RPM : rev./min FEED : mm/min

2WRE — Cutting Conditions

Material		Mild Steels/Carbon Steels/Gray Cast Iron SS/FC/SC				Tool Steels/Mould Steels SCM/HPM				Alloy Steels / Pre-hardened Steels NAK80/KP4M				Hardened Steels STAVAX/SKD11			
Hardness		~ 30HRC				30~ 40HRC				40 ~ 45HRC				45~ 55HRC			
Outside Dia	Effective Length	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø 0.5	2	56,800	900	0.020	0.098	54,000	760	0.016	0.098	40,600	510	0.014	0.098	32,500	350	0.010	0.0882
〃	3	44,200	660	0.080	0.016	39,900	530	0.090	0.016	32,200	370	0.008	0.016	25,700	260	0.006	0.0144
〃	4	40,600	580	0.009	0.012	36,100	460	0.008	0.012	29,700	330	0.008	0.012	23,700	230	0.005	0.0108
〃	5	37,000	500	0.080	0.008	32,300	390	0.008	0.008	27,200	290	0.006	0.008	21,700	200	0.004	0.0072
〃	6	33,400	420	0.005	0.004	28,500	320	0.005	0.004	24,700	250	0.003	0.004	19,700	170	0.002	0.0036
〃	8	29,100	320	0.002	0.002	24,100	240	0.002	0.002	21,600	190	0.001	0.002	17,400	130	0.001	0.0018
〃	10	26,100	250	0.001	0.001	21,200	180	0.001	0.001	19,600	150	0.001	0.001	15,600	100	0.001	0.0009
〃	14	21,500	120	0.001	0.001	16,700	80	0.001	0.001	16,300	70	0.001	0.001	13,000	50	0.001	0.0009
Ø 0.6	2	63,600	1,240	0.025	0.203	53,300	930	0.020	0.203	39,100	600	0.016	0.203	31,300	410	0.011	0.1827
〃	3	52,500	990	0.018	0.114	44,000	740	0.016	0.114	33,500	500	0.013	0.114	26,800	340	0.009	0.1026
〃	4	41,300	740	0.012	0.025	34,700	550	0.011	0.025	27,900	390	0.009	0.025	22,300	270	0.006	0.0225
〃	5	36,700	630	0.010	0.017	30,900	470	0.009	0.017	25,500	340	0.007	0.017	20,400	240	0.005	0.0153
〃	6	32,100	520	0.007	0.008	27,000	390	0.006	0.008	23,000	290	0.005	0.008	18,400	200	0.003	0.0072
〃	8	26,800	390	0.004	0.003	22,600	300	0.004	0.003	20,000	230	0.003	0.003	16,000	160	0.002	0.0027
〃	10	23,400	300	0.002	0.002	19,700	230	0.002	0.002	17,900	180	0.002	0.002	14,300	130	0.001	0.0018
〃	12	20,900	240	0.002	0.001	17,600	180	0.001	0.001	16,400	150	0.001	0.001	13,100	100	0.001	0.0009
〃	16	16,200	100	0.001	0.001	13,700	80	0.001	0.001	13,500	70	0.001	0.001	10,800	50	0.001	0.0009
Ø 0.7	2	59,800	1,380	0.030	0.047	50,200	1,040	0.027	0.047	36,100	660	0.021	0.047	28,800	430	0.015	0.0423
〃	4	38,900	840	0.017	0.038	32,700	630	0.015	0.038	25,800	440	0.012	0.038	20,600	290	0.009	0.0342
〃	6	30,200	600	0.010	0.014	25,400	450	0.009	0.014	21,200	330	0.007	0.014	16,900	230	0.005	0.0126
〃	8	25,300	460	0.006	0.006	21,300	350	0.005	0.006	18,400	260	0.004	0.006	14,700	190	0.003	0.0054
〃	10	22,000	360	0.004	0.003	18,500	270	0.003	0.003	16,500	220	0.003	0.003	13,200	160	0.002	0.0027
Ø 0.8	2	41,200	1,050	0.033	0.108	34,500	460	0.029	0.108	26,200	530	0.023	0.108	21,000	370	0.016	0.0972
〃	4	37,100	930	0.027	0.08	31,100	700	0.024	0.08	24,100	480	0.019	0.08	19,300	330	0.013	0.072
〃	6	28,800	680	0.015	0.024	24,200	510	0.013	0.024	19,800	370	0.010	0.024	15,800	250	0.007	0.0216
