



Size R1.5~R6

**HBL**



R1.5~R3

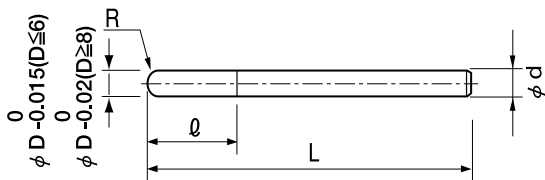
R4~R6

Material Applications (☆ Highly Recommended ○ Recommended ○ Suggested)

Work Material															
Carbon Steels S45C S55C	Alloy Steels SK / SCM SUS	Prehardened Steels NAK HPM	Hardened Steels			Cast Iron	Aluminum Alloys	Graphite	Copper	Plastics	Glass Filled Plastics	Titanium Alloys	Heat Resistant Alloys	Cemented Carbide	Hard Brittle (Non-Metallic) Materials
			~55HRC	~60HRC	~70HRC										
○	○	○	○	○		○			○			○	○		

Features

Long shank ball design for hard material.  
**HARDMAX** offers outstanding tool life.  
 Suitable for both dry and wet coolant types.  
 Diameter Tolerance: 0/-0.015 (D≤6)、0/-0.02 (D≥8)



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. Shank taper angle should not make contact with the work piece.

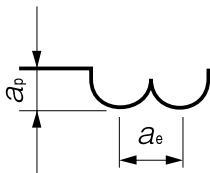
Total 6 models

Unit (mm)

Model Number	Radius of Ball Nose R	Length of Cut ℓ	Overall Length L	Shank Diameter φd	Price (¥)
<b>HBL 2030-0800</b>	R1.5	4.5	80	3	12,200
<b>HBL 2040-1000</b>	R2	6	100	4	13,900
<b>HBL 2060-1400</b>	R3	18	140	6	21,100
<b>HBL 2080-1600</b>	R4	20	160	8	29,480
<b>HBL 2100-1800</b>	R5	25	180	10	35,700
<b>HBL 2120-2000</b>	R6	25	200	12	46,090

## Milling Conditions for HBL

WORK MATERIAL		CARBON STEELS S45C / S50C (~225HB)		ALLOY STEELS SK / SCM / SUS (225~325HB)		PREHARDENED STEELS HARDENED STEELS NAK / SKD (30~45HRC)		HARDENED STEELS SKD61 / SKT (45~50HRC)		HARDENED STEELS SKD61 / 11 (50~60HRC)	
Model Number	Radius of Ball Nose (mm)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)
2030-0800	R1.5	16,000	800	13,300	580	10,700	420	6,400	230	4,800	90
2040-1000	R2	12,000	840	10,000	560	8,000	400	4,800	230	3,600	100
2060-1400	R3	8,000	960	6,700	670	5,400	480	3,200	250	2,400	110
2080-1600	R4	6,000	1,050	5,000	700	4,000	520	2,400	260	1,800	110
2100-1800	R5	4,800	1,100	4,000	730	3,200	540	2,000	300	1,500	120
2120-2000	R6	4,000	1,130	3,400	810	2,700	590	1,600	320	1,200	140



Cutting Amount (mm)

$$a_e = 0.1D = P_t$$

$$a_p = 0.04D \text{ (Max0.5mm)}$$

D : Outside Diameter (mm)

$a_p$  : Axial Depth (mm)

## Note:

- Decrease both spindle speed and feed rate proportionally in case of chattering.
- Set spindle speed, feed rate, and radial depth ( $a_e$ ) in accordance with the required surface quality.
- Adjust milling parameters according to the operating environment when milling a work piece over 60HRC.
- Recommend air blow or oil mist.
- Recommend oil coolant for Stainless Steels and Heat Resistant Alloys.
- Recommend wet coolant for Copper.

Square	Square
	Long Neck Square
Radius	Radius
	Long Neck Radius
Ball	Ball / Long Shank Ball
	Long Neck Ball
	Taper Neck Ball
Taper	Taper
	Spiral V Cutter
Drill Thread Mill	
EURO Series	
Technical Data	