

## 2 Flutes UDC High-grade Ball End Mills for Cemented Carbide and Hard Brittle Materials

Size R0.1~R3



# UDCBF



Patented in Japan, US, China, Korea, Germany, Switzerland, and Liechtenstein

Additional 1 model

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
			~50HRC	~55HRC	~60HRC	~65HRC	~70HRC										
												○			★	● *	

\* Hard Brittle (Non-Metallic) Materials: Ceramics (Alumina, Zirconia, etc.), Glasses and etc.

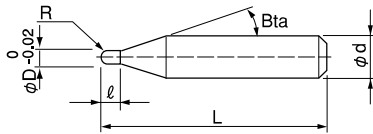
### Features

Ball type End Mills for milling Cemented Carbide and Hard Brittle (Non-Metallic) Materials. Upgraded version of UDCB.

New Diamond coating and flute design increase material removal amount.

Chip pocket designed on tool tip improves the surface finishing quality.

Special cutting edge treatment helps to avoid the edge chipping & level gap. Recommended to use on semi-roughing & finishing process.



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.

Label Sample



#001 φD0.797 R+0.003/0.000

Diameter and Ball R accuracy measurements are printed on the label to support High Precision milling.

Total 17 models

Unit (mm)

Model Number	Radius of Ball Nose R	Length of Cut ℓ	Shank Taper Angle Bta	Overall Length L	Shank Diameter φd	Suggested Retail Price ¥
UDCBF 2002-0014	R0.1	0.14	16°	50	4	47,000
UDCBF 2003-0021	R0.15	0.21	16°	50	4	47,000
UDCBF 2004-0028	R0.2	0.28	16°	50	4	42,800
UDCBF 2005-0035	R0.25	0.35	16°	50	4	42,800
UDCBF 2006-0042	R0.3	0.42	16°	50	4	38,400
UDCBF 2007-0049	R0.35	0.49	16°	50	4	38,400
UDCBF 2008-0056	R0.4	0.56	16°	50	4	38,400
UDCBF 2009-0063	R0.45	0.63	16°	50	4	38,400
UDCBF 2010-0070	R0.5	0.7	16°	50	4	38,400
UDCBF 2012-0084	R0.6	0.84	16°	50	4	38,400
UDCBF 2015-0105	R0.75	1.05	16°	50	4	38,400
UDCBF 2020-0140	R1	1.4	16°	50	4	38,400
※ UDCBF 2025-0175	R1.25	1.75	16°	50	4	42,300
UDCBF 2030-0210	R1.5	2.1	16°	60	6	42,300
UDCBF 2040-0280	R2	2.8	16°	60	6	42,300
UDCBF 2050-0350	R2.5	3.5	16°	60	6	42,300
UDCBF 2060-0420	R3	4.2	—	60	6	42,300

※ Additional model

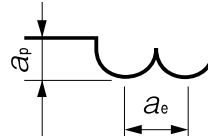
- φ3mm Shank V Series
- UDC-PCD Series
- CBN Series
- Square
- Long Neck Square
- Radius
- Long Neck Radius
- Taper Neck Radius
- Ball / Long Shank Ball
- Long Neck Ball
- Taper Neck Ball
- Taper
- Barrel
- Spiral V Cutter
- Drill
- Technical Data

