HUB

HITACHI
Inspire the Next

UTILITY SERIES

Solid Micro-Grain Carbide End Mills
for Maximum Cost Performance

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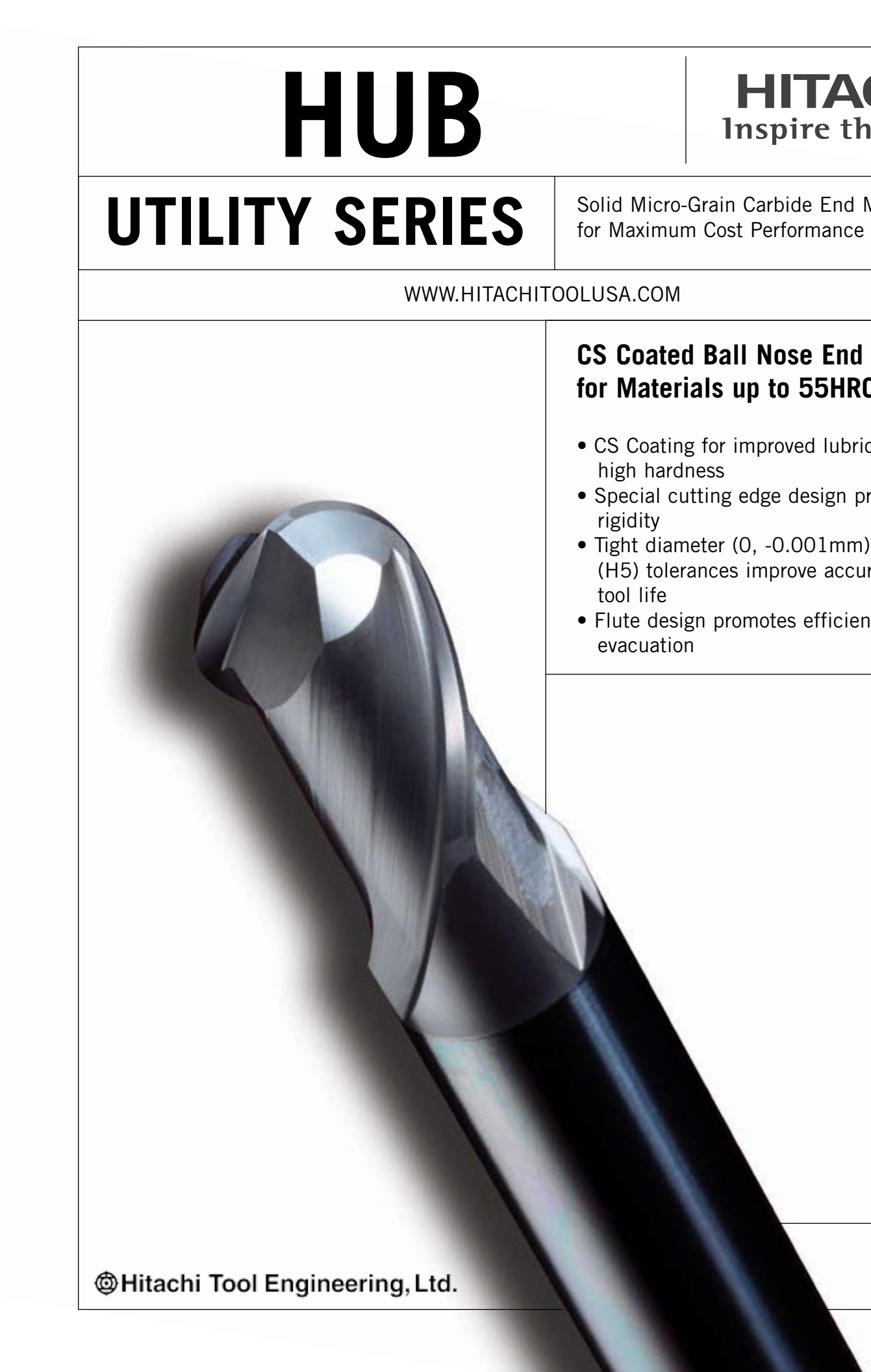
CS Coated Ball Nose End Mills for Materials up to 55HRC

