



Size R0.1~R3

UDCLB



New Price

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										
														○ *1	◎ *2

*1 DCB/DCLB series are highly recommended for Glass Filled Plastic milling.
 *2 Hard Brittle (Non-Metallic) Materials: Ceramics (Alumina, Zirconia, etc.), Glasses and etc.

Total 37 models

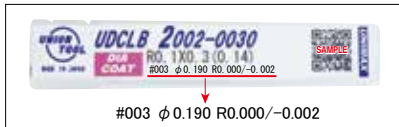
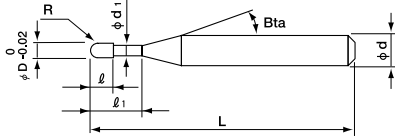
Model Number	Radius of Ball Nose R	Effective Length l_e	Length of Cut l_c	Neck Diameter ϕ_d	Shank Taper Angle Bfa	Overall Length L	Shank Diameter ϕ_d	Price (¥)
<input type="checkbox"/> UDCLB 2002-0030	R0.1	0.3	0.14	0.18	16°	50	4	39,580
<input type="checkbox"/> UDCLB 2002-0050		0.5				50	4	39,580
<input type="checkbox"/> UDCLB 2002-0075		0.75				50	4	39,580
<input type="checkbox"/> UDCLB 2002-0100	R0.2	1	0.28	0.36	16°	50	4	39,580
<input type="checkbox"/> UDCLB 2004-0050		0.5				50	4	36,080
<input type="checkbox"/> UDCLB 2004-0100		1				50	4	36,080
<input type="checkbox"/> UDCLB 2004-0150	R0.3	1.5	0.42	0.56	16°	50	4	36,080
<input type="checkbox"/> UDCLB 2004-0200		2				50	4	36,080
<input type="checkbox"/> UDCLB 2006-0100		1				50	4	32,410
<input type="checkbox"/> UDCLB 2006-0150	R0.4	1.5	0.56	0.76	16°	50	4	32,410
<input type="checkbox"/> UDCLB 2006-0200		2				50	4	32,410
<input type="checkbox"/> UDCLB 2006-0300		3				50	4	32,410
<input type="checkbox"/> UDCLB 2008-0200	R0.5	2	0.7	0.96	16°	50	4	32,410
<input type="checkbox"/> UDCLB 2008-0300		3				50	4	32,410
<input type="checkbox"/> UDCLB 2008-0400		4				50	4	32,410
<input type="checkbox"/> UDCLB 2010-0200	R1	2	1.4	1.9	16°	50	4	32,410
<input type="checkbox"/> UDCLB 2010-0250		2.5				50	4	32,410
<input type="checkbox"/> UDCLB 2010-0300		3				50	4	32,410
<input type="checkbox"/> UDCLB 2010-0400	R1.5	4	2.1	2.9	16°	50	4	32,410
<input type="checkbox"/> UDCLB 2010-0500		5				50	4	32,410
<input type="checkbox"/> UDCLB 2020-0300		3				50	4	32,410
<input type="checkbox"/> UDCLB 2020-0400	R2	4	2.8	3.9	16°	50	4	32,410
<input type="checkbox"/> UDCLB 2020-0600		6				50	4	32,410
<input type="checkbox"/> UDCLB 2020-0800		8				50	4	32,410
<input type="checkbox"/> UDCLB 2020-1000	R2.5	10	3.5	4.8	16°	50	4	32,410
<input type="checkbox"/> UDCLB 2030-0600		6				60	6	35,580
<input type="checkbox"/> UDCLB 2030-0800		8				60	6	35,580
<input type="checkbox"/> UDCLB 2030-1000	R3	10	4.2	5.7	—	60	6	35,580
<input type="checkbox"/> UDCLB 2030-1200		12				60	6	35,580
<input type="checkbox"/> UDCLB 2030-1400		14				60	6	35,580
<input type="checkbox"/> UDCLB 2040-0800	R3	8	4.2	5.7	—	60	6	35,580
<input type="checkbox"/> UDCLB 2040-1000		10				60	6	35,580
<input type="checkbox"/> UDCLB 2040-1500		15				60	6	35,580
<input type="checkbox"/> UDCLB 2050-1000	R3	10	4.2	5.7	—	60	6	35,580
<input type="checkbox"/> UDCLB 2050-1500		15				60	6	35,580
<input type="checkbox"/> UDCLB 2060-1000		10				60	6	35,580
<input type="checkbox"/> UDCLB 2060-1500	15	60	6	35,580				

