Solid Ball Nose End Mill for Machining Hardened Material (Micro Solid Tools)

2KMB

Coating with Kyocera's Original Technology MEGACOAT HARD EX Provides Long Tool Life, High Quality and Stable Machining

**A new lineup has been added to the K-series.
Solid tool for hardened material supporting up to 70 HRC is now available!
Higher precision, larger variety.
New tools bring new innovation!
The K-series continues to overcome numerous machining challenges.**

Expanded lineup of standard and long neck types NEW

K-series
Let your potential shine

Solid Ball Nose End Mill for Machining Hardened Material (Micro Solid Tools)

2KMB

Standard Type
Total 17 Items
R0.05 - R3.0

Long Neck Type
Total 166 Items
R0.05 - R3.0

Solving new challenges in solid tool machining

The new lineup of the K-series is an essential tool for precision parts and mold machining.
Kyocera will expand the possibilities of solid tools and support your manufacturing.

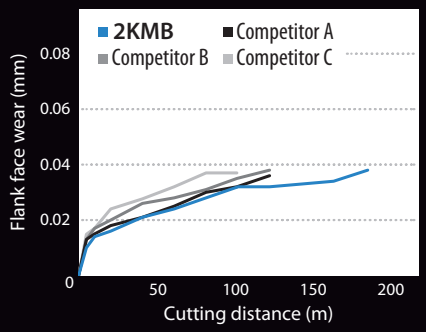
Long Tool Life in Various Hardened Materials

Prehardened Steel 35 -45 HRC	Prehardened Steel Hardened Steel 45 -55 HRC	Hardened Steel 55 -62 HRC	Hardened Steel 62 -66 HRC	Hardened Steel 66 -**70 HRC**

Compatible with a variety of hardened materials such as stainless steel, high-speed steel, etc., as well as alloy tool steel **(~ 70 HRC)**

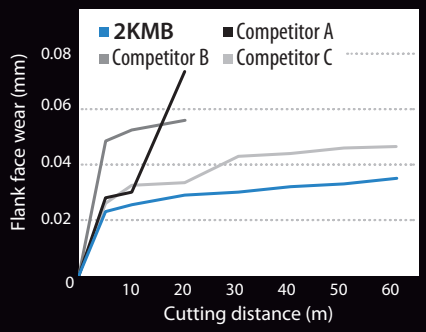
Wear Resistance Comparison (Internal evaluation)

STAVAX (55HRC)



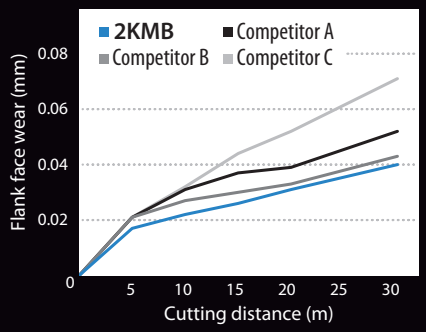
Cutting Conditions: n = 20,000 min^{-1}, Vf = 1,320 mm/min,
ap x ae = 0.08 x 0.2 mm, Wet (Mist) ø2

SKD11 (60HRC)



Cutting Conditions: n = 16,900 min^{-1}, Vf = 1,320 mm/min,
ap x ae = 0.08 x 0.2 mm, Wet (Mist) ø2

Powder high-speed steel (70HRC)



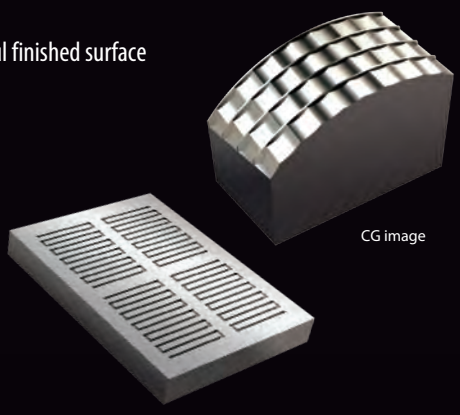
Cutting Conditions: n = 13,700 min^{-1}, Vf = 1,190 mm/min,
ap x ae = 0.08 x 0.2 mm, Wet (Mist) ø2

Experience the Excellent Finish

The new MEGACOAT HARD EX coating technology and a unique shape creates a glossy and beautiful finished surface
Reduced process cycle times

