MITSUBISHI
MITSUBISHI MATERIALS

TOOLS NEWS

2009.2 Update B090G

Expansion

CBN end mill series

CBN end mill series, the ultimate choice for finish machining moulds.

■ Long neck corner radius type now included.

CBN end mill series

CBN-2XLB
2 flute CBN long neck
ball nose slot drill

CBN-2XLRB
2 flute CBN long neck
radius end mill

CBN end mill series, the ultimate choice for finish machining of moulds.

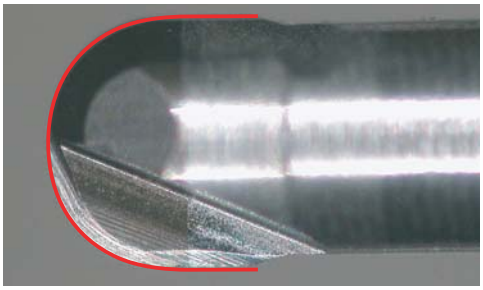
The realisation of excellent performance when milling hardened steel over 65HRC.

Feature 1 High precision geometry with good fracture resistance

- **CBN material with good fracture resistance enables the machining of 70HRC hardened steel.**
- **2 variations, long neck ball nose and long neck radius types available.**

Long neck ball nose type

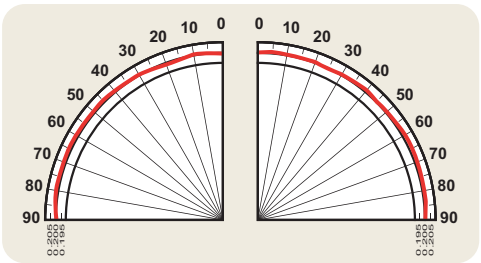
- Cutting edge geometry that offers excellent chip disposal enables long, stable operations.
- Excellent performance over a wide array of machining applications due to the precision, seamless cutting edge geometry.
  Radius tolerance ±5μm, diameter tolerance 0~-10μm.



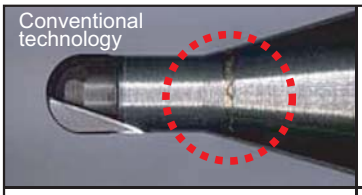
Long neck radius type

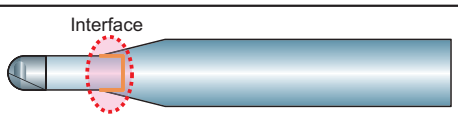
- Capable of a large pick feed for high efficiency finishing of flat faces.
- High precision design with radius tolerance of ±5μm

Inspection Report CBN-2XLRB ø2 x 0.2R



Feature 1 An original manufacturing method allows a wide variety of neck lengths



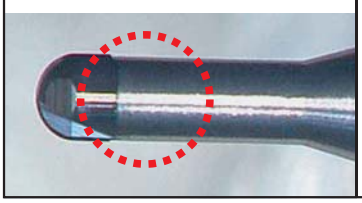


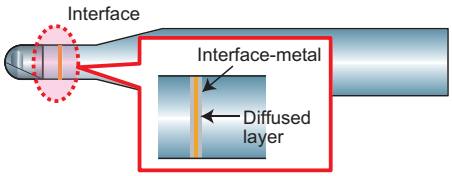
(Inserted brazed method)

The neck is inserted into the shank and brazed.
➡ Low bonding strength

It's impossible to increase the neck length.

CBN-2XLB





Possible to increase the neck length.

[Diffusion Bonding] (PAT.P)

Newly developed joining method.
➡ Bonding strength is the same as the carbide material.

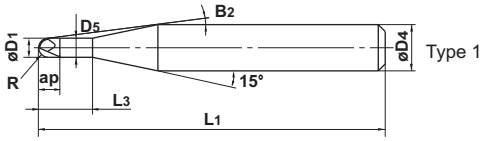
* Example: R1 neck length of 5mm extended to 20mm.

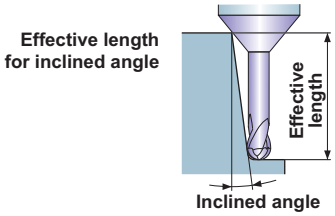
CBN-2XLB

Ball nose, Short cut length, 2 flute, Relieved neck

±0.005

0 — -0.010





● CBN long neck ball nose slot drill. A wide variation of neck lengths available.

