

4 Flutes CBN Long Neck Radius End Mills



Size $\phi 0.1 \sim \phi 2$

CBN-LRF4000

NEW



Material Applications (★ Highly Recommended ● Recommended ○ Suggested)

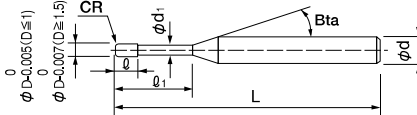
Work Material																	
Carbon Steels S45C S55C	Alloy Steels SK / SCM SUS	Prehardened Steels NAK HPM	Hardened Steels					Cast Iron	Aluminum Alloys	Graphite	Copper	Plastics	Glass Filled Plastics	Titanium Alloys	Heat Resistant Alloys	Cemented Carbide	Hard Brittle (Non-Metallic) Materials
			~50HRC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

Label Sample

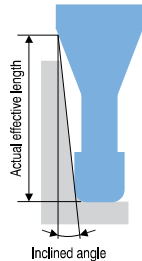


#001 $\phi D1.999 R+0.001/0.000$

Diameter and Corner 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.



Features

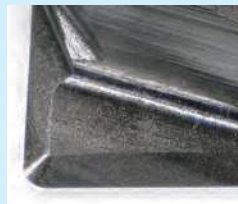
4-flute shape withstands high efficiency milling.
Milling time can be significantly reduced compared to 2-flute.



CBN-LRF2000/4000 Common features

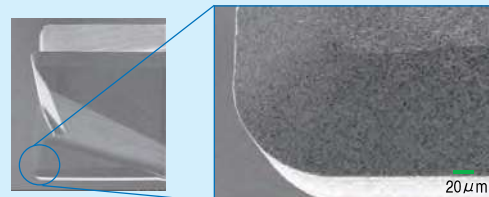
Feature 1 High rigidity cutting edge

Super negative rake angle from the cutting edge at the tip point to peripheral cutting edge.
Less damage when milling hard materials.



Feature 2 Sharp cutting edge

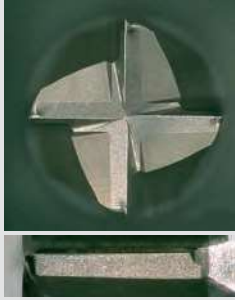
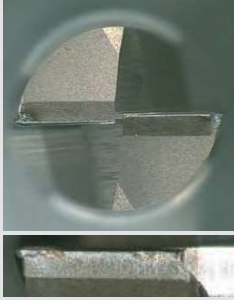
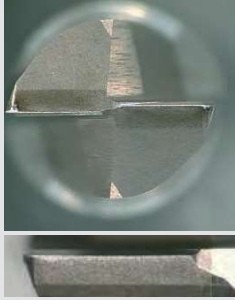
The cutting edge is outstandingly sharp even with the super negative rake angle.



Pocket milling
2 Flutes / 4 Flutes CBN-LRF $\phi 2 \times CR0.1 \times EL6$

STAVAX (52HRC)

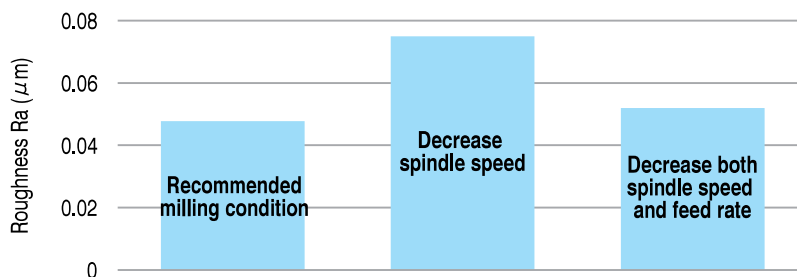
Tool	Flutes	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p (mm)	a _e (mm)	Feed per tooth (mm/t)	Cycle Time
CBN-LRF $\phi 2 \times CR0.1 \times EL6$	4	28,000	3,300	0.05	0.7	0.029	45 min / 1 pocket
CBN-LRF $\phi 2 \times CR0.1 \times EL6$	2	28,000	3,300	0.05	0.7	0.059	45 min / 1 pocket
CBN-LRF $\phi 2 \times CR0.1 \times EL6$	2	28,000	1,650	0.05	0.7	0.029	85 min / 1 pocket

Tool	4 Flutes	2 Flutes	2 Flutes
Feed rate (mm/min)	3,300	3,300	1,650
Cycle time	135 min	135 min	255 min
Tool photo			
Milling results	Mill under higher efficiency conditions than 2-flute. Greatly shortens milling time.	Large damage under the same milling conditions as 4-flute.	When the feed per tooth is the same, the damage is small, but the milling time is about twice as long.

