

YB/IHUB



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



FEATURES

- CS Coating for improved lubrication and high hardness
- Special cutting edge design provides high rigidity
- Tight diameter and shank (h5) tolerances improve accuracy and tool life
- Flute design promotes efficient chip evacuation

INTRODUCTION

The YB/IHUB 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.



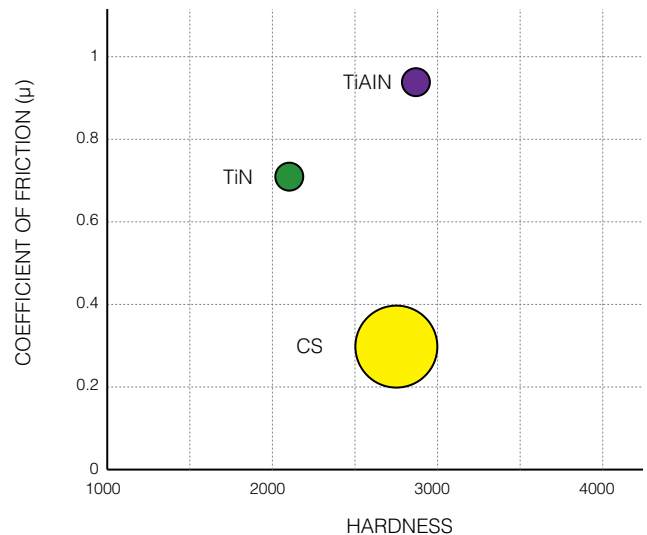
Tight diameter and shank tolerance for improved accuracy and tool life

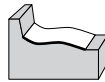
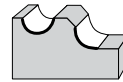
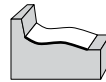
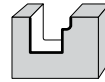
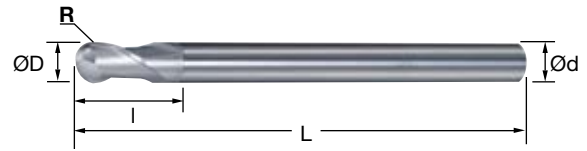
FEATURES

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.



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Helix Angle	30°
R (R≤6)	±0.005
R (R>6)	±0.01
D (R≤6)	0/-0.01
D (R>6)	0/-0.02
d	h5

YB - METRIC

Part No.	ØD	R	I	L	Ød
YB2010-CS	1	0.5	1.5	50	4
YB2020-CS	2	1.0	3.0	60	6
YB2030-CS	3	1.5	4.5	60	6
YB2040-CS	4	2.0	6.0	70	6
YB2060-CS	6	3.0	9.0	90	6
YB2080-CS	8	4.0	12.0	100	8
YB2100-CS	10	5.0	15.0	100	10
YB2120-CS	12	6.0	18.0	110	12

IHUB - INCH

Part No.	ØD	R	I	L	Ød
IHUB2010-CS	1/32	1/64	1/32	2.5	1/4
IHUB2020-CS	1/16	1/32	1/16	2.5	1/4
IHUB2030-CS	3/32	3/64	3/32	2.5	1/4
IHUB2040-CS	1/8	1/16	1/8	3.0	1/4
IHUB2060-CS	3/16	3/32	3/16	3.0	1/4
IHUB2080-CS	1/4	1/8	1/4	3.0	1/4
IHUB2100-CS	5/16	5/32	5/8	4.0	5/16
IHUB2120-CS	3/8	3/16	3/4	4.0	3/8
IHUB2160-CS	1/2	1/4	1	4.0	1/2

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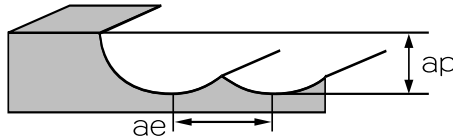
YB/IHUB Cutting Conditions



CS Coated Ball End Mill (YB-CS)

Material	Cast Iron/ Carbon Steel	Alloy Steel / Tool Steel	Pre Hardend Steel / Hardened Steel	Hardened Steel
Hardness	250HB	25 35HRC	35 45HRC	45 55HRC

Step Over /
Step Down



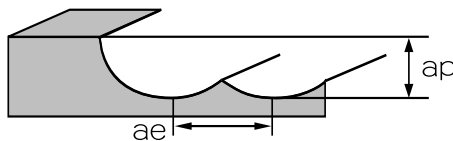
R	ap	ae
$R \leq 1.0$	0.05xR or less	0.2xR or less
$1.0 < R$	0.1xR or less	0.2xR or less

Cutting Condition		Vc 150 250m/min		Vc 125 225m/min		Vc 100 200m/min		Vc 75 175m/min	
R	Mill Dia. mm	N (RPM)	Vf (mm/min)	N (RPM)	Vf (mm/min)	N (RPM)	Vf (mm/min)	N (RPM)	Vf (mm/min)
R0.5	1	31,800	572	27,900	502	23,900	430	19,900	358
R1	2	31,800	1,910	27,900	1,670	23,900	1,430	19,900	1,190
R2	4	15,900	1,910	13,900	1,670	11,900	1,430	9,950	1,190
R3	6	10,600	1,910	9,280	1,670	7,960	1,430	6,630	1,190
R4	8	7,960	1,910	6,960	1,670	5,970	1,430	4,970	1,190
R5	10	6,370	1,780	5,570	1,560	4,770	1,340	3,980	1,110
R6	12	5,310	1,590	4,640	1,390	3,980	1,190	3,320	996

CS Coated Ball End Mill (IHUB)

Material	Cast Iron/ Carbon Steel	Alloy Steel / Tool Steel	Pre Hardend Steel / Hardened Steel	Hardened Steel
Hardness	250HB	25 35HRC	35 45HRC	45 55HRC

Step Over /
Step Down



R	ap	ae
$R \leq 3/64$	0.05xR or less	0.2xR or less
$3/64 < R$	0.1xR or less	0.2xR or less

Cutting Condition		SFM 260 650 feet/min		SFM 230 570 feet/min		SFM 200 480 feet/min		SFM 160 400 feet/min	
R	Mill Dia. mm	N (RPM)	Vf (inch/min)	N (RPM)	Vf (inch/min)	N (RPM)	Vf (inch/min)	N (RPM)	Vf (inch/min)
1/64	1/32	31,800	19	27,900	17	23,900	15	19,900	2
1/32	1/16	31,800	39	27,900	34	23,900	29	19,900	24
3/64	3/32	26,700	75	23,400	66	20,000	57	16,600	47
1/16	1/8	20,000	75	17,600	67	15,000	57	12,400	47
3/32	3/16	13,400	75	11,700	66	10,000	57	8,300	47
1/8	1/4	10,000	75	8,800	67	7,500	57	6,200	47
5/32	5/16	8,000	75	7,000	66	6,000	57	5,000	47
3/16	3/8	6,700	70	5,900	62	5,000	53	4,100	43
1/4	1/2	5,000	63	4,400	55	3,700	47	3,100	39