

YE-CE11



CBN END MILL

(Cubic Boron Nitride)

Superior Finishing & Longer Tool Life for High Hardened Steel



 **YG-1 CO., LTD.**

BALL NOSE END MILLS



▶ Radius Tolerance(mm) : ±0.005
▶ Shank Dia. Tolerance : h5

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter
	R (±0.005)	D1	D2	L1	L3	L2	D3
ESB94004012	R0.2	0.4	4	0.3	1.2	50	0.37
ESB94005015	R0.25	0.5	4	0.4	1.5	50	0.46
ESB94006015	R0.3	0.6	4	0.5	1.5	50	0.56
ESB94008020	R0.4	0.8	4	0.6	2	50	0.76
ESB94010025	R0.5	1.0	4	0.6	2.5	50	0.95
ESB94010040	R0.5	1.0	4	0.6	4	50	0.95
ESB94010060	R0.5	1.0	4	0.6	6	50	0.95
ESB94012030	R0.6	1.2	4	0.8	3	50	1.15
ESB94015030	R0.75	1.5	4	0.95	3	50	1.45
ESB94015040	R0.75	1.5	4	0.95	4	50	1.45
ESB94015060	R0.75	1.5	4	0.95	6	50	1.45
ESB94020050	R1.0	2.0	4	1.2	5	50	1.95
ESB94020060	R1.0	2.0	4	1.2	6	50	1.95
ESB94030060	R1.5	3.0	4	1.8	6	50	2.85

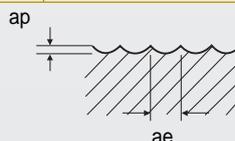
◎ : Excellent ○ : Good

Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		High Hardened Steels	Copper	Graphite	Cast Iron	Aluminum	Stainless Steels	Titanium	Inconel
~HB225	HB225~325	HRc30~40	HRc40~45	HRc45~55	HRc55~70							
				◎	◎							

CUTTING CONDITION

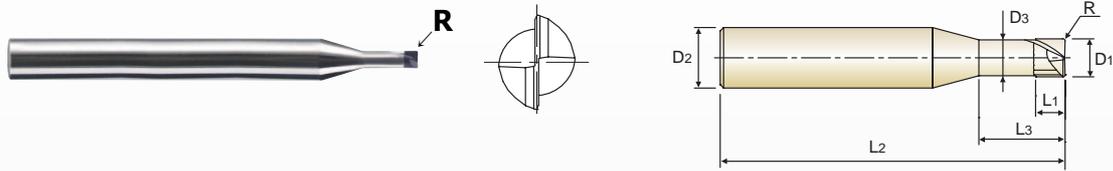
MATERIAL	HARDENED STEELS		HIGH HARDENED STEELS	
	HRc50 ~ HRc60		HRc60 ~ HRc70	
	RPM	FEED	RPM	FEED
R0.2 × 0.4	50,000	1,200	50,000	1,200
R0.25 × 0.5	50,000	1,500	50,000	1,500
R0.3 × 0.6	50,000	2,000	50,000	2,000
R0.4 × 0.8	50,000	2,000	50,000	2,000
R0.5 × 1.0	50,000	3,000	50,000	3,000
R0.6 × 1.2	50,000	3,000	50,000	3,000
R0.75 × 1.5	50,000	3,000	50,000	3,000
R1.0 × 2.0	40,000	3,200	32,000	2,500
R1.5 × 3.0	26,500	2,100	21,500	1,700

ap : R0.2 ~ R0.4 = 0.005mm
R0.5 ~ R1.5 = 0.01mm
ae : R0.2 ~ R0.4 = 0.005mm
R0.5 ~ R1.5 = 0.01 mm



RPM = rev./min.
FEED = mm/min.