Unit : mm

Order Number	Radius of ball nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
CBN2XLBR0020N010S04	0.2	0.4	0.3	1	0.36	13.4°	51	4	2	●	1	1	1	1.1	1.2
R0020N010S06	0.2	0.4	0.3	1	0.36	13.9°	51	6	2	●	1	1	1	1.1	1.2
R0020N016S04	0.2	0.4	0.3	1.6	0.36	12.4°	51	4	2	●	1	1.6	1.7	1.8	2
R0020N016S06	0.2	0.4	0.3	1.6	0.36	13.3°	51	6	2	●	1	1.6	1.7	1.8	2
NEW R0030N009S06	0.3	0.6	0.4	0.9	0.56	14.1°	62	6	2	●	1	0.9	0.9	1	1.1
R0030N015S04	0.3	0.6	0.5	1.5	0.56	12.6°	51	4	2	●	1	1.5	1.6	1.7	1.8
R0030N015S06	0.3	0.6	0.5	1.5	0.56	13.4°	51	6	2	●	1	1.5	1.6	1.7	1.8
R0030N024S04	0.3	0.6	0.5	2.4	0.56	11.3°	51	4	2	●	1	2.5	2.6	2.7	2.9
R0030N024S06	0.3	0.6	0.5	2.4	0.56	12.5°	51	6	2	●	1	2.5	2.6	2.7	2.9
* R0040N010S06	0.4	0.8	0.5	1	0.76	14.1°	62	6	2	●	1	1	1	1.1	1.2
R0040N020S04	0.4	0.8	0.6	2	0.76	11.8°	51	4	2	●	1	2	2.1	2.3	2.4
R0040N020S06	0.4	0.8	0.6	2	0.76	12.9°	51	6	2	●	1	2	2.1	2.3	2.4
R0040N032S04	0.4	0.8	0.6	3.2	0.76	10.3°	51	4	2	●	1	3.3	3.4	3.6	3.9
R0040N032S06	0.4	0.8	0.6	3.2	0.76	11.7°	51	6	2	●	1	3.3	3.4	3.6	3.9
* R0050N011S06	0.5	1	0.6	1.1	0.94	14.1°	62	6	2	●	1	1.1	1.1	1.2	1.2
R0050N025S04	0.5	1	0.8	2.5	0.94	11°	51	4	2	●	1	2.6	2.7	2.8	3
R0050N025S06	0.5	1	0.8	2.5	0.94	12.3°	51	6	2	●	1	2.6	2.7	2.8	3
R0050N040S04	0.5	1	0.8	4	0.94	9.3°	51	4	2	●	1	4.1	4.3	4.6	4.9
R0050N040S06	0.5	1	0.8	4	0.94	11°	51	6	2	●	1	4.1	4.3	4.6	4.9
R0075N038S04	0.75	1.5	1.1	3.8	1.44	9.1°	52	4	2	●	1	3.9	4.1	4.3	4.6
R0075N038S06	0.75	1.5	1.1	3.8	1.44	11°	52	6	2	●	1	3.9	4.1	4.3	4.6
R0075N060S04	0.75	1.5	1.1	6	1.44	7.1°	52	4	2	●	1	6.2	6.4	6.8	7.3
R0075N060S06	0.75	1.5	1.1	6	1.44	9.3°	52	6	2	●	1	6.2	6.4	6.8	7.3
NEW R0100N017S06	1	2	1.2	1.7	1.9	13.6°	62	6	2	●	1	1.7	1.7	1.8	1.9
R0100N050S04	1	2	1.5	5	1.9	7.3°	52	4	2	●	1	5.1	5.3	5.6	6
R0100N050S06	1	2	1.5	5	1.9	9.8°	52	6	2	●	1	5.1	5.3	5.6	6
R0100N080S04	1	2	1.5	8	1.9	5.3°	52	4	2	●	1	8.2	8.5	9	9.7
R0100N080S06	1	2	1.5	8	1.9	7.9°	52	6	2	●	1	8.2	8.5	9	9.7

*Designed with short cutting edge and neck lengths for high rigidity.

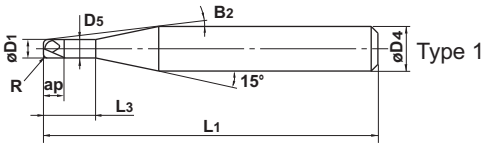
● : Inventory maintained.

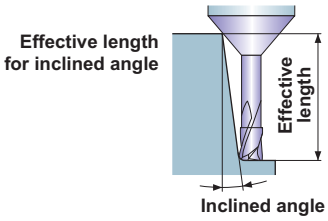
CBN-2XLRB

Corner radius end mill, Short cut length, 2 flute, Long neck

R ±0.005

0 — -0.010





CBN 0°

- CBN long neck radius end mill. A wide variation of neck lengths available.

