

Speed & Feed Recommendations



Z1M, Z1MB Metric		HARDNESS		CUT	SPEED	FEED (mm/flute)				
		BRINELL		Type	m/min	3	6	10	12	20
<div></div> 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	
<div></div> 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	
<div></div> 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	
<div></div> 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	
<div></div> 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	
<div></div> 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	
<div></div> 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	
<div></div> 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	
<div></div> 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 ₁) ipm = (mm/flute) x 4 x rpm
SLOT	PROFILE	LIGHT*	
Rw = D ₁ Ad = D ₁	Rw = .5 x D ₁ Ad = 1.5 x D ₁	Rw = .05 x D ₁ Ad = L ₂	<ul style="list-style-type: none"> • maximum recommended depths shown • reduce speed and feed for materials harder than listed * finish cuts typically require reduced feed and cutting depths of .02 x D₁ maximum • refer to the SGS Tool Wizard for more complete technical information (available at)