



- 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 μm) WC grade.



D Size	D Tolerance
Ø0.8 ~ 5	+0 ~ -0.01 mm
Ø6 ~ 12	-0.005 ~ -0.015 mm

### 4CRE

### Cutting Condition

• RPM: rev./min • Feed: mm/min

Material		Prehardened Steel / Hardened Steel				Hardened Steels			
Hardness		30 ~ 45HRC				45 ~ 55HRC			
Outside Diameter	Effective Length	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø1	4	13,455	1,265	0.038	0.264	11,730	1,046	0.030	0.238
"	10	8,625	495	0.011	0.123	7,475	495	0.009	0.098
Ø1.2	4	12,880	1,380	0.031	0.440	11,730	1,070	0.023	0.293
"	10	8,855	782	0.017	0.176	7,130	587	0.009	0.147
Ø1.5	6	11,385	1,265	0.040	0.475	10,350	1,150	0.037	0.435
"	12	9,280	817	0.028	0.317	6,790	759	0.025	0.290
Ø2	6	12,650	1,265	0.063	0.633	11,730	1,173	0.059	0.713
"	12	9,970	1,012	0.045	0.396	8,280	943	0.043	0.396
Ø2.5	10	10,580	1,380	0.065	0.528	9,775	1,150	0.065	0.528
"	20	8,160	1,150	0.047	0.264	7,845	655	0.030	0.220
Ø3	10	11,040	2,070	0.094	0.684	10,235	2,070	0.059	0.684
"	20	7,340	1,495	0.057	0.567	6,230	1,495	0.035	0.567
Ø4	13	9,085	1,576	0.105	1.150	7,590	1,530	0.082	1.150
"	20	7,130	1,380	0.069	0.920	5,980	1,288	0.054	0.920
"	30	6,325	1,104	0.043	0.745	5,290	1,058	0.033	0.745
Ø6	20	5,635	1,691	0.176	2.305	3,335	978	0.176	1.281
"	40	2,875	782	0.098	1.320	1,610	460	0.098	0.733
Ø8	22	4,600	1,840	0.212	2.921	2,760	782	0.212	1.518
Ø10	24	3,680	2,013	0.242	3.140	2,185	621	0.253	1.645
Ø12	26	2,875	2,070	0.265	3.105	1,725	495	0.276	1.714

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.