

NS TOOL

CORE LINE

For Crafting Tomorrow

CBN

CBN END MILL SERIES Vol.4

CORNER RADIUS END MILL



Various lineup optimize a long time machining on hardened steel

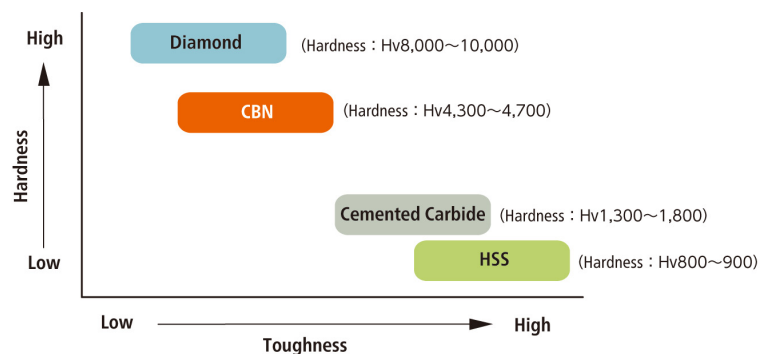
CBN corner radius end mill

Type	Model	Maximum cutting depth					Size Number of flute/Helix angle/Tolerance	Applications
		2D	3D	4D	5D	6D		
Multi purpose	SSR200						$\phi 0.1 \times R0.02 \sim \phi 2 \times R0.5$ Total 172 sizes 2, 0°, Corner R (±0.002 (R≤0.05), ±0.005 (R>0.05)), ϕd h4, Slot, Face	
		All-round type with minimum corner R of 0.02mm and a wide variety of sizes to support micro precision machining						
High efficiency	SHR320						$\phi 0.5 \times R0.1 \sim \phi 2 \times R0.3$ Total 14 sizes 3, 20°, Corner R (±0.005), ϕd h4, Slot, Face	
		The spiral corner R achieves both cutting edge rigidity and cutting ability for high efficiency machining						
High precision	SHPR400						$\phi 0.1 \times R0.01 \sim \phi 3 \times R0.2$ Total 142 sizes 4, 0°, Corner R (±0.002, -0.001 to -0.003), ϕd h4, Slot, Face	
		4-flute type from the smallest diameter of $\phi 0.1$ High precision type pursues machining accuracy with Corner R tolerance of ± 0.002 mm						
For flat surface	SSF120						$\phi 0.2 \times R0.05 \sim \phi 2 \times R0.1$ Total 9 sizes 1, -20°, Corner R (±0.005), ϕd h4, Face	
		Specialized for plane surface machining Single-flute that is not affected by chattering of the end cutting edge achieves incredible surface roughness						

Features

Long tool life

CBN (Cubic Boron Nitride) sintered alloy



CBN(Cubic Boron Nitride) sintered alloy is 3 times harder than Tungsten carbide, second hardest material next to diamond, Moreover strong heat-resistant and high thermal conductivity. However less tough characteristic of CBN often causes chipping of tool edge easily. Accordingly, CBN is recommended for finishing of hard materials with less cutting load on the tool edge, which guarantees extra long tool life.

Tool life comparison with solid carbide end mill

■ Comparison of small diameter CBN end mill and coated solid carbide end mill for hardened steel machining

Tool : CBN corner radius end mill $\phi 0.1 \times R0.02 \times 0.5$
 Coated carbide square end mill $\phi 0.1 \times 0.5$

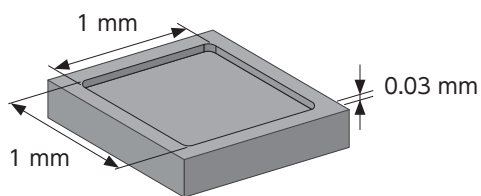
Work material : DC53 (59HRC)
 as the same as SKD11

Spindle speed n : 50,000 min⁻¹

Feed vf : 100 mm/min

Depth of cut : ap 0.001 x ae 0.01 mm

Coolant : Oil mist



Machined size: 1 x 1 x depth 0.03 mm
 In-corner R size : R0.05 mm

Even the small diameter of $\phi 0.1$ mm, cBN tool is able to continue to use on hardened steel even after 5hrs machining

	SSR200 CBN end mill	Coated carbide end mill
Before		
After 1hr		
Bottom edge retreat amount (mm)	0.0015	0.0080
After 3hrs		Tool broken at 1hr 15min during machining
Bottom edge retreat amount (mm)	0.0020	Bottom edge retreat amount
After 5hrs		
Bottom edge retreat amount (mm)	0.0025	

■ Comparison of surface roughness between CBN end mills and coated carbide end mills

Tool : Corner radius end mill $\phi 0.5 \times R0.05 \times 1$

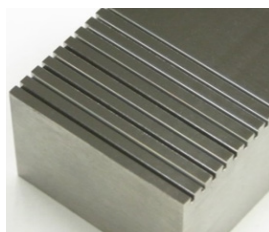
Work material : ELMAX (58HRC)

Spindle speed n : 30,000 min⁻¹

Feed vf : 300 mm/min

Depth of cut : ap 0.005 mm

Coolant : Oil mist



Machined size
 width 0.5 x length 20 x depth 1mm

	SSR200 CBN end mill	Coated carbide end mill
After 1 grooving Cutting length approx. 4m		
After 3 grooving Cutting length approx. 12m		
After 6 grooving Cutting length approx. 24m		End of machining due to tool life

Even in grooving with high cutting load, CBN tools can be used for a long time

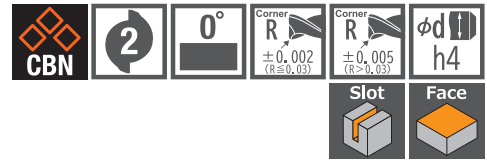
All-round type with a wide variety size lineup

CBN Super Speed Radius End Mill

SSR200

ϕ 0.1 × R0.02 ~ ϕ 2 × R0.5

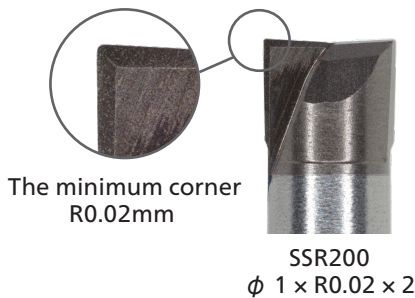
Total 172 sizes



Features

Fine precision

All-round type from a minimum corner R of 0.02 mm



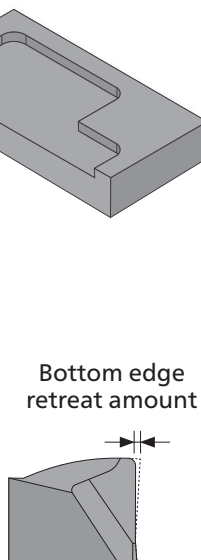
Chamfering design connects smoothly from end cutting edge to peripheral cutting edge

■ Corner condition of corner R0.02 mm after machining

Tool : SSR200 ϕ 0.1 × R0.02 × 0.5
 Work material : STAVAX (52HRC)
 Work size : 10×5mm
 Machining depth : (0.5mm)
 Coolant : Oil mist
 Total machining time : 4 hr

Spindle speed : 50,000 min⁻¹
 Feed : 150 mm/min
 Depth of cut : ap 0.002 × ae 0.015 mm

Corner condition after machining	
Actual corner R R0.023 mm	Scale <input type="checkbox"/> 0.02 mm



	Rake	End cutting edge
Before		
After		
Bottom edge retreat amount (mm)	0.0015	

Machining case

Gear YXR7(63HRC)

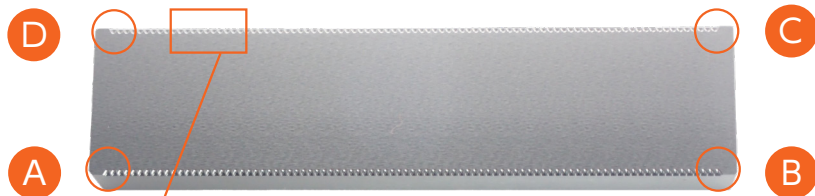
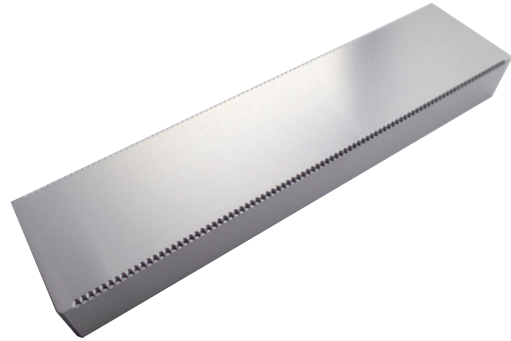
For hardened steel machining that requires long tool life
 CBN end mill can maintain high accuracy even over 12 hours finishing

Work material : YXR7 (63HRC)

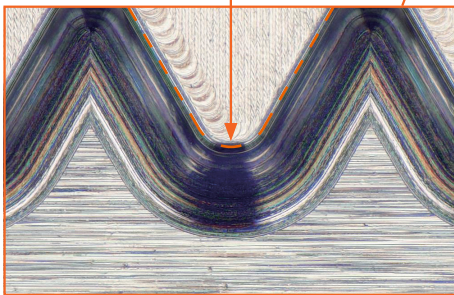
Work size : 85 × 20 mm
 (Machining depth 0.65 mm)

Coolant : Oil mist

Total machining time : 43hr 58min



Measuring position R



Accuracy

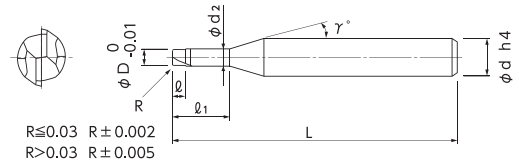
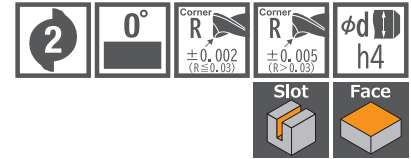
			Unit [mm]
Measuring position	Target	Actual	Error
A	0.075	0.077	+ 0.002
B		0.073	- 0.002
C		0.079	+ 0.004
D		0.077	+ 0.002

Process	Roughing	Stock removal ①	Stock removal ②	Stock removal ③	Finishing
Tool	SSPB220 R0.3 × 1.2	SSPB220 R0.2 × 0.5	SSR200 φ 0.2 × R0.03 × 0.3	SSR200 φ 0.2 × R0.03 × 0.3	SSR200 φ 0.15 × R0.03 × 0.3
Spindle speed [min ⁻¹]	40,000	40,000	40,000	40,000	40,000
Feed [mm/min]	600	300	180	180	120
Depth of cut ap × ae [mm]	0.01 × 0.01	0.004 × 0.008	0.003 × 0.006	0.002 × 0.01	0.005 × 0.003
Stock [mm]	0.005	0.005	0.005	0.003	-
Machining time	16hr 44min	8hr 40min	4hr 50min	58 min	12hr 46min

CBN Super Speed Radius End Mill

Total 172 sizes

Corner radius end mill with CBN material at the cutting edge
Total 172 sizes. Applicable for various machining profiles

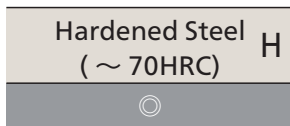


- Realized high efficient machining with radius flute along with excellent wear resistance of CBN.
- Realized excellent surface roughness by introducing smooth tangent on all over flute.
- Compatible with hardened steels up to 70HRC.
- Lineup from Dia.0.1mm. 172 sizes in total.