〃	8	24,100	520	0.009	0.01	20,300	390	0.008	0.01	17,200	300	0.006	0.01	13,800	200	0.004	0.009
〃	10	21,000	420	0.006	0.005	17,700	320	0.005	0.005	15,500	240	0.040	0.005	12,400	170	0.003	0.0045
〃	12	18,700	340	0.004	0.003	15,800	260	0.003	0.003	14,100	200	0.003	0.003	11,300	140	0.002	0.0027
〃	14	15,600	230	0.002	0.001	13,200	180	0.020	0.001	12,300	150	0.001	0.001	9,800	100	0.001	0.0009
Ø 0.9	6	27,600	790	0.019	0.019	23,000	590	0.017	0.019	18,500	420	0.013	0.019	14,800	290	0.010	0.0171
〃	8	23,000	600	0.012	0.012	19,300	450	0.011	0.012	16,100	330	0.008	0.012	12,900	230	0.006	0.0108
〃	10	20,000	470	0.008	0.008	16,800	360	0.007	0.008	14,500	270	0.005	0.008	11,600	190	0.004	0.0072
Ø 1.0	2	37,900	1,340	0.048	0.263	31,500	990	0.043	0.263	23,400	6,500	0.034	0.263	18,700	440	0.031	0.237
〃	3	37,900	1,340	0.048	0.263	31,500	990	0.043	0.263	23,400	6,500	0.034	0.263	18,700	440	0.031	0.237
〃	4	34,100	1,170	0.040	0.195	28,400	870	0.036	0.195	21,500	580	0.028	0.195	17,200	400	0.025	0.176
〃	5	30,300	1,000	0.032	0.058	25,300	750	0.029	0.058	19,600	510	0.022	0.058	15,700	360	0.020	0.052
〃	6	26,500	850	0.023	0.024	22,100	630	0.021	0.024	17,600	440	0.016	0.024	14,100	310	0.014	0.022
〃	8	22,100	660	0.014	0.013	18,600	490	0.013	0.013	15,300	360	0.010	0.013	12,300	250	0.009	0.012
〃	10	19,200	530	0.010	0.013	16,200	400	0.009	0.013	13,800	300	0.007	0.013	11,000	210	0.006	0.012
〃	12	17,200	440	0.007	0.007	14,500	330	0.006	0.007	12,600	250	0.005	0.007	10,100	170	0.005	0.006
〃	14	15,600	360	0.005	0.005	13,200	270	0.004	0.005	11,700	210	0.003	0.005	9,400	150	0.003	0.005
〃	16	14,300	300	0.004	0.003	12,100	230	0.003	0.003	11,000	180	0.003	0.003	8,800	130	0.003	0.003
〃	20	12,500	200	0.003	0.001	10,600	160	0.003	0.001	9,800	130	0.002	0.001	7,900	90	0.002	0.001
〃	25	10,800	120	0.003	0.001	9,200	90	0.002	0.001	8,800	80	0.002	0.001	7,100	50	0.002	0.001
〃	30	9,700	50	0.002	0.001	8,200	40	0.002	0.001	8,100	30	0.001	0.001	6,500	30	0.001	0.0009
Ø 1.2	4	28,900	1,180	0.050	0.189	24,100	870	0.047	0.189	18,300	580	0.036	0.189	14,500	400	0.032	0.170
〃	6	24,800	970	0.037	0.120	20,700	720	0.034	0.120	16,100	490	0.026	0.120	12,800	340	0.023	0.108
〃	8	20,700	760	0.024	0.051	17,300	570	0.021	0.051	13,900	400	0.016	0.051	11,100	280	0.014	0.046
〃	10	18,000	620	0.016	0.026	15,100	470	0.014	0.026	12,400	340	0.011	0.026	9,900	230	0.010	0.023
〃	12	16,100	520	0.011	0.015	13,500	390	0.010	0.015	11,400	290	0.008	0.015	9,100	200	0.007	0.014
〃	16	13,400	380	0.006	0.006	11,300	290	0.005	0.006	9,800	220	0.004	0.006	7,900	150	0.004	0.005
〃	20	11,700	280	0.004	0.003	9,900	210	0.004	0.003	8,800	170	0.003	0.003	7,000	120	0.003	0.003
〃	25	10,800	120	0.003	0.001	9,200	90	0.002	0.001	8,800	80	0.002	0.001	7,100	50	0.002	0.001
〃	30	9,700	50	0.002	0.001	8,200	40	0.002	0.001	8,100	30	0.001	0.001	6,500	30	0.001	0.0009