CORNER RADIUS END MILLS



▶ Corner Radius Tolerance(mm) : ±0.005
▶ Shank Dia. Tolerance : h5

Unit : mm

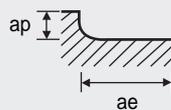
EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter
	R (±0.005)	D1	D2	L1	L3	L2	D3
ESD02005052	RO.05	0.5	4	0.3	2	50	0.46
ESD02005053	RO.05	0.5	4	0.3	3	50	0.46
ESD02010053	RO.05	1.0	4	0.7	3	50	0.95
ESD02010055	RO.05	1.0	4	0.7	5	50	0.95
ESD02010103	RO.1	1.0	4	0.7	3	50	0.95
ESD02010105	RO.1	1.0	4	0.7	5	50	0.95
ESD02015105	RO.1	1.5	4	1.0	5	50	1.45
ESD02015108	RO.1	1.5	4	1.0	8	50	1.45
ESD02015205	RO.2	1.5	4	1.0	5	50	1.45
ESD02015208	RO.2	1.5	4	1.0	8	50	1.45
ESD02020106	RO.1	2.0	4	1.2	6	50	1.95
ESD02020100	RO.1	2.0	4	1.2	10	50	1.95
ESD02020206	RO.2	2.0	4	1.2	6	50	1.95
ESD02020200	RO.2	2.0	4	1.2	10	50	1.95

◎ : Excellent ○ : Good

Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		High Hardened Steels	Copper	Graphite	Cast Iron	Aluminum	Stainless Steels	Titanium	Inconel
~HB225	HB225~325	HRc30~40	HRc40~45	HRc45~55	HRc55~70							
				◎	◎							

CUTTING CONDITION

MATERIAL	HARDENED STEELS				HIGH HARDENED STEELS				
	HRc50 ~ HRc60				HRc60 ~ HRc70				
	HARDNESS	RPM	FEED	DEPTH OF CUT		RPM	FEED	DEPTH OF CUT	
ae[mm]				ap[mm]	ae[mm]			ap[mm]	
DIAMETER									
0.5	50,000	700	0.10	0.01	50,000	550	0.06	0.005	
1.0	43,000	1,000	0.20	0.01	30,000	700	0.10	0.10	
1.5	30,000	1,000	0.40	0.02	19,000	700	0.20	0.20	
2.0	22,000	900	0.60	0.03	14,000	800	0.30	0.30	



RPM = rev./min.
FEED = mm/min.

CBN *Cubic Boron Nitride*



ADVANTAGES

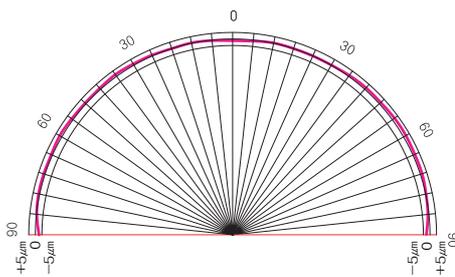
Applications

- ▶ Applicable for high hardened steel (HRc 50 ~ HRc 70)
- ▶ Applicable for finishing operation with high spindle speed (RPM 20,000 ~ 50,000)
 - * Achieve mirror-like surface of work materials

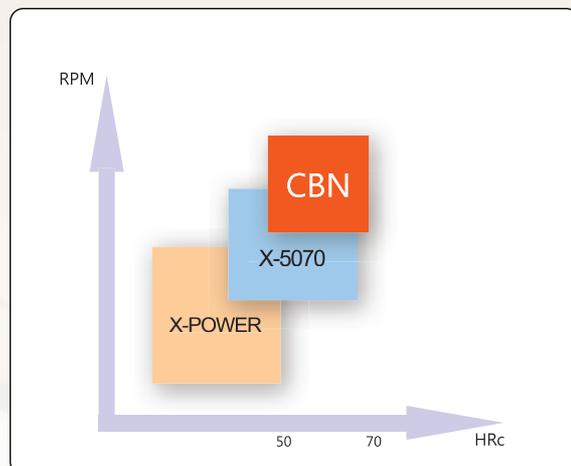
Features

- ▶ Premium tool substrate CBN(Cubic Boron Nitride)
 - * Superior tool life compared with carbide end mills
 - * Excellent heat resistance
- ▶ Achieve stable machining and higher accuracy for the duration
 - Save the setting time and cost due to reducing frequent tool changes
 - Improve repeatability in performance
- ▶ Specially designed geometry improves tool rigidity at high speed cutting

RADIUS TOLERANCE



- * Tighter Radius Tolerance $\pm 0.005\text{mm}$
higher accuracy and longer tool life.