New price

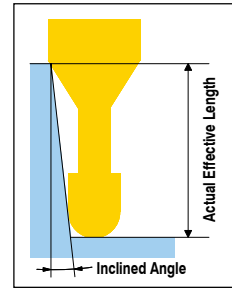
Features

Long Neck Ball type End Mills for milling Cemented Carbide and Hard Brittle (Non-Metallic) Materials. Developed to give improved hardness and durability, new Diamond coating also has outstanding adhesion to the cutting tool.

By combining the new coating with optimum cutting geometries, the tool literally "cuts" the work piece. Leaves a burr and pit free surface finish on semi-roughing & finishing process.



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



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.

Unit (mm)

Model Number	Radius of Ball Nose R	Effective Length ℓ_1	Effective Length by Inclined Angles				
			30°	1°	1°30'	2°	3°
UDCLB 2002-0030	R0.1	0.3	0.30	0.31	0.32	0.32	0.34
UDCLB 2002-0050		0.5	0.51	0.52	0.54	0.55	0.59
UDCLB 2002-0075		0.75	0.77	0.79	0.81	0.84	0.89
UDCLB 2002-0100		1	1.02	1.05	1.09	1.12	1.20
UDCLB 2004-0050	R0.2	0.5	0.54	0.55	0.56	0.58	0.61
UDCLB 2004-0100		1	1.06	1.08	1.12	1.15	1.22
UDCLB 2004-0150		1.5	1.57	1.62	1.67	1.72	1.83
UDCLB 2004-0200		2	2.09	2.15	2.22	2.29	2.44
UDCLB 2006-0100	R0.3	1	1.05	1.08	1.11	1.13	1.20
UDCLB 2006-0150		1.5	1.57	1.61	1.66	1.70	1.81
UDCLB 2006-0200		2	2.08	2.14	2.21	2.27	2.42
UDCLB 2006-0300		3	3.12	3.21	3.31	3.41	3.65
UDCLB 2008-0200	R0.4	2	2.08	2.14	2.20	2.26	2.40
UDCLB 2008-0300		3	3.11	3.20	3.30	3.40	3.62
UDCLB 2008-0400		4	4.14	4.27	4.40	4.54	4.85
UDCLB 2010-0200		R0.5	2	2.08	2.13	2.19	2.25
UDCLB 2010-0250	2.5		2.59	2.66	2.74	2.81	2.99
UDCLB 2010-0300	3		3.11	3.20	3.29	3.38	3.60
UDCLB 2010-0400	4		4.14	4.26	4.39	4.52	4.83
UDCLB 2010-0500	R1	5	5.17	5.32	5.49	5.66	6.05
UDCLB 2020-0300		3	3.20	3.27	3.35	3.43	3.62
UDCLB 2020-0400		4	4.23	4.34	4.45	4.57	4.84
UDCLB 2020-0600		6	6.30	6.47	6.65	6.85	7.29
UDCLB 2020-0800	R1.5	8	8.36	8.60	8.85	9.13	9.74
UDCLB 2020-1000		10	10.42	10.73	11.06	11.41	12.19
UDCLB 2030-0600		6	6.28	6.44	6.60	6.78	7.18
UDCLB 2030-0800		8	8.34	8.57	8.80	9.06	9.63
UDCLB 2030-1000	R2	10	10.41	10.70	11.01	11.34	12.08
UDCLB 2030-1200		12	12.47	12.83	13.21	13.61	14.52
UDCLB 2030-1400		14	14.53	14.96	15.41	15.89	16.97
UDCLB 2040-0800		8	8.33	8.53	8.76	8.99	9.52
UDCLB 2040-1000	R2.5	10	10.39	10.66	10.96	11.27	11.97
UDCLB 2040-1500		15	15.55	15.99	16.46	16.96	18.09
UDCLB 2050-1000		10	10.55	10.82	11.10	11.40	12.07
UDCLB 2050-1500		15	15.71	16.14	16.60	17.09	No Interference
UDCLB 2060-1000	R3	10	No Interference	No Interference	No Interference	No Interference	No Interference
UDCLB 2060-1500		15	No Interference	No Interference	No Interference	No Interference	No Interference