Cutting edge shape

Work Material



Unit [Size : mm]

Code No.	Dia. (D)	Corner Radius (R)	Under Neck Length (ℓ1)	Length of Cut (ℓ)	Neck Dia. (d2)	Neck Taper Angle (γ)	Shank Dia. (d)	Overall Length (L)
01-00490-01022	0.1	R0.02	0.2	0.04	0.09	15°	4	50
01-00490-01023			0.3	0.04	0.09	15°	4	50
01-00490-01024			0.5	0.04	0.09	15°	4	50
01-00490-01032		R0.03	0.2	0.04	0.09	15°	4	50
01-00490-01033			0.3	0.04	0.09	15°	4	50
01-00490-01034			0.5	0.04	0.09	15°	4	50
01-00490-01522	0.15	R0.02	0.2	0.06	0.14	15°	4	50
01-00490-01523			0.3	0.06	0.14	15°	4	50
01-00490-01524			0.5	0.06	0.14	15°	4	50
01-00490-01532		R0.03	0.2	0.06	0.14	15°	4	50
01-00490-01533			0.3	0.06	0.14	15°	4	50
01-00490-01534			0.5	0.06	0.14	15°	4	50
01-00490-02020	0.2	R0.02	0.3	0.08	0.19	15°	4	50
01-00490-02021			0.5	0.08	0.19	15°	4	50
01-00490-02022			1	0.08	0.19	15°	4	50
01-00490-02030		R0.03	0.3	0.08	0.19	15°	4	50
01-00490-02031			0.5	0.08	0.19	15°	4	50
01-00490-02032			1	0.08	0.19	15°	4	50
01-00490-02050		R0.05	0.3	0.08	0.19	15°	4	50
01-00490-02051			0.5	0.08	0.19	15°	4	50
01-00490-02052			1	0.08	0.19	15°	4	50
01-00490-03021	0.3	R0.02	0.5	0.13	0.28	15°	4	50
01-00490-03020			0.75	0.13	0.28	15°	4	50
01-00490-03022			1	0.13	0.28	15°	4	50
01-00490-03023			1.5	0.13	0.28	15°	4	50
01-00490-03024			2	0.13	0.28	15°	4	50

How to Order

When you order, indicate SSR200 (D)×(R)×(ℓ1).

※(γ) is reference value.

CBN Super Speed Radius End Mill

Unit [Size : mm]

Code No.	Dia. (D)	Corner Radius (R)	Under Neck Length (ℓ1)	Length of Cut (ℓ)	Neck Dia. (d2)	Neck Taper Angle (γ)	Shank Dia. (d)	Overall Length (L)	
01-00490-03031	0.3	R0.03	0.5	0.13	0.28	15°	4	50	
01-00490-03030			0.75	0.13	0.28	15°	4	50	
01-00490-03032			1	0.13	0.28	15°	4	50	
01-00490-03033			1.5	0.13	0.28	15°	4	50	
01-00490-03034			2	0.13	0.28	15°	4	50	
01-00490-03051			0.5	R0.05	0.13	0.28	15°	4	50
01-00490-03050		0.75	0.13		0.28	15°	4	50	
01-00490-03052		1	0.13		0.28	15°	4	50	
01-00490-03053		1.5	0.13		0.28	15°	4	50	
01-00490-03054		2	0.13		0.28	15°	4	50	
01-00490-04021		0.4	R0.02		0.5	0.24	0.37	15°	4
01-00490-04022				1	0.24	0.37	15°	4	50
01-00490-04023	1.5			0.24	0.37	15°	4	50	
01-00490-04024	2			0.24	0.37	15°	4	50	
01-00490-04031	R0.03		0.5	0.24	0.37	15°	4	50	
01-00490-04032			1	0.24	0.37	15°	4	50	
01-00490-04033			1.5	0.24	0.37	15°	4	50	
01-00490-04034			2	0.24	0.37	15°	4	50	
01-00490-04051			R0.05	0.5	0.24	0.37	15°	4	50
01-00490-04052				1	0.24	0.37	15°	4	50
01-00490-04053	1.5			0.24	0.37	15°	4	50	
01-00490-04054	2			0.24	0.37	15°	4	50	
01-00490-04101	R0.1		0.5	0.24	0.37	15°	4	50	
01-00490-04102			1	0.24	0.37	15°	4	50	
01-00490-04103			1.5	0.24	0.37	15°	4	50	
01-00490-04104			2	0.24	0.37	15°	4	50	
01-00490-05020	0.5		R0.02	0.5	0.3	0.46	15°	4	48
01-00490-05022				1	0.3	0.46	15°	4	50
01-00490-05021				1.5	0.3	0.46	15°	4	50
01-00490-05023				2.5	0.3	0.46	15°	4	50
01-00490-05030			R0.03	0.5	0.3	0.46	15°	4	48
01-00490-05032				1	0.3	0.46	15°	4	50
01-00490-05031				1.5	0.3	0.46	15°	4	50
01-00490-05033			2.5	0.3	0.46	15°	4	50	
01-00490-05050		R0.05	0.5	0.3	0.46	15°	4	48	
01-00490-05052			1	0.3	0.46	15°	4	50	
01-00490-05051			1.5	0.3	0.46	15°	4	50	
01-00490-05053			2.5	0.3	0.46	15°	4	50	
01-00490-05100			R0.1	0.5	0.3	0.46	15°	4	48
01-00490-05102				1	0.3	0.46	15°	4	50
01-00490-05101		1.5		0.3	0.46	15°	4	50	
01-00490-05103		2.5		0.3	0.46	15°	4	50	
01-00490-06021		0.6	R0.02	0.5	0.3	0.56	15°	4	48
01-00490-06022				1	0.3	0.56	15°	4	50
01-00490-06023				1.5	0.3	0.56	15°	4	50
01-00490-06024				2.5	0.3	0.56	15°	4	50
01-00490-06031			R0.03	0.5	0.3	0.56	15°	4	48
01-00490-06032				1	0.3	0.56	15°	4	50
01-00490-06033				1.5	0.3	0.56	15°	4	50
01-00490-06034			2.5	0.3	0.56	15°	4	50	
01-00490-06051	R0.05		0.5	0.3	0.56	15°	4	48	
01-00490-06052			1	0.3	0.56	15°	4	50	
01-00490-06053			1.5	0.3	0.56	15°	4	50	
01-00490-06054	2.5		0.3	0.56	15°	4	50		
01-00490-06101	R0.1		0.5	0.3	0.56	15°	4	48	
01-00490-06102			1	0.3	0.56	15°	4	50	
01-00490-06103			1.5	0.3	0.56	15°	4	50	
01-00490-06104			2.5	0.3	0.56	15°	4	50	

CBN Super Speed Radius End Mill

Unit [Size : mm]

Code No.	Dia. (D)	Corner Radius (R)	Under Neck Length (ℓ1)	Length of Cut (ℓ)	Neck Dia. (d2)	Neck Taper Angle (γ)	Shank Dia. (d)	Overall Length (L)	
01-00490-08021	0.8	R0.02	1.5	0.56	0.76	15°	4	50	
01-00490-08022			2.5	0.56	0.76	15°	4	50	
01-00490-08023			5	0.56	0.76	15°	4	53	
01-00490-08031		R0.03	1.5	0.56	0.76	15°	4	50	
01-00490-08032			2.5	0.56	0.76	15°	4	50	
01-00490-08033			5	0.56	0.76	15°	4	53	
01-00490-08051		R0.05	1.5	0.56	0.76	15°	4	50	
01-00490-08052			2.5	0.56	0.76	15°	4	50	
01-00490-08053			5	0.56	0.76	15°	4	53	
01-00490-08101		R0.1	1.5	0.56	0.76	15°	4	50	
01-00490-08102			2.5	0.56	0.76	15°	4	50	
01-00490-08103			5	0.56	0.76	15°	4	53	
01-00490-10020	1	R0.02	1	0.7	0.95	15°	4	49	
01-00490-10022			2	0.7	0.95	15°	4	50	
01-00490-10021			3	0.7	0.95	15°	4	50	
01-00490-10023			5	0.7	0.95	15°	4	53	
01-00490-10030		R0.03	1	0.7	0.95	15°	4	49	
01-00490-10032			2	0.7	0.95	15°	4	50	
01-00490-10031			3	0.7	0.95	15°	4	50	
01-00490-10033			5	0.7	0.95	15°	4	53	
01-00490-10050		R0.05	1	0.7	0.95	15°	4	49	
01-00490-10052			2	0.7	0.95	15°	4	50	
01-00490-10051			3	0.7	0.95	15°	4	50	
01-00490-10053			5	0.7	0.95	15°	4	53	
01-00490-10100		R0.1	1	0.7	0.95	15°	4	49	
01-00490-10102			2	0.7	0.95	15°	4	50	
01-00490-10101			3	0.7	0.95	15°	4	50	
01-00490-10103			5	0.7	0.95	15°	4	53	
01-00490-10200		R0.2	1	0.7	0.95	15°	4	49	
01-00490-10202			2	0.7	0.95	15°	4	50	
01-00490-10201			3	0.7	0.95	15°	4	50	
01-00490-10203			5	0.7	0.95	15°	4	53	
01-00490-10300		R0.3	1	0.7	0.95	15°	4	49	
01-00490-10302			2	0.7	0.95	15°	4	50	
01-00490-10301			3	0.7	0.95	15°	4	50	
01-00490-10303			5	0.7	0.95	15°	4	53	
01-00490-15022		1.5	R0.02	2	1	1.45	15°	4	52
01-00490-15020				3	1	1.45	15°	4	52
01-00490-15021				4.5	1	1.45	15°	4	52
01-00490-15023				7.5	1	1.45	15°	4	52
01-00490-15032			R0.03	2	1	1.45	15°	4	52
01-00490-15030				3	1	1.45	15°	4	52
01-00490-15031	4.5			1	1.45	15°	4	52	
01-00490-15033	7.5			1	1.45	15°	4	52	
01-00490-15052	R0.05		2	1	1.45	15°	4	52	
01-00490-15050			3	1	1.45	15°	4	52	
01-00490-15051			4.5	1	1.45	15°	4	52	
01-00490-15053			7.5	1	1.45	15°	4	52	
01-00490-15102	R0.1		2	1	1.45	15°	4	52	
01-00490-15100			3	1	1.45	15°	4	52	
01-00490-15101			4.5	1	1.45	15°	4	52	
01-00490-15103			7.5	1	1.45	15°	4	52	

How to Order

When you order, indicate SSR200 (D)×(R)×(ℓ1).

※(γ) is reference value.

Unit [Size : mm]

Code No.	Dia. (D)	Corner Radius (R)	Under Neck Length (ℓ_1)	Length of Cut (ℓ)	Neck Dia. (d2)	Neck Taper Angle (γ)	Shank Dia. (d)	Overall Length (L)
01-00490-15202	1.5	R0.2	2	1	1.45	15°	4	52
01-00490-15200			3	1	1.45	15°	4	52
01-00490-15201			4.5	1	1.45	15°	4	52
01-00490-15203			7.5	1	1.45	15°	4	52
01-00490-15302		R0.3	2	1	1.45	15°	4	52
01-00490-15300			3	1	1.45	15°	4	52
01-00490-15301			4.5	1	1.45	15°	4	52
01-00490-15303			7.5	1	1.45	15°	4	52
01-00490-20022	2	R0.02	3	1.2	1.94	15°	4	53
01-00490-20020			4	1.2	1.94	15°	4	53
01-00490-20021			6	1.2	1.94	15°	4	53
01-00490-20023			10	1.2	1.94	15°	4	53
01-00490-20032		R0.03	3	1.2	1.94	15°	4	53
01-00490-20030			4	1.2	1.94	15°	4	53
01-00490-20031			6	1.2	1.94	15°	4	53
01-00490-20033			10	1.2	1.94	15°	4	53
01-00490-20052		R0.05	3	1.2	1.94	15°	4	53
01-00490-20050			4	1.2	1.94	15°	4	53
01-00490-20051			6	1.2	1.94	15°	4	53
01-00490-20053			10	1.2	1.94	15°	4	53
01-00490-20102		R0.1	3	1.2	1.94	15°	4	53
01-00490-20100			4	1.2	1.94	15°	4	53
01-00490-20101			6	1.2	1.94	15°	4	52
01-00490-20103			10	1.2	1.94	15°	4	52
01-00490-20202		R0.2	3	1.2	1.94	15°	4	53
01-00490-20200			4	1.2	1.94	15°	4	53
01-00490-20201			6	1.2	1.94	15°	4	52
01-00490-20203			10	1.2	1.94	15°	4	52
01-00490-20302		R0.3	3	1.2	1.94	15°	4	53
01-00490-20300			4	1.2	1.94	15°	4	53
01-00490-20301			6	1.2	1.94	15°	4	52
01-00490-20303			10	1.2	1.94	15°	4	52
01-00490-20502		R0.5	3	1.2	1.94	15°	4	53
01-00490-20500			4	1.2	1.94	15°	4	53
01-00490-20501			6	1.2	1.94	15°	4	52
01-00490-20503			10	1.2	1.94	15°	4	52

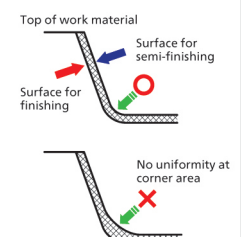
Points in Use

Advice on Cutting Environment

- Minimize the deflection of cutting edge.
- To understand the nature of the expansion of the main spindle and machine posture transformation, and take measures against them.

