UNION TOOL CO.

UDC-H

The smaller sizes have been added to the UDCBH & UDCLBH to achieve higher efficient micro milling for cemented carbide!

UDC
Existing Models

UDCBH

Additional
4 models

2 Flute High-speed Ball End Mills for Cemented Carbide and Hard Brittle Materials

R0.1～R1

MG | UDC | 0° | R ±0.01 | Shank Dia 0/-0.005

Work Material		
GLASS FILLED PLASTICS	CEMENTED CARBIDE	HARD BRITTLE ※ MATERIALS
○	★	●

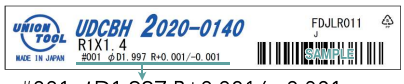
※Hard Brittle (Non-Metallic) Materials: Ceramics (Alumina, Zirconia, etc.), Glasses and etc.

★Highly Recommended ● Recommended ○ Suggested

Features

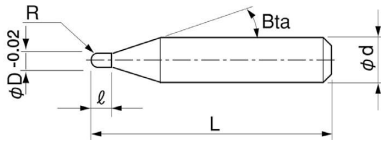
High efficiency and long life Ball End Mills for milling Cemented Carbide.
High-level treatment to reduce the cutting resistance and mill at a high feed rate.
Wear resistance improved drastically with optimized diamond coating. Best suited for roughing to semi-finishing.

Label Sample



#001 φD1.997 R+0.001/−0.001

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



The shank taper angle shown is not an exact value.

Total 10 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 ¥
※	UDCBH 2002-0014	R0.1	0.14	16°	50	4	54,050
※	UDCBH 2003-0021	R0.15	0.21	16°	50	4	54,050
※	UDCBH 2004-0028	R0.2	0.28	16°	50	4	49,220
※	UDCBH 2005-0035	R0.25	0.35	16°	50	4	49,220
	UDCBH 2006-0042	R0.3	0.42	16°	50	4	44,160
	UDCBH 2007-0049	R0.35	0.49	16°	50	4	44,160
	UDCBH 2008-0056	R0.4	0.56	16°	50	4	44,160
	UDCBH 2010-0070	R0.5	0.7	16°	50	4	44,160
	UDCBH 2015-0105	R0.75	1.05	16°	50	4	44,160
	UDCBH 2020-0140	R1	1.4	16°	50	4	44,160

※ Additional model

UDCLBH

Additional 2 models

2 Flute High-speed Long Neck Ball End Mills for Cemented Carbide and Hard Brittle Materials

R0.2～R1

MG | UDC | 0° | R ±0.01 | Shank Dia 0/-0.005

Work Material		
GLASS FILLED PLASTICS	CEMENTED CARBIDE	HARD BRITTLE ※ MATERIALS
○	★	●

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

★Highly Recommended ● Recommended ○ Suggested

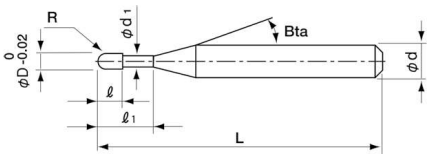
Features

Long life Long Neck Ball End Mills for milling Cemented Carbide.
High-level treatment to reduce the cutting resistance and minimize damage on cutting edge.
Wear resistance improved drastically with optimized diamond coating. Best suited for roughing to semi-finishing.

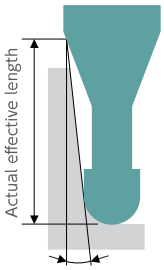
Label Sample

#001 φD1.989 R0.000/−0.002

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



The shank taper angle shown is not an exact value.



Inclined angle

Unit (mm)

