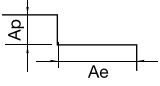


2ERE						Cutting Conditions							
Material		Copper Alloys C1100				Alloy Steels / Pre-hardened Steels NAK80/KP4M				Hardened Steels STAVAX/SKD11			
Hardness						40~ 45HRC				45 ~ 55HRC			
Outside Dia	Effective Length	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø 0.5	2	56,800	1,440	0.020	0.098	48,280	1,152	0.018	0.088	43,452	1,037	0.015	0.075
"	3	44,200	1,056	0.009	0.016	37,570	845	0.008	0.014	33,813	760	0.007	0.012
"	4	40,600	928	0.008	0.012	34,510	742	0.008	0.011	31,059	668	0.006	0.009
"	5	37,000	800	0.008	0.008	31,450	640	0.007	0.007	28,305	576	0.006	0.006
"	6	33,400	672	0.005	0.004	28,390	538	0.005	0.004	25,551	484	0.004	0.003
"	8	29,100	512	0.002	0.002	24,735	410	0.002	0.002	22,262	369	0.002	0.002
"	10	26,100	400	0.001	0.001	22,185	320	0.001	0.001	19,967	288	0.001	0.001
"	14	21,500	192	0.001	0.001	18,275	154	0.001	0.001	16,448	138	0.001	0.001
Ø 0.6	2	63,600	1,984	0.025	0.203	54,060	1,587	0.023	0.183	48,654	1,428	0.019	0.155
"	3	52,500	1,584	0.018	0.114	44,625	1,267	0.016	0.103	40,163	1,140	0.014	0.087
"	4	41,300	1,184	0.012	0.025	35,105	947	0.011	0.023	31,595	852	0.009	0.019
"	5	36,700	1,008	0.010	0.017	31,195	806	0.009	0.015	28,076	726	0.008	0.013
"	6	32,100	832	0.007	0.008	27,285	666	0.006	0.007	24,557	599	0.005	0.006
"	8	26,800	624	0.004	0.003	22,780	499	0.004	0.003	20,502	449	0.003	0.002
"	10	23,400	480	0.002	0.002	19,890	380	0.002	0.002	17,901	350	0.002	0.002
"	12	20,900	384	0.002	0.001	17,765	307	0.002	0.001	15,989	276	0.002	0.001
"	16	16,200	160	0.001	0.001	13,770	128	0.001	0.001	12,393	115	0.001	0.001
Ø 0.7	2	59,800	2,208	0.030	0.055	50,830	1,766	0.027	0.050	45,747	1,590	0.023	0.042
"	4	38,900	1,344	0.017	0.047	33,065	1,075	0.015	0.042	29,759	968	0.013	0.036
"	6	30,200	960	0.010	0.014	25,670	768	0.009	0.013	23,103	691	0.008	0.011
"	8	25,300	736	0.006	0.006	21,505	589	0.005	0.005	19,355	530	0.005	0.005
"	10.0	22,000	576	0.004	0.003	18,700	461	0.004	0.003	16,830	415	0.003	0.002
Ø 0.8	2	41,200	1,680	0.033	0.108	35,020	1,344	0.030	0.097	31,518	1,210	0.025	0.083
"	4	37,100	1,488	0.027	0.080	31,535	1,190	0.024	0.072	28,382	1,071	0.021	0.061
"	6	28,800	1,088	0.015	0.024	24,480	870	0.014	0.022	22,032	783	0.011	0.018
"	8	24,100	832	0.009	0.010	20,485	666	0.008	0.009	18,437	599	0.007	0.008
"	10	21,000	672	0.006	0.005	17,850	538	0.005	0.005	16,065	484	0.005	0.004
"	12	18,700	544	0.004	0.003	15,895	435	0.004	0.003	14,306	392	0.003	0.002
"	14	15,600	368	0.002	0.001	13,260	294	0.002	0.001	11,934	265	0.002	0.001
Ø 0.9	6	27,600	1,264	0.019	0.019	23,460	1,011	0.017	0.017	21,114	910	0.015	0.015
"	8	23,000	960	0.012	0.012	19,550	768	0.011	0.011	17,595	691	0.009	0.009
"	10	20,000	752	0.008	0.008	17,000	602	0.007	0.007	15,300	541	0.006	0.006
Ø 1.0	2	37,900	2,144	0.048	0.263	30,320	1,822	0.038	0.210	27,288	1,640	0.033	0.179
"	3	37,900	2,144	0.048	0.263	30,320	1,822	0.038	0.210	27,288	1,640	0.033	0.179
"	4	34,100	1,872	0.040	0.195	27,280	1,591	0.032	0.156	24,552	1,432	0.027	0.133
"	5	30,300	1,600	0.032	0.083	24,240	1,360	0.026	0.066	21,816	1,224	0.022	0.056
"	6	26,500	1,360	0.023	0.058	21,200	1,156	0.018	0.046	19,080	1,040	0.016	0.039