Advice on Finishing Allowance (stock amount)

- When using small CBN End Mill, **uniform finishing allowance (stock amount) is important.**
- When tool is used on roughing and semi-finishing and it has a big abrasion, finishing allowance (stock amount) on semi-finishing and finishing is increasing and it affects tool life and cutting accuracy. **Therefore, it is important to get uniform stock amount in the pre-stage cutting.**



Recommended Milling Conditions

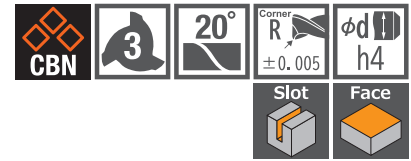
Work Material			Hardened Steels SKD61·STAVAX (~52HRC)				Hardened Steels DC53·ELMAX·PD613 (~62HRC)				High Speed Steels DRM3·YXR3 (~68HRC)			
Radius	Neck Taper Angle	Under Neck Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			a _p mm	a _e mm	mm/min	min ⁻¹	a _p mm	a _e mm	mm/min	min ⁻¹	a _p mm	a _e mm	mm/min	min ⁻¹
0.1	0.02 · 0.03	0.2	0.002	0.015	200	50,000	0.002	0.01	150	50,000	0.001	0.01	100	50,000
		0.3	0.002	0.015	150	50,000	0.001	0.01	100	50,000	0.001	0.01	50	50,000
		0.5	0.002	0.01	150	50,000	0.001	0.01	100	50,000	0.001	0.01	50	50,000
0.15	0.02 · 0.03	0.2	0.003	0.02	250	50,000	0.003	0.02	200	50,000	0.002	0.015	150	50,000
		0.3	0.003	0.02	200	50,000	0.003	0.02	150	50,000	0.002	0.015	100	50,000
		0.5	0.002	0.02	200	50,000	0.002	0.02	150	50,000	0.001	0.015	100	50,000
0.2	0.02 · 0.03 · 0.05	0.3	0.003	0.03	400	50,000	0.003	0.03	350	50,000	0.002	0.02	250	50,000
		0.5	0.003	0.03	300	50,000	0.003	0.03	300	50,000	0.002	0.02	200	50,000
		1	0.003	0.02	200	50,000	0.003	0.02	200	50,000	0.002	0.01	100	50,000
0.3	0.02 · 0.03 · 0.05	0.5 · 0.75 · 1	0.003	0.05	500	50,000	0.003	0.05	400	50,000	0.002	0.03	300	50,000
		1.5 · 2	0.003	0.03	400	50,000	0.003	0.03	300	50,000	0.002	0.02	200	50,000
0.4	0.02 · 0.03 · 0.05 · 0.1	0.5 · 1	0.005	0.1	700	50,000	0.005	0.1	600	50,000	0.003	0.03	400	50,000
		1.5 · 2	0.005	0.05	500	50,000	0.005	0.05	400	50,000	0.003	0.02	300	50,000
0.5	0.02 · 0.03	0.5 · 1 · 1.5	0.005	0.2	600	50,000	0.005	0.2	600	50,000	0.003	0.1	500	50,000
		2.5	0.005	0.1	600	50,000	0.005	0.1	600	50,000	0.003	0.05	500	50,000
	0.05	0.5 · 1 · 1.5	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.005	0.2	500	50,000
		2.5	0.01	0.1	600	50,000	0.01	0.1	600	50,000	0.005	0.1	500	50,000
	0.1	0.5 · 1 · 1.5	0.02	0.2	800	50,000	0.02	0.2	800	50,000	0.01	0.1	700	50,000
		2.5	0.01	0.1	800	50,000	0.01	0.1	800	50,000	0.01	0.05	700	50,000
0.6	0.02 · 0.03	0.5 · 1 · 1.5	0.005	0.2	600	50,000	0.005	0.2	600	50,000	0.003	0.1	500	50,000
		2.5	0.005	0.1	600	50,000	0.005	0.1	600	50,000	0.003	0.05	500	50,000
	0.05	0.5 · 1 · 1.5	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.005	0.2	500	50,000
		2.5	0.01	0.1	600	50,000	0.01	0.1	600	50,000	0.005	0.1	500	50,000
	0.1	0.5 · 1 · 1.5	0.02	0.2	1,000	50,000	0.02	0.2	1,000	50,000	0.01	0.1	700	50,000
		2.5	0.01	0.1	1,000	50,000	0.01	0.1	1,000	50,000	0.01	0.05	700	50,000
0.8	0.02 · 0.03	1.5 · 2.5	0.005	0.2	800	50,000	0.005	0.2	800	50,000	0.003	0.1	600	40,000
		5	0.005	0.1	800	50,000	0.005	0.1	800	50,000	0.003	0.05	600	40,000
	0.05	1.5 · 2.5	0.02	0.3	1,000	50,000	0.02	0.2	1,000	50,000	0.01	0.1	700	40,000
		5	0.01	0.2	1,000	50,000	0.01	0.1	1,000	50,000	0.01	0.05	700	40,000
	0.1	1.5 · 2.5	0.02	0.3	1,400	50,000	0.02	0.2	1,200	50,000	0.01	0.1	1,000	40,000
		5	0.01	0.2	1,400	50,000	0.01	0.1	1,200	50,000	0.01	0.05	1,000	40,000

Work Material			Hardened Steels SKD61·STAVAX (~52HRC)				Hardened Steels DC53·ELMAX·PD613 (~62HRC)				High Speed Steels DRM3·YXR3 (~68HRC)				
Radius	Neck Taper Angle	Under Neck Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹	
1	0.02 · 0.03	1 · 2	0.005	0.4	800	48,000	0.005	0.3	800	48,000	0.005	0.2	600	32,000	
	0.05		0.01	0.4	1,000	48,000	0.01	0.3	1,000	48,000	0.01	0.2	800	32,000	
	0.1 · 0.2 · 0.3		0.03	0.4	1,500	48,000	0.03	0.3	1,200	48,000	0.01	0.2	1,000	32,000	
	0.02 · 0.03	3 · 5	0.005	0.3	800	48,000	0.005	0.2	800	48,000	0.005	0.1	600	32,000	
	0.05		0.01	0.3	1,000	48,000	0.01	0.2	1,000	48,000	0.01	0.1	800	32,000	
	0.1 · 0.2 · 0.3		0.02	0.3	1,500	48,000	0.02	0.2	1,200	48,000	0.01	0.1	1,000	32,000	
1.5	0.02 · 0.03	2	0.005	0.7	1,200	32,000	0.005	0.6	1,100	32,000	0.005	0.3	900	20,000	
	0.05		0.02	0.7	1,200	32,000	0.01	0.6	1,100	32,000	0.01	0.3	900	20,000	
	0.1 · 0.2 · 0.3		0.04	0.7	2,400	32,000	0.04	0.6	1,800	32,000	0.01	0.3	1,300	20,000	
	0.02 · 0.03	3 · 4.5	0.005	0.7	1,000	32,000	0.005	0.6	1,000	32,000	0.005	0.3	800	20,000	
	0.05		0.02	0.7	1,000	32,000	0.01	0.6	1,000	32,000	0.01	0.3	800	20,000	
	0.1 · 0.2 · 0.3		0.04	0.7	2,000	32,000	0.04	0.6	1,500	32,000	0.01	0.3	1,200	20,000	
	0.02 · 0.03	7.5	0.005	0.5	1,000	32,000	0.005	0.4	1,000	32,000	0.005	0.2	800	20,000	
	0.05		0.02	0.5	1,000	32,000	0.01	0.4	1,000	32,000	0.01	0.2	800	20,000	
	0.1 · 0.2 · 0.3		0.03	0.5	2,000	32,000	0.03	0.4	1,500	32,000	0.01	0.2	1,200	20,000	
	2	0.02 · 0.03	3	0.005	0.8	1,200	24,000	0.005	0.7	1,100	24,000	0.005	0.5	900	16,000
		0.05		0.02	0.8	1,200	24,000	0.01	0.7	1,100	24,000	0.01	0.5	900	16,000
		0.1 · 0.2 · 0.3 · 0.5		0.05	0.8	2,400	24,000	0.05	0.7	1,800	24,000	0.01	0.5	1,300	16,000
0.02 · 0.03		4 · 6	0.005	0.8	1,000	24,000	0.005	0.7	1,000	24,000	0.005	0.5	800	16,000	
0.05			0.02	0.8	1,000	24,000	0.01	0.7	1,000	24,000	0.01	0.5	800	16,000	
0.1 · 0.2 · 0.3 · 0.5			0.05	0.8	2,000	24,000	0.05	0.7	1,500	24,000	0.01	0.5	1,200	16,000	
0.02 · 0.03		10	0.005	0.6	1,000	24,000	0.005	0.5	1,000	24,000	0.005	0.3	800	16,000	
0.05			0.02	0.6	1,000	24,000	0.01	0.5	1,000	24,000	0.01	0.3	800	16,000	
0.1 · 0.2 · 0.3 · 0.5			0.03	0.6	2,000	24,000	0.03	0.5	1,500	24,000	0.01	0.3	1,200	16,000	
Notes			<p>※1 Depth of Cut shows the maximum value for semi-finishing and finishing. Adjust milling conditions depending on the rigidity of the machine and desired accuracy.</p> <p>※2 Depth of Cut : ap = Axial Depth of Cut / ae = Radial Depth of Cut.</p> <p>※3 Recommend to apply helical or ramping for approaching into axial direction.</p> <p>※4 We recommend using oil mist coolant.</p> <p>※5 Adjust both spindle speed and feed at the same rate.</p> <p>※6 Adjust milling conditions according to the volume of Depth of Cut and rigidity of machine.</p> <p>※7 Length of tool overhang must be as short as possible.</p> <p>※8 Machine, tool chuck must be sufficiently accurate.</p>												