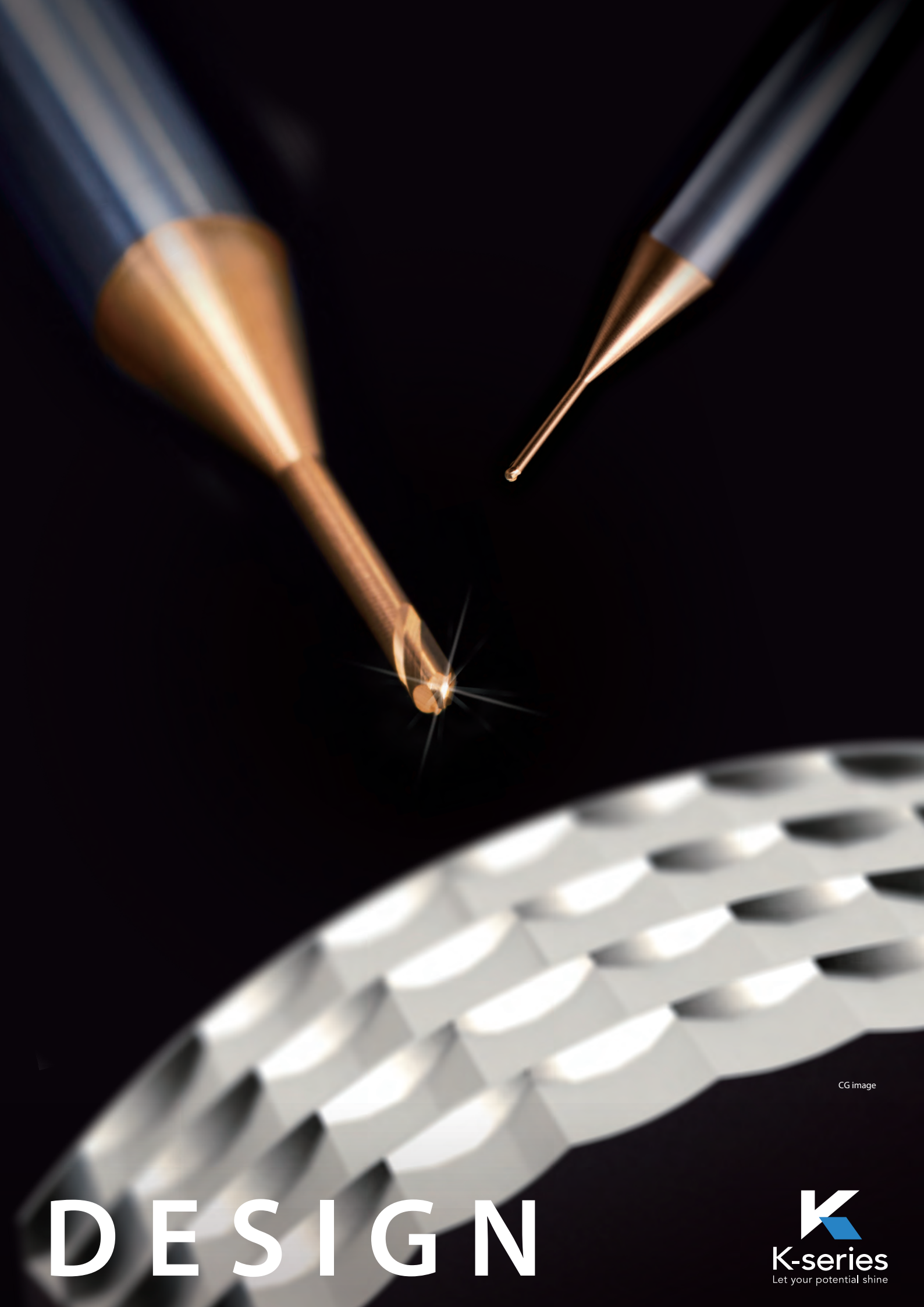
Surface Finish Condition
(Internal evaluation)

Cutting Conditions: n = 18,000 min^{-1},
Vf = 1,600 mm/min,
ap x ae = 0.1 x 0.15 mm,
Wet (Mist)
ø 2.5 (Long Neck Type)
Powder high-speed steel (70 HRC)



CG image

INNOVATIVE


CG image
DESIGN
K-series
Let your potential shine

Long Tool Life with Unique Coating

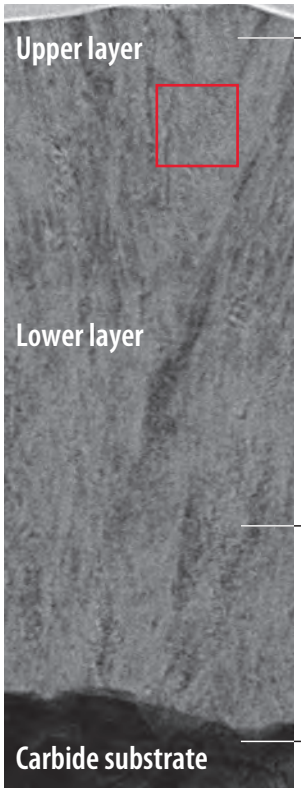
New PVD Coating NEW

MEGACOAT HARD EX

Kyocera's Original New Coating MEGACOAT HARD Enables Long Tool Life for Various Hardened Materials.

