

- Endmills for pre-hardened and hardened steel (HRC50~62)
- Good wear resistance by Si-based PVD coating.
- High precise edge tolerance.
- Designed for minimizing edge chipping by corner R shape.
- Various corner R and flute length for wide range application.
- Outstanding performance at high speed machining by ultra fine (0.2 μ m) WC grade.

2

UWC

TISIN
Coating

R
 ± 0.005

R
 ± 0.01

R
 ± 0.015

30°
Helix Angle

R0.02 ~ 0.5

R1 ~ 1.5

R2 ~ 3

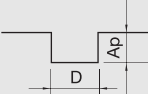
D Size	D Tolerance
$\varnothing 0.2 \sim 5$	+0 ~ -0.01 mm
$\varnothing 6 \sim 12$	-0.005 ~ -0.015 mm
$\varnothing 16$	-0.01 ~ -0.02 mm

Material		Copper				Prehardened Steel / Hardened Steel				Hardened Steels				Hardened Steels			
Hardness						30 ~ 45HRC				45 ~ 55HRC				55 ~ 62HRC			
Outside Diameter	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
∅0.2	1	50,000	352	0.264	0.020	50,000	196	0.006	0.020	34,500	150	0.004	0.020	14,950	24	0.001	0.015
"	1.5	50,000	311	0.017	0.010	50,000	173	0.005	0.010	26,450	104	0.003	0.010	11,730	20	0.001	0.007
∅0.3	1	50,000	890	0.029	0.020	50,000	495	0.007	0.020	34,500	345	0.005	0.015	21,505	34	0.004	0.015
"	3	50,000	393	0.029	0.015	50,000	219	0.006	0.015	24,150	81	0.003	0.010	14,605	20	0.002	0.010
∅0.4	1	47,150	890	0.047	0.062	50,000	495	0.013	0.070	39,675	368	0.011	0.070	23,575	39	0.004	0.070
"	3	33,350	683	0.026	0.053	26,450	380	0.008	0.026	26,450	276	0.007	0.026	15,755	29	0.003	0.026
∅0.5	1	48,300	2,008	0.079	0.114	48,300	1,116	0.033	0.119	39,100	840	0.029	0.119	24,150	92	0.013	0.119
"	3	31,050	1,118	0.056	0.088	31,050	621	0.022	0.110	25,415	460	0.020	0.110	15,755	51	0.008	0.110
"	5	25,760	827	0.026	0.044	25,760	459	0.011	0.010	20,700	345	0.010	0.010	12,995	38	0.004	0.010
∅0.6	2	27,945	890	0.111	0.158	27,945	495	0.010	0.214	23,000	380	0.010	0.214	14,835	42	0.004	0.214
"	6	16,445	435	0.035	0.044	16,445	242	0.003	0.010	13,570	184	0.003	0.010	8,740	21	0.001	0.010
∅0.8	4	17,250	787	0.129	0.194	17,020	437	0.014	0.114	14,720	345	0.015	0.114	9,890	40	0.007	0.114
"	8	12,650	475	0.029	0.098	12,650	264	0.005	0.088	10,695	184	0.004	0.088	7,475	20	0.002	0.088
∅1	4	13,800	1,449	0.196	0.396	13,800	805	0.029	0.264	11,730	655	0.034	0.264	8,280	78	0.017	0.264
"	10	8,625	559	0.047	0.308	8,625	311	0.011	0.123	7,475	264	0.013	0.123	5,290	31	0.006	0.123
"	16	6,900	331	0.018	0.220	6,900	184	0.004	0.026	5,980	161	0.005	0.026	4,255	19	0.002	0.026
∅1.2	6	9,200	1,035	0.182	0.457	9,200	575	0.018	0.088	8,165	483	0.0215	0.088	6,095	59	0.011	0.088
"	12	6,670	662	0.053	0.396	6,670	368	0.007	0.070	5,980	299	0.008	0.070	4,370	37	0.004	0.070
∅1.5	4	12,880	1,925	0.293	0.660	12,880	1,070	0.044	0.440	11,730	920	0.059	0.440	8,970	121	0.032	0.440
"	10	8,280	1,325	0.147	0.554	8,280	736	0.031	0.282	7,590	633	0.041	0.282	5,865	83	0.022	0.282
"	20	5,865	725	0.041	0.352	6,350	403	0.005	0.106	4,160	345	0.006	0.106	3,870	45	0.003	0.106