Square

Square

Long Neck Square

Square

Radius

Radius

Long Neck Radius

Radius

Radius

Long Neck Radius

Radius

Ball / Long Shank Ball

Ball

Long Neck Ball

Ball

Taper Neck Ball

Ball

Taper

Taper

Spiral V Cutter

Cutter

Drill Thread Mill

Drill

EURO Series

EURO Series

Technical Data

Technical Data

Milling Conditions for UDCLB

Work Material		Cemented Carbide						Hard Brittle (Non-Metallic) Materials				
Model Number	Radius of Ball Nose (mm)	Effective Length (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Feed Rate2 (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Feed Rate2 (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
2002	R0.1	0.3	30,000	100	10	0.01	0.01	30,000	100	10	0.01	0.01
		0.5	30,000	30	10	0.005	0.008	30,000	30	10	0.005	0.008
		0.75	30,000	30	10	0.005	0.006	30,000	30	10	0.005	0.006
2004	R0.2	1	30,000	25	10	0.005	0.005	30,000	25	10	0.005	0.005
		0.5	30,000	150	15	0.02	0.08	30,000	150	15	0.02	0.08
		1	30,000	100	10	0.015	0.07	30,000	100	10	0.015	0.07
2006	R0.3	1.5	30,000	60	10	0.01	0.06	30,000	60	10	0.01	0.06
		2	30,000	30	10	0.008	0.05	30,000	30	10	0.008	0.05
		1	30,000	200	20	0.03	0.14	30,000	200	20	0.03	0.14
2008	R0.4	1.5	30,000	200	20	0.03	0.14	30,000	200	20	0.03	0.14
		2	30,000	150	15	0.022	0.11	30,000	150	15	0.022	0.11
		3	30,000	75	10	0.01	0.08	30,000	75	10	0.01	0.08
2010	R0.5	2	30,000	250	25	0.04	0.19	30,000	250	25	0.04	0.19
		3	30,000	230	23	0.037	0.17	30,000	230	23	0.037	0.17
		4	30,000	210	21	0.035	0.16	30,000	210	21	0.035	0.16
2020	R1	2	30,000	300	30	0.05	0.25	30,000	300	30	0.05	0.25
		2.5	30,000	300	30	0.05	0.25	30,000	300	30	0.05	0.25
		3	30,000	300	30	0.05	0.25	30,000	300	30	0.05	0.25
2030	R1.5	4	30,000	300	30	0.05	0.25	30,000	300	30	0.05	0.25
		5	30,000	300	30	0.05	0.25	30,000	300	30	0.05	0.25
		3	30,000	300	100	0.1	0.3	24,000	240	100	0.1	0.3
2040	R2	4	30,000	300	100	0.1	0.3	24,000	240	100	0.1	0.3
		6	30,000	300	100	0.1	0.3	24,000	240	100	0.1	0.3
		8	30,000	300	100	0.1	0.3	24,000	240	100	0.1	0.3
2050	R2.5	10	30,000	300	100	0.1	0.3	24,000	240	100	0.1	0.3
		6	27,500	275	140	0.125	0.33	24,000	240	120	0.125	0.33
		8	27,500	275	140	0.125	0.33	24,000	240	120	0.125	0.33
2060	R3	10	27,500	275	140	0.125	0.33	24,000	240	120	0.125	0.33
		12	27,500	220	110	0.125	0.33	24,000	200	100	0.125	0.33
		14	27,500	220	110	0.125	0.33	24,000	200	100	0.125	0.33
2060	R3	8	24,000	240	120	0.15	0.35	24,000	240	120	0.15	0.35
		10	24,000	240	120	0.15	0.35	24,000	240	120	0.15	0.35
		15	24,000	240	120	0.15	0.35	24,000	240	120	0.15	0.35
2060	R3	10	22,000	220	110	0.175	0.37	22,000	220	110	0.175	0.37
		15	22,000	220	110	0.175	0.37	22,000	220	110	0.175	0.37
		10	20,000	200	100	0.2	0.4	20,000	200	100	0.2	0.4
2060	R3	15	20,000	200	100	0.2	0.4	20,000	200	100	0.2	0.4