High efficiency 3-flute design realizes high feed

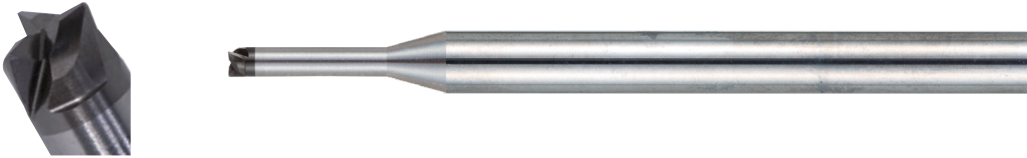
CBN High Efficient Radius End Mill

SHR320



ϕ 0.5 × R0.1 ~ ϕ 2 × R0.3

Total 14 sizes

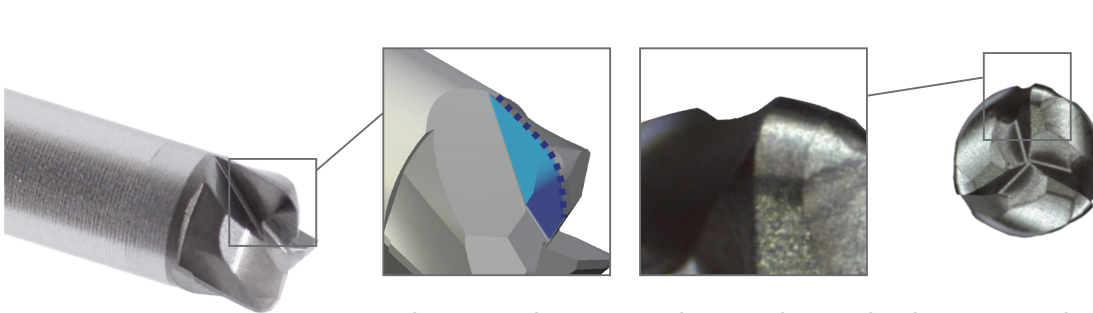


Features

High Efficiency

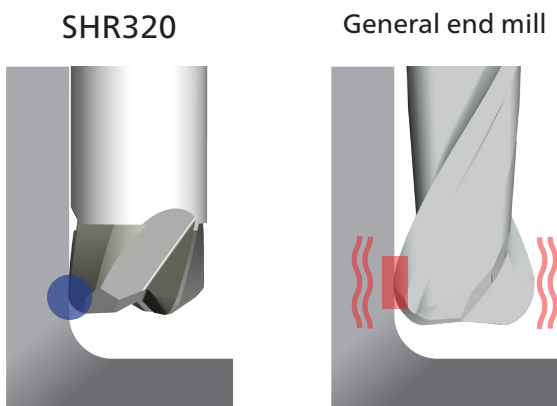
Specialized tool design achieves high efficiency

Effect of spiral corner R shape



Adopt spiral corner R shape achieves both cutting edge rigidity and cutting ability

Peripheral cutting edge with back taper design



Milling by point reduce the chattering

Cutting load is large due to surface machining

Adopted strong back taper shape for peripheral cutting edge to suppress chattering that occurred by increasing cutting load. Realizes a stable cutting surface through reducing cutting load.

Machining case

Bend mold punch SLD (60HRC)

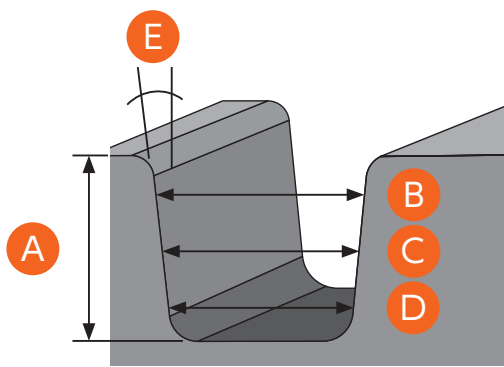
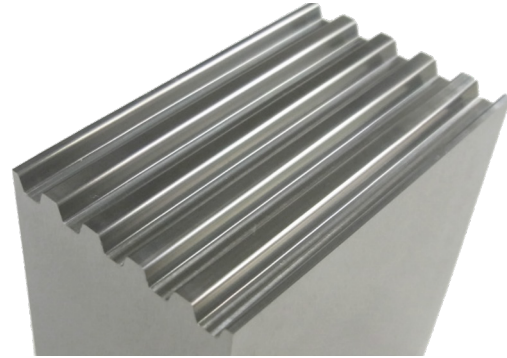
Maintain high accuracy even during high feed machining
Combine long tool life and high efficiency

Work material : SLD (60HRC)

Work size : 30 × 50 mm
(Machining depth 2 mm)

Coolant : Oil mist

Total machining time : 3hr 20min



Measuring position

Accuracy

Unit [mm]

Measuring position	Target	Actual	Error
A	2.000	1.999	- 0.001
B	3.392	3.384 (3.391)	- 0.001
C	3.028	3.019 (3.026)	- 0.002
D	2.664	2.655 (2.662)	- 0.002
E	20°	20° 1'36"	1'36"

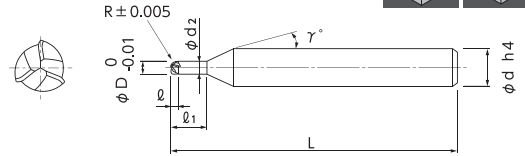
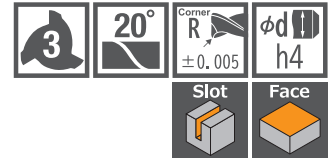
※ NC data is based on nominal diameter. The actual value in () is the calculated value according to the actual outer diameter, and the error indicates the difference between the target value and the calculated value.

Process	Roughing	Semi-roughing	Semi-finishing	Finishing
Tool	MHRH430R φ2 × R0.1 × 6		SHR320 φ2 × R0.1 × 6	SHR320 φ2 × R0.1 × 6
Spindle speed [min ⁻¹]	20,000		40,000	40,000
Feed [mm/min]	750		1,000	2,000
Depth of cut ap × ae [mm]	ap 0.05 (Slot)	ap 0.04 (Contour line)	Side:0.02 × 0.015 Flat:0.015 × 0.2	Side:0.01 × 0.005 Flat:0.005 × 0.1
Stock [mm]	0.02		0.005	-
Machining time	15 min	39 min	1hr 8min	1hr 18min

CBN High Efficient Radius End Mill

Total 14 sizes

3-flute CBN corner radius end mill.
Realized high efficient and high accurate machining

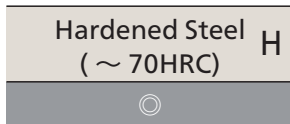


- Realized high accuracy and high efficiency machining by adopting 3 flutes and corner R with spiral shape.



Cutting edge shape

Work Material



Unit [Size : mm]

Code No.	Dia. (D)	Corner Radius (R)	Under Neck Length (l ₁)	Length of Cut (l)	Neck Dia. (d ₂)	Neck Taper Angle (γ)	Shank Dia. (d)	Overall Length (L)
01-00495-05011	0.5	R0.1	1.5	0.25	0.46	15°	4	50
01-00495-05012			2.5	0.25	0.46	15°	4	50
01-00495-10011	1	R0.1	3	0.5	0.95	15°	4	50
01-00495-10012			5	0.5	0.95	15°	4	52
01-00495-10021		R0.2	3	0.5	0.95	15°	4	50
01-00495-10022			5	0.5	0.95	15°	4	52
01-00495-15011	1.5	R0.1	4.5	0.75	1.45	15°	4	52
01-00495-15012			7.5	0.75	1.45	15°	4	52
01-00495-15021		R0.2	4.5	0.75	1.45	15°	4	52
01-00495-15022			7.5	0.75	1.45	15°	4	52
01-00495-20011	2	R0.1	6	1	1.94	15°	4	52
01-00495-20012			10	1	1.94	15°	4	52
01-00495-20031		R0.3	6	1	1.94	15°	4	52
01-00495-20032			10	1	1.94	15°	4	52

How to Order When you order, indicate SHR320 (D)×(R)×(l₁).

※(γ) is reference value.

Work Material			Hardened Steels STAVAX·SKD61 (~52HRC)				Hardened Steels SKD11·ELMAX (~62HRC)				High Speed Steels SKH·HAP (~68HRC)			
Radius	Neck Taper Angle	Under Neck Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			a _p mm	a _e mm	mm/min	min ⁻¹	a _p mm	a _e mm	mm/min	min ⁻¹	a _p mm	a _e mm	mm/min	min ⁻¹
0.5	0.1	1.5	0.008	0.2	1,500	50,000	0.005	0.15	800	50,000	0.003	0.1	600	50,000
		2.5	0.006	0.15	1,000	40,000	0.005	0.1	500	40,000	0.003	0.05	300	40,000
1	0.1 0.2	3	0.012	0.4	2,000	40,000	0.007	0.25	1,000	40,000	0.006	0.15	800	35,000
		5	0.008	0.3	1,500	30,000	0.005	0.15	800	30,000	0.004	0.1	400	25,000
1.5	0.1 0.2	4.5	0.015	0.6	2,500	35,000	0.008	0.4	1,200	35,000	0.007	0.2	1,000	30,000
		7.5	0.012	0.4	1,800	25,000	0.006	0.3	1,000	25,000	0.005	0.15	500	20,000
2	0.1 0.3	6	0.02	0.8	3,000	30,000	0.01	0.6	1,500	30,000	0.008	0.3	1,200	25,000
		10	0.015	0.6	2,000	20,000	0.008	0.4	1,000	20,000	0.006	0.2	600	18,000
Notes			<p>※1 Depth of Cut is for contour line milling as the value of reference. Please adjust it depending on machine rigidity and machining method.</p> <p>※2 Ramping approach with angle 3° or smaller is recommended.</p> <p>※3 Recommend leaving uniform finishing allowance on the machined surface in the pre-stage cutting (semi-finishing).</p> <p>※4 When cutting high load sections or complex shapes, it requires attention to condition setting and tool path.</p> <p>※5 Adjust both spindle speed and feed at the same rate.</p> <p>※6 Oil mist coolant is recommended.</p>											

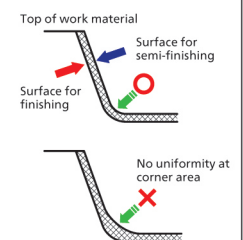
Points in Use

Advice on Cutting Environment

- Minimize the deflection of cutting edge.
- To understand the nature of the expansion of the main spindle and machine posture transformation, and take measures against them.

Advice on Finishing Allowance (stock amount)

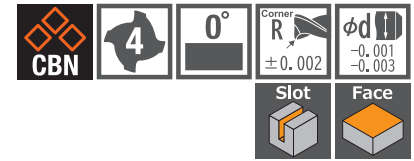
- When using small CBN End Mill, **uniform finishing allowance (stock amount) is important.**
- When tool is used on roughing and semi-finishing and it has a big abrasion, finishing allowance (stock amount) on semi-finishing and finishing is increasing and it affects tool life and cutting accuracy. **Therefore, it is important to get uniform stock amount in the pre-stage cutting.**



High accuracy specifications pursued from the smallest diameter ϕ 0.1

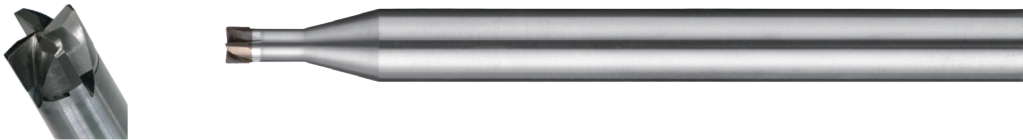
CBN Super High Precision Radius End Mill

SHPR400



ϕ 0.1 × R0.01 ~ ϕ 3 × R0.2

Total 142 sizes



Features

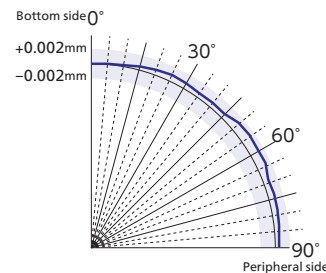
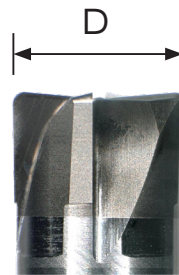
Fine precision

Small diameter 4-flute design realizes high precision

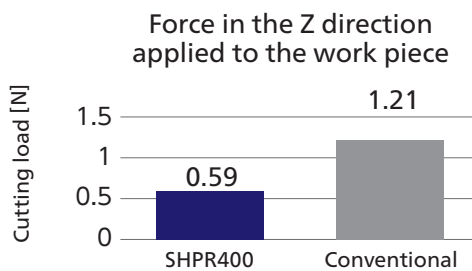
■ Tool design achieves high precision finishing

Tolerance of outer diameter
 $D \leq 1$ $0 \sim -0.005$ mm
 $1 < D \leq 3$ $0 \sim -0.007$ mm