∅2	6	12,535	1,801	0.314	0.836	12,535	1,001	0.042	0.792	11,730	909	0.059	0.792	9,430	130	0.035	0.792
"	12	9,200	1,449	0.182	0.704	9,200	805	0.030	0.440	8,280	725	0.043	0.440	6,785	105	0.025	0.440
"	20	6,900	1,139	0.091	0.651	6,200	633	0.017	0.194	3,520	564	0.023	0.194	3,226	82	0.014	0.194
"	30	5,865	973	0.049	0.440	3,300	541	0.005	0.132	2,860	495	0.005	0.132	2,386	68	0.002	0.132
∅2.5	10	10,350	1,801	0.331	0.836	10,350	1,001	0.051	0.528	9,775	943	0.073	0.528	8,165	151	0.047	0.528
"	30	6,210	787	0.067	0.616	6,210	437	0.011	0.176	5,865	414	0.016	0.176	4,830	65	0.010	0.176
∅3	12	10,350	2,029	0.381	0.831	10,350	1,127	0.103	0.616	9,775	874	0.103	0.655	8,740	196	0.073	0.655
"	20	8,165	1,553	0.254	0.762	6,050	863	0.071	0.567	3,420	667	0.071	0.567	3,108	147	0.043	0.567
"	30	6,900	1,263	0.137	0.674	3,300	702	0.049	0.371	2,890	541	0.049	0.371	2,440	115	0.028	0.352
∅4	12	8,740	1,904	0.401	1.525	8,740	1,058	0.081	1.124	7,360	920	0.117	1.124	6,210	210	0.083	1.124
"	20	6,785	1,458	0.375	1.325	5,880	810	0.053	0.880	5,750	840	0.078	0.880	4,830	194	0.057	0.880
"	30	5,750	752	0.196	1.210	2,950	418	0.028	0.671	2,540	656	0.041	0.671	2,160	149	0.030	0.708
"	45	4,715	500	0.096	1.118	2,300	278	0.007	0.326	2,015	322	0.010	0.326	1,800	75	0.007	0.326
∅5	15	7,705	3,064	0.697	2.277	7,705	1,702	0.106	1.346	5,520	1,139	0.150	1.346	4,600	342	0.110	1.346
"	30	5,290	1,470	0.342	1.760	2,780	817	0.053	1.035	3,795	541	0.075	1.035	3,220	164	0.055	1.035
∅6	20	5,980	2,194	0.600	2.194	5,460	1,219	0.476	1.356	3,565	1,035	0.186	1.356	3,105	393	0.145	1.356
"	40	4,600	1,635	0.565	2.049	2,380	909	0.410	1.304	2,160	759	0.164	1.304	2,040	304	0.123	1.304
∅8	22	5,520	1,946	0.528	2.542	5,520	1,081	0.419	1.518	3,220	909	0.164	1.518	2,760	346	0.128	1.518
"	40	4,140	1,449	0.497	2.277	2,120	805	0.361	1.323	2,080	667	0.144	1.323	1,955	268	0.108	1.323
∅10	24	4,600	1,656	0.449	2.887	4,485	920	0.356	1.645	2,760	771	0.139	1.645	2,300	294	0.108	1.645
"	45	3,450	1,221	0.423	2.438	3,450	679	0.307	1.334	1,955	564	0.122	1.334	1,725	228	0.092	1.334
∅12	26	3,795	1,387	0.377	3.013	3,795	771	0.299	2.024	2,300	644	0.117	2.024	1,955	247	0.091	2.024
"	50	2,875	1,035	0.355	2.415	2,875	575	0.258	1.403	1,725	483	0.103	1.403	1,380	191	0.077	1.403
∅16	35	2,990	1,097	0.302	2.921	2,990	610	0.239	2.162	1,725	518	0.094	2.162	1,610	198	0.073	2.162

Depth of Cut

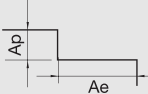
Slotting

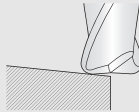
- Ap : Axial Depth
- D : Outside Diameter



Side Milling

- Ap : Axial Depth
- Ae : Radial Depth





Inclined Cutting

- When milling workpiece HRC over 62, reduce 20% of the RPM and feed with the same diameter.
- If the effective length is long, reduce the RPM and feed maximum 30%.
- Consider the corner radius value when you set up the Ae value.
- For curved milling, set up the lower value of the pitch than the corner radius value of tool diameter.
- For curved milling, raise up the feed up to 30% in stable milling condition.