

POW•R•FEED M90 END MILLS

For high performance milling in a broad range of materials

Application Guide • Speed & Feed

Work Material	Type of Cut	Axial DOC	Radial DOC	No. of Flutes	Speed (SFM)	Feed (Inches per Tooth)							Speed (m/min)	Feed (mm per Tooth)						
						1/8	1/4	3/8	1/2	5/8	3/4	1		3,0	6,0	9,0	12,0	16,0	19,0	25,0
Cast Iron - Gray	Slot	1 x D	1 x D	4	400	.0006	.0012	.0019	.0025	.0031	.0038	.0050	122	.0152	.0305	.0483	.0635	.0787	.0965	.1270
	Rough	1.5 x D	.5 x D	4	500	.0007	.0015	.0023	.0030	.0037	.0046	.0060	152	.0183	.0381	.0579	.0762	.0945	.1158	.1524
	Rough	1.5 x D	.5 x D	5	500	--	.0014	.0021	.0028	.0035	.0043	.0056	152	--	.0356	.0533	.0711	.0889	.1092	.1422
	Finish	1.5 x D	.01 x D	5	650	--	.0014	.0021	.0028	.0035	.0043	.0056	198	--	.0356	.0533	.0711	.0889	.1092	.1422
Cast Iron - Ductile	Slot	1 x D	1 x D	4	300	.0006	.0012	.0018	.0023	.0029	.0035	.0046	91	.0152	.0305	.0483	.0635	.0787	.0965	.1270
	Rough	1.5 x D	.5 x D	4	400	.0007	.0014	.0021	.0028	.0035	.0042	.0056	122	.0183	.0356	.0533	.0711	.0889	.1067	.1422
	Rough	1.5 x D	.5 x D	5	400	--	.0013	.0020	.0027	.0033	.0040	.0054	122	--	.0330	.0508	.0686	.0838	.1016	.1372
	Finish	1.5 x D	.01 x D	5	520	--	.0013	.0020	.0027	.0033	.0040	.0054	158	--	.0330	.0508	.0686	.0838	.1016	.1372
Cast Iron - Malleable	Slot	0.75	1 x D	4	250	.0004	.0008	.0012	.0015	.0019	.0023	.0030	76	.0102	.0203	.0305	.0381	.0483	.0584	.0762
	Rough	1 x D	.75 x D	4	325	.0005	.0011	.0016	.0022	.0027	.0033	.0044	99	.0127	.0279	.0406	.0559	.0686	.0838	.1118
	Rough	1 x D	.75 x D	5	325	--	.0010	.0015	.0021	.0026	.0032	.0042	99	--	.0254	.0381	.0533	.0660	.0813	.1067
	Finish	1.5 x D	.01 x D	5	425	--	.0010	.0015	.0021	.0026	.0032	.0042	130	--	.0254	.0381	.0533	.0660	.0813	.1067
Low Carbon Steel ≤ 38 HRC 1018, 12L14, 8620	Slot	1 x D	1 x D	4	350	.0008	.0016	.0024	.0032	.0040	.0048	.0064	107	.0203	.0406	.0610	.0813	.1016	.1219	.1626
	Rough	1.5 x D	.5 x D	4	425	.0010	.0020	.0030	.0040	.0050	.0060	.0080	130	.0254	.0508	.0762	.1016	.1270	.1524	.2032
	Rough	1.5 x D	.5 x D	5	425	--	.0019	.0028	.0038	.0047	.0057	.0076	130	--	.0483	.0711	.0965	.1194	.1448	.1930
	Finish	1.5 x D	.01 x D	5	550	--	.0019	.0028	.0038	.0047	.0057	.0076	168	--	.0483	.0711	.0965	.1194	.1448	.1930
Medium Carbon Steels ≤ 38 HRC 4140, 4340	Slot	1 x D	1 x D	4	325	.0006	.0013	.0020	.0027	.0034	.0040	.0054	99	.0152	.0330	.0508	.0686	.0864	.1016	.1372
	Rough	1.5 x D	.5 x D	4	375	.0008	.0017	.0026	.0035	.0044	.0053	.0070	114	.0203	.0432	.0660	.0889	.1118	.1346	.1778
	Rough	1.5 x D	.5 x D	5	375	--	.0016	.0025	.0034	.0042	.0051	.0068	114	--	.0406	.0635	.0864	.1067	.1295	.1727
	Finish	1.5 x D	.01 x D	5	490	--	.0016	.0025	.0034	.0042	.0051	.0068	149	--	.0406	.0635	.0864	.1067	.1295	.1727
Tool & Die Steels ≤ 38 HRC A2, D2, H13, P20	Slot	1 x D	1 x D	4	325	.0006	.0013	.0020	.0027	.0034	.0040	.0054	99	.0152	.0330	.0508	.0686	.0864	.1016	.1372
	Rough	1.5 x D	.5 x D	4	375	.0008	.0017	.0026	.0035	.0044	.0053	.0070	114	.0203	.0432	.0660	.0889	.1118	.1346	.1778
	Rough	1.5 x D	.5 x D	5	375	--	.0016	.0025	.0034	.0042	.0051	.0068	114	--	.0406	.0635	.0864	.1067	.1295	.1727