Corner R accuracy
 ± 0.002 mm



■ Specialized tool design reduces cutting load



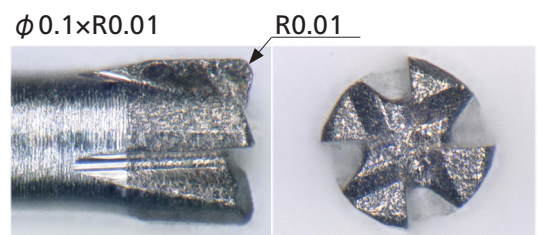
Tool : SHPR400 ϕ 1 × R0.1 × 3
 Work material : DC53 (60HRC)
 Coolant : Oil mist
 Spindle speed : 40,000 min⁻¹
 Feed : 1,600 mm/min
 Depth of cut : $a_p 0.02 \times a_e 0.1$ mm

■ 4-Flute from ϕ 0.1



Adopt 4-flute from ϕ 0.1 as the first in the industry

Increased cutting efficiency and stable tool life are achieved in precise machining

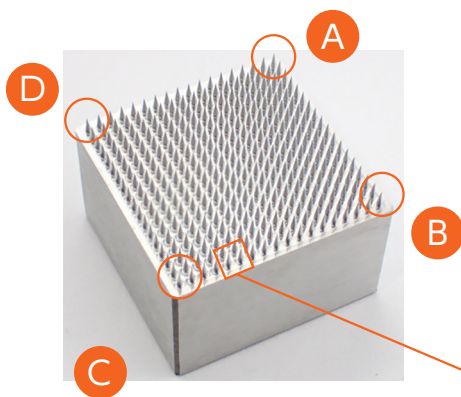
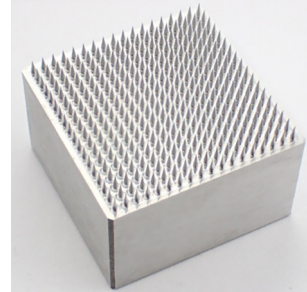


Machining case

Micro needle STAVAX (52HRC)

Cutting edge with high machinability realizes high precision machining and long tool life even for micro pin shapes that are difficult to maintain machining accuracy

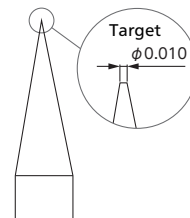
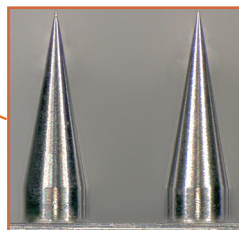
Work material : STAVAX (52HRC)
 Work size : 15 × 15 mm
 (Machining depth 1.2 mm)
 Coolant : Oil mist
 Total machining time : 24hr 53min



Accuracy

Unit [mm]

Measuring position	Target	Actual	Error
A	0.010	0.009	- 0.001
B		0.013	+ 0.003
C		0.013	+ 0.003
D		0.013	+ 0.003



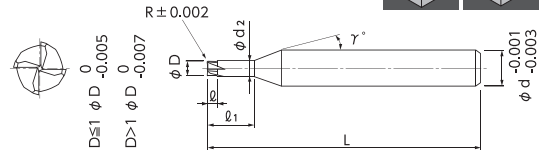
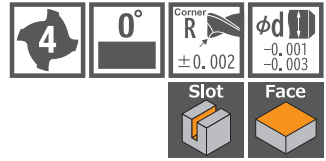
Process	Roughing ①	Roughing ②	Roughing ③	Roughing ④	Finishing
Tool	MHRH430R φ 2 × R0.02 × 4	SSPB220 R0.2 × 1.2	SSPB220 R0.2 × 1.2	SSR200 φ 0.3 × R0.02 × 1.5	SHPR400 φ 0.3 × R0.02 × 1.5
Spindle speed [min ⁻¹]	20,000	40,000	40,000	40,000	40,000
Feed [mm/min]	1,000	750	500	500	25 ~ 300
Depth of cut ap × ae [mm]	0.01 × 0.5	ap 0.005	ap 0.005	ap 0.003	0.003 × 0.04
Stock [mm]	0.01	0.01	0.05	0.04	-
Machining time	8 min	3hr 19min	2hr 45min	3hr 51min	14hr 50min

※2 end mills used for finishing

CBN Super High Precision Radius End Mill

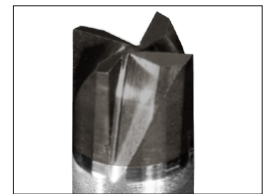
Total 142 sizes

4-flute corner radius end mill from Dia.0.1mm.
High precise type to pursue machining accuracy



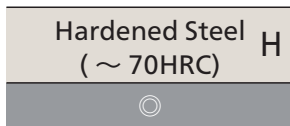
- New tool design has been developed to reduce the cutting resistance and upgrade the finishing accuracy!
- Realized 4-Flute type from $\phi 0.1$! Achieved higher efficient machining and more stable tool life in micro machining!
- The shank diameter accuracy is $2\mu\text{m}$ ($-0.001 \sim -0.003$), and also supports high precision shrink fit holders.

Beware of stocks because there is no blade to the shaft center of endteeth of $\phi 0.1$ and $\phi 0.15$.



Cutting edge shape

Work Material



Unit [Size : mm]

Code No.	Dia. (D)	Corner Radius (R)	Under Neck Length (L1)	Length of Cut (L)	Neck Dia. (d2)	Neck Taper Angle (γ)	Shank Dia. (d)	Overall Length (L)
01-00485-01002	0.1	R0.01	0.2	0.04	0.09	15°	4	50
01-00485-01003			0.3	0.04	0.09	15°	4	50
01-00485-01005			0.5	0.04	0.09	15°	4	50
01-00485-01022		R0.02	0.2	0.04	0.09	15°	4	50
01-00485-01023			0.3	0.04	0.09	15°	4	50
01-00485-01025			0.5	0.04	0.09	15°	4	50
01-00485-01522	0.15	R0.02	0.2	0.06	0.14	15°	4	50
01-00485-01523			0.3	0.06	0.14	15°	4	50
01-00485-01525			0.5	0.06	0.14	15°	4	50
01-00485-01532		R0.03	0.2	0.06	0.14	15°	4	50
01-00485-01533			0.3	0.06	0.14	15°	4	50
01-00485-01535			0.5	0.06	0.14	15°	4	50
01-00485-02203	0.2	R0.02	0.3	0.08	0.19	15°	4	50
01-00485-02205			0.5	0.08	0.19	15°	4	50
01-00485-02210			1	0.08	0.19	15°	4	50
01-00485-02303		R0.03	0.3	0.08	0.19	15°	4	50
01-00485-02305			0.5	0.08	0.19	15°	4	50
01-00485-02310			1	0.08	0.19	15°	4	50
01-00485-03205	0.3	R0.02	0.5	0.13	0.285	15°	4	50
01-00485-03207			0.75	0.13	0.285	15°	4	50
01-00485-03210			1	0.13	0.285	15°	4	50
01-00485-03215			1.5	0.13	0.285	15°	4	50
01-00485-03220			2	0.13	0.285	15°	4	50

How to Order

When you order, indicate SHPR400 (D)×(R)×(L).

※(γ) is reference value.

CBN Super High Precision Radius End Mill

Unit [Size : mm]

Code No.	Dia. (D)	Corner Radius (R)	Under Neck Length (ℓ1)	Length of Cut (ℓ)	Neck Dia. (d2)	Neck Taper Angle (γ)	Shank Dia. (d)	Overall Length (L)
01-00485-03405	0.3	R0.05	0.5	0.13	0.285	15°	4	50
01-00485-03407			0.75	0.13	0.285	15°	4	50
01-00485-03410			1	0.13	0.285	15°	4	50
01-00485-03415			1.5	0.13	0.285	15°	4	50
01-00485-03420			2	0.13	0.285	15°	4	50
01-00485-04205	0.4	R0.02	0.5	0.24	0.37	15°	4	50
01-00485-04210			1	0.24	0.37	15°	4	50
01-00485-04215			1.5	0.24	0.37	15°	4	50
01-00485-04220			2	0.24	0.37	15°	4	50
01-00485-04225			2.5	0.24	0.37	15°	4	50
01-00485-04405		R0.05	0.5	0.24	0.37	15°	4	50
01-00485-04410			1	0.24	0.37	15°	4	50
01-00485-04415			1.5	0.24	0.37	15°	4	50
01-00485-04420			2	0.24	0.37	15°	4	50
01-00485-04425			2.5	0.24	0.37	15°	4	50
01-00485-04505		R0.1	0.5	0.24	0.37	15°	4	50
01-00485-04510			1	0.24	0.37	15°	4	50
01-00485-04515			1.5	0.24	0.37	15°	4	50
01-00485-04520			2	0.24	0.37	15°	4	50
01-00485-04525			2.5	0.24	0.37	15°	4	50
01-00485-05205	0.5	R0.02	0.5	0.3	0.46	15°	4	48
01-00485-05210			1	0.3	0.46	15°	4	50
01-00485-05215			1.5	0.3	0.46	15°	4	50
01-00485-05220			2	0.3	0.46	15°	4	50
01-00485-05225			2.5	0.3	0.46	15°	4	50
01-00485-05405		R0.05	0.5	0.3	0.46	15°	4	48
01-00485-05410			1	0.3	0.46	15°	4	50
01-00485-05415			1.5	0.3	0.46	15°	4	50
01-00485-05420			2	0.3	0.46	15°	4	50
01-00485-05425			2.5	0.3	0.46	15°	4	50
01-00485-05505		R0.1	0.5	0.3	0.46	15°	4	48
01-00485-05510			1	0.3	0.46	15°	4	50
01-00485-05515			1.5	0.3	0.46	15°	4	50
01-00485-05520			2	0.3	0.46	15°	4	50
01-00485-05525			2.5	0.3	0.46	15°	4	50
01-00485-06205	0.6	R0.02	0.5	0.3	0.56	15°	4	48
01-00485-06210			1	0.3	0.56	15°	4	50
01-00485-06215			1.5	0.3	0.56	15°	4	50
01-00485-06220			2	0.3	0.56	15°	4	50
01-00485-06225			2.5	0.3	0.56	15°	4	50
01-00485-06405		R0.05	0.5	0.3	0.56	15°	4	48
01-00485-06410			1	0.3	0.56	15°	4	50
01-00485-06415			1.5	0.3	0.56	15°	4	50
01-00485-06420			2	0.3	0.56	15°	4	50
01-00485-06425			2.5	0.3	0.56	15°	4	50
01-00485-06505		R0.1	0.5	0.3	0.56	15°	4	48
01-00485-06510			1	0.3	0.56	15°	4	50
01-00485-06515			1.5	0.3	0.56	15°	4	50
01-00485-06520			2	0.3	0.56	15°	4	50
01-00485-06525			2.5	0.3	0.56	15°	4	50
01-00485-08215	0.8	R0.02	1.5	0.56	0.76	15°	4	50
01-00485-08225			2.5	0.56	0.76	15°	4	50
01-00485-08250			5	0.56	0.76	15°	4	53
01-00485-08415		R0.05	1.5	0.56	0.76	15°	4	50
01-00485-08425			2.5	0.56	0.76	15°	4	50
01-00485-08450			5	0.56	0.76	15°	4	53
01-00485-08515		R0.1	1.5	0.56	0.76	15°	4	50
01-00485-08525			2.5	0.56	0.76	15°	4	50
01-00485-08550			5	0.56	0.76	15°	4	53
01-00485-10201	1	R0.02	1	0.7	0.95	15°	4	49
01-00485-10202			2	0.7	0.95	15°	4	50
01-00485-10203			3	0.7	0.95	15°	4	50
01-00485-10205			5	0.7	0.95	15°	4	53

SHPR400

CBN Super High Precision Radius End Mill

Unit [Size : mm]

