

HIGH PERFORMANCE END MILLS

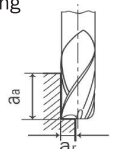
Standard Milling Conditions Aqua V Mill 4 & 5 Flute Series Profile Roughing

List No. 9701, 9702, 9703, 9704, 9705, 9706, 9707, 9708, 9709, 9710, 9727

Mill Dia.	Radial WOC		Work Material								
			Cast Irons	Carbon Steel (1018/1020)	Alloy Steels 4130/4140	Tool Steels < 40 HRC	Stainless Steels 400 series	Stainless Steels 300 series	Stainless Steels PH	Titanium	High Temp Alloys
			425-475 SFM	400-450 SFM	350-400 SFM	350-400 SFM	350-400 SFM	300-350 SFM	275-325 SFM	225-275 SFM	75-125 SFM
3	Ar	RPM	14550	13750	12150	12150	12150	10500	9700	8100	3250
		5%	0.0023	0.0023	0.0018	0.0015	0.0015	0.0018	0.0015	0.0015	0.0015
	IPT	10%	0.0016	0.0016	0.0013	0.0011	0.0011	0.0013	0.0011	0.0011	0.0011
		30%	0.0009	0.0009	0.0007	0.0006	0.0006	0.0007	0.0006	0.0006	0.0006
1/8	Ar	RPM	13750	13000	11450	11450	11450	9900	9200	7650	3050
		5%	0.0023	0.0023	0.0018	0.0018	0.0018	0.0018	0.0015	0.0015	0.0018
	IPT	10%	0.0016	0.0016	0.0013	0.0013	0.0013	0.0013	0.0011	0.0011	0.0013
		30%	0.0009	0.0009	0.0007	0.0007	0.0007	0.0007	0.0006	0.0006	0.0007
4	Ar	RPM	10900	10300	9100	9100	9100	7900	7300	6100	2400
		5%	0.0028	0.0028	0.0023	0.0020	0.0020	0.0023	0.0018	0.0018	0.0023
	IPT	10%	0.0020	0.0020	0.0016	0.0014	0.0014	0.0016	0.0013	0.0013	0.0016
		30%	0.0011	0.0011	0.0009	0.0008	0.0008	0.0009	0.0007	0.0007	0.0009
3/16	Ar	RPM	9150	8700	7650	7650	7650	6600	6100	5100	2000
		5%	0.0033	0.0033	0.0028	0.0025	0.0025	0.0028	0.0023	0.0023	0.0025
	IPT	10%	0.0023	0.0023	0.0020	0.0018	0.0018	0.0020	0.0016	0.0016	0.0018
		30%	0.0013	0.0013	0.0011	0.0010	0.0010	0.0011	0.0009	0.0009	0.0010
5	Ar	RPM	8750	8250	7300	7300	7300	6300	5800	4850	1950
		5%	0.0033	0.0033	0.0028	0.0028	0.0028	0.0030	0.0023	0.0023	0.0028
	IPT	10%	0.0023	0.0023	0.0020	0.0020	0.0020	0.0022	0.0016	0.0018	0.0020
		30%	0.0013	0.0013	0.0011	0.0011	0.0011	0.0012	0.0009	0.0010	0.0011
6	Ar	RPM	7300	6900	6100	6100	6100	5250	4850	4050	1600
		5%	0.0038	0.0038	0.0033	0.0033	0.0033	0.0035	0.0028	0.0028	0.0033
	IPT	10%	0.0027	0.0027	0.0023	0.0023	0.0023	0.0025	0.0020	0.0020	0.0023
		30%	0.0015	0.0015	0.0013	0.0013	0.0013	0.0014	0.0011	0.0011	0.0013
1/4	Ar	RPM	6900	6500	5700	5700	5700	5000	4600	3800	1500
		5%	0.0040	0.0040	0.0035	0.0033	0.0033	0.0038	0.0030	0.0030	0.0035
	IPT	10%	0.0029	0.0029	0.0025	0.0023	0.0023	0.0027	0.0022	0.0022	0.0025
		30%	0.0016	0.0016	0.0014	0.0013	0.0013	0.0015	0.0012	0.0012	0.0014
5/16	Ar	RPM	5500	5200	4600	4600	4600	4000	3700	3050	1200
		5%	0.0048	0.0048	0.0043	0.0043	0.0043	0.0045	0.0035	0.0038	0.0043
	IPT	10%	0.0034	0.0034	0.0031	0.0031	0.0031	0.0032	0.0025	0.0027	0.0031
		30%	0.0019	0.0019	0.0017	0.0017	0.0017	0.0018	0.0014	0.0015	0.0017
8	Ar	RPM	5500	4600	4600	4600	4600	4000	3700	3050	1200
		5%	0.0048	0.0048	0.0043	0.0043	0.0043	0.0045	0.0035	0.0038	0.0043