Pocket Size: 50 × 40 × 2 mm Coolant: Oil mist

Surface roughness by different milling conditions
4 Flutes CBN-LRF $\phi 0.3 \times CR0.05 \times EL0.5$

STAVAX (52HRC)



Spindle speed (min ⁻¹)	60,000	30,000	30,000
Feed rate (mm/min)	950	950	475
Cycle Time	26 min / Pocket	26 min / Pocket	50 min / Pocket



Pocket Size
 10 × 4 × 0.2 mm
 Coolant: Oil mist
 a_p : 0.005 mm
 a_e : 0.08 mm

Achieves high-speed milling that exceeds conventional CBN end mills even for small diameters.
 $\phi 0.3$ can be used in a machining center equipped with a 30,000 min⁻¹ spindle. It is recommended to decrease both spindle speed and feed rate proportionally.

4 Flutes

$\phi 3$ mm Shank
 V Series

UDC-PCD
 Series

CBN
 Series

Square
 Long Neck
 Square

Radius

Radius
 Long Neck
 Radius

Radius
 Taper Neck
 Radius

Ball / Long
 Shank Ball

Ball
 Long Neck
 Ball

Ball
 Taper Neck
 Ball

Taper

Barrel

Spiral
 V Cutter

Drill

Technical Data

Technical Data

147

4 Flutes CBN Long Neck Radius End Mills

Total 62 models

*Shank taper angle Bta is only for reference.

Unit (mm)

Model Number	Outside Diameter ϕD	Corner Radius CR	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°
CBN-LRF 4001-002002	0.1	RO.02	0.2	0.04	0.09	15°	50	4	49,200	0.22	0.23	0.25	0.26	0.28
CBN-LRF 4001-002003			0.3							0.33	0.34	0.36	0.37	0.40
CBN-LRF 4001-002005			0.5							0.54	0.56	0.58	0.60	0.65
CBN-LRF 40015-002X2	0.15	RO.02	0.2	0.06	0.14	15°	50	4	49,200	0.22	0.23	0.25	0.26	0.28
CBN-LRF 40015-002X3			0.3							0.33	0.34	0.36	0.37	0.40
CBN-LRF 40015-002X5			0.5							0.54	0.56	0.58	0.60	0.65
CBN-LRF 4002-002005	0.2	RO.02	0.5	0.08	0.19	15°	50	4	40,000	0.54	0.56	0.58	0.60	0.65
CBN-LRF 4002-002X75			0.75							0.80	0.82	0.86	0.89	0.96
CBN-LRF 4002-002010			1							1.05	1.09	1.13	1.18	1.27
CBN-LRF 4002-005005		RO.05	0.5							0.53	0.55	0.57	0.60	0.65
CBN-LRF 4002-005X75			0.75							0.79	0.82	0.85	0.88	0.96
CBN-LRF 4002-005010			1							1.05	1.09	1.13	1.17	1.27
CBN-LRF 4003-002X75	0.3	RO.02	0.75	0.13	0.28	15°	50	4	40,520	0.83	0.86	0.89	0.92	1.00
CBN-LRF 4003-002010			1							1.08	1.12	1.17	1.21	1.31
CBN-LRF 4003-005005		RO.05	0.5							0.57	0.59	0.61	0.63	0.68
CBN-LRF 4004-002015	0.4	RO.02	1.5	0.24	0.38	15°	50	4	38,880	1.54	1.59	1.65	1.71	1.86
CBN-LRF 4004-003005		RO.03	0.5							0.51	0.53	0.55	0.57	0.62
CBN-LRF 4004-005005		RO.05	0.5							0.51	0.53	0.55	0.57	0.62
CBN-LRF 4004-005015			1.5							1.54	1.59	1.65	1.71	1.85
CBN-LRF 4004-010005		RO.1	0.5							0.51	0.53	0.54	0.56	0.61
CBN-LRF 4004-010010			1							1.03	1.06	1.10	1.14	1.23
CBN-LRF 4005-002010	0.5	RO.02	1	0.3	0.48	15°	50	4	31,750	1.03	1.07	1.11	1.15	1.25
CBN-LRF 4005-005005			0.5							0.51	0.53	0.55	0.57	0.62
CBN-LRF 4005-005010			RO.05							1	1.03	1.07	1.10	1.15
CBN-LRF 4005-005015		1.5								1.54	1.59	1.65	1.71	1.85
CBN-LRF 4005-010005		RO.1								0.5	0.51	0.53	0.54	0.56
CBN-LRF 4005-010015			1.5							1.53	1.59	1.64	1.70	1.84
CBN-LRF 4005-015005			RO.15							0.5	0.51	0.52	0.54	0.56
CBN-LRF 4005-015015		1.5								1.53	1.58	1.64	1.69	1.83
CBN-LRF 4006-005005		RO.05								0.5	0.51	0.53	0.55	0.57
CBN-LRF 4006-010005	0.6	RO.1	0.5	0.3	0.58	15°	50	4	28,200	0.51	0.53	0.54	0.56	0.61
CBN-LRF 4006-010010			1							1.03	1.06	1.10	1.14	1.23