Code No.	Dia. (D)	Corner Radius (R)	Under Neck Length (ℓ1)	Length of Cut (ℓ)	Neck Dia. (d2)	Neck Taper Angle (γ)	Shank Dia. (d)	Overall Length (L)	
01-00485-10401	1	R0.05	1	0.7	0.95	15°	4	49	
01-00485-10402			2	0.7	0.95	15°	4	50	
01-00485-10403			3	0.7	0.95	15°	4	50	
01-00485-10405			5	0.7	0.95	15°	4	53	
01-00485-10501		R0.1	1	0.7	0.95	15°	4	49	
01-00485-10502			2	0.7	0.95	15°	4	50	
01-00485-10503			3	0.7	0.95	15°	4	50	
01-00485-10505			5	0.7	0.95	15°	4	53	
01-00485-10601		R0.2	1	0.7	0.95	15°	4	49	
01-00485-10602			2	0.7	0.95	15°	4	50	
01-00485-10603			3	0.7	0.95	15°	4	50	
01-00485-10605			5	0.7	0.95	15°	4	53	
01-00485-15202	1.5	R0.02	2	1	1.45	15°	4	52	
01-00485-15203			3	1	1.45	15°	4	52	
01-00485-15204			4.5	1	1.45	15°	4	52	
01-00485-15207			7.5	1	1.45	15°	4	52	
01-00485-15402		R0.05	2	1	1.45	15°	4	52	
01-00485-15403			3	1	1.45	15°	4	52	
01-00485-15404			4.5	1	1.45	15°	4	52	
01-00485-15407		R0.1	7.5	1	1.45	15°	4	52	
01-00485-15502			2	1	1.45	15°	4	52	
01-00485-15503			3	1	1.45	15°	4	52	
01-00485-15504		R0.2	4.5	1	1.45	15°	4	52	
01-00485-15507			7.5	1	1.45	15°	4	52	
01-00485-15602			2	1	1.45	15°	4	52	
01-00485-15603		R0.2	3	1	1.45	15°	4	52	
01-00485-15604			4.5	1	1.45	15°	4	52	
01-00485-15607			7.5	1	1.45	15°	4	52	
01-00485-20203		2	R0.02	3	1.2	1.94	15°	4	53
01-00485-20204				4	1.2	1.94	15°	4	53
01-00485-20206				6	1.2	1.94	15°	4	53
01-00485-20210				10	1.2	1.94	15°	4	53
01-00485-20403			R0.05	3	1.2	1.94	15°	4	53
01-00485-20404				4	1.2	1.94	15°	4	53
01-00485-20406				6	1.2	1.94	15°	4	53
01-00485-20410				10	1.2	1.94	15°	4	53
01-00485-20503	R0.1		3	1.2	1.94	15°	4	53	
01-00485-20504			4	1.2	1.94	15°	4	53	
01-00485-20506			6	1.2	1.94	15°	4	53	
01-00485-20510			10	1.2	1.94	15°	4	53	
01-00485-20603	R0.2		3	1.2	1.94	15°	4	53	
01-00485-20604			4	1.2	1.94	15°	4	53	
01-00485-20606			6	1.2	1.94	15°	4	53	
01-00485-20610			10	1.2	1.94	15°	4	53	
01-00485-30406	3		R0.05	6	1.8	2.85	15°	6	53
01-00485-30409				9	1.8	2.85	15°	6	53
01-00485-30412				12	1.8	2.85	15°	6	63
01-00485-30415				15	1.8	2.85	15°	6	63
01-00485-30506			R0.1	6	1.8	2.85	15°	6	53
01-00485-30509				9	1.8	2.85	15°	6	53
01-00485-30512				12	1.8	2.85	15°	6	63
01-00485-30515				15	1.8	2.85	15°	6	63
01-00485-30606			R0.2	6	1.8	2.85	15°	6	53
01-00485-30609				9	1.8	2.85	15°	6	53
01-00485-30612				12	1.8	2.85	15°	6	63
01-00485-30615				15	1.8	2.85	15°	6	63

How to Order

When you order, indicate SHPR400 (D)×(R)×(ℓ1).

※(γ) is reference value.

Recommended Milling Conditions

Work Material				Hardened Steels STAVAX·SKD61 (~52HRC)				Hardened Steels SKD11·ELMAX (~62HRC)				High Speed Steels SKH·HAP (~68HRC)			
Dia.	Corner Radius	Under Neck Length	L/D	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
				a _p mm	a _e mm	mm/min	min ⁻¹	a _p mm	a _e mm	mm/min	min ⁻¹	a _p mm	a _e mm	mm/min	min ⁻¹
0.1	R0.01	0.2	2	0.002	0.015	320	50,000	0.002	0.01	240	50,000	0.001	0.01	120	50,000
		0.3	3	0.002	0.015	240	50,000	0.001	0.01	160	50,000	0.001	0.01	60	50,000
		0.5	5	0.002	0.01	240	50,000	0.001	0.01	160	50,000	0.001	0.01	60	50,000
	R0.02	0.2	2	0.002	0.015	400	50,000	0.002	0.01	300	50,000	0.001	0.01	200	50,000
		0.3	3	0.002	0.015	300	50,000	0.001	0.01	200	50,000	0.001	0.01	100	50,000
		0.5	5	0.002	0.01	300	50,000	0.001	0.01	200	50,000	0.001	0.01	100	50,000
0.15	R0.02	0.2	1.3	0.003	0.02	500	50,000	0.003	0.02	400	50,000	0.002	0.015	300	50,000
		0.3	2	0.003	0.02	400	50,000	0.003	0.02	300	50,000	0.002	0.015	200	50,000
		0.5	3.3	0.002	0.02	400	50,000	0.002	0.02	300	50,000	0.001	0.015	200	50,000
	R0.03	0.2	1.3	0.003	0.02	500	50,000	0.003	0.02	400	50,000	0.002	0.015	300	50,000
		0.3	2	0.003	0.02	400	50,000	0.003	0.02	300	50,000	0.002	0.015	200	50,000
		0.5	3.3	0.002	0.02	400	50,000	0.002	0.02	300	50,000	0.001	0.015	200	50,000
0.2	R0.02	0.3	1.5	0.003	0.03	800	50,000	0.003	0.03	700	50,000	0.002	0.02	500	50,000
		0.5	2.5	0.003	0.03	600	50,000	0.003	0.03	600	50,000	0.002	0.02	400	50,000
		1	5	0.003	0.02	400	50,000	0.003	0.02	400	50,000	0.002	0.01	200	50,000
	R0.03	0.3	1.5	0.003	0.03	800	50,000	0.003	0.03	700	50,000	0.002	0.02	500	50,000
		0.5	2.5	0.003	0.03	600	50,000	0.003	0.03	600	50,000	0.002	0.02	400	50,000
		1	5	0.003	0.02	400	50,000	0.003	0.02	400	50,000	0.002	0.01	200	50,000
0.3	R0.02	0.5	1.7	0.003	0.05	800	50,000	0.003	0.05	700	50,000	0.002	0.03	500	50,000
		0.75	2.5	0.003	0.05	800	50,000	0.003	0.05	640	50,000	0.002	0.03	480	50,000
		1	3.3	0.003	0.05	800	50,000	0.003	0.05	640	50,000	0.002	0.03	480	50,000
		1.5	5	0.003	0.03	640	50,000	0.003	0.03	480	50,000	0.002	0.02	320	50,000
		2	6.7	0.003	0.03	640	50,000	0.003	0.03	480	50,000	0.002	0.02	320	50,000
	R0.05	0.5	1.7	0.003	0.05	1,000	50,000	0.003	0.05	800	50,000	0.002	0.03	600	50,000
		0.75	2.5	0.003	0.05	1,000	50,000	0.003	0.05	800	50,000	0.002	0.03	600	50,000
		1	3.3	0.003	0.05	1,000	50,000	0.003	0.05	800	50,000	0.002	0.03	600	50,000
		1.5	5	0.003	0.03	800	50,000	0.003	0.03	600	50,000	0.002	0.02	400	50,000
		2	6.7	0.003	0.03	800	50,000	0.003	0.03	600	50,000	0.002	0.02	400	50,000
0.4	R0.02	0.5	1.3	0.004	0.1	900	50,000	0.004	0.1	800	50,000	0.003	0.08	600	50,000
		1	2.5	0.004	0.1	900	50,000	0.004	0.1	800	50,000	0.003	0.08	600	50,000
		1.5	3.8	0.004	0.1	900	50,000	0.004	0.1	800	50,000	0.003	0.08	600	50,000
		2	5	0.004	0.08	800	50,000	0.004	0.08	700	50,000	0.003	0.05	500	50,000
		2.5	6.3	0.004	0.08	800	50,000	0.004	0.08	700	50,000	0.003	0.05	500	50,000
	R0.05	0.5	1.3	0.005	0.1	1,100	50,000	0.005	0.1	1,000	50,000	0.004	0.08	800	50,000
		1	2.5	0.005	0.1	1,100	50,000	0.005	0.1	1,000	50,000	0.004	0.08	800	50,000
		1.5	3.8	0.005	0.1	1,100	50,000	0.005	0.1	1,000	50,000	0.004	0.08	800	50,000
		2	5	0.005	0.08	1,000	50,000	0.005	0.08	800	50,000	0.004	0.05	600	50,000
		2.5	6.3	0.005	0.08	1,000	50,000	0.005	0.08	800	50,000	0.004	0.05	600	50,000
	R0.1	0.5	1.3	0.008	0.1	1,200	50,000	0.008	0.1	1,100	50,000	0.005	0.08	900	50,000
		1	2.5	0.008	0.1	1,200	50,000	0.008	0.1	1,100	50,000	0.005	0.08	900	50,000
		1.5	3.8	0.008	0.1	1,200	50,000	0.008	0.1	1,100	50,000	0.005	0.08	900	50,000
		2	5	0.005	0.08	1,200	50,000	0.005	0.08	1,100	50,000	0.004	0.05	900	50,000
2.5		6.3	0.005	0.08	1,200	50,000	0.005	0.08	1,100	50,000	0.004	0.05	900	50,000	
0.5	R0.02	0.5	1	0.005	0.15	1,000	50,000	0.005	0.15	1,000	50,000	0.003	0.1	800	50,000
		1	2	0.005	0.15	1,000	50,000	0.005	0.15	1,000	50,000	0.003	0.1	800	50,000
		1.5	3	0.005	0.15	1,000	50,000	0.005	0.15	1,000	50,000	0.003	0.1	800	50,000
		2	4	0.005	0.1	1,000	50,000	0.005	0.1	1,000	50,000	0.003	0.08	800	50,000
		2.5	5	0.005	0.08	1,000	50,000	0.005	0.08	1,000	50,000	0.003	0.05	800	50,000
	R0.05	0.5	1	0.01	0.15	1,200	50,000	0.01	0.15	1,200	50,000	0.007	0.1	1,000	50,000
		1	2	0.01	0.15	1,200	50,000	0.01	0.15	1,200	50,000	0.007	0.1	1,000	50,000
		1.5	3	0.01	0.15	1,200	50,000	0.01	0.15	1,200	50,000	0.007	0.1	1,000	50,000
		2	4	0.007	0.12	1,200	50,000	0.007	0.12	1,200	50,000	0.005	0.08	1,000	50,000
		2.5	5	0.007	0.1	1,200	50,000	0.007	0.1	1,200	50,000	0.005	0.07	1,000	50,000