## Milling Conditions for UDCBF

WORK MATERIAL			CEMENTED CARBIDE(≥87HRA) HARD BRITTLE MATERIALS					CEMENTED CARBIDE(<87HRA)				
Model Number	Radius of Ball Nose (mm)	Length of Cut (mm)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	※Feed Rate 2 (mm/min)	$a_p$ (mm)	$a_e$ (mm)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	※Feed Rate 2 (mm/min)	$a_p$ (mm)	$a_e$ (mm)
2002-0014	R0.1	0.14	30,000	100	10	0.01	0.01	30,000	100	10	0.01	0.01
2003-0021	R0.15	0.21	30,000	125	13	0.015	0.03	30,000	125	13	0.015	0.03
2004-0028	R0.2	0.28	30,000	150	15	0.02	0.08	30,000	150	15	0.02	0.08
2005-0035	R0.25	0.35	30,000	175	18	0.025	0.11	30,000	175	18	0.025	0.11
2006-0042	R0.3	0.42	30,000	200	20	0.03	0.14	30,000	200	20	0.03	0.14
2007-0049	R0.35	0.49	30,000	225	23	0.035	0.17	30,000	225	23	0.035	0.17
2008-0056	R0.4	0.56	30,000	250	25	0.04	0.19	30,000	250	25	0.04	0.19
2009-0063	R0.45	0.63	30,000	275	28	0.045	0.22	30,000	275	28	0.045	0.22
2010-0070	R0.5	0.7	30,000	300	30	0.05	0.25	30,000	300	150	0.35	0.075
2012-0084	R0.6	0.84	27,500	275	36	0.06	0.26	25,000	250	125	0.42	0.09
2015-0105	R0.75	1.05	25,000	250	45	0.075	0.27	19,000	190	95	0.525	0.12
2020-0140	R1	1.4	20,000	200	60	0.1	0.3	12,500	125	60	0.7	0.15
2025-0175	R1.25	1.75	20,000	200	60	0.12	0.3	10,000	100	50	0.8	0.18
2030-0210	R1.5	2.1	20,000	200	100	0.15	0.3	9,000	280	140	0.38	0.15
2040-0280	R2	2.8	18,000	180	90	0.175	0.32	7,200	280	140	0.5	0.2
2050-0350	R2.5	3.5	16,000	160	80	0.225	0.31	6,000	330	170	0.6	0.25
2060-0420	R3	4.2	15,000	150	75	0.3	0.3	5,500	280	140	0.65	0.28

These milling parameters are based on VF-20, VM-40, VC-70, VU-70 (TAS standard) for Cemented Carbide, and Alumina for Hard Brittle Materials. These are for reference only. Tool life may differ depending on the type of Cemented Carbide / Hard Brittle Materials. For best result, fine parameter adjustments may be required, depending on the materials of Cemented Carbide / Hard Brittle Materials; milling shape and strategy; machine rigidity and spindle capability.

※ Feed Rate2: Feed rate of approach and \*connection moves.  
\*Changing from one engagement point to the next.



## Note:

- This application requires a high cutting force. A machine with poor rigidity and high vibration is not recommended.
- Allow sufficient machine and spindle warm-up time for stability and to remove any expansion of the main spindle before running the program.
- Tool setting length should achieve the least possible overhang.
- Avoid contact with the coated area of the shank. This will prevent tip vibration and tool jamming in the collet / holder.
- Run-out and vibration should be checked dynamically at the tool point while mounted in the machine and both should achieve the lowest level possible.
- Use an inclined or helical approach (Recommended inclination angle: <5 degree).
- Decrease both spindle speed and feed rate proportionally.
- Air blow is highly recommended for longer tool life. Both oil mist and oil coolant are alternatives.
- Recommend water soluble coolant for Hard Brittle (Non-Metallic) Materials.
- When milling some work pieces, heavier chips may be created. To evacuate these chips it is important to accurately position the coolant nozzle on the milling part.
- Remove chips to prevent heat generation and ignition during milling process.
- Protective gear, such as safety glasses and face guards are required when milling.
- Chips / dust generated while milling can have adverse affects on the machine parts if they are not properly evacuated. Take steps to assure proper evacuation.

φ3mm Shank  
V Series

UDC-PCD  
Series

CBN  
Series

Square

Long Neck  
Square

Radius

Long Neck  
Radius

Taper Neck  
Radius

Ball / Long  
Shank Ball

Long Neck  
Ball

Taper Neck  
Ball

Taper

Barrel

Spiral  
V Cutter

Drill

Technical Data