* These milling parameters are based on VF-20, VM-40 (CIS standard) for Cemented Carbide, and Alumina for Hard Brittle Materials.

These are for reference only.

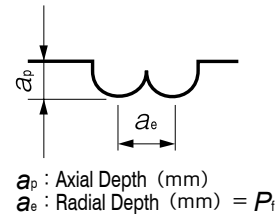
Tool life may differ depending on the type of Cemented Carbide / Hard Brittle Materials.

For best results, 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: Approach feed rate and contact time on the surface

Note:

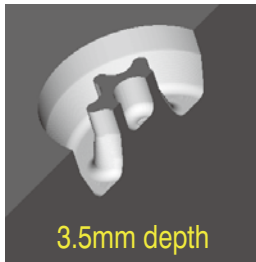
- This application requires a high cutting force. A machine with poor rigidity and high vibration is not recommended.
- Allow sufficient machine and spindle warm-up time for stability and to remove any expansion of the main spindle before running the program.
- Tool setting length should achieve the 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: <1 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.



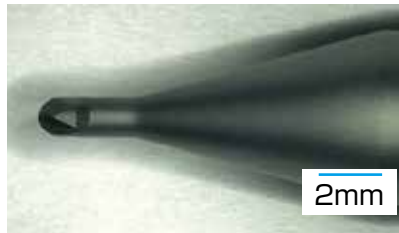
Milling Example: Cemented Carbide Hexalobular Milling #1



Size: $\phi 9 \times 3.5\text{mm}$ depth



Tool	UDCLB 2010-0200 (R0.5 x 2mm)
Work Material	Super Micro Grain Cemented Carbide VF-20 (92.5HRA)
Spindle Speed	30,000min ⁻¹
Feed Rate	300mm/min
Axial Depth a_p	0.05mm
Radial Depth a_e	0.30mm (Surface 0.05mm)
Coolant	Air Blow
Cycle Time	64.5min
Material Removal Amount	164.6mm ³ 2.57mm ³ /min



UDCLB Series
VF-20
Hexalobular
Milling Video



Milling Example: Cemented Carbide Hexalobular Milling #2



Size:
 $\phi 9 \times 6\text{mm}$ depth



Tool	UDCLB 2010-0200 (R0.5 x 2mm) UDCLB 2010-0500 (R0.5 x 5mm)
Work Material	Super Micro Grain Cemented Carbide VF-20 (92.5HRA)
Spindle Speed	30,000min ⁻¹
Feed Rate	300mm/min
Milling Amount	① 0.5 x 2 Roughing (3.5mm depth) $a_p=0.05\text{mm}$ $a_e=0.3\text{mm}$ ② 0.5 x 5 Roughing (6mm depth) $a_p=0.05\text{mm}$ $a_e=0.25\text{mm}$ ③ 0.5 x 5 Finishing $a_p=0.03\text{mm}$ $a_e=0.005\text{mm}$
Coolant	Air Blow
Cycle Time	156min
Material Removal Amount	296.5mm ³ 274.4mm ³



Tool #1 milled 3.5mm depth.



Tool #2 milled 131.9mm³ in 76.5 minutes.

Square

Long Neck
Square

Radius

Long Neck
RadiusBall / Long
Shank BallLong Neck
BallTaper Neck
Ball

Taper

Spiral
V CutterDrill
Thread Mill

EURO Series

Technical Data