IPT7 & IPC7 Series Application Guide – Speed & Feed (inch)

ISO Classification	Work Material	Type of Cut	Axial DOC	Radial DOC	Number of Flutes	Speed (SFM)	Feed (Inches per Tooth) 3/16	1/4	3/8	1/2	5/8	3/4	1
K	Cast Iron - Gray	Peripheral - HEM*	<=3 x D	.1 x D	7	400	0.0027	0.0036	0.0054	0.0072	0.0090	0.0108	0.0144
	ASTM-A48	Peripheral - HEM*	>3xD-4xD	.08 x D	7	400	0.0024	0.0032	0.0049	0.0065	0.0081	0.0097	0.0130
	Class 20, 25, 30, 35 & 40	Peripheral - HEM*	>4xD-5xD	.08 x D	7	390	0.0022	0.0029	0.0043	0.0058	0.0072	0.0086	0.0115
		Finish	3 x D	.015 x D	7	450	0.0010	0.0013	0.0020	0.0026	0.0033	0.0039	0.0052
	Cast Iron	Peripheral - HEM*	<=3 x D	.08 x D	7	390	0.0022	0.0029	0.0044	0.0058	0.0073	0.0087	0.0116
	Malleable	Peripheral - HEM*	>3xD-4xD	.08 x D	7	390	0.0020	0.0026	0.0039	0.0052	0.0065	0.0078	0.0104
		Peripheral - HEM*	>4xD-5xD	.08 x D	7	375	0.0017	0.0023	0.0035	0.0046	0.0058	0.0070	0.0093
		Finish	3 x D	.015 x D	7	350	0.0008	0.0011	0.0016	0.0021	0.0026	0.0032	0.0042
P	Low Carbon Steel ≤ 38 Rc	Peripheral - HEM*	<=3 x D	.08 x D	7	485	0.0028	0.0038	0.0056	0.0075	0.0094	0.0113	0.0150
	1018, 1020, 12L14, 5120, 8620	Peripheral - HEM*	>3xD-4xD	.08 x D	7	485	0.0025	0.0034	0.0051	0.0068	0.0084	0.0101	0.0135
		Peripheral - HEM*	>4xD-5xD	.08 x D	7	465	0.0023	0.0030	0.0045	0.0060	0.0075	0.0090	0.0120
		Finish	3 x D	.015 x D	7	420	0.0011	0.0014	0.0021	0.0028	0.0035	0.0042	0.0056
	Medium Carbon Steels ≤ 48 Rc	Peripheral - HEM*	<=3 x D	.08 x D	7	450	0.0027	0.0036	0.0053	0.0071	0.0089	0.0107	0.0142
	1045, 4140, 4340, 5140	Peripheral - HEM*	>3xD-4xD	.08 x D	7	450	0.0024	0.0032	0.0048	0.0064	0.0080	0.0096	0.0128
		Peripheral - HEM*	>4xD-5xD	.08 x D	7	425	0.0021	0.0028	0.0043	0.0057	0.0071	0.0085	0.0114
		Finish	3 x D	.015 x D	7	390	0.0009	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050
	Tool & Die Steels ≤ 48 Rc	Peripheral - HEM*	<=3 x D	.08 x D	7	420	0.0024	0.0032	0.0048	0.0064	0.0080	0.0096	0.0128
	A2, D2, O1, S7, P20, H13	Peripheral - HEM*	>3xD-4xD	.08 x D	7	420	0.0022	0.0029	0.0043	0.0058	0.0072	0.0086	0.0115
		Peripheral - HEM*	>4xD-5xD	.08 x D	7	395	0.0019	0.0026	0.0038	0.0051	0.0064	0.0077	0.0102
		Finish	3 x D	.015 x D	7	365	0.0008	0.0011	0.0016	0.0021	0.0026	0.0032	0.0042
M	Austenitic Stainless Steels,	Peripheral - HEM*	<=3 x D	.08 x D	7	450	0.0024	0.0032	0.0048	0.0064	0.0080	0.0096	0.0128
	FeNi Alloys	Peripheral - HEM*	>3xD-4xD	.08 x D	7	440	0.0022	0.0029	0.0043	0.0058	0.0072	0.0086	0.0115
	303, 304, 316, Invar, Kovar	Peripheral - HEM*	>4xD-5xD	.07 x D	7	425	0.0019	0.0026	0.0038	0.0051	0.0064	0.0077	0.0102
		Finish	3 x D	.015 x D	7	390	0.0009	0.0012	0.0018	0.0024	0.0030	0.0036	0.0048
	Martensitic & Ferritic	Peripheral - HEM*	<=3 x D	.08 x D	7	450	0.0028	0.0038	0.0056	0.0075	0.0094	0.0113	0.0150
