MITSUBISHI
MITSUBISHI MATERIALS

MITSUBISHI CARBIDE

2009.3 Update B090E

CBN end mill series

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

■Expansion of the long neck ball nose series.

CBN end mill series

CBN2XLB
2 flute CBN long neck
ball nose slot drill

CBN2XLRB
2 flute CBN long neck
corner radius end mill

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

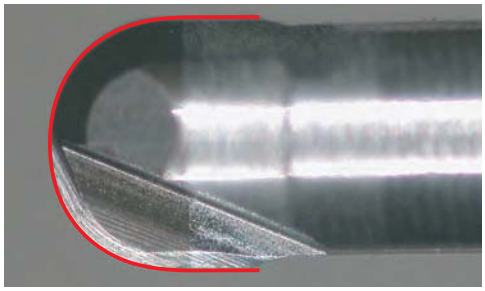
The realisation of excellent performance when milling hardened steel over 65HRC.

Feature 1 High precision geometry with good fracture resistance

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

Long neck ball nose type

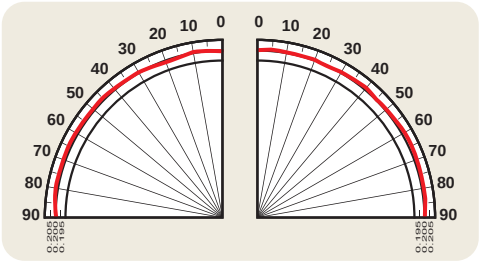
- Cutting edge geometry offers excellent chip disposal properties to enable long stable operations.
- The precision seamless cutting edge geometry gives excellent performance over a wide array of machining applications.
  Radius tolerance ±5μm, diameter tolerance 0~-10μm.



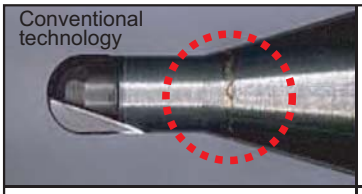
Long neck radius type

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

Inspection Report CBN2XLRB ø2 x 0.2R



Feature 2 An original manufacturing method allows a wide variety of neck lengths

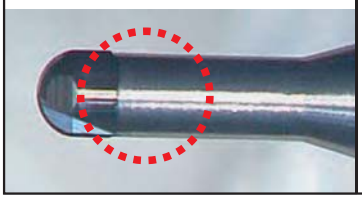


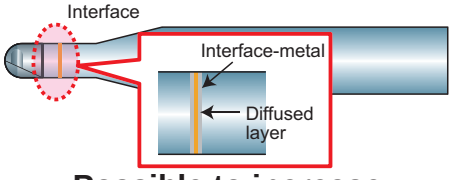
(Inserted brazed method)

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

Impossible to increase the neck length.

CBN2XLB





Possible to increase the neck length.

[Diffusion Bonding] (PAT.P)

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

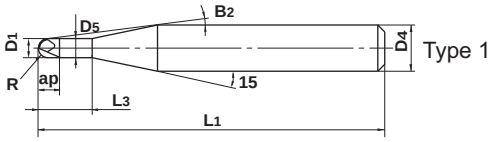
* Example: R1 neck length of 5mm extended to 20mm.

CBN2XLB

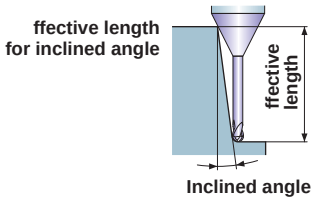
Ball nose, Short cut length, 2 flute, Relieved neck