Advanced Technology from Kyocera Uses a Special Two-layer Structure with both Chipping Resistance and Abrasion Resistance

Section view



Chipping Suppression

High-toughness Crystalline Layer

- Unique structure for high shock resistance
- Toughness improvement by controlling internal stress and crystal growth direction

Suppresses the progression of high-temperature wear

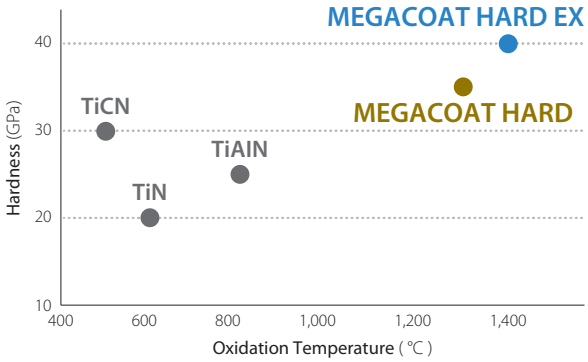
Special Laminated Structural Layer

- High hardness
- Excellent oxidation resistance and unique composition design with high lubricity

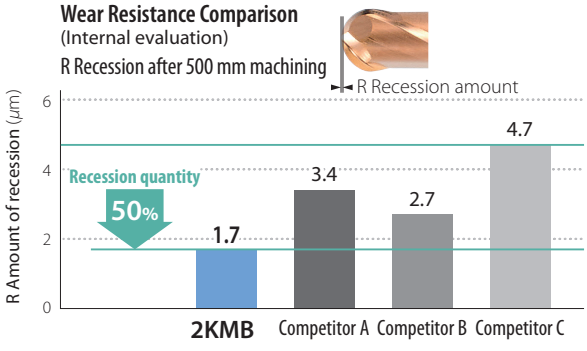
Suppresses hard film peeling

Special Interface Treatment

Coating Properties



Wear Resistance Comparison
(Internal evaluation)
R Recession after 500 mm machining



Cutting Conditions: n = 40,000 min^{-1}, Vf = 70 mm/min, ap × ae = 0.003 × 0.005 mm, Wet (Oil-based) Shouldering SKD 11 (60HRC) ø0.1 (Long neck type)

Unique Shape Controls Hardened Material

Point 01

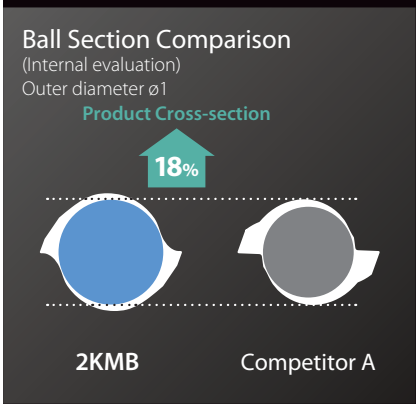
High Quality with an S-shaped flute design

Excellent Sharpness
High Quality Finish and High Abrasion Resistance

Point 02

High Rigidity with a Large Core Thickness

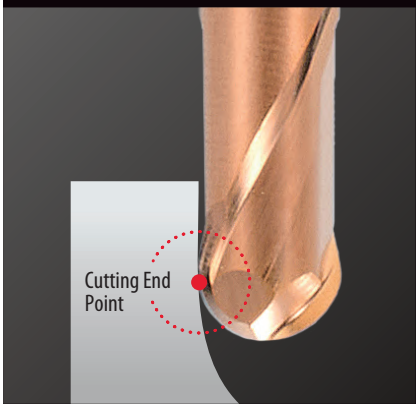
Ensures High Rigidity and Stable Machining