	Stainless Steels	Peripheral - HEM*	>3xD-4xD	.08 x D	7	450	0.0025	0.0034	0.0051	0.0068	0.0084	0.0101	0.0135
	410, 416, 440	Peripheral - HEM*	>4xD-5xD	.08 x D	7	425	0.0023	0.0030	0.0045	0.0060	0.0075	0.0090	0.0120
		Finish	3 x D	.015 x D	7	390	0.0009	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050
	Precipitation Hardening	Peripheral - HEM*	<=3 x D	.08 x D	7	440	0.0023	0.0031	0.0047	0.0062	0.0078	0.0093	0.0124
	Stainless Steels	Peripheral - HEM*	>3xD-4xD	.08 x D	7	440	0.0021	0.0028	0.0042	0.0056	0.0070	0.0084	0.0112
	17-4, 15-5, 13-8	Peripheral - HEM*	>4xD-5xD	.07 x D	7	415	0.0019	0.0025	0.0037	0.0050	0.0062	0.0074	0.0099
		Finish	3 x D	.015 x D	7	380	0.0008	0.0010	0.0015	0.0020	0.0025	0.0030	0.0040
S	Titanium Alloys	Peripheral - HEM*	<=3 x D	.1 x D	7	405	0.0015	0.0021	0.0031	0.0041	0.0051	0.0062	0.0082
	6Al-4V, 6-2-4	Peripheral - HEM*	>3xD-4xD	.08 x D	7	405	0.0014	0.0018	0.0028	0.0037	0.0046	0.0055	0.0074
		Peripheral - HEM*	>4xD-5xD	.08 x D	7	390	0.0012	0.0016	0.0025	0.0033	0.0041	0.0049	0.0066
		Finish	3 x D	.015 x D	7	350	0.0006	0.0008	0.0012	0.0016	0.0020	0.0024	0.0032
	Difficult to Machine	Peripheral - HEM*	<=2.5 x D	.08 x D	7	335	0.0015	0.0020	0.0030	0.0040	0.0050	0.0060	0.0080
	Titanium Alloys	Peripheral - HEM*	>2.5xD-3.5xD	.07 x D	7	325	0.0014	0.0018	0.0027	0.0036	0.0045	0.0054	0.0072
	10-2-3	Peripheral - HEM*	>3.5xD-4xD	.06 x D	7	305	0.0012	0.0016	0.0024	0.0032	0.0040	0.0048	0.0064
		Finish	3 x D	.01 x D	7	290	0.0005	0.0007	0.0011	0.0014	0.0018	0.0021	0.0028
	Hastalloy, Waspalloy	Peripheral - HEM*	<=1.5 x D	.08 x D	7	100	0.0035	0.0047	0.0071	0.0094	0.0118	0.0141	0.0188
		Peripheral - HEM*	>1.5xD-2.5xD	.08 x D	7	95	0.0032	0.0042	0.0063	0.0085	0.0106	0.0127	0.0169
		Peripheral - HEM*	>2.5xD-3.5xD	.06 x D	7	85	0.0028	0.0038	0.0056	0.0075	0.0094	0.0113	0.0150
		Finish	2 x D	.01 x D	7	90	0.0019	0.0025	0.0038	0.0050	0.0063	0.0075	0.0100
	Inconel 718, Rene 88	Peripheral - HEM*	<=1.5 x D	.07 x D	7	95	0.0035	0.0047	0.0070	0.0093	0.0116	0.0140	0.0186
		Peripheral - HEM*	>1.5xD-2.5xD	.06 x D	7	90	0.0031	0.0042	0.0063	0.0084	0.0105	0.0126	0.0167
		Peripheral - HEM*	>2.5xD-3xD	.06 x D	7	85	0.0028	0.0037	0.0056	0.0074	0.0093	0.0112	0.0149
		Finish	2 x D	.01 x D	7	85	0.0018	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096

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

Common Machining Formulas:

$$RPM = \frac{SFM \times 3.82}{D}$$

$$SFM = RPM \times D \times .262$$

$$IPM = RPM \times IPT \times Z$$

$$MRR = RDOC \times ADOC \times IPM$$

D	Tool Cutting Diameter
Z	Number of Flutes
RPM	Revolutions per Minute
SFM	Surface Feet per Minute
IPM	Inches per Minute
IPT	Inch per Tooth
MRR	Metal Removal Rate
RDOC	Radial Depth of Cut
ADOC	Axial Depth of Cut