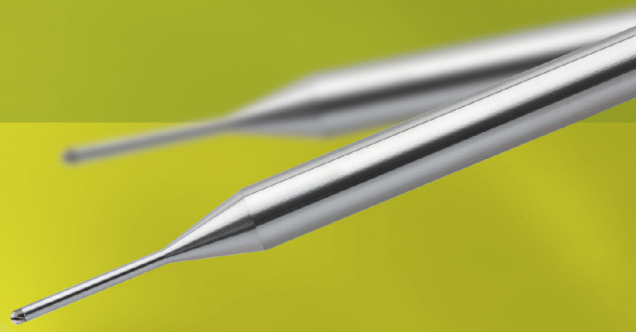
UNION TOOL CO.

2 Flute cBN High-grade Long Neck Ball End Mills for Finishing



CBN-LBF Size R0.1～R0.5

cBN | 0° | R ±0.003 | Shank Dia 0/-0.005

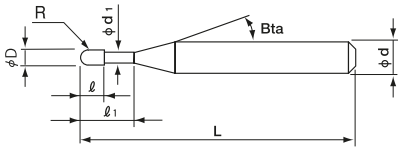
Material Applications(☆ Highly Recommended ◎ Recommended ○ Suggested)

Work Material															
CARBON STEELS S45C S55C	ALLOY STEELS SK/SCM SUS	PREHARDENED STEELS NAK HPM	HARDENED STEELS ～55HRC	HARDENED STEELS ～60HRC	HARDENED STEELS ～70HRC	CAST IRON	ALUMINUM ALLOYS	GRAPHITE	COPPER	PLASTICS	GLASS FILLED PLASTICS	TITANIUM ALLOYS	HEAT RESISTANT ALLOYS	CEMENTED CARBIDE	HARD BRITTLE (NON-METALLIC) MATERIALS
		○	◎	◎	◎ ～68HRC										

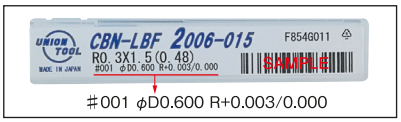
NEW

Features

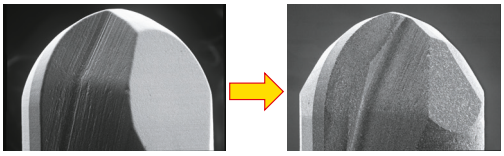
- Optimized cBN material for milling the ultra-hard materials and improved flute design offers high precision milling and long tool life.
- Excellent wear resistance and chipping resistant tool maintain outstanding surface roughness and precision under long cycle time.
- Ball radius accuracy : ±0.003mm based on Nominal Radius.
- *Nominal Radius: Directly input the nominal ball radius rate into the CAM for higher precision milling.



The shank taper angle shown is not an exact value and to avoid contact with the work piece, we recommend the user controls the precise value of this angle.



#001 φD0.600 R+0.003/0.000



【 Conventional 】

【 New 】
Sharp cutting edge
Better biting
Higher milling precision

Diameter and Ball Radius accuracy measurments are printed on the label to support High Precision milling.

Total 24 models

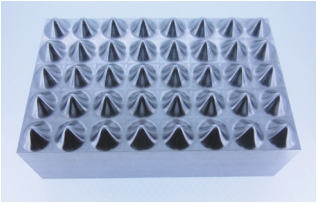
Unit (mm)

Model Number	Radius of Ball Nose R	Effective Length ℓ1	Length of Cut ℓ	Neck Diameter φd1	Shank Taper Angle Bta	Overall Length L	Shank Diameter φd
CBN-LBF 2002-006	R0.1	0.6	0.16	0.19	16°	50	4
CBN-LBF 2002-010		1				50	4
CBN-LBF 2003-009	R0.15	0.9	0.24	0.28	16°	50	4
CBN-LBF 2003-015		1.5				50	4
CBN-LBF 2004-012	R0.2	1.2	0.32	0.38	16°	50	4
CBN-LBF 2004-020		2				50	4
CBN-LBF 2004-030		3				50	4
CBN-LBF 2005-015	R0.25	1.5	0.4	0.48	16°	50	4
CBN-LBF 2005-025		2.5				50	4
CBN-LBF 2005-035		3.5				50	4
CBN-LBF 2006-015	R0.3	1.5	0.48	0.58	16°	50	4
CBN-LBF 2006-030		3				50	4
CBN-LBF 2006-040		4				50	4
CBN-LBF 2006-050		5				50	4
CBN-LBF 2006-060		6				50	4
CBN-LBF 2008-020	R0.4	2	0.6	0.78	16°	50	4
CBN-LBF 2008-040		4				50	4
CBN-LBF 2008-060		6				50	4
CBN-LBF 2010-025	R0.5	2.5	0.7	0.98	16°	50	4
CBN-LBF 2010-040		4				50	4
CBN-LBF 2010-050		5				50	4
CBN-LBF 2010-060		6				50	4
CBN-LBF 2010-080		8				50	4
CBN-LBF 2010-100		10				50	4

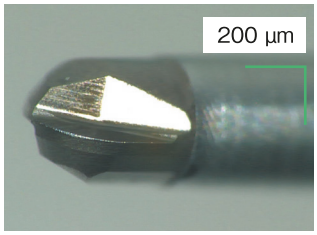
Milling Example for Finishing

STAVAX (52HRC)

