

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



Size R0.1~R3



UDCLBF



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

Material Applications (★ Highly Recommended ● Recommended ○ Suggested)

Work Material																	
Carbon Steels	Alloy Steels	Prehardened Steels	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										
S45C	SK / SCM	NAK HPM														★	●
S55C	SUS																*

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

Features

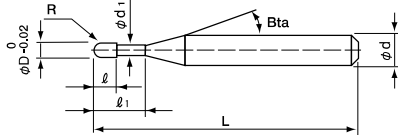
Long Neck Ball type End Mills for milling Cemented Carbide and Hard Brittle (Non-Metallic) Materials. Upgraded version of UDCLB.

New Diamond coating and flute design increase material removal amount.

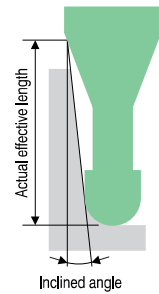
Chip pocket designed on tool tip improves the surface finishing quality.

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 φD0.389 R0.000/-0.004

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

Total 61 models

Unit (mm)

Model Number	Radius of Ball Nose R	Effective Length l_1	Length of Cut l	Neck Diameter ϕd_1	Shank Taper Angle Bta	Overall Length L	Shank Diameter ϕd	Suggested Retail Price ¥	Effective Length by Inclined Angles				
									30°	1°	1°30'	2°	3°
UDCLBF 2002-0030	R0.1	0.3	0.14	0.18	16°	50	4	47,500	0.30	0.31	0.32	0.32	0.34
UDCLBF 2002-0050		0.5				50	4	47,500	0.51	0.52	0.54	0.55	0.59
UDCLBF 2002-0075		0.75				50	4	47,500	0.77	0.79	0.81	0.84	0.89
UDCLBF 2002-0100		1				50	4	47,500	1.02	1.05	1.09	1.12	1.20
UDCLBF 2003-0050	R0.15	0.5	0.21	0.28	16°	50	4	47,500	0.51	0.52	0.53	0.55	0.58
UDCLBF 2003-0075		0.75				50	4	47,500	0.76	0.78	0.81	0.83	0.88
UDCLBF 2003-0100		1				50	4	47,500	1.02	1.05	1.08	1.11	1.19
UDCLBF 2004-0050	R0.2	0.5	0.28	0.36	16°	50	4	43,300	0.54	0.55	0.56	0.58	0.61
UDCLBF 2004-0100		1				50	4	43,300	1.06	1.08	1.12	1.15	1.22
UDCLBF 2004-0150		1.5				50	4	43,300	1.57	1.62	1.67	1.72	1.83
UDCLBF 2004-0200		2				50	4	43,300	2.09	2.15	2.22	2.29	2.44
UDCLBF 2004-0250		2.5				50	4	43,300	2.60	2.68	2.77	2.86	3.06

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

Unit (mm)