Next Page ➔

- $\phi 3$ mm 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

Unit (mm)

Model Number	Outside Diameter ϕD	Corner Radius CR	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°				
CBN-LRF 4008-005010	0.8	RO.05	1	0.56	0.78	15°	50	4	28,680	1.03	1.07	1.10	1.15	1.24				
CBN-LRF 4008-010010			1				50	4	28,680	1.03	1.06	1.10	1.14	1.23				
CBN-LRF 4008-010020		RO.1	2				50	4	28,680	2.05	2.12	2.20	2.28	2.46				
CBN-LRF 4008-010050			5				50	4	32,520	5.15	5.33	5.52	5.73	6.19				
CBN-LRF 4008-020010		RO.2	1				50	4	28,680	1.02	1.05	1.09	1.12	1.20				
CBN-LRF 4010-002010	1	RO.02	1	0.7	0.98	15°	50	4	29,300	1.03	1.07	1.11	1.15	1.25				
CBN-LRF 4010-002030			3				50	4	29,300	3.10	3.21	3.33	3.45	3.73				
CBN-LRF 4010-005010		RO.05	1				50	4	26,420	1.03	1.07	1.11	1.15	1.24				
CBN-LRF 4010-005020			2				50	4	26,420	2.06	2.14	2.21	2.30	2.48				
CBN-LRF 4010-010010			1				50	4	26,420	1.03	1.06	1.10	1.14	1.23				
CBN-LRF 4010-010020		RO.1	2				50	4	26,420	2.06	2.13	2.21	2.29	2.47				
CBN-LRF 4010-010030			3				50	4	26,420	3.10	3.20	3.32	3.44	3.72				
CBN-LRF 4010-020020		RO.2	2				50	4	26,420	2.06	2.13	2.20	2.28	2.45				
CBN-LRF 4015-002030		1.5	RO.02				3	1	1.46	15°	50	4	34,520	3.13	3.24	3.36	3.49	3.78
CBN-LRF 4015-010030			RO.1				3				50	4	31,080	3.13	3.24	3.35	3.48	3.76
CBN-LRF 4015-030030	RO.3		3	50	4	31,080	3.12				3.23	3.33	3.45	3.71				
CBN-LRF 4015-050030	RO.5		3	50	4	31,080	3.12				3.21	3.31	3.42	3.66				
CBN-LRF 4020-002040	2	RO.02	4	1.2	1.97	15°	50	4	35,630	4.15	4.29	4.45	4.62	5.00				
CBN-LRF 4020-002060			6				50	4	35,630	6.22	6.43	6.67	6.92	7.48				
CBN-LRF 4020-002100			10				50	4	38,650	10.35	10.71	11.10	11.52	12.46				
CBN-LRF 4020-005060			RO.05				6	50	4	31,970	6.21	6.43	6.66	6.91	7.48			
CBN-LRF 4020-005100							10	50	4	34,800	10.35	10.71	11.10	11.51	12.45			
CBN-LRF 4020-010040			RO.1				4	50	4	31,970	4.15	4.29	4.44	4.61	4.98			
CBN-LRF 4020-010060		6					50	4	31,970	6.21	6.43	6.66	6.91	7.46				
CBN-LRF 4020-010100		10					50	4	34,800	10.35	10.71	11.09	11.51	12.44				
CBN-LRF 4020-020040		RO.2					4	50	4	31,970	4.14	4.28	4.43	4.59	4.95			
CBN-LRF 4020-020060			6				50	4	31,970	6.21	6.42	6.65	6.89	7.44				
CBN-LRF 4020-020100			10				50	4	34,800	10.34	10.70	11.08	11.49	12.41				
CBN-LRF 4020-050060			RO.5				6	50	4	31,970	6.20	6.40	6.62	6.85	7.37			
CBN-LRF 4020-050100							10	50	4	34,800	10.33	10.68	11.05	11.45	12.34			