±0.005

0 — -0.010



Type 1



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

Unit mm

rder Number	Radius of ball nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting dge to hank Angle B2	verall Length L1	hank Dia. D4	No. of lutes N	tock	Type	ffective length for inclined angle 30	1	2	3
CBN2 LBR0020N010 04	0.2	0.4	0.3	1	0.36	13.4°	51	4	2	★	1	1	1	1.1	1.2
R0020N010 06	0.2	0.4	0.3	1	0.36	13.9°	51	6	2	●	1	1	1	1.1	1.2
R0020N016 04	0.2	0.4	0.3	1.6	0.36	12.4°	51	4	2	★	1	1.6	1.7	1.8	2
R0020N016 06	0.2	0.4	0.3	1.6	0.36	13.3°	51	6	2	★	1	1.6	1.7	1.8	2
NEW R0030N009 06	0.3	0.6	0.4	0.9	0.56	14.1°	62	6	2	★	1	0.9	0.9	1	1.1
R0030N015 04	0.3	0.6	0.5	1.5	0.56	12.6°	51	4	2	★	1	1.5	1.6	1.7	1.8
R0030N015 06	0.3	0.6	0.5	1.5	0.56	13.4°	51	6	2	●	1	1.5	1.6	1.7	1.8
R0030N024 04	0.3	0.6	0.5	2.4	0.56	11.3°	51	4	2	★	1	2.5	2.6	2.7	2.9
R0030N024 06	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 * R0040N010 06	0.4	0.8	0.5	1	0.76	14.1°	62	6	2	★	1	1	1	1.1	1.2
R0040N020 04	0.4	0.8	0.6	2	0.76	11.8°	51	4	2	★	1	2	2.1	2.3	2.4
R0040N020 06	0.4	0.8	0.6	2	0.76	12.9°	51	6	2	●	1	2	2.1	2.3	2.4
R0040N032 04	0.4	0.8	0.6	3.2	0.76	10.3°	51	4	2	★	1	3.3	3.4	3.6	3.9
R0040N032 06	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 * R0050N011 06	0.5	1	0.6	1.1	0.94	14.1°	62	6	2	★	1	1.1	1.1	1.2	1.2
R0050N025 04	0.5	1	0.8	2.5	0.94	11°	51	4	2	●	1	2.6	2.7	2.8	3
R0050N025 06	0.5	1	0.8	2.5	0.94	12.3°	51	6	2	●	1	2.6	2.7	2.8	3
R0050N040 04	0.5	1	0.8	4	0.94	9.3°	51	4	2	●	1	4.1	4.3	4.6	4.9
R0050N040 06	0.5	1	0.8	4	0.94	11°	51	6	2	●	1	4.1	4.3	4.6	4.9
R0075N038 04	0.75	1.5	1.1	3.8	1.44	9.1°	52	4	2	★	1	3.9	4.1	4.3	4.6
R0075N038 06	0.75	1.5	1.1	3.8	1.44	11°	52	6	2	★	1	3.9	4.1	4.3	4.6
R0075N060 04	0.75	1.5	1.1	6	1.44	7.1°	52	4	2	★	1	6.2	6.4	6.8	7.3
R0075N060 06	0.75	1.5	1.1	6	1.44	9.3°	52	6	2	★	1	6.2	6.4	6.8	7.3
NEW R0100N017 06	1	2	1.2	1.7	1.9	13.6°	62	6	2	★	1	1.7	1.7	1.8	1.9
R0100N050 04	1	2	1.5	5	1.9	7.3°	52	4	2	●	1	5.1	5.3	5.6	6
R0100N050 06	1	2	1.5	5	1.9	9.8°	52	6	2	●	1	5.1	5.3	5.6	6
R0100N080 04	1	2	1.5	8	1.9	5.3°	52	4	2	●	1	8.2	8.5	9	9.7
R0100N080 06	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 optimum neck lengths for high rigidity.

● **Inventory maintained.**

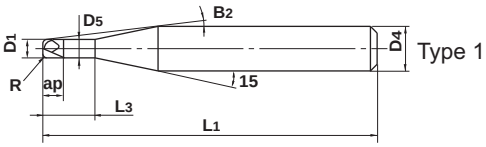
★ **Inventory maintained. (Available from spring 2009)**

CBN2XLRB

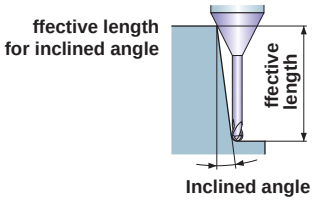
Corner radius end mill, Short cut length, 2 flute, Long neck

±0.005

0 — -0.010



Type 1



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

Unit mm

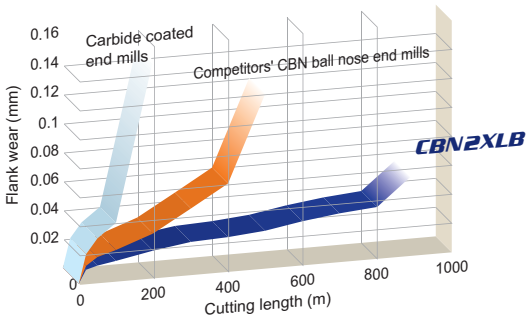
rder Number	Radius of ball nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting dge to hank Angle B2	verall Length L1	hank Dia. D4	No. of lutes N	tock	Type	ffective length for inclined angle 30	1	2	3
CBN2 LRBD0050R005N02	0.05	0.5	0.3	2	0.46	11.6°	51	4	2	★	1	2.1	2.1	2.3	2.5
D0050R005N03	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 in apan.

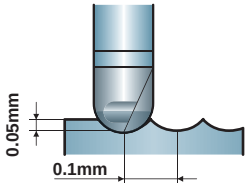
Cutting Performance

inishing of high hardness materials

Long tool life when machining high hardness steel.