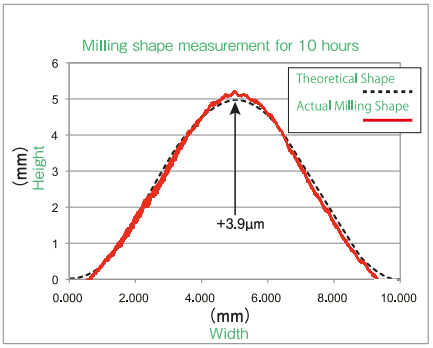
Size 80 × 50 × 30 mm



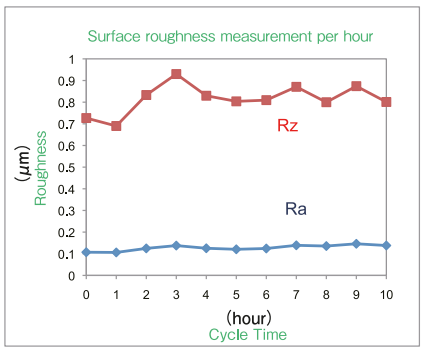
Tool	CBN-LBF 2006-015
Milling Method	Z-level + helical milling
Spindle Speed	30,000 min^{-1}
Feed Rate	800 mm/min
Axial Depth a_p	0.0001 mm (Cusp Height)
Radial Depth a_e	0.015 mm
Coolant	Oil Mist
Cycle Time	9 h 48 min 2 sec



Tool damage after milling 10 hours.



Excellent finishing shape for 10 hours milling.



Constant surface roughness under long cycle time.

Point

① Optimized cBN material for milling the ultra-hard materials.

② Improved flute design.

③ Sharper edge compared to the conventional design

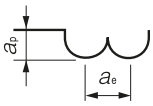
↓↓↓↓↓↓

High precision and long tool life.

CBN-LBF Milling Conditions

WORK MATERIAL			HEAT-TREATED STEELS / HARDENED STEELS STAVAX (~52HRC)				HARDENED STEELS SKD11 (~62HRC)				HARDENED STEELS HAP10 (~68HRC)			
Model Number	Radius of Ball Nose (mm)	Effective Length (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
2002-006	R0.1	0.6	30,000	500	0.005	0.005	30,000	400	0.005	0.005	30,000	300	0.005	0.005
2002-010		1	30,000	290	0.005	0.005	30,000	200	0.005	0.005	30,000	120	0.005	0.005
2003-009	R0.15	0.9	30,000	760	0.005	0.005	30,000	600	0.005	0.005	30,000	430	0.005	0.005
2003-015		1.5	30,000	460	0.005	0.005	30,000	320	0.005	0.005	30,000	190	0.005	0.005
2004-012	R0.2	1.2	30,000	1,050	0.005	0.01	30,000	800	0.005	0.01	30,000	620	0.005	0.005
2004-020		2	30,000	600	0.005	0.01	30,000	450	0.005	0.01	30,000	330	0.005	0.005
2004-030		3	20,000	400	0.005	0.005	20,000	300	0.005	0.005	20,000	190	0.003	0.003
2005-015	R0.25	1.5	30,000	1,300	0.01	0.01	30,000	1,000	0.01	0.01	30,000	760	0.005	0.01
2005-025		2.5	30,000	800	0.01	0.01	30,000	700	0.01	0.01	30,000	480	0.005	0.01
2005-035		3.5	22,000	550	0.01	0.01	22,000	500	0.005	0.01	22,000	330	0.005	0.005
2006-015	R0.3	1.5	30,000	2,000	0.02	0.03	30,000	1,500	0.02	0.03	30,000	1,000	0.01	0.02
2006-030		3	26,000	1,100	0.02	0.02	26,000	900	0.02	0.02	26,000	760	0.01	0.01
2006-040		4	22,000	750	0.01	0.02	22,000	650	0.01	0.02	22,000	570	0.005	0.01
2006-050		5	18,000	550	0.01	0.01	18,000	450	0.01	0.01	18,000	410	0.005	0.005
2006-060		6	12,000	350	0.005	0.01	12,000	290	0.005	0.005	12,000	260	0.003	0.003
2008-020	R0.4	2	30,000	2,500	0.02	0.03	30,000	2,100	0.02	0.03	30,000	1,700	0.01	0.02
2008-040		4	25,000	1,500	0.02	0.02	25,000	1,350	0.02	0.02	25,000	1,200	0.01	0.01
2008-060		6	18,000	1,000	0.01	0.02	18,000	800	0.01	0.02	18,000	750	0.005	0.01
2010-025	R0.5	2.5	30,000	3,300	0.04	0.04	30,000	3,000	0.03	0.04	30,000	2,100	0.02	0.03
2010-040		4	27,000	2,700	0.03	0.04	27,000	2,300	0.03	0.03	27,000	1,800	0.02	0.02
2010-050		5	23,000	2,200	0.03	0.03	23,000	1,800	0.03	0.03	23,000	1,450	0.02	0.02
2010-060		6	20,000	1,900	0.02	0.03	20,000	1,500	0.02	0.03	20,000	1,200	0.01	0.02
2010-080		8	14,000	1,300	0.01	0.02	14,000	1,000	0.01	0.02	14,000	800	0.01	0.01
2010-100		10	9,000	800	0.01	0.02	9,000	600	0.01	0.01	9,000	490	0.005	0.005

ap :Axial Depth (mm)
ae :Radial Depth (mm)



Note:

・Decrease both spindle speed and feed rate proportionally when the milling parameters exceed the machine's maximum spindle speed.

・Recommend oil mist to avoid tool damage.

U.S. UNION TOOL, INC.

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