Point 03

Low Resistance with a Strong Back Taper

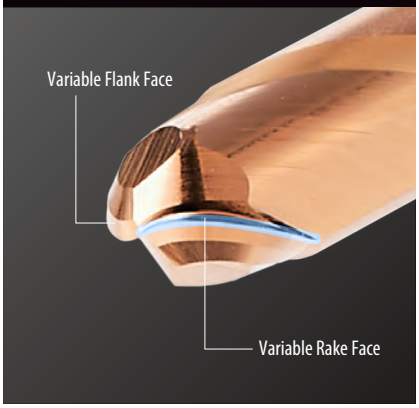
Chatter Resistant Point Design
Improves Finished Surface Quality and Reduction of Inclination



Point 04

Stable machining with a unique cutting edge shape

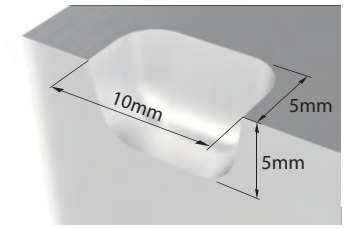
Simultaneous Cutting Edge Strength and Low Resistance
Achieves Stable Machining and High-quality Finished Surfaces



Cutting Performance

(Internal evaluation)

80° Slope Half Pocketing

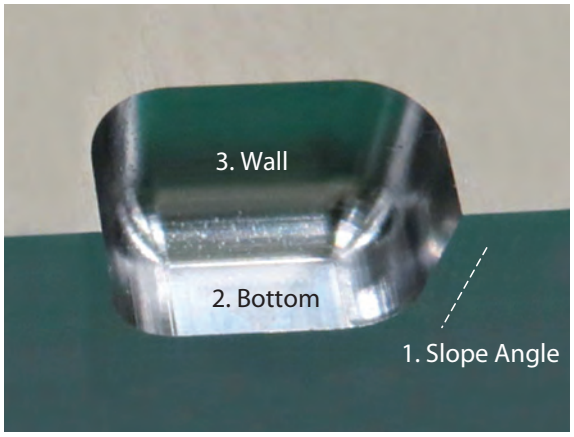


2KMBL0200-0800-S4 Tool diameter DC ø2 Long neck type
SKD11 (60HRC)

	n (min^{-1})	Vf (mm/min)	ap×ae (mm)	Coolant
Wall Finishing	10,000	400	0.02×0.02	Wet (Mist)
Bottom Finishing	10,000	400	0.02×0.02	Wet (Mist)

Provides an excellent surface finish that is resistant to deflection even when machining at large depths

Long tool life with stable cuts and uniform finish is possible

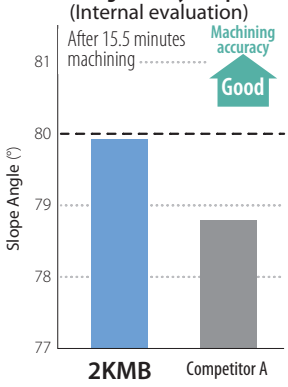


01

Machining Accuracy

2KMB shows smaller deflection and higher precision machining than competitors.

Machining Accuracy Comparison
(Internal evaluation)

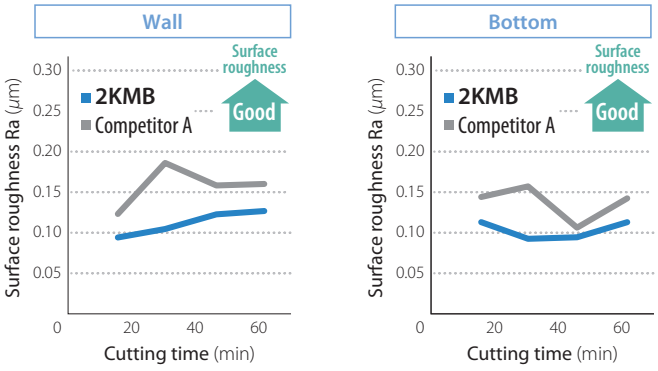


02

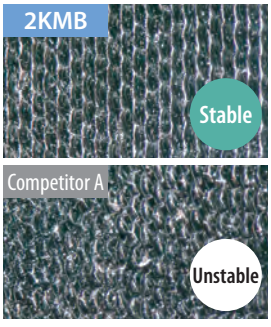
Machining Quality

2KMB shows a better surface and superior surface finish than competitors.

