

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 NEW

2 flute CBN long neck radius end mill

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

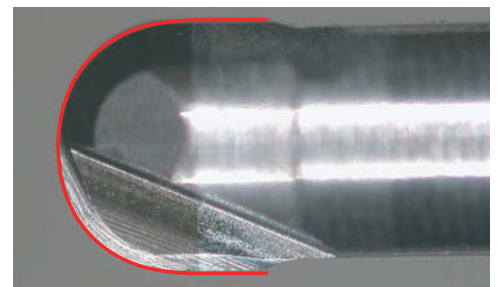
The realisation of excellent performance when milling hardened steel over 65HRC.

### 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

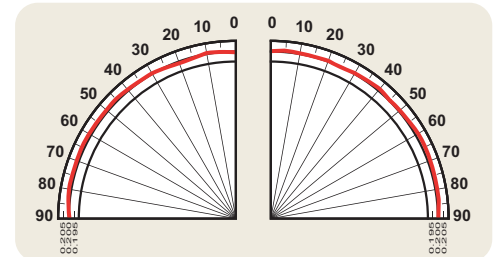
- Cutting edge geometry that offers excellent chip disposal enables long, stable operations.
- Excellent performance over a wide array of machining applications due to the precision, seamless cutting edge geometry.  
Radius tolerance  $\pm 5\mu\text{m}$ , diameter tolerance 0~-10 $\mu\text{m}$ .



#### Long neck radius type

- Capable of a large pick feed for high efficiency finishing of flat faces.
- High precision design with radius tolerance of  $\pm 5\mu\text{m}$

■ Inspection Report CBN-2XLRB  $\phi 2 \times 0.2R$



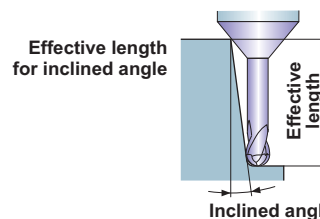
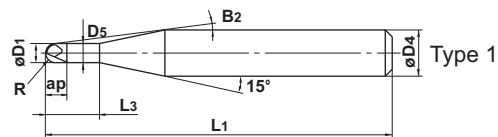
### Feature 1 An original manufacturing method allows a wide variety of neck lengths

<p>Conventional technology</p>	<p>Interface</p>	<p><b>(Inserted brazed method)</b></p> <p>The neck is inserted into the shank and brazed.</p> <p>➔ Low bonding strength</p> <p><b>It's impossible to increase the neck length.</b></p>
<p><b>CBN-2XLB</b></p>	<p>Interface</p> <p>Interface-metal</p> <p>Diffused layer</p>	<p><b>[Diffusion Bonding] (PAT.P)</b></p> <p>Newly developed joining method.</p> <p>➔ Bonding strength is the same as the carbide material.</p> <p>* Example: R1 neck length of 5mm extended to 20mm.</p>

# CBN END MILLS

## CBN-2XLB

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



Inclined angle

Unit : mm

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

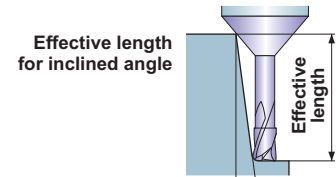
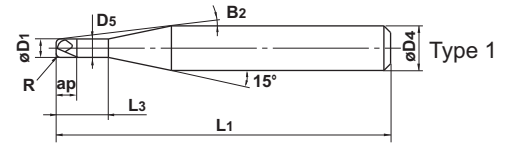
Order Number	Radius of ball nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle			
												30°	1°	2°	3°
CBN2XLBR0020N010S04	0.2	0.4	0.3	1	0.36	13.4°	51	4	2	●	1	1	1.1	1.2	
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
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
NEW * 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
NEW * 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
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. ○ : Inventory maintained. (Available from October 2008)

# CBN-2XLRB NEW

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



Inclined angle

Unit : mm

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

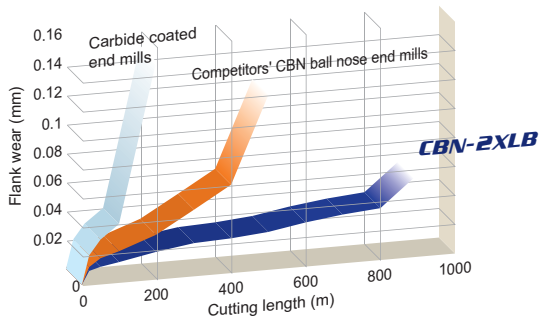
Order Number	Radius of ball nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle			
												30°	1°	2°	3°
CBN2XLRBD0050R005N02	0.05	0.5	0.3	2	0.46	11.6°	51	4	2	●	1	2.1	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.

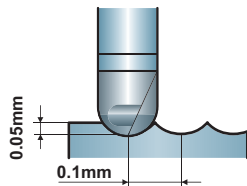
# Cutting Performance

## Finishing of high hardness materials

Long tool life when machining high hardness steel.