4 Flutes

Ø3mm Shank
V SeriesUDC-PCD
SeriesCBN
Series

Square

Long Neck
Square

Radius

Long Neck
RadiusTaper Neck
RadiusBall / Long
Shank BallLong Neck
BallTaper Neck
Ball

Taper

Barrel

Spiral
V Cutter

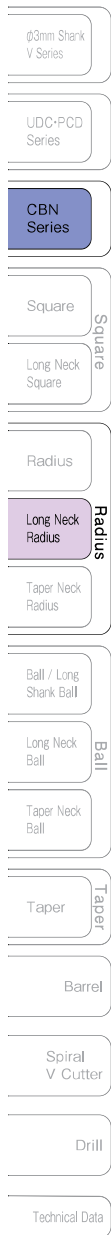
Drill

Technical Data

4 Flutes CBN Long Neck Radius End Mills

Milling Conditions for CBN-LRF (4 Flutes)

WORK MATERIAL				HEAT-TREATED STEELS / HARDENED STEELS STAVAX (~52HRC)				HARDENED STEELS SKD11 (~62HRC)				HARDENED STEELS HAP10 / HAP72 (~70HRC)			
Model Number	Outside Diameter (mm)	Corner Radius (mm)	Effective Length (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p Axial Depth (mm)	a _e Radial Depth (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p Axial Depth (mm)	a _e Radial Depth (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p Axial Depth (mm)	a _e Radial Depth (mm)
4001-002002	0.1	R0.02	0.2	60,000	360	0.002	0.02	55,000	280	0.002	0.015	50,000	200	0.002	0.01
4001-002003			0.3	60,000	360	0.002	0.02	55,000	280	0.002	0.015	50,000	200	0.002	0.01
4001-002005			0.5	60,000	360	0.002	0.02	55,000	280	0.002	0.015	50,000	200	0.002	0.01
40015-002X2	0.15	R0.02	0.2	60,000	480	0.003	0.03	55,000	340	0.003	0.025	50,000	250	0.002	0.015
40015-002X3			0.3	60,000	480	0.003	0.03	55,000	340	0.003	0.025	50,000	250	0.002	0.015
40015-002X5			0.5	60,000	480	0.003	0.03	55,000	340	0.003	0.025	50,000	250	0.002	0.015
4002-002005	0.2	R0.02	0.5	60,000	560	0.003	0.04	55,000	430	0.003	0.03	50,000	300	0.003	0.02
4002-002X75			0.75	60,000	560	0.003	0.04	55,000	430	0.003	0.03	50,000	300	0.003	0.02
4002-002010			1	60,000	560	0.003	0.04	55,000	430	0.003	0.03	50,000	300	0.003	0.02
4002-005005		R0.05	0.5	60,000	700	0.003	0.04	55,000	550	0.003	0.03	50,000	410	0.003	0.02
4002-005X75			0.75	60,000	700	0.003	0.04	55,000	550	0.003	0.03	50,000	410	0.003	0.02
4002-005010			1	60,000	700	0.003	0.04	55,000	550	0.003	0.03	50,000	410	0.003	0.02