Unit : mm

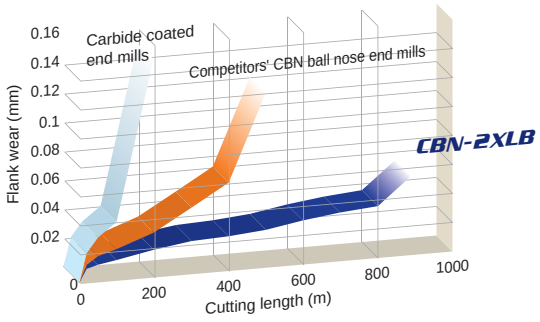
Order Number	Radius of ball nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
CBN2XLRBD0050R005N02	0.05	0.5	0.3	2	0.46	11.6°	51	4	2	●	1	2.1	2.1	2.3	2.5
D0050R005N03	0.05	0.5	0.3	3	0.46	10.4°	51	4	2	●	1	3.1	3.2	3.5	3.7
D0050R010N02	0.1	0.5	0.3	2	0.46	11.7°	51	4	2	●	1	2.1	2.1	2.3	2.5
D0050R010N03	0.1	0.5	0.3	3	0.46	10.5°	51	4	2	●	1	3.1	3.2	3.4	3.7
D0100R005N03	0.05	1	0.6	3	0.94	9.7°	51	4	2	●	1	3.2	3.4	3.7	4
D0100R005N05	0.05	1	0.6	5	0.94	7.9°	51	4	2	●	1	5.3	5.6	6	6.5
D0100R010N03	0.1	1	0.6	3	0.94	9.7°	51	4	2	●	1	3.2	3.4	3.6	4
D0100R010N05	0.1	1	0.6	5	0.94	8°	51	4	2	●	1	5.3	5.6	6	6.5
D0100R020N03	0.2	1	0.6	3	0.94	9.8°	51	4	2	●	1	3.2	3.4	3.5	4
D0100R020N05	0.2	1	0.6	5	0.94	8°	51	4	2	●	1	5.3	5.6	6	6.5
D0100R030N03	0.3	1	0.6	3	0.94	9.9°	51	4	2	●	1	3.2	3.4	3.4	4
D0100R030N05	0.3	1	0.6	5	0.94	8.1°	51	4	2	●	1	5.3	5.6	6	6.5
D0150R010N05	0.1	1.5	0.9	5	1.44	7.3°	52	4	2	●	1	5.3	5.6	6	6.5
D0150R010N08	0.1	1.5	0.9	8	1.44	5.6°	52	4	2	●	1	8.5	8.8	9.5	10.2
D0150R020N05	0.2	1.5	0.9	5	1.44	7.3°	52	4	2	●	1	5.3	5.6	6	6.5
D0150R020N08	0.2	1.5	0.9	8	1.44	5.6°	52	4	2	●	1	8.5	8.8	9.5	10.2
D0150R030N05	0.3	1.5	0.9	5	1.44	7.4°	52	4	2	●	1	5.3	5.6	6	6.5
D0150R030N08	0.3	1.5	0.9	8	1.44	5.7°	52	4	2	●	1	8.5	8.8	9.5	10.2
D0200R010N06	0.1	2	1.2	6	1.9	5.9°	52	4	2	●	1	6.3	6.6	7.1	7.6
D0200R010N10	0.1	2	1.2	10	1.9	4.2°	52	4	2	●	1	10.5	10.9	11.7	12.6
D0200R020N06	0.2	2	1.2	6	1.9	5.9°	52	4	2	●	1	6.3	6.6	7.1	7.6
D0200R020N10	0.2	2	1.2	10	1.9	4.2°	52	4	2	●	1	10.5	10.9	11.7	12.6
D0200R030N06	0.3	2	1.2	6	1.9	6°	52	4	2	●	1	6.3	6.6	7	7.6
D0200R030N10	0.3	2	1.2	10	1.9	4.2°	52	4	2	●	1	10.5	10.8	11.6	12.6
D0200R050N06	0.5	2	1.2	6	1.9	6.1°	52	4	2	●	1	6.3	6.5	7	7.5
D0200R050N10	0.5	2	1.2	10	1.9	4.3°	52	4	2	●	1	10.5	10.8	11.6	12.5

● : Inventory maintained.

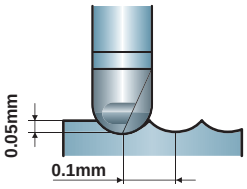
Cutting Performance

Finishing of high hardness materials

Long tool life when machining high hardness steel.