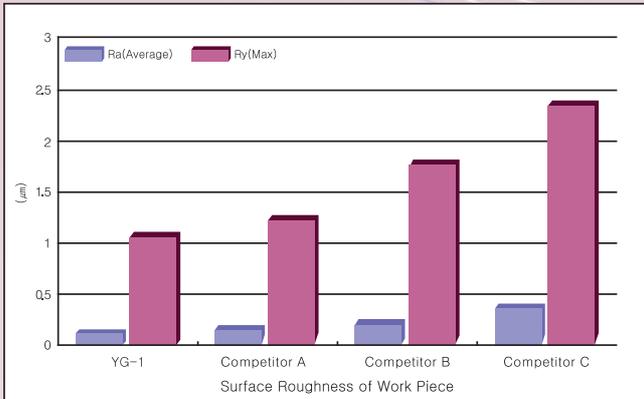


- * High Speed & Finishing

CBN Cubic Boron Nitride

TEST RESULTS AGAINST COMPETITOR'S CBN BALL NOSE END MILL (Total Milling Length : 750m)

Surface Roughness of Work Piece



CUTTING CONDITION (Ø2mm)

Tools : 2Flute, CBN Ball Nose End mill

Size : Ø2(R1.0)

Work Material : • JIS:SKD11(HRc60)
• DIN:X155CrV-Mo12-1
• WR:1.2379

Cutting Speed : 188.50 m/min.

R.P.M : 30,000 rev./min.

Feed : 2,000 mm/min.

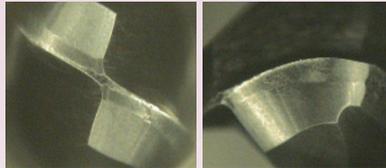
Milling Depth : 0.01 mm

Coolant : Oil Mist

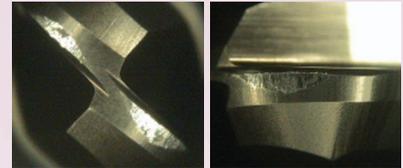
Machine : Machining Center

Maximum Wear (μm)

YG-1
(57.630 μm)



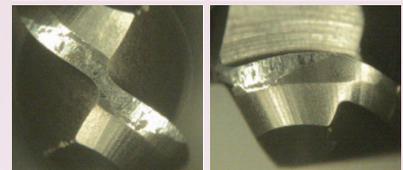
Competitor A
(100.314 μm)



Competitor B
(71.471 μm)

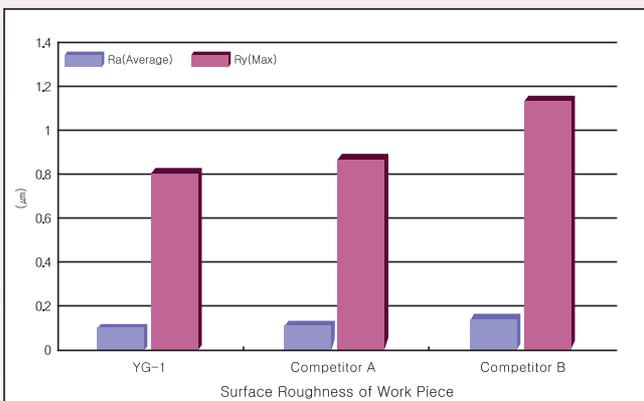


Competitor C
(170.200 μm)



TEST RESULTS AGAINST COMPETITOR'S CBN CORNER RADIUS END MILL (Total Milling Length : 20m)

Surface Roughness of Work Piece



CUTTING CONDITION (Ø2mm)

Tools : CBN 2Flute Corner Radius End Mill

Size : Ø2(R0.2)

Work Material : • JIS:SKD11(HRc60)
• DIN:X155CrV-Mo12-1
• WR:1.2379

Cutting Speed : 125.66 m/min.

R.P.M : 20,000 rev./min.

Feed : 600 mm/min.

Feed per tooth : 0.015 mm/tooth

Milling Depth : Axial : 0.03 mm

Radial : 0.6 mm

Coolant : Oil Mist

Machine : Machining Center

Maximum Wear (μm)

YG-1
(219.827 μm)



Competitor A
(299.326 μm)



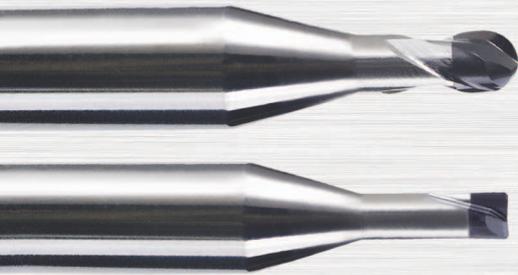
Competitor B
(245.661 μm)



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www.yg1.kr



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