"	8	22,100	1,056	0.014	0.024	17,680	898	0.011	0.019	15,912	808	0.010	0.016
"	10	19,200	848	0.010	0.013	15,360	721	0.008	0.010	13,824	649	0.007	0.009
"	12	17,200	704	0.007	0.007	13,760	598	0.006	0.006	12,384	539	0.005	0.005
"	14	15,600	576	0.005	0.005	12,480	490	0.004	0.004	11,232	441	0.003	0.003
"	16	14,300	480	0.004	0.003	11,440	408	0.003	0.002	10,296	367	0.003	0.002

2ERE						Cutting Conditions							
Material		Copper Alloys C1100				Alloy Steels / Pre-hardened Steels NAK80/KP4M				Hardened Steels STAVAX/SKD11			
Hardness						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
"	20	12,500	320	0.003	0.001	10,000	272	0.002	0.001	9,000	245	0.002	0.001
"	25	10,800	192	0.003	0.001	8,640	163	0.002	0.001	7,776	147	0.002	0.001
"	30	9,700	80	0.002	0.001	7,760	68	0.002	0.001	6,984	61	0.001	0.001
Ø 1.2	4	28,900	1,888	0.050	0.189	23,120	1,605	0.040	0.151	20,808	1,444	0.034	0.129
"	6	24,800	1,552	0.037	0.120	19,840	1,319	0.030	0.096	17,856	1,187	0.025	0.082
"	8	20,700	1,216	0.024	0.051	16,560	1,034	0.019	0.041	14,904	930	0.016	0.035
"	10	18,000	992	0.016	0.026	14,400	843	0.013	0.021	12,960	759	0.011	0.018
"	12	16,100	832	0.011	0.015	12,880	707	0.009	0.012	11,592	636	0.007	0.010
"	16	13,400	608	0.006	0.006	10,720	517	0.005	0.005	9,648	465	0.004	0.004
"	20	11,700	448	0.004	0.003	9,360	381	0.003	0.002	8,424	343	0.003	0.002
"	25	10,800	192	0.003	0.001	8,640	163	0.002	0.001	7,776	147	0.002	0.001
"	30	9,700	80	0.002	0.001	7,760	68	0.002	0.001	6,984	61	0.001	0.001
Ø 1.4	6	23,300	1,712	0.052	0.222	18,640	1,455	0.042	0.178	16,776	1,310	0.035	0.151
"	8	19,500	1,360	0.035	0.094	15,600	1,156	0.028	0.075	14,040	1,040	0.024	0.064
"	10	16,900	1,136	0.025	0.048	13,520	966	0.020	0.038	12,168	869	0.017	0.033
"	14	13,700	816	0.013	0.018	10,960	694	0.010	0.014	9,864	624	0.009	0.012
"	16	12,600	720	0.010	0.012	10,080	612	0.008	0.010	9,072	551	0.007	0.008
"	20	10,300	480	0.006	0.005	8,240	408	0.005	0.004	7,416	367	0.004	0.003
Ø 1.5	4	26,600	2,144	0.073	0.462	21,280	1,822	0.058	0.370	19,152	1,640	0.050	0.314
"	6	22,800	1,792	0.057	0.293	18,240	1,523	0.046	0.234	16,416	1,371	0.039	0.199
"	8	19,000	1,440	0.041	0.124	15,200	1,224	0.033	0.099	13,680	1,102	0.028	0.084
"	10	16,600	1,200	0.030	0.063	13,280	1,020	0.024	0.050	11,952	918	0.020	0.043
"	12	14,800	1,008	0.023	0.037	11,840	857	0.018	0.030	10,656	771	0.016	0.025
"	14	13,400	880	0.017	0.023	10,720	748	0.014	0.018	9,648	673	0.012	0.016
"	16	12,300	768	0.013	0.015	9,840	653	0.010	0.012	8,856	588	0.009	0.010
"	18	11,500	672	0.011	0.011	9,200	571	0.009	0.009	8,280	514	0.007	0.007
"	20	10,700	592	0.009	0.008	8,560	503	0.007	0.006	7,704	453	0.006	0.005
"	25	9,300	432	0.005	0.004	7,440	367	0.004	0.003	6,696	330	0.003	0.003
"	30	8,300	320	0.004	0.002	6,640	272	0.003	0.002	5,976	245	0.003	0.001
Ø 1.6	10	16,100	1,248	0.035	0.082	12,880	1,061	0.028	0.066	11,592	955	0.024	0.056
"	14	13,000	928	0.020	0.030	10,400	789	0.016	0.024	9,360	710	0.014	0.020
"	18	11,100	720	0.013	0.014	8,880	612	0.010	0.011	7,992	551	0.009	0.010
Ø 2.0	4	23,000	2,400	0.070	0.966	18,400	2,040	0.056	0.773	16,560	1,836	0.048	0.657
