X5070 END MILLS

RECOMMENDED CUTTING CONDITIONS

G8A38, G8A28, G8A53 SERIES — 2 FLUTE BALL NOSE

ISO	VDI 3323	Material Description	HRc	Ae	Ap	Parameter	Diameter (Ø) 0.2	0.3	0.4	0.5	0.6	0.8	1	1.2	1.5	2
P	5	Non-alloy steel	32	0.05D	0.02D	SFM (vc)	105	155	205	260	310	410	515	620	775	1025
						IPT (fz)	.0005	.0006	.0008	.0010	.0011	.0015	.0019	.0020	.0021	.0023
						RPM	50000	50000	50000	50000	50000	50000	50000	50000	50000	49700
						IPM (feed)	47	59	75	95	114	154	189	201	213	224
	8-9	Low alloy steel	32-38	0.05D	0.02D	SFM (vc)	105	155	205	260	310	410	515	620	775	1025
						IPT (fz)	.0005	.0006	.0008	.0010	.0011	.0015	.0019	.0020	.0021	.0023
						RPM	50000	50000	50000	50000	50000	50000	50000	50000	50000	49700
						IPM (feed)	47	59	75	95	114	154	189	201	213	224
	11.1	High alloyed steel, and tool steel	35	0.05D	0.02D	SFM (vc)	105	155	205	260	310	410	515	620	775	1025
						IPT (fz)	.0005	.0006	.0008	.0010	.0011	.0015	.0019	.0020	.0021	.0023
						RPM	50000	50000	50000	50000	50000	50000	50000	50000	50000	49700
						IPM (feed)	47	59	75	95	114	154	189	201	213	224
	11.2		44	0.05D	0.02D	SFM (vc)	105	155	205	260	310	410	515	595	740	985
						IPT (fz)	.0004	.0005	.0007	.0008	.0010	.0013	.0017	.0018	.0018	.0020
						RPM	50000	50000	50000	50000	50000	50000	50000	48000	48000	47800
						IPM (feed)	41	54	67	83	98	130	165	169	177	189
H	38.1	Hardened steel	45-49	0.05D	0.02D	SFM (vc)	105	155	205	260	310	410	515	595	740	985
						IPT (fz)	.0004	.0005	.0007	.0008	.0010	.0013	.0017	.0018	.0018	.0020
						RPM	50000	50000	50000	50000	50000	50000	50000	48000	48000	47800
						IPM (feed)	41	54	67	83	98	130	165	169	177	189
	38.2		50-55	0.05D	0.02D	SFM (vc)	95	140	185	230	280	370	465	530	665	825
						IPT (fz)	.0004	.0005	.0007	.0008	.0010	.0013	.0017	.0018	.0018	.0020
						RPM	45000	45000	45000	45000	45000	45000	45000	43000	43000	40000
						IPM (feed)	38	47	59	75	87	118	150	152	158	158
	39.1		56-60	0.05D	0.02D	SFM (vc)	80	125	165	205	245	330	410	470	570	720
						IPT (fz)	.0004	.0005	.0006	.0007	.0009	.0012	.0015	.0016	.0016	.0018
						RPM	40000	40000	40000	40000	40000	40000	40000	38000	37000	35000
						IPM (feed)	30	38	47	59	71	95	118	118	122	124
	39.2		61-65	0.05D	0.02D	SFM (vc)	70	110	145	180	215	290	360	420	510	660
						IPT (fz)	.0004	.0005	.0006	.0007	.0009	.0012	.0015	.0016	.0016	.0017
						RPM	35000	35000	35000	35000	35000	35000	35000	34000	33000	32000
						IPM (feed)	27	33	41	51	63	83	102	106	106	110
	39.3		66-70	0.05D	0.02D	SFM (vc)	65	95	130	160	195	260	360	380	460	585
						IPT (fz)	.0003	.0004	.0006	.0007	.0009	.0011	.0013	.0015	.0015	.0016
						RPM	31500	31500	31500	31500	31500	31500	35000	30600	29700	28500
						IPM (feed)	22	28	35	43	55	71	91	91	91	91
	40	Chilled Cast Iron	42	0.05D	0.02D	SFM (vc)	105	155	205	260	310	410	515	595	740	985
						IPT (fz)	.0004	.0005	.0007	.0008	.0010	.0013	.0017	.0018	.0018	.0020
						RPM	50000	50000	50000	50000	50000	50000	50000	48000	48000	47800
						IPM (feed)	41	54	67	83	98	130	165	169	177	189
	41	Hardened Cast Iron	55	0.05D	0.02D	SFM (vc)	95	140	185	230	280	370	465	530	665	825
						IPT (fz)	.0004	.0005	.0007	.0008	.0010	.0013	.0017	.0018	.0018	.0020
						RPM	45000	45000	45000	45000	45000	45000	45000	43000	43000	40000
						IPM (feed)	38	47	59	75	87	118	150	152	158	158