RPM : rev./min FEED : mm/min

2WRE — Cutting Conditions

Material		Mild Steels/Carbon Steels/Gray Cast Iron SS/FC/SC				Tool Steels/Mould Steels SCM/HPM				Alloy Steels / Pre-hardened Steels NAK80/KP4M				Hardened Steels STAVAX/SKD11			
Hardness		~ 30HRC				30~ 40HRC				40 ~ 45HRC				45~ 55HRC			
Outside Dia	Effective Length	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø 1.4	6	23,300	1,070	0.052	0.222	19,400	800	0.047	0.222	14,800	540	0.060	0.222	11,900	370	0.054	0.200
〃	8	19,500	850	0.035	0.094	16,300	640	0.032	0.094	12,900	440	0.025	0.094	10,300	310	0.023	0.085
〃	10	16,900	710	0.025	0.048	14,200	530	0.022	0.048	11,500	380	0.017	0.048	9,200	260	0.015	0.043
〃	14	13,700	510	0.013	0.018	11,500	390	0.012	0.018	9,700	290	0.009	0.018	7,800	200	0.008	0.016
〃	16	12,600	450	0.010	0.012	10,600	340	0.009	0.012	9,100	250	0.007	0.012	7,300	180	0.006	0.011
〃	20	10,300	300	0.006	0.005	8,700	230	0.005	0.005	7,800	180	0.004	0.005	6,200	120	0.004	0.005
Ø 1.5	4	26,600	1,340	0.073	0.462	22,100	1,000	0.065	0.462	16,300	640	0.051	0.462	13,000	440	0.046	0.416
〃	6	22,800	1,120	0.057	0.293	19,000	840	0.051	0.293	14,400	550	0.040	0.293	11,500	380	0.036	0.264
〃	8	19,000	900	0.041	0.124	15,900	670	0.037	0.124	12,500	460	0.029	0.124	10,000	320	0.026	0.112
〃	10	16,600	750	0.030	0.063	13,800	560	0.027	0.063	11,200	390	0.021	0.063	8,900	270	0.019	0.057
〃	12	14,800	630	0.023	0.037	12,400	470	0.020	0.037	10,200	340	0.016	0.037	8,200	240	0.014	0.033
〃	14	13,400	550	0.017	0.023	11,200	410	0.016	0.023	9,500	300	0.012	0.023	7,600	210	0.011	0.021
〃	16	12,300	480	0.013	0.015	10,300	360	0.012	0.015	8,900	270	0.009	0.015	7,100	190	0.008	0.014
〃	18	11,500	420	0.011	0.011	9,600	310	0.010	0.011	8,400	240	0.007	0.011	6,700	170	0.006	0.010
〃	20	10,700	370	0.009	0.008	9,000	280	0.008	0.008	7,900	220	0.006	0.008	6,300	150	0.005	0.007
〃	25	9,300	270	0.005	0.004	7,800	200	0.005	0.004	7,100	160	0.004	0.004	5,700	110	0.004	0.004
〃	30	8,300	200	0.004	0.002	7,000	150	0.004	0.002	6,500	120	0.003	0.002	5,200	90	0.003	0.002
Ø 1.6	10	16,100	780	0.035	0.082	13,500	580	0.032	0.082	10,800	410	0.025	0.082	8,600	280	0.018	0.074
〃	14	13,000	580	0.020	0.030	10,900	430	0.018	0.030	9,100	320	0.014	0.030	7,300	220	0.010	0.027
〃	18	11,100	450	0.013	0.014	9,300	340	0.012	0.014	8,000	260	0.009	0.014	6,400	180	0.006	0.013
Ø 2	4	23,000	1,500	0.070	0.966	20,000	1,200	0.060	0.966	14,000	750	0.052	0.966	12,000	500	0.040	0.869
〃	6	20,300	1,350	0.064	0.926	17,400	1,030	0.058	0.926	12,500	650	0.045	0.926	10,000	450	0.032	0.833
〃	8	17,000	1,090	0.054	0.391	14,500	830	0.048	0.391	10,800	540	0.038	0.391	8,700	380	0.027	0.352
〃	10	14,800	920	0.045	0.200	12,600	700	0.040	0.200	9,700	470	0.031	0.200	7,800	330	0.022	0.180
〃	12	13,200	790	0.037	0.116	11,200	600	0.034	0.116	8,900	420	0.026	0.116	7,100	290	0.019	0.104