Recommended Milling Conditions

Work Material				Hardened Steels STAVAX·SKD61 (~52HRC)				Hardened Steels SKD11·ELMAX (~62HRC)				High Speed Steels SKH·HAP (~68HRC)			
Dia.	Corner Radius	Under Neck Length	L/D	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
				a _p mm	a _e mm	mm/min	min ⁻¹	a _p mm	a _e mm	mm/min	min ⁻¹	a _p mm	a _e mm	mm/min	min ⁻¹
0.5	R0.1	0.5	1	0.02	0.15	1,600	50,000	0.02	0.15	1,500	50,000	0.01	0.1	1,400	50,000
		1	2	0.02	0.15	1,600	50,000	0.02	0.15	1,500	50,000	0.01	0.1	1,400	50,000
		1.5	3	0.02	0.15	1,600	50,000	0.02	0.15	1,500	50,000	0.01	0.1	1,400	50,000
		2	4	0.01	0.12	1,600	50,000	0.01	0.12	1,500	50,000	0.008	0.08	1,400	50,000
		2.5	5	0.008	0.1	1,600	50,000	0.008	0.1	1,500	50,000	0.005	0.07	1,400	50,000
0.6	R0.02	0.5	0.8	0.005	0.18	1,200	50,000	0.005	0.18	1,200	50,000	0.003	0.15	1,000	50,000
		1	1.7	0.005	0.18	1,200	50,000	0.005	0.18	1,200	50,000	0.003	0.15	1,000	50,000
		1.5	2.5	0.005	0.18	1,200	50,000	0.005	0.18	1,200	50,000	0.003	0.15	1,000	50,000
		2	3.3	0.005	0.18	1,200	50,000	0.005	0.18	1,200	50,000	0.003	0.15	1,000	50,000
		2.5	4.2	0.005	0.15	1,200	50,000	0.005	0.15	1,200	50,000	0.003	0.12	1,000	50,000
	R0.05	0.5	0.8	0.01	0.18	1,400	50,000	0.01	0.18	1,400	50,000	0.007	0.15	1,200	50,000
		1	1.7	0.01	0.18	1,400	50,000	0.01	0.18	1,400	50,000	0.007	0.15	1,200	50,000
		1.5	2.5	0.01	0.18	1,400	50,000	0.01	0.18	1,400	50,000	0.007	0.15	1,200	50,000
		2	3.3	0.01	0.18	1,400	50,000	0.01	0.18	1,400	50,000	0.007	0.15	1,200	50,000
	R0.1	0.5	0.8	0.02	0.2	1,800	50,000	0.02	0.18	1,600	50,000	0.01	0.15	1,400	50,000
		1	1.7	0.02	0.2	1,800	50,000	0.02	0.18	1,600	50,000	0.01	0.15	1,400	50,000
		1.5	2.5	0.02	0.2	1,800	50,000	0.02	0.18	1,600	50,000	0.01	0.15	1,400	50,000
		2	3.3	0.02	0.2	1,800	50,000	0.02	0.18	1,600	50,000	0.01	0.15	1,400	50,000
		2.5	4.2	0.02	0.18	1,800	50,000	0.02	0.15	1,600	50,000	0.01	0.12	1,400	50,000
	0.8	R0.02	1.5	1.9	0.005	0.2	1,400	45,000	0.005	0.2	1,400	45,000	0.003	0.1	1,000
2.5			3.1	0.005	0.2	1,400	45,000	0.005	0.2	1,400	45,000	0.003	0.1	1,000	40,000
5			6.3	0.005	0.1	1,400	45,000	0.005	0.1	1,400	45,000	0.003	0.05	1,000	40,000
R0.05		1.5	1.9	0.01	0.25	1,800	45,000	0.01	0.2	1,600	45,000	0.007	0.1	1,200	40,000
		2.5	3.1	0.01	0.25	1,800	45,000	0.01	0.2	1,600	45,000	0.007	0.1	1,200	40,000
		5	6.3	0.01	0.2	1,800	45,000	0.01	0.15	1,600	45,000	0.005	0.1	1,200	40,000
R0.1		1.5	1.9	0.02	0.3	2,200	45,000	0.02	0.2	1,800	45,000	0.01	0.1	1,400	40,000
		2.5	3.1	0.02	0.3	2,200	45,000	0.02	0.2	1,800	45,000	0.01	0.1	1,400	40,000
		5	6.3	0.01	0.2	2,200	45,000	0.01	0.15	1,800	45,000	0.005	0.1	1,400	40,000
1	R0.02	1	1	0.005	0.4	1,400	40,000	0.005	0.3	1,400	40,000	0.005	0.2	1,200	36,000
		2	2	0.005	0.4	1,400	40,000	0.005	0.3	1,400	40,000	0.005	0.2	1,200	36,000
		3	3	0.005	0.3	1,400	40,000	0.005	0.2	1,400	40,000	0.005	0.1	1,200	36,000
		5	5	0.005	0.3	1,400	40,000	0.005	0.2	1,400	40,000	0.005	0.1	1,200	36,000
		5	5	0.005	0.3	1,400	40,000	0.005	0.2	1,400	40,000	0.005	0.1	1,200	36,000
	R0.05	1	1	0.015	0.4	2,000	40,000	0.01	0.3	1,600	40,000	0.01	0.2	1,200	36,000
		2	2	0.015	0.4	2,000	40,000	0.01	0.3	1,600	40,000	0.01	0.2	1,200	36,000
		3	3	0.015	0.3	2,000	40,000	0.01	0.2	1,600	40,000	0.01	0.1	1,200	36,000
		5	5	0.01	0.3	1,800	40,000	0.01	0.2	1,600	40,000	0.005	0.1	1,200	36,000
	R0.1	1	1	0.02	0.4	2,200	40,000	0.02	0.3	2,000	40,000	0.01	0.2	1,500	36,000
		2	2	0.02	0.4	2,200	40,000	0.02	0.3	2,000	40,000	0.01	0.2	1,500	36,000
		3	3	0.02	0.3	2,200	40,000	0.02	0.2	2,000	40,000	0.01	0.1	1,500	36,000
		5	5	0.015	0.3	2,200	40,000	0.015	0.2	2,000	40,000	0.007	0.1	1,500	36,000
	R0.2	1	1	0.03	0.4	2,500	40,000	0.03	0.3	2,000	40,000	0.01	0.2	1,500	36,000
		2	2	0.03	0.4	2,500	40,000	0.03	0.3	2,000	40,000	0.01	0.2	1,500	36,000
3		3	0.02	0.3	2,500	40,000	0.02	0.2	2,000	40,000	0.01	0.1	1,500	36,000	
5		5	0.02	0.3	2,500	40,000	0.02	0.2	2,000	40,000	0.007	0.1	1,500	36,000	
1.5	R0.02	2	1.3	0.005	0.6	2,200	36,000	0.005	0.5	1,800	30,000	0.005	0.3	1,300	24,000
		3	2	0.005	0.6	2,200	36,000	0.005	0.5	1,800	30,000	0.005	0.3	1,300	24,000
		4.5	3	0.005	0.6	2,200	36,000	0.005	0.5	1,800	30,000	0.005	0.3	1,200	24,000
		7.5	5	0.005	0.5	2,000	36,000	0.005	0.4	1,700	30,000	0.005	0.2	1,200	24,000
	R0.05	2	1.3	0.02	0.6	2,500	36,000	0.02	0.5	2,000	30,000	0.01	0.3	1,500	24,000
		3	2	0.02	0.6	2,500	36,000	0.02	0.5	2,000	30,000	0.01	0.3	1,500	24,000
		4.5	3	0.02	0.6	2,500	36,000	0.01	0.5	2,000	30,000	0.01	0.3	1,500	24,000
		7.5	5	0.02	0.5	2,400	36,000	0.01	0.4	2,000	30,000	0.01	0.2	1,400	24,000

Recommended Milling Conditions

Work Material				Hardened Steels STAVAX・SKD61 (~52HRC)				Hardened Steels SKD11・ELMAX (~62HRC)				High Speed Steels SKH・HAP (~68HRC)			
Dia.	Corner Radius	Under Neck Length	L/D	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
				ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹
1.5	R0.1	2	1.3	0.04	0.6	4,000	36,000	0.03	0.5	3,200	30,000	0.015	0.3	2,000	24,000
		3	2	0.04	0.6	3,500	36,000	0.03	0.5	2,800	30,000	0.015	0.3	1,800	24,000
		4.5	3	0.04	0.6	3,500	36,000	0.03	0.5	2,800	30,000	0.01	0.3	1,800	24,000
		7.5	5	0.03	0.5	3,000	36,000	0.02	0.4	2,500	30,000	0.01	0.2	1,600	24,000
	R0.2	2	1.3	0.04	0.6	4,000	36,000	0.03	0.5	3,200	30,000	0.015	0.3	2,000	24,000
		3	2	0.04	0.6	3,500	36,000	0.03	0.5	2,800	30,000	0.015	0.3	1,800	24,000
		4.5	3	0.04	0.6	3,500	36,000	0.03	0.5	2,800	30,000	0.01	0.3	1,800	24,000
		7.5	5	0.03	0.5	3,000	36,000	0.02	0.4	2,500	30,000	0.01	0.2	1,600	24,000
2	R0.02	3	1.5	0.005	0.8	2,500	30,000	0.005	0.7	2,000	24,000	0.005	0.4	1,200	16,000
		4	2	0.005	0.8	2,300	30,000	0.005	0.7	1,800	24,000	0.005	0.4	1,100	16,000
		6	3	0.005	0.8	2,300	30,000	0.005	0.7	1,800	24,000	0.005	0.4	1,100	16,000
		10	5	0.005	0.6	2,200	30,000	0.005	0.5	1,700	24,000	0.005	0.3	1,000	16,000
	R0.05	3	1.5	0.025	0.8	2,700	30,000	0.02	0.7	2,200	24,000	0.015	0.4	1,300	16,000
		4	2	0.025	0.8	2,700	30,000	0.02	0.7	2,200	24,000	0.015	0.3	1,300	16,000
		6	3	0.025	0.8	2,700	30,000	0.02	0.7	2,200	24,000	0.015	0.3	1,300	16,000
		10	5	0.02	0.6	2,500	30,000	0.015	0.5	2,000	24,000	0.01	0.3	1,200	16,000
	R0.1	3	1.5	0.05	0.8	4,000	30,000	0.04	0.7	3,200	24,000	0.02	0.4	1,500	16,000
		4	2	0.05	0.8	3,500	30,000	0.04	0.7	2,800	24,000	0.02	0.3	1,500	16,000
		6	3	0.04	0.8	3,500	30,000	0.03	0.7	2,800	24,000	0.02	0.3	1,500	16,000
		10	5	0.03	0.6	3,000	30,000	0.02	0.5	2,400	24,000	0.01	0.3	1,300	16,000
	R0.2	3	1.5	0.05	0.8	4,000	30,000	0.04	0.7	3,200	24,000	0.02	0.4	1,500	16,000
		4	2	0.05	0.8	3,500	30,000	0.04	0.7	2,800	24,000	0.02	0.3	1,500	16,000
		6	3	0.04	0.8	3,500	30,000	0.03	0.7	2,800	24,000	0.02	0.3	1,500	16,000
		10	5	0.03	0.6	3,000	30,000	0.02	0.5	2,400	24,000	0.01	0.3	1,300	16,000
3	R0.05	6	2	0.03	1	2,700	24,000	0.02	0.85	2,200	20,000	0.015	0.6	1,300	12,000
		9	3	0.03	1	2,700	24,000	0.02	0.85	2,200	20,000	0.015	0.6	1,300	12,000
		12	4	0.03	0.85	2,700	24,000	0.02	0.7	2,200	20,000	0.015	0.5	1,300	12,000
		15	5	0.02	0.85	2,500	24,000	0.02	0.7	2,000	20,000	0.01	0.5	1,200	12,000
	R0.1	6	2	0.05	1	4,000	24,000	0.04	0.85	3,200	20,000	0.02	0.6	1,500	12,000
		9	3	0.05	1	3,500	24,000	0.04	0.85	2,800	20,000	0.02	0.6	1,500	12,000
		12	4	0.04	0.85	3,500	24,000	0.04	0.7	2,800	20,000	0.02	0.5	1,500	12,000
		15	5	0.03	0.85	3,000	24,000	0.03	0.7	2,400	20,000	0.015	0.5	1,300	12,000
	R0.2	6	2	0.05	1	4,000	24,000	0.04	0.85	3,200	20,000	0.02	0.6	1,500	12,000
		9	3	0.05	1	3,500	24,000	0.04	0.85	2,800	20,000	0.02	0.6	1,500	12,000
		12	4	0.04	0.85	3,500	24,000	0.04	0.7	2,800	20,000	0.02	0.5	1,500	12,000
		15	5	0.03	0.85	3,000	24,000	0.03	0.7	2,400	20,000	0.015	0.5	1,300	12,000
Notes				<p>※1 Depth of Cut shows maximum value for semi-finishing and finishing. Adjust milling conditions depending on rigidity of machine, desired accuracy and milling shape.</p> <p>※2 Depth of Cut : ap = Axial Depth of Cut / ae = Radial Depth of Cut.</p> <p>※3 To achieve better cutting surface, obtain uniform stock amount on cutting surface in semi-finishing.</p> <p>※4 When machining at high load area, such as corners, please pay attention to set cutting condition and tool paths.</p> <p>※5 Recommend to apply helical or ramping for approaching into axial direction.</p> <p>※6 Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.</p> <p>※7 We recommend using oil mist coolant.</p>											