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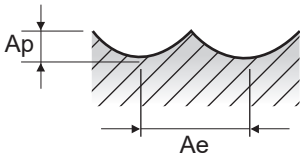
SFM = Surface Feet per Minute
RPM = Revolutions Per Minute
IPT = Inches Per Tooth
IPM = Inches Per Minute
Ap : Inch (Axial Depth of Cut)
Ae : Inch (Radial Depth of Cut)



X5070 END MILLS

RECOMMENDED CUTTING CONDITIONS

G8A38, G8A28, G8A53 SERIES — 2 FLUTE BALL NOSE

ISO	VDI 3323	Material Description	HRc	Ae	Ap	Parameter	Diameter (Ø) 3	4	5	6	8	10	12	16	20
P	5	Non-alloy steel	32	0.05D	0.02D	SFM (vc)	1025	1025	960	860	915	960	860	920	915
						IPT (fz)	.0036	.0047	.0061	.0069	.0074	.0078	.0083	.0093	.0104
						RPM	33100	24900	18600	13900	11100	9300	6950	5570	4450
						IPM (feed)	236	236	228	191	165	146	116	104	93
	8-9	Low alloy steel	32-38	0.05D	0.02D	SFM (vc)	1025	1025	960	860	915	960	860	920	915
						IPT (fz)	.0036	.0047	.0061	.0069	.0074	.0078	.0083	.0093	.0104
						RPM	33100	24900	18600	13900	11100	9300	6950	5570	4450
						IPM (feed)	236	236	228	191	165	146	116	104	93
	11.1	High alloyed steel, and tool steel	35	0.05D	0.02D	SFM (vc)	1025	1025	960	860	915	960	860	920	915
						IPT (fz)	.0036	.0047	.0061	.0069	.0074	.0078	.0083	.0093	.0104
						RPM	33100	24900	18600	13900	11100	9300	6950	5570	4450
						IPM (feed)	236	236	228	191	165	146	116	104	93
	11.2		44	0.05D	0.02D	SFM (vc)	985	985	915	830	880	915	825	880	885
						IPT (fz)	.0033	.0044	.0054	.0060	.0064	.0069	.0073	.0081	.0090
						RPM	31800	23900	17800	13400	10700	8900	6680	5350	4300
						IPM (feed)	209	209	193	161	138	122	98	87	77
H	38.1	Hardened steel	45-49	0.05D	0.02D	SFM (vc)	985	985	915	830	880	915	825	880	885
						IPT (fz)	.0033	.0044	.0054	.0060	.0064	.0069	.0073	.0081	.0090
						RPM	31800	23900	17800	13400	10700	8900	6680	5350	4300
						IPM (feed)	209	209	193	161	138	122	98	87	77
	38.2		50-55	0.05D	0.02D	SFM (vc)	820	825	775	680	740	775	695	740	740
						IPT (fz)	.0030	.0040	.0049	.0055	.0059	.0063	.0067	.0074	.0082
						RPM	26500	20000	15000	11000	9000	7500	5600	4500	3600
						IPM (feed)	158	158	148	122	106	95	75	67	59
	39.1		56-60	0.05D	0.02D	SFM (vc)	725	720	695	620	660	680	620	660	660
						IPT (fz)	.0026	.0035	.0044	.0049	.0053	.0057	.0061	.0066	.0073
						RPM	23500	17500	13500	10000	8000	6600	5000	4000	3200
						IPM (feed)	124	124	120	98	85	75	61	53	47
	39.2		61-65	0.05D	0.02D	SFM (vc)	650	660	595	545	575	600	545	575	575
						IPT (fz)	.0026	.0034	.0043	.0048	.0052	.0056	.0056	.0056	.0057
						RPM	21000	16000	11500	8800	7000	5800	4400	3500	2800
						IPM (feed)	110	110	100	85	73	65	49	39	32
	39.3		66-70	0.05D	0.02D	SFM (vc)	585	600	540	495	535	545	495	530	525
						IPT (fz)	.0024	.0031	.0040	.0043	.0047	.0051	.0051	.0053	.0051
						RPM	19000	14500	10500	8000	6500	5300	4000	3200	2550
						IPM (feed)	91	91	83	69	61	54	41	34	26
	40	Chilled Cast Iron	42	0.05D	0.02D	SFM (vc)	985	985	915	830	880	915	825	880	885
						IPT (fz)	.0033	.0044	.0054	.0060	.0064	.0069	.0073	.0081	.0090
						RPM	31800	23900	17800	13400	10700	8900	6680	5350	4300
						IPM (feed)	209	209	193	161	138	122	98	87	77
	41	Hardened Cast Iron	55	0.05D	0.02D	SFM (vc)	820	825	775	680	740	775	695	740	740
						IPT (fz)	.0030	.0040	.0049	.0055	.0059	.0063	.0067	.0074	.0082
						RPM	26500	20000	15000	11000	9000	7500	5600	4500	3600
						IPM (feed)	158	158	148	122	106	95	75	67	59

SFM = Surface Feet per Minute
RPM = Revolutions Per Minute
IPT = Inches Per Tooth
IPM = Inches Per Minute
Ap : Inch (Axial Depth of Cut)
Ae : Inch (Radial Depth of Cut)