Model Number	Radius of Ball Nose R	Effective Length ℓ_1	Length of Cut ℓ	Neck Diameter ϕd_1	Shank Taper Angle Bia	Overall Length L	Shank Diameter ϕd	Suggested Retail Price ¥	Effective Length by Inclined Angles				
									30°	1°	1°30'	2°	3°
UDCLBF 2006-0100	RO.3	1	0.42	0.56	16°	50	4	38,900	1.05	1.08	1.11	1.13	1.20
UDCLBF 2006-0150		1.5				50	4	38,900	1.57	1.61	1.66	1.70	1.81
UDCLBF 2006-0200		2				50	4	38,900	2.08	2.14	2.21	2.27	2.42
UDCLBF 2006-0300		3				50	4	38,900	3.12	3.21	3.31	3.41	3.65
UDCLBF 2006-0400		4				50	4	38,900	4.15	4.27	4.41	4.55	4.87
UDCLBF 2006-0500		5				50	4	38,900	5.18	5.34	5.51	5.69	6.09
UDCLBF 2006-0600	6	50	4	38,900	6.21	6.40	6.61	6.83	7.32				
UDCLBF 2008-0200	RO.4	2	0.56	0.76	16°	50	4	38,900	2.08	2.14	2.20	2.26	2.40
UDCLBF 2008-0300		3				50	4	38,900	3.11	3.20	3.30	3.40	3.62
UDCLBF 2008-0400		4				50	4	38,900	4.14	4.27	4.40	4.54	4.85
UDCLBF 2008-0500		5				50	4	38,900	5.18	5.33	5.50	5.67	6.07
UDCLBF 2008-0600		6				50	4	38,900	6.21	6.40	6.60	6.81	7.29
UDCLBF 2008-0800		8				50	4	38,900	8.27	8.53	8.80	9.09	9.74
UDCLBF 2010-0150	RO.5	1.5	0.7	0.96	16°	50	4	38,900	1.56	1.60	1.64	1.68	1.77
UDCLBF 2010-0200		2				50	4	38,900	2.08	2.13	2.19	2.25	2.38
UDCLBF 2010-0250		2.5				50	4	38,900	2.59	2.66	2.74	2.81	2.99
UDCLBF 2010-0300		3				50	4	38,900	3.11	3.20	3.29	3.38	3.60
UDCLBF 2010-0400		4				50	4	38,900	4.14	4.26	4.39	4.52	4.83
UDCLBF 2010-0600		6				50	4	38,900	6.20	6.39	6.59	6.80	7.27
UDCLBF 2010-0800	8	50	4	38,900	8.27	8.52	8.79	9.08	9.72				
UDCLBF 2010-1000	10	50	4	38,900	10.33	10.65	10.99	11.35	12.17				
UDCLBF 2015-0200	RO.75	2	1.05	1.44	16°	50	4	38,900	2.11	2.15	2.20	2.25	2.37
UDCLBF 2015-0400		4				50	4	38,900	4.17	4.28	4.40	4.53	4.81
UDCLBF 2015-0600		6				50	4	38,900	6.23	6.41	6.60	6.81	7.26
UDCLBF 2015-0800		8				50	4	38,900	8.29	8.54	8.80	9.08	9.71
UDCLBF 2015-1000		10				50	4	38,900	10.36	10.67	11.00	11.36	12.16
UDCLBF 2015-1200		12				50	4	38,900	12.42	12.80	13.20	13.64	14.60
UDCLBF 2020-0300	R1	3	1.4	1.9	16°	50	4	38,900	3.20	3.27	3.35	3.43	3.62
UDCLBF 2020-0400		4				50	4	38,900	4.23	4.34	4.45	4.57	4.84
UDCLBF 2020-0600		6				50	4	38,900	6.30	6.47	6.65	6.85	7.29
UDCLBF 2020-0800		8				50	4	38,900	8.36	8.60	8.85	9.13	9.74
UDCLBF 2020-1000		10				50	4	38,900	10.42	10.73	11.06	11.41	12.19
UDCLBF 2020-1200		12				50	4	38,900	12.48	12.86	13.26	13.68	14.63
UDCLBF 2020-1400		14				50	4	38,900	14.55	14.99	15.46	15.96	17.08
UDCLBF 2020-1600		16				50	4	38,900	16.61	17.12	17.66	18.24	19.53
UDCLBF 2020-1800		18				60	4	38,900	18.67	19.25	19.86	20.52	No Interference
UDCLBF 2020-2000		20				60	4	38,900	20.74	21.38	22.06	22.79	No Interference
UDCLBF 2030-0600	R1.5	6	2.1	2.9	16°	60	6	42,800	6.28	6.44	6.60	6.78	7.18
UDCLBF 2030-0800		8				60	6	42,800	8.34	8.57	8.80	9.06	9.63
UDCLBF 2030-1000		10				60	6	42,800	10.41	10.70	11.01	11.34	12.08
UDCLBF 2030-1200		12				60	6	42,800	12.47	12.83	13.21	13.61	14.52
UDCLBF 2030-1400		14				60	6	42,800	14.53	14.96	15.41	15.89	16.97
UDCLBF 2040-0800	R2	8	2.8	3.9	16°	60	6	42,800	8.33	8.53	8.76	8.99	9.52
UDCLBF 2040-1000		10				60	6	42,800	10.39	10.66	10.96	11.27	11.97
UDCLBF 2040-1500	R2.5	15	3.5	4.8	16°	60	6	42,800	15.55	15.99	16.46	16.96	18.09
UDCLBF 2050-1000		10				60	6	42,800	10.55	10.82	11.10	11.40	12.07
UDCLBF 2050-1500	R3	15	4.2	5.7	—	60	6	42,800	15.71	16.14	16.60	17.09	No Interference
UDCLBF 2060-1000		10				60	6	42,800	No Interference	No Interference	No Interference	No Interference	No Interference
UDCLBF 2060-1500	15	60	6	42,800	No Interference	No Interference	No Interference	No Interference	No Interference				