	Finish	1.5 x D	.01 x D	5	485	--	.0016	.0025	.0034	.0042	.0051	.0068	148	--	.0406	.0635	.0864	.1067	.1295	.1727
Tool Steels - 39 HRC to 48 HRC	Slot	.75 x D	1 x D	4	225	.0005	.0010	.0015	.0020	.0025	.0030	.0040	69	.0127	.0254	.0381	.0508	.0635	.0762	.1016
	Rough	1 x D	.5 x D	4	275	.0006	.0012	.0017	.0023	.0029	.0035	.0046	84	.0146	.0292	.0438	.0584	.0730	.0876	.1168
	Rough	1 x D	.5 x D	5	275	--	.0011	.0016	.0022	.0028	.0034	.0044	84	--	.0279	.0406	.0559	.0711	.0864	.1118
	Finish	1.5 x D	.01 x D	5	355	--	.0011	.0016	.0022	.0028	.0034	.0044	108	--	.0279	.0406	.0559	.0711	.0864	.1118
Easy to Machine Stainless Steel 416, 410, 302, 303	Slot	1 x D	1 x D	4	300	.0006	.0012	.0018	.0025	.0031	.0037	.0050	91	.0152	.0305	.0457	.0635	.0787	.0940	.1270
	Rough	1.5 x D	.5 x D	4	375	.0008	.0016	.0024	.0032	.0040	.0048	.0064	114	.0203	.0406	.0610	.0813	.1016	.1219	.1626
	Rough	1.5 x D	.5 x D	5	375	--	.0015	.0022	.0030	.0037	.0045	.0060	114	--	.0381	.0559	.0762	.0940	.1143	.1524
	Finish	1.5 x D	.01 x D	5	485	--	.0015	.0022	.0030	.0037	.0045	.0060	148	--	.0381	.0559	.0762	.0940	.1143	.1524
Moderately Difficult Stainless Steel 304, 316, Invar, Kovar	Slot	.75 x D	1 x D	4	275	.0005	.0011	.0016	.0022	.0027	.0033	.0044	84	.0127	.0279	.0406	.0559	.0686	.0838	.1118
	Rough	1.5 x D	.5 x D	4	350	.0007	.0015	.0023	.0032	.0037	.0045	.0064	107	.0178	.0381	.0584	.0813	.0940	.1143	.1626
	Rough	1.5 x D	.5 x D	5	350	--	.0014	.0022	.0031	.0036	.0044	.0062	107	--	.0356	.0559	.0787	.0914	.1118	.1575
	Finish	1.5 x D	.01 x D	5	450	--	.0014	.0022	.0031	.0036	.0044	.0062	137	--	.0356	.0559	.0787	.0914	.1118	.1575
Difficult to Machine Stainless Steels 316L, 17-4 PH, 15-5 PH, 13-8 PH	Slot	.5 x D	1 x D	4	250	.0004	.0009	.0012	.0018	.0022	.0027	.0036	76	.0102	.0229	.0305	.0457	.0559	.0686	.0914
	Rough	1 x D	.5 x D	4	300	.0005	.0011	.0016	.0022	.0028	.0033	.0044	91	.0127	.0279	.0406	.0559	.0711	.0838	.1118
	Rough	1 x D	.5 x D	5	300	--	.0010	.0015	.0021	.0026	.0031	.0042	91	--	.0254	.0381	.0533	.0660	.0787	.1067
	Finish	1.5 x D	.01 x D	5	390	--	.0010	.0015	.0021	.0026	.0031	.0042	119	--	.0254	.0381	.0533	.0660	.0787	.1067
Titanium Alloys	Slot	.5 x D	1 x D	4	250	.0003	.0007	.0011	.0015	.0018	.0023	.0030	76	.0076	.0178	.0279	.0381	.0457	.0584	.0762
	Rough	1 x D	.5 x D	4	300	.0005	.0010	.0015	.0020	.0025	.0030	.0040	91	.0127	.0254	.0381	.0508	.0635	.0762	.1016
	Rough	1 x D	.5 x D	5	300	--	.0009	.0013	.0018	.0023	.0028	.0036	91	--	.0229	.0330	.0457	.0584	.0711	.0914
	Finish	1.5 x D	.01 x D	5	390	--	.0009	.0013	.0018	.0023	.0028	.0036	119	--	.0229	.0330	.0457	.0584	.0711	.0914
High Temperature Alloys	Slot	.25 x D	1 x D	4	70	.0004	.0008	.0012	.0015	.0019	.0024	.0030	21	.0102	.0203	.0305	.0381	.0483	.0610	.0762
	Rough	1 x D	.25 x D	4	95	.0005	.0009	.0014	.0018	.0022	.0028	.0036	29	.0127	.0229	.0356	.0457	.0559	.0711	.0914
	Rough	1 x D	.25 x D	5	95	--	.0009	.0014	.0018	.0022	.0028	.0036	29	--	.0229	.0356	.0457	.0559	.0711	.0914
	Finish	1.5 x D	.01 x D	5	125	--	.0009	.0014	.0018	.0022	.0028	.0036	38	--	.0229	.0356	.0457	.0559	.0711	.0914

D = tool diameter Reduce feed rates by 20% when using long length tools Starting parameters shown