4003-002X75	0.3	R0.02	0.75	60,000	750	0.003	0.08	55,000	580	0.003	0.06	50,000	400	0.003	0.03
4003-002010			1	60,000	750	0.003	0.08	55,000	580	0.003	0.06	50,000	400	0.003	0.03
4003-005005		R0.05	0.5	60,000	950	0.005	0.08	55,000	750	0.005	0.06	50,000	550	0.004	0.03
4004-002015	0.4	R0.02	1.5	55,000	850	0.005	0.1	53,000	700	0.005	0.08	50,000	550	0.004	0.05
4004-003005		R0.03	0.5	55,000	1,000	0.006	0.1	53,000	800	0.006	0.08	50,000	600	0.004	0.05
4004-005005		R0.05	0.5	55,000	1,200	0.01	0.1	53,000	1,000	0.01	0.08	50,000	730	0.007	0.05
4004-005015			1.5	55,000	1,200	0.01	0.1	53,000	1,000	0.01	0.08	50,000	730	0.007	0.05
4004-010005		R0.1	0.5	55,000	1,500	0.01	0.1	53,000	1,300	0.01	0.08	50,000	1,000	0.008	0.05
4004-010010			1	55,000	1,500	0.01	0.1	53,000	1,300	0.01	0.08	50,000	1,000	0.008	0.05
4005-002010	0.5	R0.02	1	50,000	950	0.005	0.15	50,000	900	0.005	0.12	50,000	700	0.005	0.08
4005-005005		R0.05	0.5	50,000	1,500	0.01	0.15	50,000	1,300	0.01	0.12	50,000	1,000	0.01	0.08
4005-005010			1	50,000	1,500	0.01	0.15	50,000	1,300	0.01	0.12	50,000	1,000	0.01	0.08
4005-005015			1.5	50,000	1,500	0.01	0.15	50,000	1,300	0.01	0.12	50,000	1,000	0.01	0.08
4005-010005		R0.1	0.5	50,000	1,900	0.02	0.15	50,000	1,700	0.02	0.12	50,000	1,400	0.01	0.08
4005-010015			1.5	50,000	1,900	0.02	0.15	50,000	1,700	0.02	0.12	50,000	1,400	0.01	0.08
4005-015005		R0.15	0.5	50,000	2,200	0.03	0.15	50,000	2,000	0.03	0.12	50,000	1,800	0.01	0.08
4005-015015			1.5	50,000	2,200	0.03	0.15	50,000	2,000	0.03	0.12	50,000	1,800	0.01	0.08
4006-005005		0.6	R0.05	0.5	50,000	1,700	0.01	0.2	50,000	1,500	0.01	0.15	50,000	1,200	0.01
4006-010005	R0.1		0.5	50,000	2,300	0.02	0.2	50,000	2,000	0.02	0.15	50,000	1,700	0.012	0.1
4006-010010			1	50,000	2,300	0.02	0.2	50,000	2,000	0.02	0.15	50,000	1,700	0.012	0.1

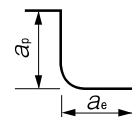


Milling Conditions for CBN-LRF (4 Flutes)