〃	14	12,000	700	0.031	0.073	10,200	530	0.028	0.073	8,200	370	0.022	0.073	6,600	260	0.016	0.066
〃	16	11,100	620	0.026	0.049	9,400	470	0.024	0.049	7,700	340	0.018	0.049	6,100	230	0.013	0.044
〃	18	10,300	550	0.022	0.034	8,700	420	0.020	0.034	7,200	310	0.015	0.034	5,800	210	0.011	0.031
〃	20	9,600	500	0.018	0.025	8,100	380	0.016	0.025	6,900	280	0.013	0.025	5,500	190	0.009	0.023
〃	22	8,700	420	0.014	0.018	7,500	320	0.014	0.018	6,500	250	0.010	0.018	5,200	170	0.008	0.016
〃	25	8,400	390	0.012	0.013	7,100	290	0.011	0.013	6,200	230	0.008	0.013	4,900	160	0.006	0.012
〃	30	7,500	310	0.008	0.007	6,300	230	0.007	0.007	5,600	180	0.005	0.007	4,500	130	0.004	0.006
Ø 2.5	8	15,000	1,340	0.077	0.954	12,800	1,020	0.069	0.954	9,600	670	0.054	0.954	7,700	460	0.039	0.859
〃	10	13,100	1,140	0.068	0.488	11,100	860	0.061	0.488	8,600	590	0.048	0.488	6,900	400	0.034	0.439
〃	12	11,800	1,000	0.060	0.283	10,000	750	0.054	0.283	7,900	520	0.042	0.283	6,300	360	0.030	0.255
〃	16	9,900	790	0.045	0.119	8,400	590	0.040	0.119	6,800	430	0.031	0.119	5,500	290	0.022	0.107
〃	20	8,700	650	0.033	0.061	7,300	490	0.030	0.061	6,100	360	0.023	0.061	4,900	250	0.017	0.055
〃	25	7,600	520	0.022	0.031	6,400	390	0.019	0.031	5,500	300	0.015	0.031	4,400	210	0.011	0.028
〃	30	6,800	430	0.014	0.018	5,700	320	0.012	0.018	5,000	250	0.010	0.018	4,000	1,700	0.007	0.016
〃	35	6,200	380	0.009	0.012	5,200	280	0.008	0.012	4,800	190	0.007	0.012	3,800	1,400	0.005	0.011
〃	40	5,700	290	0.005	0.008	4,800	220	0.004	0.008	4,400	170	0.003	0.008	3,500	120	0.002	0.007
〃	50	5,000	190	0.001	0.004	4,200	140	0.001	0.004	3,900	120	0.001	0.004	3,100	80	0.001	0.004
Ø 3	6	13,200	1,470	0.103	1.978	10,900	1,080	0.093	1.978	8,000	700	0.072	1.978	6,400	480	0.052	1.780
〃	10	11,600	1,270	0.092	1.013	9,600	930	0.083	1.013	7,200	620	0.064	1.013	5,800	430	0.046	0.912
〃	12	10,500	1,110	0.081	0.586	8,700	830	0.073	0.586	6,700	560	0.057	0.586	5,300	380	0.041	0.527
〃	16	8,900	900	0.064	0.247	7,400	670	0.058	0.247	5,900	470	0.045	0.247	4,700	320	0.032	0.222
〃	20	7,800	750	0.050	0.127	6,600	560	0.045	0.127	5,300	400	0.035	0.127	4,300	280	0.025	0.114
〃	25	6,900	620	0.036	0.065	5,800	460	0.032	0.065	4,800	340	0.025	0.065	3,900	230	0.018	0.059
〃	30	6,200	520	0.026	0.038	5,200	390	0.023	0.038	4,500	290	0.018	0.038	3,600	200	0.013	0.034
〃	35	5,700	440	0.018	0.024	4,800	330	0.016	0.024	4,200	250	0.013	0.024	3,300	170	0.009	0.022
〃	40	5,300	370	0.013	0.016	4,500	280	0.012	0.016	3,900	220	0.009	0.016	3,100	150	0.006	0.014
〃	45	5,000	330	0.008	0.012	4,200	230	0.008	0.012	3,700	180	0.006	0.012	2,900	130	0.005	0.011
〃	50	4,700	270	0.006	0.008	3,900	200	0.005	0.008	3,600	160	0.004	0.008	2,800	110	0.003	0.007
〃	60	4,500	250	0.003	0.005	3,600	180	0.003	0.005	3,200	130	0.003	0.005	2,500	90	0.002	0.005