Total 24 models

	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	Suggested Retail Price ¥	Effective Length by Inclined Angles 30′	1°	1°30′	2°	3°
※	UDCLBH 2004-0050	R0.2	0.5	0.28	0.375	16°	50	4	49,800	0.51	0.52	0.54	0.55	0.58
※	UDCLBH 2004-0100		1				50	4	49,800	1.03	1.06	1.09	1.12	1.19
	UDCLBH 2006-0100	R0.3	1	0.42	0.575	16°	50	4	44,740	1.03	1.05	1.08	1.10	1.17
	UDCLBH 2006-0150		1.5				50	4	44,740	1.54	1.58	1.63	1.67	1.78
	UDCLBH 2006-0200		2				50	4	44,740	2.06	2.12	2.18	2.24	2.39
	UDCLBH 2006-0300		3				50	4	44,740	3.09	3.18	3.28	3.38	3.61
	UDCLBH 2007-0100	R0.35	1	0.49	0.675	16°	50	4	44,740	1.02	1.05	1.07	1.10	1.16
	UDCLBH 2008-0200	R0.4	2	0.56	0.775	16°	50	4	44,740	2.05	2.11	2.17	2.23	2.37
	UDCLBH 2008-0300		3				50	4	44,740	3.09	3.17	3.27	3.37	3.59
	UDCLBH 2008-0400		4				50	4	44,740	4.12	4.24	4.37	4.51	4.82
	UDCLBH 2010-0150	R0.5	1.5	0.7	0.975	16°	50	4	44,740	1.54	1.57	1.61	1.65	1.73
	UDCLBH 2010-0200		2				50	4	44,740	2.05	2.10	2.16	2.22	2.35
	UDCLBH 2010-0250		2.5				50	4	44,740	2.57	2.63	2.71	2.78	2.96
	UDCLBH 2010-0300		3				50	4	44,740	3.08	3.17	3.26	3.35	3.57
	UDCLBH 2010-0400		4				50	4	44,740	4.11	4.23	4.36	4.49	4.79
	UDCLBH 2010-0500		5				50	4	44,740	5.15	5.30	5.46	5.63	6.02
	UDCLBH 2015-0200	R0.75	2	1.05	1.455	16°	50	4	44,740	2.08	2.12	2.17	2.22	2.33
	UDCLBH 2015-0400		4				50	4	44,740	4.14	4.25	4.37	4.50	4.78
	UDCLBH 2015-0600		6				50	4	44,740	6.21	6.38	6.57	6.78	7.23
	UDCLBH 2020-0300	R1	3	1.4	1.915	16°	50	4	44,740	3.18	3.25	3.32	3.41	3.59
	UDCLBH 2020-0400		4				50	4	44,740	4.21	4.31	4.42	4.54	4.81
	UDCLBH 2020-0600		6				50	4	44,740	6.27	6.44	6.62	6.82	7.26
	UDCLBH 2020-0800		8				50	4	44,740	8.33	8.57	8.83	9.10	9.71
	UDCLBH 2020-1000		10				50	4	44,740	10.39	10.70	11.03	11.38	12.15

※ Additional model

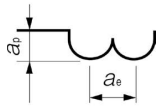
UDCBH Milling Conditions

WORK MATERIAL			CEMENTED CARBIDE (≧87HRA)					CEMENTED CARBIDE (<87HRA)					HARD BRITTLE MATERIALS				
Model Number	Radius of Ball Nose (mm)	Length of Cut (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	※ Feed Rate 2 (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	※ Feed Rate 2 (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	※ Feed Rate 2 (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
2002-0014	R0.1	0.14	30,000	200	20	0.008	0.008	30,000	200	20	0.008	0.008	30,000	100	10	0.01	0.01
2003-0021	R0.15	0.21	30,000	250	25	0.012	0.024	30,000	250	25	0.024	0.012	30,000	125	13	0.015	0.03
2004-0028	R0.2	0.28	30,000	450	45	0.02	0.08	30,000	600	60	0.08	0.02	30,000	150	15	0.02	0.08
2005-0035	R0.25	0.35	30,000	525	53	0.025	0.11	30,000	700	70	0.11	0.025	30,000	175	18	0.025	0.11
2006-0042	R0.3	0.42	30,000	600	200	0.03	0.14	30,000	900	300	0.17	0.03	30,000	200	20	0.03	0.14
2007-0049	R0.35	0.49	30,000	690	230	0.035	0.17	30,000	1,050	350	0.18	0.035	30,000	225	23	0.035	0.17
2008-0056	R0.4	0.56	30,000	750	250	0.04	0.19	30,000	1,250	420	0.19	0.04	30,000	250	25	0.04	0.19
2010-0070	R0.5	0.7	30,000	900	300	0.05	0.22	25,000	1,300	430	0.2	0.05	30,000	300	30	0.05	0.25
2015-0105	R0.75	1.05	30,000	1,200	400	0.075	0.27	19,000	1,450	480	0.23	0.07	24,000	400	45	0.075	0.27
2020-0140	R1	1.4	30,000	1,500	500	0.1	0.3	16,500	1,600	530	0.25	0.1	18,000	600	200	0.1	0.3