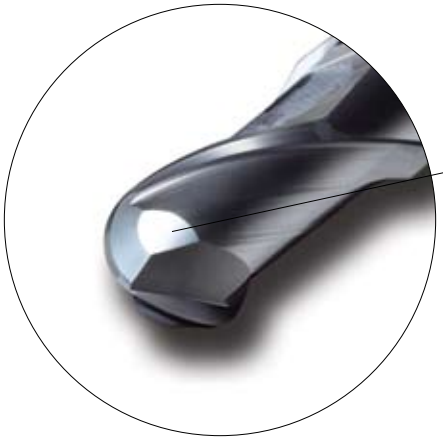
- CS Coating for improved lubrication and high hardness
- Special cutting edge design provides high rigidity
- Tight diameter (0, -0.001mm) and shank (H5) tolerances improve accuracy and tool life
- Flute design promotes efficient chip evacuation



Hitachi Tool Engineering, Ltd.

INTRODUCTION

The HUB Utility Series Ball End Mills have been designed for maximum cost performance in carbon steels, alloy steels, pre-hardened steels and hardened steels up to 55HRC. Special cutting geometries and tight tolerances improve accuracy and tool life. The special CS Coating improves machining efficiency and tool life.

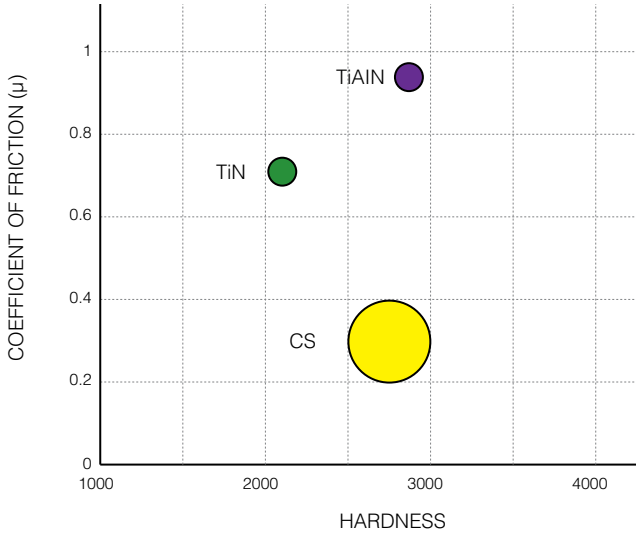


FEATURES

1.	CS Coating (CrSiN)

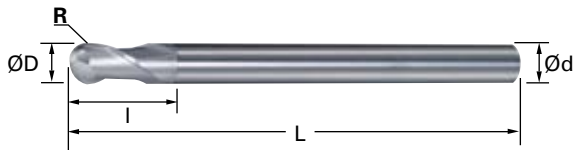
The special nano-composite CS Coating has improved lubrication properties without reducing the hardness. As shown in the chart below, our special CS Coating maintains a hardness close to TiAlN but the coefficient of friction is much less than that of either TiAlN or TiN.

These properties serve to reduce cutting heat therefore improving cutting efficiency and improving tool life. Dry machining is possible for many applications.



