

- Endmills for pre-hardened and hardened steel (HRC50~62)
- Good wear resistance by Si-based PVD coating.
- High precise edge tolerance.
- Very nice work surface finish.
- Outstanding performance at high speed machining by ultra fine (0.2 μ m) WC grade.

2

UWC

TISIN
Coating

R
 ± 0.005
0.03 ~ 2.93R

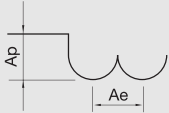
R
 ± 0.01
3 ~ 6R

R
 ± 0.015
6.5 ~ 10R

30°
Helix Angle

D Size	D Tolerance
$\varnothing 0.06 \sim 0.19$	+0 ~ -0.005 mm
$\varnothing 0.2 \sim 5.8$	+0 ~ -0.01 mm
$\varnothing 6 \sim 12$	-0.005 ~ -0.015 mm
$\varnothing 13 \sim 20$	-0.01 ~ -0.02 mm

Material		Copper				Prehardened Steel / Hardened Steel				Hardened Steels				Hardened Steels			
Hardness						30 ~ 45HRC				45 ~ 55HRC				55 ~ 62HRC			
Radius	Cutting 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
R0.05	0.2	40,000	300	0.010	0.050	40,000	300	0.005	0.040	30,000	200	0.004	0.040	Cutting is not possible.			
R0.1	0.2	54,000	430	0.012	0.008	54,000	630	0.020	0.060	44,300	450	0.040	0.012	30,000	300	0.023	0.008
"	0.4	54,000	430	0.007	0.008	54,000	430	0.020	0.051	44,300	345	0.016	0.040	32,800	260	0.010	0.023
R0.15	0.3	54,000	720	0.020	0.013	54,000	750	0.030	0.090	44,300	600	0.024	0.072	32,800	450	0.015	0.042
"	0.6	54,000	720	0.012	0.013	54,000	715	0.030	0.075	44,300	575	0.024	0.060	32,800	430	0.015	0.035
R0.2	0.4	54,000	870	0.028	0.016	54,000	1,000	0.040	0.120	44,300	800	0.032	0.096	32,800	600	0.020	0.056
"	0.8	54,000	870	0.016	0.016	54,000	880	0.040	0.105	44,300	700	0.032	0.084	32,800	525	0.020	0.049
R0.25	0.5	56,000	1,250	0.035	0.022	53,000	1,250	0.050	0.150	43,500	1,000	0.040	0.120	32,200	750	0.025	0.070
"	1	56,000	1,380	0.021	0.022	50,000	1,000	0.050	0.125	41,350	800	0.040	0.100	30,600	600	0.025	0.058
R0.3	0.6	58,000	1,510	0.042	0.026	52,000	1,380	0.060	0.180	42,650	1,100	0.048	0.144	31,500	825	0.030	0.084
"	1.2	58,000	1,710	0.025	0.026	48,500	1,020	0.060	0.155	40,500	810	0.048	0.124	30,000	610	0.030	0.072
R0.4	0.8	52,000	1,870	0.056	0.036	48,000	1,500	0.080	0.240	39,500	1,200	0.064	0.192	29,250	900	0.040	0.112
"	2	52,000	1,970	0.033	0.036	45,000	1,085	0.080	0.200	37,500	870	0.064	0.160	27,800	650	0.040	0.093
R0.5	1	41,000	1,660	0.063	0.040	38,540	1,560	0.100	0.300	36,900	1,250	0.080	0.240	27,300	940	0.050	0.140
"	2.5	41,000	1,880	0.022	0.040	38,540	1,000	0.100	0.200	31,500	800	0.080	0.160	23,000	600	0.050	0.090
R0.6	3	34,000	2,120	0.072	0.051	31,960	1,550	0.120	0.360	32,800	1,250	0.096	0.288	24,400	940	0.060	0.168
R0.75	1.5	27,000	2,280	0.087	0.068	25,380	1,600	0.150	0.450	28,700	1,280	0.120	0.360	21,500	960	0.075	0.210