Single flute for hardened steel machining achieves high precision finishing on plane surface

CBN Super Surface End Mill

SSF120



$\phi 0.2 \times R0.05 \sim \phi 2 \times R0.1$

Total 9 sizes

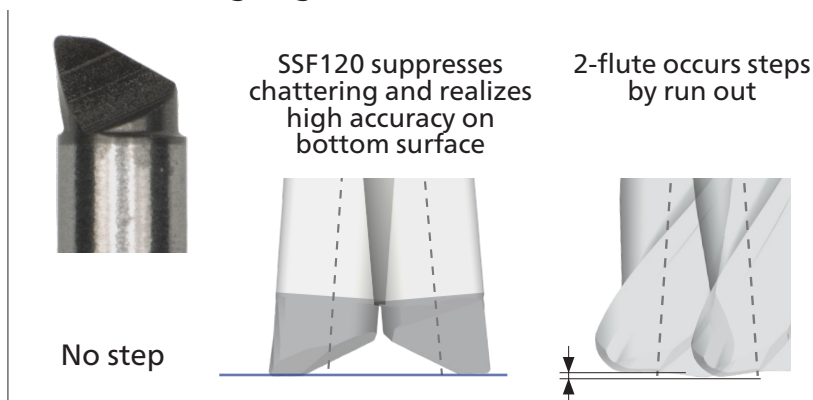


Features

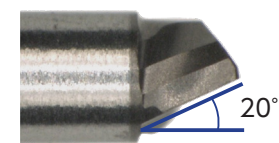
Bottom surface finishing

Unique cutting edge design achieves high precise bottom surface finishing

Single flute design suppresses chattering at end cutting edge

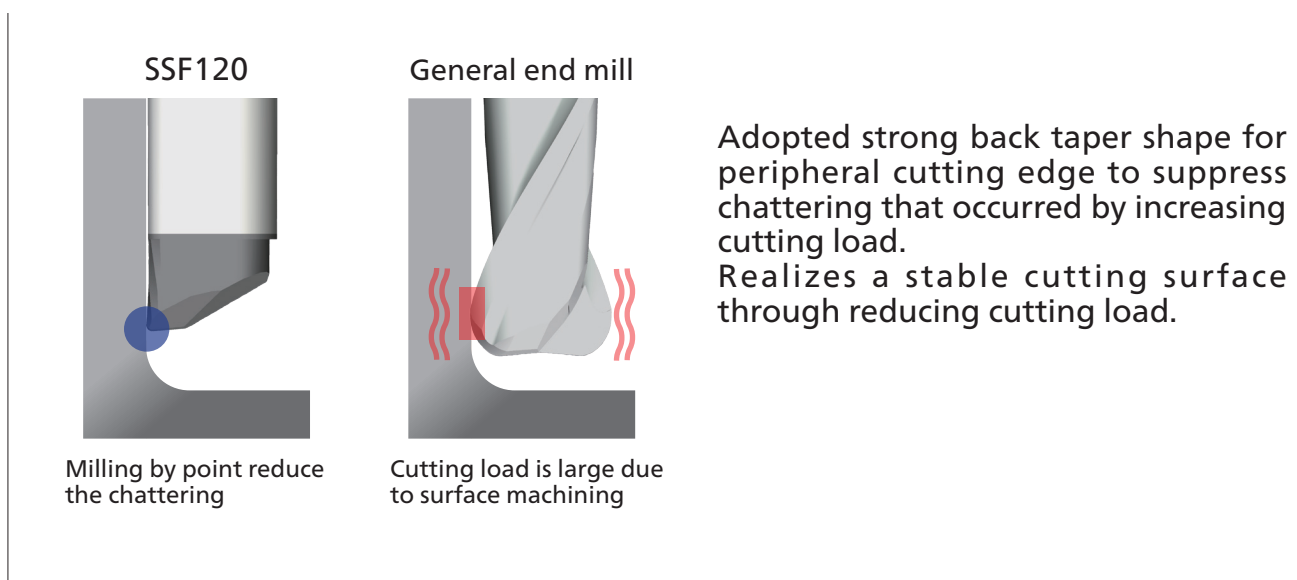


High rigidity tool design



Left-handed 20° helix angle increases tool rigidity

Peripheral cutting edge with back taper design

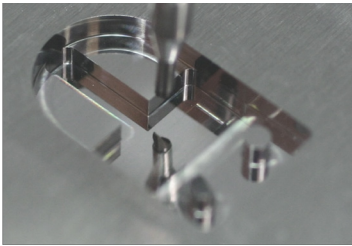


Machining case 1

Micro pocket DC53 (60HRC)

Surface roughness of Ra0.007um is achieved by pocket processing using a specialized tool for bottom surface machining

Work material : DC53 (60HRC)
 Work size : 10 x 6 mm
 (Machining depth 2 mm)
 Coolant : Oil mist
 Finishing machining time : 1hr 36min



Surface roughness : Rz 0.070 μm
 Ra 0.007 μm

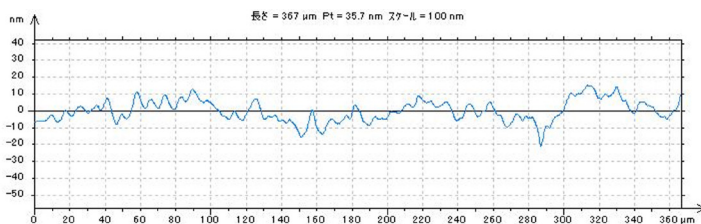
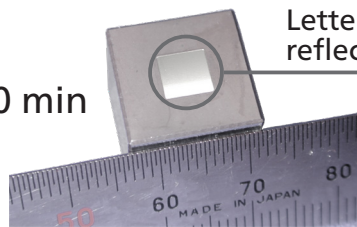
Tool	SSF120 φ0.8 x R0.05 x 2
Spindle speed [min ⁻¹]	35,000
Feed [mm/min]	150
Depth of cut ap x ae [mm]	Side : 0.01 x 0.01 Flat : 0.003 x 0.005

Machining case 2

Mirror finishing DC53 (60HRC)

Achieves a high surface roughness of Rz0.0163um that clearly reflects letters on the machined surface

Work material : DC53 (60HRC)
 Work size : 15 x 15 mm
 Coolant : Oil mist
 Total machining time : 30 min



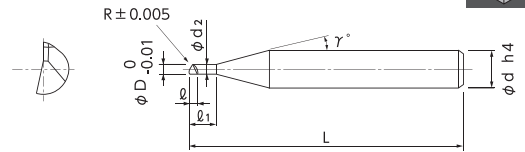
Surface roughness : Rz 0.0163 μm

Tool	SSF120 φ0.5 x R0.05 x 0.25
Spindle speed [min ⁻¹]	120,000
Feed [mm/min]	300
Depth of cut ap x ae [mm]	0.002 x 0.005

CBN Super Surface End Mill

Total 9 sizes

Single flute end mill for hardened steels
Specialized for accurate finishing on flat surface

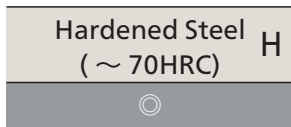


- Appropriate for datum plane machining on precision machining.
- NS original design and corner R to realize stable machining surface.



Cutting edge shape

Work Material



Unit [Size : mm]

Code No.	Dia. (D)	Corner Radius (R)	Length of Cut (ℓ)	Under Neck Length (ℓ1)	Neck Dia. (d2)	Neck Taper Angle (γ)	Shank Dia. (d)	Overall Length (L)
01-00470-00020	0.2	R0.05	0.1	0.5	0.19	15°	4	50
01-00470-00030	0.3	R0.05	0.15	0.75	0.28	15°	4	50
01-00470-00040	0.4	R0.05	0.2	1	0.37	15°	4	50
01-00470-00050	0.5	R0.05	0.25	1.25	0.46	15°	4	50
01-00470-00060	0.6	R0.05	0.3	1.5	0.56	15°	4	50
01-00470-00080	0.8	R0.05	0.4	2	0.76	15°	4	50
01-00470-00100	1	R0.1	0.5	2.5	0.95	15°	4	50
01-00470-00150	1.5	R0.1	0.75	3.8	1.45	15°	4	52
01-00470-00200	2	R0.1	1	5	1.94	15°	4	52

How to Order

When you order, indicate SSF120 (D).

※(γ) is reference value.

Work Material	Hardened Steels・High Speed Steels STAVAX・SKD11・SKH (~68HRC)			
	Depth of Cut		Feed	Spindle Speed
	a_p mm	a_e mm	mm/min	min ⁻¹
0.2	0.002	0.003	50	60,000
0.3	0.002	0.003	100	60,000
0.4	0.002	0.003	150	60,000
0.5	0.003	0.005	200	60,000
0.6	0.003	0.005	240	60,000
0.8	0.003	0.008	280	60,000
1	0.005	0.01	300	60,000
1.5	0.005	0.02	400	60,000
2	0.005	0.03	500	60,000
Notes	※1 Depth of Cut: a_p =Axial Depth of Cut / a_e =Radial Depth of Cut. ※2 We recommend using oil mist coolant. ※3 Machine, tool chuck must be sufficiently accurate. ※4 Length of tool overhang must be as short as possible.			

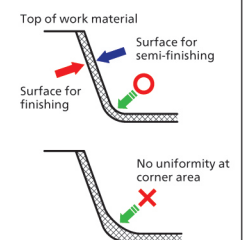
Points in Use

Advice on Cutting Environment

- Minimize the deflection of cutting edge.
- To understand the nature of the expansion of the main spindle and machine posture transformation, and take measures against them.

Advice on Finishing Allowance (stock amount)

- When using small CBN End Mill, **uniform finishing allowance (stock amount) is important.**
- When tool is used on roughing and semi-finishing and it has a big abrasion, finishing allowance (stock amount) on semi-finishing and finishing is increasing and it affects tool life and cutting accuracy. **Therefore, it is important to get uniform stock amount in the pre-stage cutting.**



NS TOOL CO.,LTD.

www.ns-tool.com

6F., Sumitomo Fudosan Oimachi Ekimae Bldg.,
1-28-1 Oi, Shinagawa-ku, Tokyo 140-0014, Japan
TEL. +81-3-3774-2459 FAX. +81-3-3774-2460

NS TOOL USA, INC.

us.ns-tool.com

2265 Building # 3, Star CT.,
Rochester Hills, MI 48309, USA
TEL. +1-248-829-1960

Attention on Safety

- 1) When removing tools from cases, be careful of getting-out of tools and don't touch directly the cutting edges.
- 2) Never touch the cutting edges directly with bare hand.
- 3) Use safety covers and eye protection, as tools may be broken.
- 4) Use holders, etc. that match the tools and nature of the machining operations.
The tool should be firmly attached to the holder to prevent shaking.
- 5) The work materials clamp firmly.
- 6) Make sure of dimensions of tools and work pieces before starting operation.
- 7) It is necessary to adjust conditions according to the dimensions of work materials and the machine.
- 8) Select a cutting fluid appropriate to the particular usage. Using water-insoluble fluid could lead to fires due to sparks generated during machining or heat caused by breakage.
Ensure that you take proper fire-prevention measures.
- 9) If abnormal sound, etc. occurs during machining, stop the machine immediately.
- 10) Don't modify tools.