

IPT11/IPC11 Application Guide – Speed & Feed (inch)

ISO Code	Work Material	Type of Cut	Axial DOC	Radial DOC	No. of Flutes	Speed (SFM)	1/2	5/8	3/4	1	1-1/4
K	Gray ASTM-A48 Class 20, 25, 30, 35 & 40	Peripheral - HEM	≤ 2 x D	.08 x D	11	365	.0053	.0066	.0080	.0106	.0133
		Peripheral - HEM	> 2 - 3 x D	.07 x D	11	365	.0046	.0058	.0069	.0092	.0115
		Peripheral - HEM	> 3 - 3.5 x D	.07 x D	11	350	.0040	.0050	.0060	.0080	.0100
		Peripheral - HEM	> 3.5 - 4 x D	.065 x D	11	350	.0034	.0043	.0051	.0068	.0085
		Finish	3 x D	.01 x D	11	370	.0022	.0028	.0033	.0044	.0055
	Cast Iron Malleable	Peripheral - HEM	≤ 2 x D	.07 x D	11	375	.0063	.0079	.0095	.0126	.0158
		Peripheral - HEM	> 2 - 3 x D	.07 x D	11	375	.0056	.0070	.0084	.0112	.0140
		Peripheral - HEM	> 3 - 3.5 x D	.07 x D	11	360	.0048	.0060	.0072	.0096	.0120
		Peripheral - HEM	> 3.5 - 4 x D	.07 x D	11	360	.0040	.0050	.0060	.0080	.0100
		Finish	3 x D	.01 x D	11	335	.0023	.0029	.0035	.0046	.0058
P	Low Carbon Steels ≤ 38 Rc 1018, 1020, 12L14, 5120, 8620	Peripheral - HEM	≤ 2 x D	.07 x D	11	550	.0055	.0069	.0083	.0110	.0138
		Peripheral - HEM	> 2 - 3 x D	.07 x D	11	530	.0048	.0060	.0072	.0096	.0120
		Peripheral - HEM	> 3 - 3.5 x D	.07 x D	11	515	.0042	.0053	.0063	.0084	.0105
		Peripheral - HEM	> 3.5 - 4 x D	.07 x D	11	505	.0036	.0045	.0054	.0072	.0090
		Finish	3 x D	.01 x D	11	475	.0020	.0025	.0030	.0040	.0050
	Medium Carbon Steels ≤ 48 HRC 1045, 4140, 4340, 5140	Peripheral - HEM	≤ 2 x D	.07 x D	11	530	.0054	.0068	.0081	.0108	.0135
		Peripheral - HEM	> 2 - 3 x D	.07 x D	11	515	.0047	.0059	.0071	.0094	.0118
		Peripheral - HEM	> 3 - 3.5 x D	.07 x D	11	500	.0041	.0051	.0062	.0082	.0103
		Peripheral - HEM	> 3.5 - 4 x D	.07 x D	11	490	.0035	.0044	.0053	.0070	.0088
		Finish	3 x D	.01 x D	11	455	.0019	.0024	.0029	.0038	.0048
	Tool and Die Steels ≤ 48 Rc A2, D2, O1, S7, P20, H13	Peripheral - HEM	≤ 2 x D	.06 x D	11	445	.0063	.0079	.0095	.0126	.0158
		Peripheral - HEM	> 2 - 3 x D	.06 x D	11	430	.0055	.0069	.0083	.0110	.0138
		Peripheral - HEM	> 3 - 3.5 x D	.06 x D	11	415	.0048	.0060	.0072	.0096	.0120
		Peripheral - HEM	> 3.5 - 4 x D	.06 x D	11	410	.0041	.0051	.0062	.0082	.0103
		Finish	3 x D	.01 x D	11	385	.0020	.0025	.0030	.0040	.0050
M	Martensitic & Ferritic Stainless Steels 410, 416, 440	Peripheral - HEM	≤ 2 x D	.06 x D	11	450	.0068	.0085	.0102	.0136	.0170
		Peripheral - HEM	> 2 - 3 x D	.06 x D	11	450	.0060	.0075	.0090	.0120	.0150
		Peripheral - HEM	> 3 - 3.5 x D	.06 x D	11	425	.0054	.0068	.0081	.0108	.0135
		Peripheral - HEM	> 3.5 - 4 x D	.06 x D	11	425	.0044	.0055	.0066	.0088	.0110
		Finish	3 x D	.01 x D	11	390	.0023	.0029	.0035	.0046	.0058