	IPT	10%	0.0034	0.0034	0.0031	0.0031	0.0031	0.0032	0.0025	0.0027	0.0031
		30%	0.0019	0.0019	0.0017	0.0017	0.0017	0.0018	0.0014	0.0015	0.0017
3/8	Ar	RPM	4600	4300	3800	3800	3800	3300	3050	2550	1000
		5%	0.0058	0.0058	0.0053	0.0050	0.0050	0.0055	0.0040	0.0045	0.0050
	IPT	10%	0.0041	0.0041	0.0038	0.0036	0.0036	0.0040	0.0029	0.0032	0.0036
		30%	0.0023	0.0023	0.0021	0.0020	0.0020	0.0022	0.0016	0.0018	0.0020
10	Ar	RPM	4350	4100	3600	3600	3600	3150	2900	2400	970
		5%	0.0060	0.0060	0.0055	0.0053	0.0053	0.0058	0.0043	0.0048	0.0053
	IPT	10%	0.0043	0.0043	0.0040	0.0038	0.0038	0.0041	0.0031	0.0034	0.0038
		30%	0.0024	0.0024	0.0022	0.0021	0.0021	0.0023	0.0017	0.0019	0.0021
7/16	Ar	RPM	3900	3700	3300	3300	3300	2800	2600	2200	870
		5%	0.0065	0.0065	0.0060	0.0058	0.0058	0.0065	0.0048	0.0053	0.0060
	IPT	10%	0.0047	0.0047	0.0043	0.0041	0.0041	0.0047	0.0034	0.0038	0.0043
		30%	0.0026	0.0026	0.0024	0.0023	0.0023	0.0026	0.0019	0.0021	0.0024
12	Ar	RPM	3600	3400	3000	3000	3000	2600	2400	2000	800
		5%	0.0070	0.0070	0.0065	0.0063	0.0063	0.0070	0.0050	0.0055	0.0065
	IPT	10%	0.0050	0.0050	0.0047	0.0045	0.0045	0.0050	0.0036	0.0040	0.0047
		30%	0.0028	0.0028	0.0026	0.0025	0.0025	0.0028	0.0020	0.0022	0.0026
1/2	Ar	RPM	3400	3250	2850	2850	2850	2500	2300	1900	760
		5%	0.0073	0.0073	0.0068	0.0065	0.0065	0.0073	0.0055	0.0060	0.0068
	IPT	10%	0.0052	0.0052	0.0049	0.0047	0.0047	0.0052	0.0040	0.0043	0.0049
		30%	0.0029	0.0029	0.0027	0.0026	0.0026	0.0029	0.0022	0.0024	0.0027
9/16	Ar	RPM	3050	2900	2550	2550	2550	2200	2000	1700	680
		5%	0.0083	0.0083	0.0078	0.0075	0.0075	0.0083	0.0060	0.0063	0.0075
	IPT	10%	0.0059	0.0059	0.0056	0.0054	0.0054	0.0059	0.0043	0.0045	0.0054
		30%	0.0033	0.0033	0.0031	0.0030	0.0030	0.0033	0.0024	0.0025	0.0030
5/8	Ar	RPM	2750	2600	2300	2300	2300	2000	1800	1500	600
		5%	0.0090	0.0090	0.0085	0.0083	0.0083	0.0093	0.0068	0.0070	0.0085
	IPT	10%	0.0065	0.0065	0.0061	0.0059	0.0059	0.0067	0.0049	0.0050	0.0061
		30%	0.0036	0.0036	0.0034	0.0033	0.0033	0.0037	0.0027	0.0028	0.0034
16	Ar	RPM	2750	2600	2300	2300	2300	2000	1800	1500	600
		5%	0.0090	0.0090	0.0085	0.0083	0.0083	0.0093	0.0068	0.0070	0.0085
	IPT	10%	0.0065	0.0065	0.0061	0.0059	0.0059	0.0067	0.0049	0.0050	0.0061
		30%	0.0036	0.0036	0.0034	0.0033	0.0033	0.0037	0.0027	0.0028	0.0034
3/4	Ar	RPM	2300	2150	1900	1900	1900	1650	1500	1300	500
		5%	0.0108	0.0108	0.0103	0.0098	0.0098	0.0110	0.0080	0.0083	0.0103
	IPT	10%	0.0077	0.0077	0.0074	0.0070	0.0070	0.0079	0.0058	0.0059	0.0074
		30%	0.0043	0.0043	0.0041	0.0039	0.0039	0.0044	0.0032	0.0033	0.0041
20	Ar	RPM	2200	2050	1800	1800	1800	1550	1450	1200	480
		5%	0.0113	0.0113	0.0108	0.0103	0.0103	0.0115	0.0083	0.0085	0.0108
	IPT	10%	0.0081	0.0081	0.0077	0.0074	0.0074	0.0083	0.0059	0.0061	0.0077
		30%	0.0045	0.0045	0.0043	0.0041	0.0041	0.0046	0.0033	0.0034	0.0043