UDCLBH Milling Conditions

WORK MATERIAL			CEMENTED CARBIDE (≧87HRA)					CEMENTED CARBIDE (<87HRA)					HARD BRITTLE MATERIALS				
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 Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	※ Feed Rate 2 (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	※ Feed Rate 2 (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
2004-0050	R0.2	0.5	30,000	450	45	0.02	0.08	30,000	600	60	0.08	0.02	30,000	150	15	0.02	0.08
2004-0100		1	30,000	300	30	0.015	0.07	30,000	300	30	0.07	0.015	30,000	100	10	0.015	0.07
2006-0100	R0.3	1	30,000	600	200	0.03	0.14	30,000	450	150	0.17	0.03	30,000	200	20	0.03	0.14
2006-0150		1.5	30,000	600	200	0.03	0.14	30,000	300	100	0.14	0.025	30,000	200	20	0.03	0.14
2006-0200		2	30,000	300	100	0.022	0.11	30,000	220	70	0.11	0.02	30,000	150	15	0.02	0.11
2006-0300		3	30,000	75	10	0.01	0.08	30,000	75	10	0.08	0.01	30,000	75	10	0.01	0.08
2007-0100	R0.35	1	30,000	690	230	0.035	0.17	30,000	525	260	0.18	0.035	30,000	225	23	0.035	0.17
2008-0200	R0.4	2	30,000	750	250	0.04	0.19	27,000	480	240	0.19	0.04	30,000	250	25	0.04	0.19
2008-0300		3	30,000	350	100	0.037	0.17	25,500	300	100	0.17	0.035	30,000	230	23	0.037	0.17
2008-0400		4	26,000	210	70	0.035	0.16	24,000	210	21	0.16	0.035	30,000	210	21	0.035	0.16
2010-0150	R0.5	1.5	30,000	900	300	0.05	0.22	25,000	650	325	0.2	0.05	30,000	300	30	0.05	0.25
2010-0200		2	30,000	900	300	0.05	0.22	24,000	580	290	0.2	0.05	30,000	300	30	0.05	0.25
2010-0250		2.5	30,000	800	300	0.05	0.22	23,500	520	260	0.2	0.05	30,000	300	30	0.05	0.25
2010-0300		3	30,000	600	200	0.05	0.22	23,000	450	220	0.2	0.05	30,000	300	30	0.05	0.25
2010-0400		4	30,000	400	100	0.05	0.22	21,000	320	160	0.2	0.05	30,000	300	30	0.05	0.25
2010-0500		5	27,000	270	100	0.045	0.2	20,000	250	125	0.2	0.05	27,000	270	30	0.045	0.2
2015-0200	R0.75	2	30,000	1,200	400	0.075	0.27	19,000	750	375	0.23	0.07	24,000	400	45	0.075	0.27
2015-0400		4	30,000	900	250	0.075	0.27	18,000	580	290	0.23	0.07	24,000	350	40	0.075	0.27
2015-0600		6	25,000	500	100	0.075	0.27	17,000	400	200	0.23	0.07	24,000	320	36	0.075	0.27
2020-0300	R1	3	30,000	1,500	500	0.1	0.3	16,500	800	400	0.25	0.1	18,000	600	200	0.1	0.3
2020-0400		4	30,000	1,500	500	0.1	0.3	15,750	750	375	0.25	0.1	18,000	500	160	0.1	0.3
2020-0600		6	20,000	850	280	0.1	0.3	15,000	620	310	0.25	0.1	18,000	400	130	0.1	0.3
2020-0800		8	13,000	400	130	0.1	0.3	14,000	520	260	0.25	0.1	18,000	350	120	0.1	0.3
2020-1000		10	10,000	200	60	0.1	0.3	13,000	420	210	0.25	0.1	18,000	300	100	0.1	0.3

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



Note: (for both UDCBH / UDCLBH)
- Avoid contact with the coated area of the shank. This will prevent tip vibration and tool jamming in the collet / holder.
- Use an inclined or helical approach (Recommended inclination angle: <5 degree).
- Air blow offers longer tool life when milling Cemented Carbide.
- Recommend water soluble coolant for Hard Brittle (Non-Metallic) Materials.
- 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.

UDCBH/UDCBF R1 × L1.4

Cemented Carbide Lens shaped milling Comparison of efficiency and material removal volume with UDCBH / UDCBF R1 x Length of Cut 1.4

VM-40 (90 HRA)

UDCBH

Compared to the conventional tools, UDCBH is…

7.5 times the efficiency

Over **4** times the removal volume

Tool	n (min^{-1})	Vf (mm/min)	a_p (mm)	a_e (mm)	1 side 16 pockets
UDCBH	30,000	15,000	0.1	0.3	1 Tool
UDCBF		200			4 Tools

Pocket size : ϕ 10 x d3.5 mm
Material removal volume : 160 mm^3/pocket
Coolant : Air blow

Please refer to the following materials to make full use of the UDC series.

How to use the UDC series

UDC milling video

UDC milling examples

Advisory for Safe Use of End Mills

Correct application and operation is strongly advised to avoid clogging, abrasion, etc, that could cause serious accidents or injuries.
Ignition or sparks generated during milling could lead to fire or extreme damage to the work piece.
End Mills are made with very sharp cutting edges and must be handled with extra care.

- Never touch the cutting edge with your bare hands, as this could cause serious injury. Special caution is required when opening the package.
- Dropping the tool could cause breakage or flying debris, leading to serious injury.
- During milling, unexpected impact or shock on the tool could cause breakage or flying debris. Ensure to use protective items such as safety glasses and a face guard.
- For best results, fine parameter adjustment may be required, depending on the materials; milling shape and strategy; machine rigidity and spindle capability.
- Use a machine that has high rigidity and generates a low level of vibration. Recommend setting the runout control value at 5μm or below for the small diameter tools ϕ1 or below.
- Do not use flammable cutting oils.

UNION TOOL

https://www.uniontool.co.jp

0120-60-2620

202302 UDC-H 6.5KA