HUB UTILITY SERIES

HUB
Utility Series



Helix Angle	30°
R	±0.007
D	0/-0.010
d	h5

HUB - METRIC

Part No.	Flutes	ØD	R	l	L	Ød
HUB2010-CS	2	**1.0**	0.5	1.0	50.0	4.0
HUB2020-CS	2	**2.0**	1.0	2.0	50.0	6.0
HUB2030-CS	2	**3.0**	1.5	3.0	70.0	6.0
HUB2040-CS	2	**4.0**	2.0	4.0	70.0	6.0
HUB2060-CS	2	**6.0**	3.0	6.0	90.0	6.0
HUB2080-CS	2	**8.0**	4.0	8.0	100.0	8.0
HUB2100-CS	2	**10.0**	5.0	10.0	100.0	10.0
HUB2120-CS	2	**12.0**	6.0	12.0	110.0	12.0

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Cutting Conditions

Work Material (Hardness)	Depth of Cut	Cutting Condition	Tool Diameter (Radius) mm 1.0 (R0.5)	2.0 (R1)	4.0 (R2)	6.0 (R3)	8.0 (R4)	10.0 (R5)	12.0 (R6)
Cast Iron, Carbon Steels (~250HB)	doc=0.1D woc=0.3D	N (rpm)	50000	47700	23900	15900	11900	9500	8000
		fz (mm/tooth)	0.012	0.04	0.08	0.12	0.16	0.18	0.19
		Vf (mm/min)	1170	3710	3720	3710	3720	3420	3110
Alloy Steels,Tool Steels (25~35HRC)	doc=0.1D woc=0.3D	N (rpm)	50000	41400	20700	13800	10300	8300	6900
		fz (mm/tooth)	0.012	0.04	0.08	0.12	0.16	0.18	0.19
		Vf (mm/min)	1170	3220	3220	3220	3220	2990	2680
Pre-hardened Steels, Hardened Steels (35~45HRC)	doc=0.1D woc=0.3D	N (rpm)	50000	36600	18300	12200	9200	7300	6100
		fz (mm/tooth)	0.010	0.03	0.07	0.10	0.14	0.16	0.17
		Vf (mm/min)	1010	2470	2470	2470	2490	2280	2060
Hardened Steels (45~55HRC)	doc=0.1D woc=0.3D	N (rpm)	50000	28600	14300	9500	7200	5700	4800
		fz (mm/tooth)	0.009	0.03	0.06	0.09	0.12	0.14	0.15
		Vf (mm/min)	930	1770	1770	1760	1790	1630	1480

Work Material (Hardness)	Depth of Cut	Cutting Condition	Tool Diameter (Radius) Inch 0.039 (R0.020)	0.079 (R0.039)	0.157 (R0.079)	0.236 (R0.118)	0.315 (R0.157)	0.394 (R0.197)	0.472 (R0.236)
Cast Iron, Carbon Steels (~250HB)	doc=0.1D woc=0.3D	N (rpm)	50000	47700	23900	15900	11900	9500	8000
		fz (in/tooth)	0.0005	0.002	0.003	0.005	0.006	0.007	0.008
		Vf (in/min)	46.063	146.030	146.336	146.030	146.398	134.646	122.457
Alloy Steels,Tool Steels (25~35HRC)	doc=0.1D woc=0.3D	N (rpm)	50000	41400	20700	13800	10300	8300	6900
		fz (in/tooth)	0.0005	0.002	0.003	0.005	0.006	0.007	0.008
		Vf (in/min)	46.063	126.743	126.743	126.743	126.714	117.638	105.619
Pre-hardened Steels, Hardened Steels (35~45HRC)	doc=0.1D woc=0.3D	N (rpm)	50000	36600	18300	12200	9200	7300	6100
		fz (in/tooth)	0.0004	0.001	0.003	0.004	0.005	0.006	0.007
		Vf (in/min)	39.921	97.108	97.108	97.108	98.091	89.669	80.923
Hardened Steels (45~55HRC)	doc=0.1D woc=0.3D	N (rpm)	50000	28600	14300	9500	7200	5700	4800
		fz (in/tooth)	0.0004	0.001	0.002	0.004	0.005	0.006	0.006
		Vf (in/min)	36.594	69.559	69.559	69.316	70.370	64.181	58.371

DISTRIBUTED BY

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