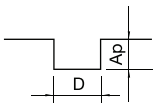
RPM : rev./min FEED : mm/min

2WRE — Cutting Conditions

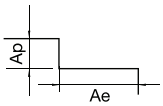
Material		Mild Steels/Carbon Steels/Gray Cast Iron SS/FC/SC				Tool Steels/Mould Steels SCM/HPM				Alloy Steels / Pre-hardened Steels NAK80/KP4M				Hardened Steels STAVAX/SKD11			
Hardness		~ 30HRC				30~ 40HRC				40 ~ 45HRC				45~ 55HRC			
Outside Dia	Effective Length	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø 4	8	10,000	1,600	0.140	1.990	8,800	1,100	0.140	1.990	6,800	770	0.093	1.990	5,300	500	0.070	1.791
〃	10	9,200	1,400	0.120	1.960	8,000	1,000	0.120	1.960	5,900	690	0.085	1.960	4,700	460	0.066	1.764
〃	12	8,500	1,280	0.112	1.852	7,100	950	0.101	1.852	5,100	600	0.078	1.852	4,100	410	0.056	1.667
〃	16	7,200	1,050	0.093	0.781	6,000	770	0.084	0.781	4,400	510	0.065	0.781	3,600	350	0.046	0.703
〃	20	6,300	880	0.077	0.400	5,200	650	0.069	0.400	4,000	440	0.054	0.400	3,200	300	0.038	0.360
〃	25	5,600	750	0.061	0.205	4,600	540	0.055	0.205	3,600	380	0.042	0.205	2,900	260	0.030	0.185
〃	30	5,000	630	0.048	0.119	4,100	460	0.043	0.119	3,300	330	0.033	0.119	2,600	230	0.024	0.107
〃	35	4,600	540	0.038	0.075	3,800	400	0.034	0.075	3,100	290	0.026	0.075	2,500	200	0.019	0.068
〃	40	4,200	470	0.030	0.050	3,500	350	0.027	0.050	2,900	250	0.021	0.050	2,300	180	0.015	0.045
〃	45	3,900	410	0.023	0.035	3,300	300	0.021	0.035	2,700	230	0.016	0.035	2,200	160	0.012	0.032
〃	50	3,700	360	0.018	0.026	3,100	270	0.016	0.026	2,600	200	0.013	0.026	2,100	140	0.009	0.023
〃	55	3,500	320	0.015	0.020	2,950	250	0.015	0.020	2,500	180	0.010	0.020	2,000	130	0.007	0.018
〃	60	3,300	280	0.011	0.015	2,800	210	0.010	0.015	2,400	160	0.008	0.015	1,900	110	0.006	0.014
Ø 5	16	6,000	1,140	0.127	1.907	5,100	860	0.114	1.907	3,500	520	0.089	1.907	2,800	360	0.064	1.716
〃	20	5,300	980	0.121	0.977	4,400	730	0.109	0.977	3,100	440	0.085	0.977	2,500	310	0.061	0.879
〃	25	4,600	820	0.109	0.500	3,800	600	0.099	0.500	2,800	390	0.077	0.500	2,200	270	0.055	0.450