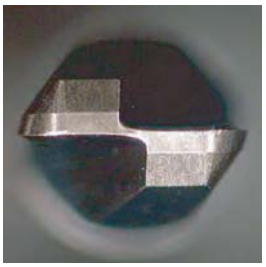
End mill	CBN2XLB R1x5
Work material	X210Cr12 (60HRC)
Revolution	20000min^{-1} (40m/min)
Feed rate	1700mm/min (0.04mm/tooth)
Cutting method	Climb cut, Mist blow



inishing of high hardness materials

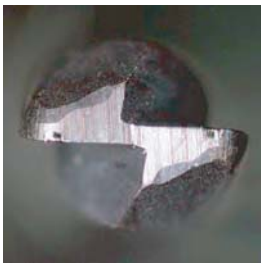
10 times longer tool life than coated carbide end mills and a reduction of the time needed for polishing operations.

CBN2XLRB



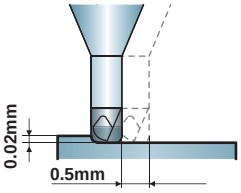
Cutting length: 500m

Coated carbide radius end mill



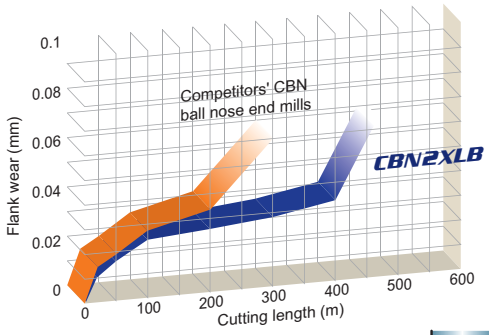
Cutting length: 50m

End mill	CBN2XLRB ø1.5xR0.3
Work material	STAVAX (52HRC)
Revolution	32000min^{-1} (150m/min)
Feed rate	1200mm/min (0.019mm/tooth)
Cutting method	Climb cut, Air blow

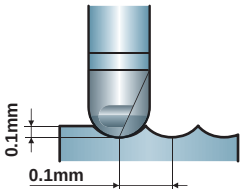


achining high hardness materials. (Depth of cut 0.10mm)

cellent wear resistance under high intensity conditions



End mill	CBN2XLB R1x5
Work material	X210Cr12 (60HRC)
Revolution	20000min^{-1} (55m/min)
Feed rate	1700mm/min (0.04mm/tooth)
Cutting method	Climb cut, Mist blow



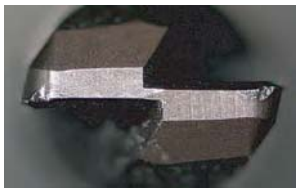
lotting

ear resistance improved by 50 when slotting hardened steel.

CBN2XLRB

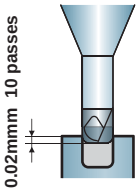
Cutting length: 30m

Conventional CBN radius end mill



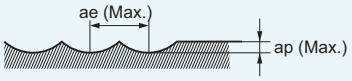
Cutting length: 20m

End mill	CBN2XLRB ø2xR0.3
Work material	X210Cr12 (60HRC)
Revolution	40000min^{-1} (12.50m/min)
Feed rate	1000mm/min (0.013mm/tooth)
Cutting method	Climb cut, Mist blow



CBN2XLB

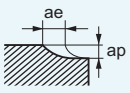
Ball nose, Short cut length, 2 flute, Relieved neck

Work material	Hardened steel (−55HRC) W.Nr. 1.2344(H13)				Hardened steel (55−62HRC) X210Cr12, X20Cr13				Hardened steel (62−70HRC) S6-5-2			
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)
	50000	1500	0.01	0.006	50000	1200	0.01	0.006	50000	1200	0.008	0.004
	50000	2000	0.02	0.01	50000	1500	0.02	0.01	50000	1500	0.015	0.008
	50000	3000	0.05	0.02	50000	2000	0.04	0.02	50000	2000	0.03	0.015
	50000	3000	0.06	0.03	50000	2000	0.05	0.03	50000	2000	0.03	0.02
	50000	3500	0.08	0.04	50000	2500	0.06	0.03	50000	2500	0.04	0.02
	50000	4000	0.1	0.05	50000	3000	0.07	0.04	50000	3000	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.

CBN2XLRB

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

Work material	Hardened steel (−55HRC) W.Nr. 1.2344(H13)				Hardened steel (55−62HRC) X210Cr12, X20Cr13				Hardened steel (62−70HRC) S6-5-2			
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)
	50000	750	0.2	0.01	50000	600	0.1	0.01	40000	400	0.06	0.005
	38000	1100	0.3	0.02	38000	760	0.2	0.01	25000	400	0.1	0.01
	25000	900	0.5	0.03	25000	700	0.4	0.02	17000	340	0.2	0.02
	20000	800	0.7	0.04	20000	600	0.6	0.03	12000	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.

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