"	4	27,000	1,830	0.052	0.068	25,380	1,000	0.150	0.325	26,000	800	0.120	0.260	19,250	600	0.075	0.152
R1	2	32,700	3,560	0.112	0.089	30,738	1,850	0.200	0.600	24,600	1,480	0.160	0.480	18,250	1,110	0.100	0.280
"	5	32,700	2,980	0.067	0.089	30,738	1,350	0.200	0.435	22,000	1,080	0.160	0.348	16,250	810	0.100	0.203
R1.25	6	30,600	3,680	0.067	0.115	28,764	1,600	0.250	0.542	27,901	1,280	0.200	0.430	15,500	960	0.125	0.251
R1.5	3	26,100	4,400	0.197	0.171	24,534	2,520	0.300	0.957	23,798	2,050	0.240	0.766	15,500	1,530	0.150	0.447
"	8	26,100	4,110	0.100	0.171	24,534	2,350	0.300	0.765	23,798	1,880	0.240	0.612	15,500	1,410	0.150	0.357
R2	4	18,800	4,160	0.266	0.208	17,672	2,450	0.400	1.380	17,142	1,960	0.320	1.100	12,800	1,470	0.200	0.644
"	8	18,800	3,920	0.134	0.208	17,672	2,350	0.400	1.020	17,142	1,880	0.320	0.816	12,800	1,410	0.200	0.476
R2.5	5	17,300	3,980	0.215	0.240	16,262	2,560	0.500	1.660	15,774	2,050	0.400	1.330	11,000	1,530	0.250	0.770
"	10	17,300	3,660	0.180	0.240	16,262	2,300	0.500	1.275	15,774	1,840	0.400	1.020	11,000	1,380	0.250	0.595
R3	6	16,500	3,880	0.290	0.281	15,510	2,700	0.600	2.340	15,045	2,160	0.480	1.870	9,600	1,620	0.300	1.090
"	12	16,500	3,500	0.230	0.281	15,510	2,400	0.600	1.530	15,045	1,920	0.480	1.225	9,600	1,440	0.300	0.715
R4	8	11,660	4,000	0.400	0.175	10,960	2,300	0.800	3.100	10,632	1,840	0.640	2.480	7,600	1,380	0.400	1.446
"	14	11,660	3,850	0.400	0.175	10,960	2,000	0.800	2.050	10,632	1,600	0.640	1.640	7,600	1,200	0.400	0.957
R5	10	9,560	4,100	0.500	0.154	8,986	2,200	1.000	3.750	8,717	1,780	0.800	3.000	6,400	1,340	0.500	1.750
"	18	9,560	3,720	0.500	0.154	8,986	1,700	1.000	2.550	8,717	1,360	0.800	2.040	6,400	1,020	0.500	1.190
R6	12	7,100	4,000	0.600	0.159	6,674	1,850	1.200	4.420	6,474	1,480	0.960	3.540	5,450	1,110	0.600	2.060
"	22	7,100	3,250	0.600	0.159	6,674	1,600	1.200	3.050	6,474	1,280	0.960	2.440	5,450	960	0.600	1.423
R8	30	4,650	2,000	0.115	0.450	4,371	1,630	3.870	1.120	4,240	1,100	2.350	0.790	4,000	810	1.742	0.500
R10	38	3,200	2,200	0.100	0.400	3,008	1,450	4.120	1.100	2,918	1,100	2.530	0.840	3,100	800	1.866	0.520

Depth of Cut	<ul style="list-style-type: none"> • Ap : Axial Depth • Ae : Radial Depth • D : Outside Diameter • n : Speed • Vf : Feed 
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- If the effective length is long, reduce the RPM and feed in the same proportion.
- 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 ($\phi 1$ or less, the vibration tolerance management should be within 5 μm).
- Air blow or oil mist is recommended for smooth chip emission, and dry milling is recommended for copper material.