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Milling Conditions for UDCLBF

WORK MATERIAL			CEMENTED CARBIDE (≥87HRA) / HARD BRITTLE MATERIALS					CEMENTED CARBIDE (<87HRA)				
Model Number	Radius of Ball Nose (mm)	Effective Length (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	※Feed Rate 2 (mm/min)	a _p (mm)	a _e (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	※Feed Rate 2 (mm/min)	a _p (mm)	a _e (mm)
2002-0030	R0.1	0.3	30,000	100	10	0.01	0.01	30,000	100	10	0.01	0.01
2002-0050		0.5	30,000	30	10	0.005	0.008	30,000	30	10	0.005	0.008
2002-0075		0.75	30,000	30	10	0.005	0.006	30,000	30	10	0.005	0.006
2002-0100		1	30,000	25	10	0.005	0.005	30,000	25	10	0.005	0.005
2003-0050	R0.15	0.5	30,000	100	10	0.01	0.03	30,000	100	10	0.01	0.03
2003-0075		0.75	30,000	80	10	0.01	0.02	30,000	80	10	0.01	0.02
2003-0100		1	30,000	60	10	0.01	0.02	30,000	60	10	0.01	0.02
2004-0050	R0.2	0.5	30,000	150	15	0.02	0.08	30,000	150	15	0.02	0.08
2004-0100		1	30,000	100	10	0.015	0.07	30,000	100	10	0.015	0.07
2004-0150		1.5	30,000	60	10	0.01	0.06	30,000	60	10	0.01	0.06
2004-0200		2	30,000	30	10	0.008	0.05	30,000	30	10	0.008	0.05
2004-0250	R0.3	2.5	30,000	15	10	0.006	0.03	30,000	15	10	0.006	0.03
2006-0100		1	30,000	200	20	0.03	0.14	30,000	200	20	0.03	0.14
2006-0150		1.5	30,000	200	20	0.03	0.14	30,000	200	20	0.03	0.14
2006-0200		2	30,000	150	15	0.022	0.11	30,000	150	15	0.022	0.11
2006-0300		3	30,000	75	10	0.01	0.08	30,000	75	10	0.01	0.08
2006-0400		4	30,000	75	10	0.01	0.08	30,000	75	10	0.01	0.08
2006-0500		5	30,000	75	10	0.01	0.06	30,000	75	10	0.01	0.06
2006-0600		6	30,000	75	10	0.01	0.03	30,000	75	10	0.01	0.03
2008-0200	R0.4	2	30,000	250	25	0.04	0.19	30,000	250	25	0.04	0.19
2008-0300		3	30,000	230	23	0.037	0.17	30,000	230	23	0.037	0.17
2008-0400		4	30,000	210	21	0.035	0.16	30,000	210	21	0.035	0.16
2008-0500		5	25,000	170	20	0.03	0.12	25,000	170	20	0.03	0.12
2008-0600		6	20,000	130	20	0.025	0.08	20,000	130	20	0.025	0.08
2008-0800		8	15,000	100	20	0.015	0.03	15,000	100	20	0.015	0.03
2010-0150	R0.5	1.5	30,000	300	30	0.05	0.25	30,000	300	150	0.35	0.075
2010-0200		2	30,000	300	30	0.05	0.25	30,000	300	150	0.35	0.075
2010-0250		2.5	30,000	300	30	0.05	0.25	30,000	300	150	0.35	0.075
2010-0300		3	30,000	300	30	0.05	0.25	25,000	250	125	0.35	0.075
2010-0400		4	30,000	300	30	0.05	0.25	25,000	250	125	0.2	0.1
2010-0600		6	25,000	250	25	0.04	0.15	25,000	250	125	0.1	0.1
2010-0800		8	20,000	200	25	0.025	0.07	20,000	200	100	0.03	0.08
2010-1000	10	10,000	100	20	0.018	0.03	20,000	200	100	0.02	0.04	
2015-0200	R0.75	2	25,000	250	45	0.075	0.27	18,000	180	90	0.52	0.12
2015-0400		4	25,000	250	45	0.075	0.27	18,000	180	90	0.52	0.12
2015-0600		6	25,000	250	45	0.075	0.27	18,000	180	90	0.4	0.12
2015-0800		8	20,000	160	30	0.075	0.27	18,000	180	90	0.2	0.2
2015-1000		10	20,000	130	30	0.05	0.15	18,000	180	90	0.075	0.25
2015-1200	12	16,000	100	30	0.03	0.08	13,500	135	70	0.05	0.16	
2020-0300	R1	3	20,000	200	60	0.1	0.3	12,500	125	60	0.7	0.15
2020-0400		4	20,000	200	60	0.1	0.3	12,500	125	60	0.7	0.15
2020-0600		6	20,000	200	60	0.1	0.3	12,500	125	60	0.7	0.15
2020-0800		8	20,000	200	60	0.1	0.3	12,500	125	60	0.4	0.2
2020-1000		10	20,000	200	60	0.1	0.3	12,500	125	60	0.25	0.25
2020-1200		12	20,000	200	60	0.09	0.25	12,500	125	60	0.1	0.3
2020-1400		14	20,000	200	60	0.07	0.15	12,500	125	60	0.1	0.3
2020-1600		16	13,000	130	36	0.04	0.08	12,500	125	60	0.1	0.3
2020-1800		18	10,000	100	30	0.025	0.05	10,000	100	50	0.04	0.1
2020-2000		20	10,000	100	30	0.02	0.035	10,000	100	50	0.02	0.07

