Size R0.3～R1 UDC

UDCLBH

MG UDC 0° R ±0.01 Shank Dia 0/-0.005

Patent pending NEW

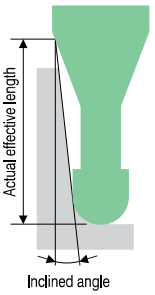
Material Applications（★ Highly Recommended ● Recommended ○ Suggested）

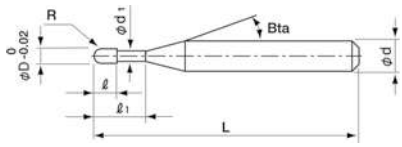
Work Material																
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels					Cast Iron	Aluminum Alloys	Graphite	Copper	Plastics	Glass Filled Plastics	Titanium Alloys	Heat Resistant Alloys	Cemented Carbide	Hard Brittle (Non-Metallic) Materials
S45C S55C	SK / SCM SUS	NAK HPM	～50HRC	～55HRC	～60HRC	～65HRC	～70HRC										
													○			★	● *

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

Features

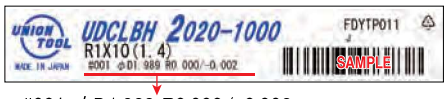
Long life Long Neck Ball End Mills for milling Cemented Carbide.
High-level treatment to reduce cutting resistance and minimize damage on cutting edge.
Wear resistance improved drastically with optimized diamond coating.
Best for roughing and semi-finishing.





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 φD1.989 R0.000/−0.002

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

Total 22 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	Suggested Retail Price ¥	Effective Length by Inclined Angles				
									30′	1°	1°30′	2°	3°
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

Unit (mm)

Model Number	Radius of Ball Nose R	Effective Length ℓ1	Length of Cut ℓ	Neck Diameter φd1	Shank Taper Angle θta	Overall Length L	Shank Diameter φd	Suggested Retail Price ¥	Effective Length by Inclined Angles				
									30′	1°	1°30′	2°	3°
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

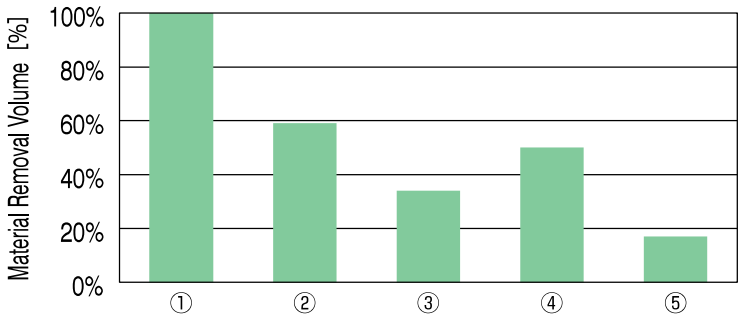
【UDC Milling Tips】

Tool life (= material removal volume) changes depending on the difference in Cemented Carbide material.
Recommend to select a material with good workability while considering the required performance (mold life).

Cemented Carbide	TAS Standard	Density g/cm³	Hardness HRA	Flexural Strength MPa	Compressive Strength MPa	Co Amount* %	Grain Size μm
①	VF-20	14.1	92.5～93	4,500～5,000	—	12	0.5
②	VM-40	14.7	90	3,240	4,700	8.8	2～3
③	VM-40	14.3	89	3,400	—	13.6	—
④	VM-50	14.2	87.5	3,160	4,070	15.1	—
⑤	—	13.1	83	2,660	2,800	28.9	—

*In-house measurement

UDCB R0.5 Comparison of material removal volume (① equals 100%)



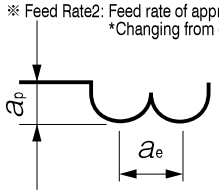
※ The ratio varies depending on the series, tool design, and sizes.

Milling Conditions for UDCLBH

WORK MATERIAL			CEMENTED CARBIDE(≧87HRA) / HARD BRITTLE MATERIALS					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 (mm)	a_e (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)
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

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.
· The tool life may shorten due to a large difference between the commanded feed speed and the actual machining speed caused by factors as machining model and machining machine.
· Decrease both feed rate and feed rate 2 proportionally.
· Tool damage may progress rapidly near the end of the tool life.