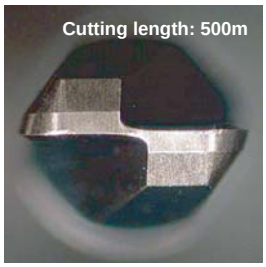
End mill	CBN2XLBR0100N050S06(1Rx5x6)
Work material	SKD11 (60HRC)
Revolution	20,000min^{-1} (40m/min)
Feed rate	1,700mm/min (0.04mm/tooth)
Cutting method	Climb cut, Mist blow



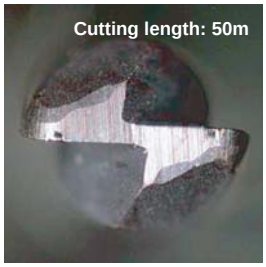
Finishing of high hardness materials

10 times longer tool life than coated carbide end mills.
A reduction of the time needed for polishing operations.

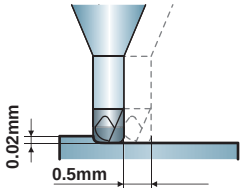
CBN-2XLRB



Coated carbide radius end mill

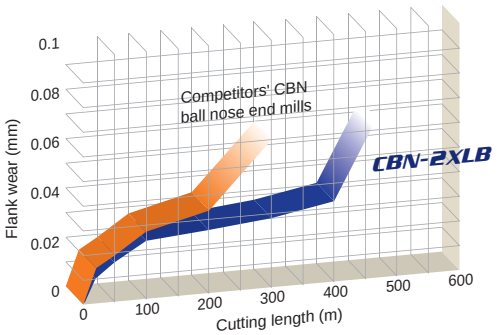


End mill	CBN2XLRBD0150R030N05(0.3Rx1.5x5)
Work material	STAVAX (52HRC)
Revolution	32,000min^{-1} (150m/min)
Feed rate	1,200mm/min (0.019mm/tooth)
Cutting method	Climb cut, Air blow

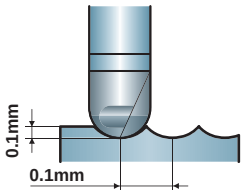


High hardness materials machining (Depth of cut 0.10mm)

Excellent wear resistance under high-intensity conditions



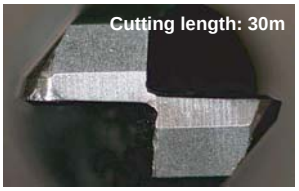
End mill	CBN2XLBR0100N050S06(1Rx5x6)
Work material	SKD11 (60HRC)
Revolution	20,000min^{-1} (55m/min)
Feed rate	1,700mm/min (0.04mm/tooth)
Cutting method	Climb cut, Mist blow



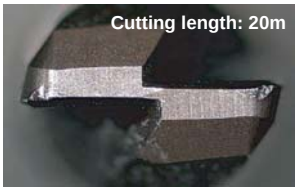
Slotting

Wear resistance increased by 50% when slotting hardened steel.

