH13-8Mo	≤ 325	Slot	88	0.0053	0.014	0.029	0.034	0.045	0.050
		Profile	110	0.0053	0.014	0.029	0.034	0.045	0.050
		Light	181	0.0120	0.031	0.067	0.079	0.107	0.115
TITANIUM Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 350	Slot	52	0.0048	0.012	0.027	0.031	0.043	0.045
		Profile	65	0.0048	0.012	0.027	0.031	0.043	0.045
		Light	108	0.0108	0.029	0.061	0.072	0.096	0.105
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Incoloy, Inconel, Rene, Waspalloy	≤ 300	Slot	19	0.0036	0.010	0.021	0.024	0.032	0.035
		Profile	24	0.0036	0.010	0.021	0.024	0.032	0.035
		Light	40	0.0082	0.022	0.045	0.055	0.075	0.080

CUT TYPE			rpm = (1000 x m/min) / (3.14 x D <sub>1</sub> ) mm/min = (mm/flute) x rpm • maximum recommended depths shown • reduce speed and feed for materials harder than listed • * finish cuts typically require reduced feed and cutting depths of 0.02 x D <sub>1</sub> maximum • refer to the SGS Tool Wizard for more complete technical information (available at ) • Max. ramp angle = 6° / Max. ramp depth = 1xD (reduce feed accordingly)
SLOT	PROFILE	LIGHT*	
a <sub>p</sub> = D <sub>1</sub> a <sub>e</sub> = D <sub>1</sub>	a <sub>p</sub> = 1.5 x D <sub>1</sub> a <sub>e</sub> = 0.5 x D <sub>1</sub>	a <sub>p</sub> = L <sub>2</sub> a <sub>e</sub> = 0.05 x D <sub>1</sub>	
			