	Austenitic Stainless Steels, FeNi Alloys 303, 304, 316, Invar, Kovar	Peripheral - HEM	≤ 2 x D	.06 x D	11	445	.0067	.0084	.0101	.0134	.0168
		Peripheral - HEM	> 2 - 3 x D	.06 x D	11	430	.0059	.0074	.0089	.0118	.0148
		Peripheral - HEM	> 3 - 3.5 x D	.06 x D	11	415	.0052	.0065	.0078	.0104	.0130
		Peripheral - HEM	> 3.5 - 4 x D	.06 x D	11	410	.0043	.0054	.0065	.0086	.0108
		Finish	3 x D	.01 x D	11	385	.0025	.0031	.0038	.0050	.0063
	Precipitation Hardening Stainless Steels 17-4, 15-5	Peripheral - HEM	≤ 2 x D	.06 x D	11	435	.0068	.0085	.0102	.0136	.0170
		Peripheral - HEM	> 2 - 3 x D	.06 x D	11	420	.0060	.0075	.0090	.0120	.0150
		Peripheral - HEM	> 3 - 3.5 x D	.06 x D	11	405	.0052	.0065	.0078	.0104	.0130
		Peripheral - HEM	> 3.5 - 4 x D	.06 x D	11	400	.0043	.0054	.0065	.0086	.0108
		Finish	3 x D	.01 x D	11	375	.0022	.0028	.0033	.0044	.0055
S	Titanium Alloys 6Al-4V, 6-2-4	Peripheral - HEM	≤ 2 x D	.06 x D	11	425	.0060	.0075	.0090	.0120	.0150
		Peripheral - HEM	> 2 - 3 x D	.06 x D	11	415	.0043	.0054	.0065	.0086	.0108
		Peripheral - HEM	> 3 - 3.5 x D	.06 x D	11	395	.0042	.0053	.0063	.0084	.0105
		Peripheral - HEM	> 3.5 - 4 x D	.06 x D	11	395	.0039	.0049	.0059	.0078	.0098
		Finish	3 x D	.015 x D	11	370	.0023	.0029	.0035	.0046	.0058
	Difficult-to-Machine Titanium Alloys 10-2-3	Peripheral - HEM	≤ 2 x D	0.06 x D	11	350	.0059	.0074	.0089	.0118	.0148
		Peripheral - HEM	> 2 - 3 x D	0.06 x D	11	330	.0042	.0053	.0063	.0084	.0105
		Peripheral - HEM	> 3 - 3.5 x D	0.055 x D	11	315	.0041	.0051	.0062	.0082	.0103
	Precipitation Hardening Stainless Steel M 13-8	Peripheral - HEM	> 3.5 - 4 x D	0.05 x D	11	310	.0038	.0048	.0057	.0076	.0095
		Finish	3 x D	.01 x D	11	300	.0020	.0025	.0030	.0040	.0050
	Hastalloy, Waspalloy	Peripheral - HEM	≤ 2 x D	.07 x D	11	105	.0090	.0113	.0135	.0180	.0225
		Peripheral - HEM	> 2 - 3 x D	.065 x D	11	100	.0081	.0101	.0122	.0162	.0203
		Peripheral - HEM	> 3 - 3.5 x D	.055 x D	11	90	.0072	.0090	.0108	.0144	.0180
		Peripheral - HEM	> 3.5 - 4 x D	.055 x D	11	90	.0065	.0081	.0097	.0130	.0162
		Finish	3 x D	.01 x D	11	90	.0047	.0059	.0071	.0094	.0118
	Inconel 718, Rene 88	Peripheral - HEM	≤ 2 x D	.065 x D	11	100	.0062	.0078	.0093	.0124	.0155
		Peripheral - HEM	> 2 - 3 x D	.06 x D	11	95	.0060	.0075	.0090	.0120	.0150
		Peripheral - HEM	> 3 - 3.5 x D	.05 x D	11	95	.0060	.0075	.0090	.0120	.0150
		Peripheral - HEM	> 3.5 - 4 x D	.05 x D	11	95	.0052	.0065	.0078	.0104	.0130
		Finish	3 x D	.01 x D	11	90	.0032	.0040	.0048	.0064	.0080

D = Tool Diameter HEM = High-efficiency machining (chip thinning calculations have already been applied to HEM parameters)

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