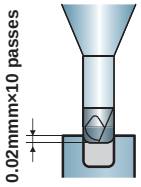
CBN-2XLRB

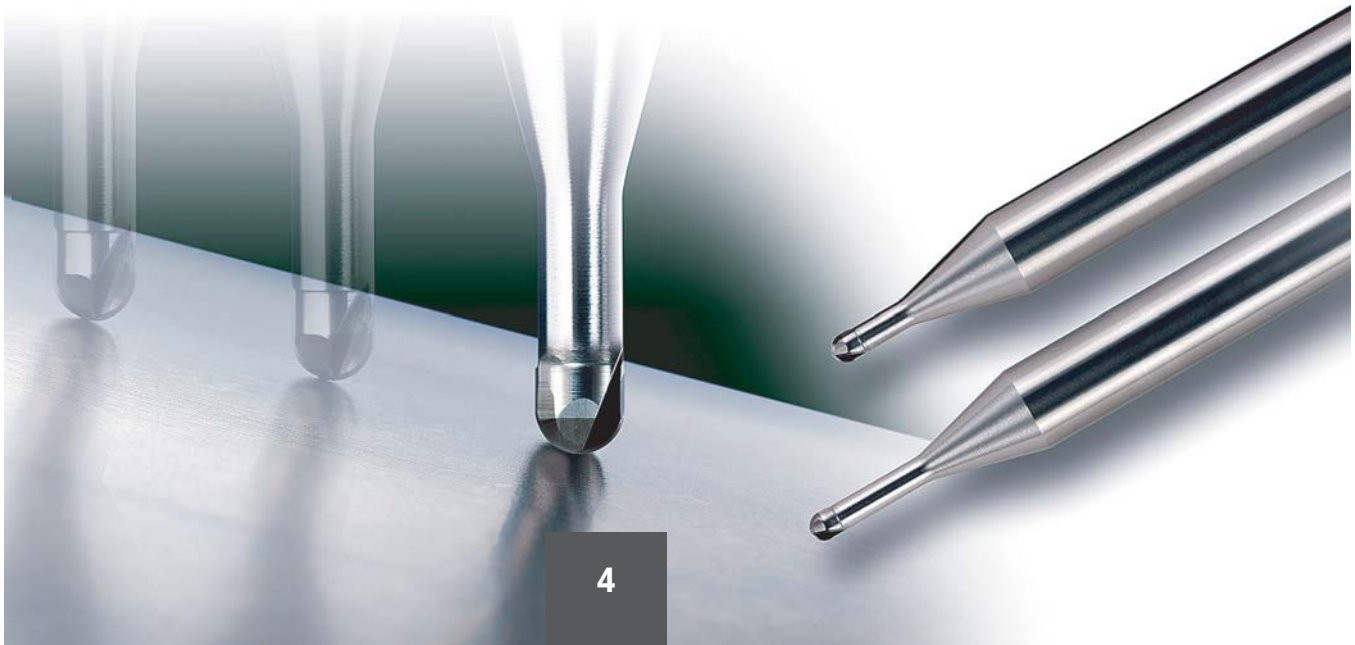


Conventional CBN radius end mill



End mill	CBN2XLRBD0200R0300N06(0.3Rx2x6)
Work material	SKD11 (60HRC)
Revolution	40,000min^{-1} (250m/min)
Feed rate	1,000mm/min (0.013mm/tooth)
Cutting method	Mist blow

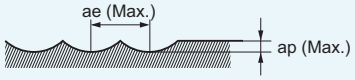




CBN END MILLS

CBN-2XLB

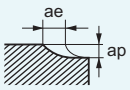
Ball nose, Short cut length, 2 flute, Relieved neck

Work material	Hardened steel (−55HRC) NAK, JIS SKD61, STAVAX				Hardened steel (55−62HRC) JIS SKD11, JIS SKS, JIS SKH				Hardened steel (62−70HRC) JIS SKS, JIS SKH, Powdered HSS			
R (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)
R0.2	50,000	1,500	0.01	0.006	50,000	1,200	0.01	0.006	50,000	1,200	0.008	0.004
R0.3	50,000	2,000	0.02	0.01	50,000	1,500	0.02	0.01	50,000	1,500	0.015	0.008
R0.4	50,000	3,000	0.05	0.02	50,000	2,000	0.04	0.02	50,000	2,000	0.03	0.015
R0.5	50,000	3,000	0.06	0.03	50,000	2,000	0.05	0.03	50,000	2,000	0.03	0.02
R0.75	50,000	3,500	0.08	0.04	50,000	2,500	0.06	0.03	50,000	2,500	0.04	0.02
R1	50,000	4,000	0.1	0.05	50,000	3,000	0.07	0.04	50,000	3,000	0.05	0.03
Depth of cut												

1) The above table shows maximum cutting conditions. Please control the pick feed (ae) according to the surface finish required.
2) Oil mist coolant is recommended
3) If the spindle speed is insufficient, the revolution and the feed rate should be reduced proportionately.

CBN-2XLRB

Corner radius end mill, Short cut length, 2 flute, Relieved neck

Work material	Hardened steel (−55HRC) NAK, JIS SKD61, STAVAX				Hardened steel (55−62HRC) JIS SKD11, JIS SKS, JIS SKH				Hardened steel (62−70HRC) JIS SKS, JIS SKH, Powdered HSS			
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)
0.5	50,000	750	0.2	0.01	50,000	600	0.1	0.01	40,000	400	0.06	0.005
1	38,000	1,100	0.3	0.02	38,000	760	0.2	0.01	25,000	400	0.1	0.01
1.5	25,000	900	0.5	0.03	25,000	700	0.4	0.02	17,000	340	0.2	0.02
2	20,000	800	0.7	0.04	20,000	600	0.6	0.03	12,000	300	0.3	0.02
Depth of cut												

1) The above table shows maximum cutting conditions.
2) Oil mist coolant is recommended
3) If the spindle speed is insufficient, the revolution and the feed rate should be reduced proportionately.

For Your Safety
●Don't handle inserts and chips without gloves. ●Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage. ●Please use safety covers and wear safety glasses. ●When using compounded cutting oils, please take fire precautions. ●When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

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(Tools specifications subject to change without notice.)

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