Depth Of Cut = Aa For applications with radial engagement > 15% of tool diameter, please use a max 1.5XD for depth of cut.

D: Dia. Of Mill Side Milling



- For slotting, it is recommended to use Aqua V Mill 4 Flute. Please refer to slotting speed/feed chart.
- For Entry, it is recommended to reduce RPM and IPT by 50%.
- When using long reach, neck relieved tools, decrease width of cut and feed rate by 50%.
- Adjust milling condition when unusual vibration or sound occurs.
- For finishing parameters, please use 0.01XD WOC, max SFM shown on chart, and IPT value shown at 30% engagement.
- If assistance is needed please reach out to the cutting tools technical team.

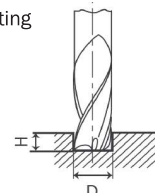
HIGH PERFORMANCE END MILLS

Standard Milling Conditions Aqua V Mill 4 Flute Series Slotting

List No. 9701, 9702, 9703, and 9704

Mill Diameter		Work Material								
		Cast Irons	Carbon Steel 1018/1020	Medium Alloy Steels 4130/4140	Tool Steels <40 HRC	Stainless Steels 400 series	Stainless Steels 300 series	Stainless Steels PH	Titanium	High Temp Alloys
		325-375 SFM	325-375 SFM	275-325 SFM	275-325 SFM	275-325 SFM	250-300 SFM	225-275 SFM	225-275 SFM	60-80 SFM
3	RPM	11300	11300	9700	9700	9700	8900	8100	8100	1950
	IPT	0.0005	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005
1/8	RPM	10700	10700	9150	8400	8400	8400	7650	7650	1850
	IPT	0.0006	0.0007	0.0006	0.0006	0.0006	0.0007	0.0005	0.0005	0.0005
4	RPM	8500	8500	7300	7300	7300	6700	6700	6100	1450
	IPT	0.0007	0.0008	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007	0.0007
3/16	RPM	7100	7100	6100	6100	6100	5600	5100	5100	1200
	IPT	0.0008	0.0010	0.0009	0.0009	0.0009	0.0010	0.0008	0.0008	0.0008
5	RPM	6800	6800	5800	5800	5800	5350	4850	4850	1150
	IPT	0.0008	0.0011	0.0009	0.0009	0.0009	0.0011	0.0008	0.0008	0.0008
6	RPM	5650	5650	4850	4850	4850	4500	4050	4050	970
	IPT	0.0011	0.0013	0.0011	0.0011	0.0011	0.0013	0.0010	0.0010	0.0010
1/4	RPM	5350	5350	4600	4600	4600	4200	3800	3800	920
	IPT	0.0011	0.0013	0.0011	0.0011	0.0011	0.0013	0.0010	0.0010	0.0010
5/16	RPM	4300	4300	3700	3700	3700	3350	3050	3050	730
	IPT	0.0014	0.0017	0.0015	0.0015	0.0015	0.0017	0.0013	0.0013	0.0013
8	RPM	4300	4300	3700	3700	3700	3350	3050	3050	730
	IPT	0.0014	0.0017	0.0015	0.0015	0.0015	0.0017	0.0013	0.0013	0.0013
3/8	RPM	3550	3550	3050	3050	3050	2800	2550	2550	610
	IPT	0.0017	0.0020	0.0018	0.0018	0.0018	0.0020	0.0015	0.0016	0.0016
10	RPM	3400	3400	2900	2900	2900	2650	2400	2400	580
	IPT	0.0018	0.0021	0.0019	0.0019	0.0019	0.0021	0.0016	0.0016	0.0016
7/16	RPM	3050	3050	2600	2600	2600	2400	2200	2200	520
	IPT	0.0019	0.0023	0.0021	0.0021	0.0021	0.0023	0.0018	0.0018	0.0018
12	RPM	2800	2800	2400	2400	2400	2200	2000	2000	480
	IPT	0.0021	0.0025	0.0023	0.0023	0.0023	0.0025	0.0019	0.0019	0.0020
1/2	RPM	2650	2650	2300	2300	2300	2100	1900	1900	460
	IPT	0.0022	0.0026	0.0024	0.0024	0.0024	0.0026	0.0020	0.0020	0.0021
9/16	RPM	2400	2400	2000	2000	2000	1850	1700	1700	400
	IPT	0.0025	0.0030	0.0027	0.0027	0.0027	0.0030	0.0023	0.0023	0.0024
5/8	RPM	2150	2150	1800	1800	1800	1700	1500	1500	370
	IPT	0.0028	0.0033	0.0030	0.0030	0.0030	0.0033	0.0025	0.0025	0.0026
16	RPM	2150	2150	1800	1800	1800	1700	1500	1500	370
	IPT	0.0028	0.0033	0.0030	0.0030	0.0030	0.0033	0.0025	0.0025	0.0026
3/4	RPM	1800	1800	1500	1500	1500	1400	1250	1250	310
	IPT	0.0033	0.0039	0.0036	0.0036	0.0036	0.0039	0.0030	0.0030	0.0031
20	RPM	1700	1700	1450	1450	1450	1350	1200	1200	290
	IPT	0.0035	0.0041	0.0038	0.0038	0.0038	0.0041	0.0032	0.0032	0.0033
DOC	H	0.5D			0.25D					0.15D
	D	1.0D								

D: Dia. Of Mill Slotting



- Adjust milling condition when unusual vibration or sound occurs.
- When using long reach tools, decrease depth of cut and feed rate by 50%.
- If assistance is needed please reach out to the cutting tools technical team.