"	6	20,300	2,160	0.064	0.926	16,240	1,836	0.051	0.741	14,616	1,652	0.044	0.630
"	8	17,000	1,744	0.054	0.391	13,600	1,482	0.043	0.313	12,240	1,334	0.037	0.266
"	10	14,800	1,472	0.045	0.200	11,840	1,251	0.036	0.160	10,656	1,126	0.031	0.136
"	12	13,200	1,264	0.037	0.116	10,560	1,074	0.030	0.093	9,504	967	0.025	0.079
"	14	12,000	1,120	0.031	0.073	9,600	952	0.025	0.058	8,640	857	0.021	0.050
"	16	11,100	992	0.026	0.049	8,880	843	0.021	0.039	7,992	759	0.018	0.033
"	18	10,300	880	0.022	0.034	8,240	748	0.018	0.027	7,416	673	0.015	0.023
"	20	9,600	800	0.018	0.025	7,680	680	0.014	0.020	6,912	612	0.012	0.017

2ERE						Cutting Conditions							
Material		Copper Alloys C1100				Alloy Steels / Pre-hardened Steels NAK80/KP4M				Hardened Steels STAVAX/SKD11			
Hardness						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
"	22	8,700	672	0.014	0.018	6,960	571	0.011	0.014	6,264	514	0.010	0.012
"	25	8,400	624	0.012	0.013	6,720	530	0.010	0.010	6,048	477	0.008	0.009
"	30	7,500	496	0.008	0.007	6,000	422	0.006	0.006	5,400	379	0.005	0.005
Ø 2.5	8	15,000	2,144	0.077	0.954	12,000	1,822	0.062	0.763	10,800	1,640	0.052	0.649
"	10	13,100	1,824	0.068	0.488	10,480	1,550	0.054	0.390	9,432	1,395	0.046	0.332
"	12	11,800	1,600	0.060	0.283	9,440	1,360	0.048	0.226	8,496	1,224	0.041	0.192
"	16	9,900	1,264	0.045	0.119	7,920	1,074	0.036	0.095	7,128	967	0.031	0.081
"	20	8,700	1,040	0.033	0.061	6,960	884	0.026	0.049	6,264	796	0.022	0.041
"	25	7,600	832	0.022	0.031	6,080	707	0.018	0.025	5,472	636	0.015	0.021
"	30	6,800	688	0.014	0.018	5,440	585	0.011	0.014	4,896	526	0.010	0.012
"	35	6,200	608	0.009	0.012	4,960	517	0.007	0.010	4,464	465	0.006	0.008
"	40	5,700	464	0.005	0.008	4,560	394	0.004	0.006	4,104	355	0.003	0.005
"	50	5,000	304	0.001	0.004	4,000	258	0.001	0.003	3,600	233	0.001	0.003
Ø 3	6	13,200	2,352	0.103	1.978	10,560	1,999	0.082	1.582	9,504	1,799	0.070	1.345
"	10	11,600	2,032	0.092	1.013	9,280	1,727	0.074	0.810	8,352	1,554	0.063	0.689
"	12	10,500	1,776	0.081	0.586	8,400	1,510	0.065	0.469	7,560	1,359	0.055	0.398
"	16	8,900	1,440	0.064	0.247	7,120	1,224	0.051	0.198	6,408	1,102	0.044	0.168
"	20	7,800	1,200	0.050	0.127	6,240	1,020	0.040	0.102	5,616	918	0.034	0.086
"	25	6,900	992	0.036	0.065	5,520	843	0.029	0.052	4,968	759	0.024	0.044
"	30	6,200	832	0.026	0.038	4,960	707	0.021	0.030	4,464	636	0.018	0.026
"	35	5,700	704	0.018	0.024	4,560	598	0.014	0.019	4,104	539	0.012	0.016
"	40	5,300	592	0.013	0.016	4,240	503	0.010	0.013	3,816	453	0.009	0.011
"	45	5,000	528	0.008	0.012	4,000	449	0.006	0.010	3,600	404	0.005	0.008
"	50	4,700	432	0.006	0.008	3,760	367	0.005	0.006	3,384	330	0.004	0.005
"	60	4,500	400	0.003	0.005	3,600	340	0.002	0.004	3,240	306	0.002	0.003
Ø 4	8	10,000	2,560	0.140	1.990	8,000	2,176	0.112	1.592	7,200	1,958	0.095	1.353
"	10	9,200	2,240	0.120	1.960	7,360	1,904	0.096	1.568	6,624	1,714	0.082	1.333
"	12	8,500	2,048	0.112	1.852	6,800	1,741	0.090	1.482	6,120	1,567	0.076	1.259
"	16	7,200	1,680	0.093	0.781	5,760	1,428	0.074	0.625	5,184	1,285	0.063	0.531
"	20	6,300	1,408	0.077	0.400	5,040	1,197	0.062	0.320	4,536	1,077	0.052	0.272
"	25	5,600	1,200	0.061	0.205	4,480	1,020	0.049	0.164	4,032	918	0.041	0.139