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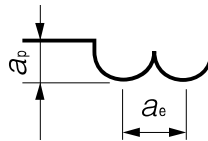
WORK MATERIAL			CEMENTED CARBIDE (≥87HRA) / HARD BRITTLE MATERIALS					CEMENTED CARBIDE (<87HRA)				
Model Number	Radius of Ball Nose (mm)	Effective Length (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	*Feed Rate 2 (mm/min)	a_e (mm)	a_e (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	*Feed Rate 2 (mm/min)	a_e (mm)	a_e (mm)
2030-0600	R1.5	6	20,000	200	100	0.15	0.3	9,000	280	140	0.38	0.15
2030-0800		8	20,000	200	100	0.15	0.3	9,000	280	140	0.38	0.15
2030-1000		10	20,000	200	100	0.15	0.3	9,000	280	140	0.38	0.15
2030-1200		12	20,000	200	100	0.15	0.3	9,000	280	140	0.38	0.15
2030-1400		14	20,000	200	100	0.15	0.3	9,000	280	140	0.38	0.15
2040-0800	R2	8	18,000	180	90	0.175	0.32	7,200	280	140	0.5	0.2
2040-1000		10	18,000	180	90	0.175	0.32	7,200	280	140	0.5	0.2
2040-1500		15	18,000	180	90	0.175	0.32	7,200	280	140	0.5	0.2
2050-1000	R2.5	10	16,000	160	80	0.225	0.31	6,000	330	170	0.6	0.25
2050-1500		15	16,000	160	80	0.225	0.31	6,000	330	170	0.6	0.25
2060-1000	R3	10	15,000	150	75	0.3	0.3	5,500	280	140	0.65	0.28
2060-1500		15	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

Radius

Long Neck
Radius

Ball / Long
Shank Ball

Ball

Long Neck
Ball

Taper

Barrel

Spiral
V Cutter

Drill

Technical Data