WORK MATERIAL				HEAT-TREATED STEELS / HARDENED STEELS STAVAX (~52HRC)				HARDENED STEELS SKD11 (~62HRC)				HARDENED STEELS HAP10 / HAP72 (~70HRC)				
Model Number	Outside Diameter (mm)	Corner Radius (mm)	Effective Length (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	
4008-005010	0.8	R0.05	1	45,000	1,800	0.01	0.28	44,000	1,600	0.01	0.21	42,000	1,300	0.01	0.13	
4008-010010		R0.1	1	45,000	2,400	0.02	0.28	44,000	2,000	0.02	0.21	42,000	1,600	0.015	0.13	
4008-010020			2	45,000	2,400	0.02	0.28	44,000	2,000	0.02	0.21	42,000	1,600	0.015	0.13	
4008-010050			5	45,000	1,700	0.02	0.14	44,000	1,400	0.02	0.11	42,000	1,100	0.015	0.07	
4008-020010		R0.2	1	45,000	2,400	0.04	0.28	44,000	2,100	0.04	0.21	42,000	1,800	0.015	0.13	
4010-002010	1	R0.02	1	40,000	1,300	0.006	0.35	37,000	1,100	0.006	0.3	34,000	900	0.005	0.2	
4010-002030			3	40,000	1,300	0.006	0.35	37,000	1,100	0.006	0.3	34,000	900	0.005	0.2	
4010-005010		R0.05	1	40,000	1,900	0.015	0.35	37,000	1,600	0.015	0.3	34,000	1,200	0.01	0.2	
4010-005020			2	40,000	1,900	0.015	0.35	37,000	1,600	0.015	0.3	34,000	1,200	0.01	0.2	
4010-010010		R0.1	1	40,000	2,600	0.03	0.35	37,000	2,000	0.03	0.3	34,000	1,400	0.015	0.2	
4010-010020			2	40,000	2,600	0.03	0.35	37,000	2,000	0.03	0.3	34,000	1,400	0.015	0.2	
4010-010030			3	40,000	2,600	0.03	0.35	37,000	2,000	0.03	0.3	34,000	1,400	0.015	0.2	
4010-020020		R0.2	2	40,000	2,600	0.05	0.35	37,000	2,200	0.05	0.3	34,000	1,800	0.015	0.2	
4015-002030		1.5	R0.02	3	30,000	1,500	0.01	0.55	27,000	1,300	0.01	0.5	23,000	1,100	0.005	0.3
4015-010030			R0.1	3	30,000	3,000	0.05	0.55	27,000	2,200	0.05	0.5	23,000	1,400	0.02	0.3
4015-030030	R0.3		3	30,000	3,000	0.07	0.55	27,000	2,400	0.07	0.5	23,000	1,700	0.02	0.3	
4015-050030	R0.5		3	30,000	3,000	0.1	0.45	27,000	2,500	0.1	0.4	23,000	2,000	0.02	0.3	
4020-002040	2	R0.02	4	28,000	1,700	0.01	0.7	23,000	1,500	0.01	0.6	18,000	1,200	0.005	0.4	
4020-002060			6	28,000	1,700	0.01	0.7	23,000	1,500	0.01	0.6	18,000	1,200	0.005	0.4	
4020-002100			10	28,000	1,700	0.01	0.7	23,000	1,500	0.01	0.6	18,000	1,200	0.005	0.4	
4020-005060		R0.05	6	28,000	2,500	0.025	0.7	23,000	1,900	0.025	0.6	18,000	1,300	0.015	0.4	
4020-005100			10	28,000	2,500	0.025	0.7	23,000	1,900	0.025	0.6	18,000	1,300	0.015	0.4	
4020-010040		R0.1	4	28,000	3,300	0.05	0.7	23,000	2,400	0.05	0.6	18,000	1,500	0.03	0.4	
4020-010060			6	28,000	3,300	0.05	0.7	23,000	2,400	0.05	0.6	18,000	1,500	0.03	0.4	
4020-010100			10	28,000	3,300	0.05	0.7	23,000	2,400	0.05	0.6	18,000	1,500	0.03	0.4	
4020-020040		R0.2	4	28,000	3,300	0.07	0.7	23,000	2,500	0.07	0.6	18,000	1,600	0.03	0.4	
4020-020060			6	28,000	3,300	0.07	0.7	23,000	2,500	0.07	0.6	18,000	1,600	0.03	0.4	
4020-020100	10		28,000	3,300	0.07	0.7	23,000	2,500	0.07	0.6	18,000	1,600	0.03	0.4		
4020-050060	R0.5	6	28,000	3,300	0.1	0.7	23,000	2,600	0.1	0.6	18,000	1,800	0.03	0.4		
4020-050100		10	28,000	3,300	0.1	0.7	23,000	2,600	0.1	0.6	18,000	1,800	0.03	0.4		

Note:

- Decrease both spindle speed and feed rate proportionally when the milling parameters exceed the machine's maximum spindle speed.
- Recommend oil mist to avoid tool damage.



4 Flutes

- Ø3mm Shank V Series
- UDC-PCD Series
- CBN Series**
- Square
 - Square
 - Long Neck Square
- Radius
 - Long Neck Radius
 - Taper Neck Radius
- Ball
 - Ball / Long Shank Ball
 - Long Neck Ball
 - Taper Neck Ball
- Taper
 - Taper
- Barrel
- Spiral V Cutter
- Drill
- Technical Data