〃	30	4,200	710	0.094	0.289	3,400	510	0.085	0.289	2,500	340	0.066	0.289	2,000	230	0.047	0.260
〃	35	3,800	620	0.077	0.182	3,100	450	0.069	0.182	2,300	300	0.054	0.182	1,900	210	0.038	0.164
〃	40	3,500	540	0.060	0.122	2,800	390	0.054	0.122	2,200	270	0.042	0.122	1,700	180	0.030	0.110
〃	50	3,100	430	0.031	0.063	2,400	300	0.028	0.063	1,900	210	0.022	0.063	1,500	150	0.016	0.057
〃	60	2,800	350	0.013	0.036	2,100	240	0.012	0.036	1,800	170	0.009	0.036	1,400	120	0.007	0.032
Ø 6	20	4,200	960	0.126	2.025	3,800	780	0.114	2.025	2,600	470	0.088	2.025	2,100	330	0.063	1.823
〃	30	3,400	730	0.109	0.600	2,800	540	0.099	0.600	2,000	340	0.077	0.600	1,600	240	0.055	0.540
〃	40	3,000	600	0.083	0.253	2,300	410	0.074	0.253	1,700	260	0.058	0.253	1,300	170	0.041	0.228
〃	50	2,600	480	0.054	0.130	1,900	310	0.049	0.130	1,500	220	0.038	0.130	1,200	160	0.027	0.117
〃	60	2,400	410	0.031	0.075	1,700	260	0.028	0.075	1,300	170	0.022	0.075	1,000	120	0.016	0.068
Ø 8	20	3,200	910	0.180	1.600	2,800	710	0.160	1.600	2,300	450	0.130	1.600	1,700	330	0.090	1.440
〃	40	2,600	600	0.120	0.200	2,000	410	0.100	0.200	1,500	250	0.080	0.200	1,100	160	0.060	0.180
Ø 10	25	2,900	890	0.200	1.760	2,700	680	0.180	1.760	2,100	430	0.130	1.760	1,500	310	0.080	1.584
〃	45	2,200	580	0.140	0.240	2,000	400	0.120	0.240	1,300	220	0.700	0.240	900	150	0.050	0.216

Depth of cut

Slotting
- Ap : Axial Depth
- D : Outside Diameter



Side Milling
- Ap : Axial Depth
- Ae : Radial Depth



- The edge of the flute precisely grinded. If you want to measure the tool and to avoid damaging on the flutes,use non-contact measuring method.
- When milling workpiece ,HRC over 60 Hardened steel,reduce 20% of the RPM and feed compared to the same diameter.
- Use this table for your reference .Adjust the parameters depending on your machining geometry,machining purpose and CNC.
- Use a machine with low vibration and good rigidity (Ø1 or less,the vibration tolerance management should be within 5μm).
- Air blow or oil mist is recommended for smooth chip emission and wet coolant milling is recommended for copper material.