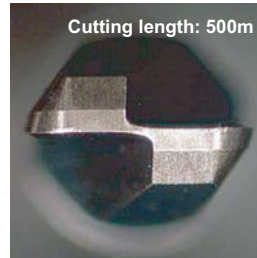
End mill	CBN-2XLB R1x5
Work material	SKD11 (60HRC)
Revolution	20,000min <sup>-1</sup> (40m/min)
Feed rate	1,700mm/min (0.04mm/tooth)
Cutting method	Climb cut, Mist blow



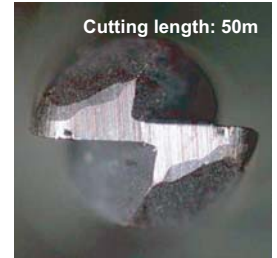
## Finishing of high hardness materials

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

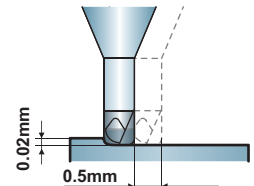
**CBN-2XLRB**



Coated carbide radius end mill

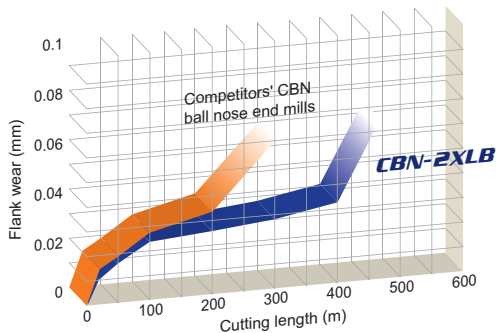


End mill	CBN-2XLRB $\phi 1.5 \times R0.3$
Work material	STAVAX (52HRC)
Revolution	32,000min <sup>-1</sup> (150m/min)
Feed rate	1,200mm/min (0.019mm/tooth)
Cutting method	Climb cut, Air blow

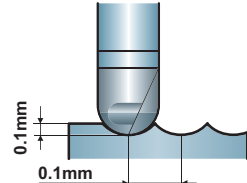


## High hardness materials machining (Depth of cut 0.10mm)

Excellent wear resistance under high-intensity conditions



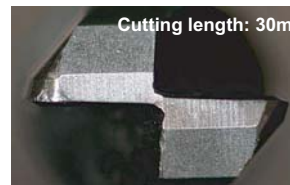
End mill	CBN-2XLB R1x5
Work material	SKD11 (60HRC)
Revolution	20,000min <sup>-1</sup> (55m/min)
Feed rate	1,700mm/min (0.04mm/tooth)
Cutting method	Climb cut, Mist blow



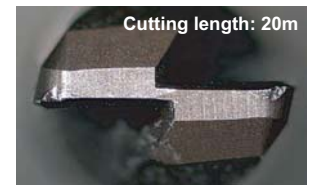
## Slotting

Wear resistance increased by 50% when slotting hardened steel.

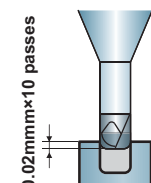
**CBN-2XLRB**



Conventional CBN radius end mill



End mill	CBN-2XLRB $\phi 2 \times R0.3$
Work material	SKD11 (60HRC)
Revolution	40,000min <sup>-1</sup> (250m/min)
Feed rate	1,000mm/min (0.013mm/tooth)
Cutting method	Mist blow



## 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 <sup>-1</sup> )	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Depth of cut ae (mm)
<b>R0.2</b>	50,000	1,500	0.01	0.006	50,000	1,200	0.01	0.006	50,000	1,200	0.008	0.004
<b>R0.3</b>	50,000	2,000	0.02	0.01	50,000	1,500	0.02	0.01	50,000	1,500	0.015	0.008
<b>R0.4</b>	50,000	3,000	0.05	0.02	50,000	2,000	0.04	0.02	50,000	2,000	0.03	0.015
<b>R0.5</b>	50,000	3,000	0.06	0.03	50,000	2,000	0.05	0.03	50,000	2,000	0.03	0.02
<b>R0.75</b>	50,000	3,500	0.08	0.04	50,000	2,500	0.06	0.03	50,000	2,500	0.04	0.02
<b>R1</b>	50,000	4,000	0.1	0.05	50,000	3,000	0.07	0.04	50,000	3,000	0.05	0.03

- 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 <sup>-1</sup> )	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Depth of cut ae (mm)
<b>0.5</b>	50,000	750	0.2	0.01	50,000	600	0.1	0.01	40,000	400	0.06	0.005
<b>1</b>	38,000	1,100	0.3	0.02	38,000	760	0.2	0.01	25,000	400	0.1	0.01
<b>1.5</b>	25,000	900	0.5	0.03	25,000	700	0.4	0.02	17,000	340	0.2	0.02
<b>2</b>	20,000	800	0.7	0.04	20,000	600	0.6	0.03	12,000	300	0.3	0.02

- 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.)