"	30	5,000	1,008	0.048	0.119	4,000	857	0.038	0.095	3,600	771	0.033	0.081
"	35	4,600	864	0.038	0.075	3,680	734	0.030	0.060	3,312	661	0.026	0.051
"	40	4,200	752	0.030	0.050	3,360	639	0.024	0.040	3,024	575	0.020	0.034
"	45	3,900	656	0.023	0.035	3,120	558	0.018	0.028	2,808	502	0.016	0.024
"	50	3,700	576	0.018	0.026	2,960	490	0.014	0.021	2,664	441	0.012	0.018
"	55	3,500	512	0.015	0.020	2,800	435	0.012	0.016	2,520	392	0.010	0.014
"	60	3,300	448	0.011	0.015	2,640	381	0.009	0.012	2,376	343	0.007	0.010
Ø 5	16	6,000	1,824	0.127	1.907	4,800	1,550	0.102	1.526	4,320	1,395	0.086	1.297
"	20	5,300	1,568	0.121	0.977	4,240	1,333	0.097	0.782	3,816	1,200	0.082	0.664
"	25	4,600	1,312	0.109	0.500	3,680	1,115	0.087	0.400	3,312	1,004	0.074	0.340

2ERE						Cutting Conditions							
Material		Copper Alloys C1100				Alloy Steels / Pre-hardened Steels NAK80/KP4M				Hardened Steels STAVAX/SKD11			
Hardness						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
"	30	4,200	1,136	0.094	0.289	3,360	986	0.075	0.231	3,024	869	0.064	0.197
"	35	3,800	992	0.077	0.182	3,040	843	0.062	0.146	2,736	759	0.052	0.124
"	40	3,500	864	0.060	0.122	2,800	734	0.048	0.098	2,520	661	0.041	0.083
"	50	3,100	688	0.031	0.063	2,480	585	0.025	0.050	2,232	526	0.021	0.043
"	60	2,800	560	0.013	0.036	2,240	476	0.010	0.029	2,016	428	0.009	0.024
Ø 6	20	4,200	1,536	0.126	2.025	3,360	1,306	0.101	1.620	3,024	1,175	0.086	1.377
"	30	3,400	1,168	0.109	0.600	2,720	993	0.087	0.480	2,448	894	0.074	0.408
"	40	3,000	960	0.083	0.253	2,400	816	0.066	0.202	2,160	734	0.056	0.172
"	50	2,600	768	0.054	0.130	2,080	653	0.043	0.104	1,872	588	0.037	0.088
"	60	2,400	656	0.031	0.075	1,920	558	0.025	0.060	1,728	502	0.021	0.051
Ø 8	20	3,200	1,456	0.180	1.600	2,560	1,238	0.144	1.280	2,304	1,114	0.122	1.088
"	40	2,600	960	0.120	0.200	2,080	816	0.096	0.160	1,872	734	0.082	0.136
Ø 10	25	2,900	1,424	0.200	1.760	2,320	1,210	0.160	1.408	2,088	1,089	0.136	1.197
"	45	2,200	928	0.140	0.240	1,760	789	0.112	0.192	1,584	710	0.095	0.163
Ø 12	30	2,000	1,296	0.190	1.650	1,600	1,102	0.152	1.320	1,440	991	0.129	1.122
"	50	1,950	912	0.150	0.250	1,560	775	0.120	0.200	1,404	698	0.102	0.170
Depth of cut		Slotting • Ap : Axial Depth • D : Outside Diameter  Side Milling • Ap : Axial Depth • Ae : Radial Depth 											

- Use a rigid precise machine and holder.
- Ap(mm): Axial Depth of cut
- Ae(mm): Radial Depth of cut
- If the effective length is long, reduce the RPM and feed in the same proportion.
- The edge of the flute precisely grinded, if you want measure the tool and to avoid damaging on the flutes, use non-contact measuring method
- If the effective length or overall length of your tool are not show above the table, adjust your parameter with upper or lower diameter of parameter.
- When milling workpiece HRC over 50 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.
- If the table over the maximum RPM and feed of your machine, adjust RPM and feed in the same proportion.
- 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.
- The Above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine ability and the operation environment.