Roughness Comparison (Internal evaluation)



Bottom Condition
(After 62 minutes machining)

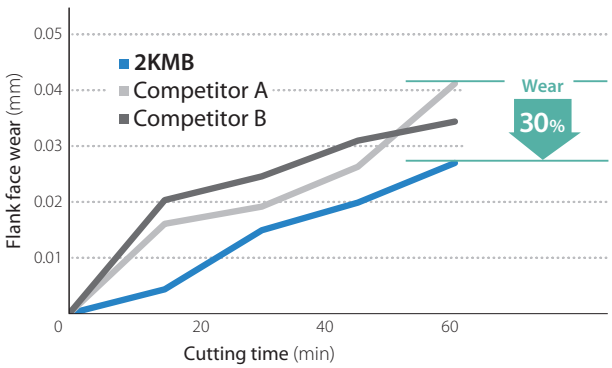


03

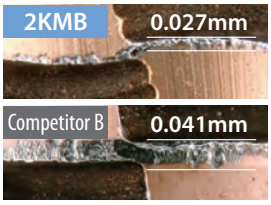
Tool Life

2KMB shows smaller wear with higher wear resistance than competitors.

Wear Resistance Comparison (Internal evaluation)

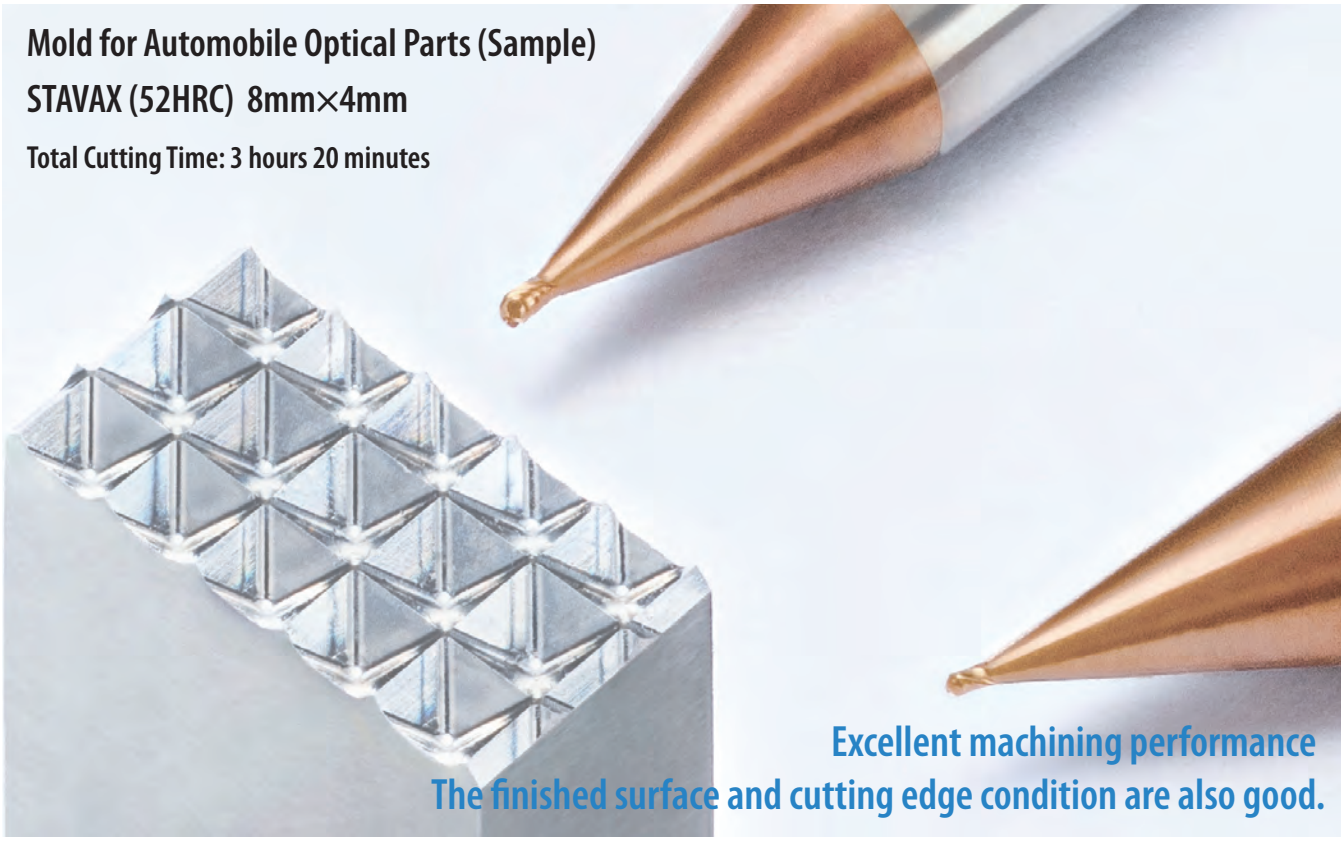


Cutting Edge Condition
(After 62 minutes machining)



Case Studies

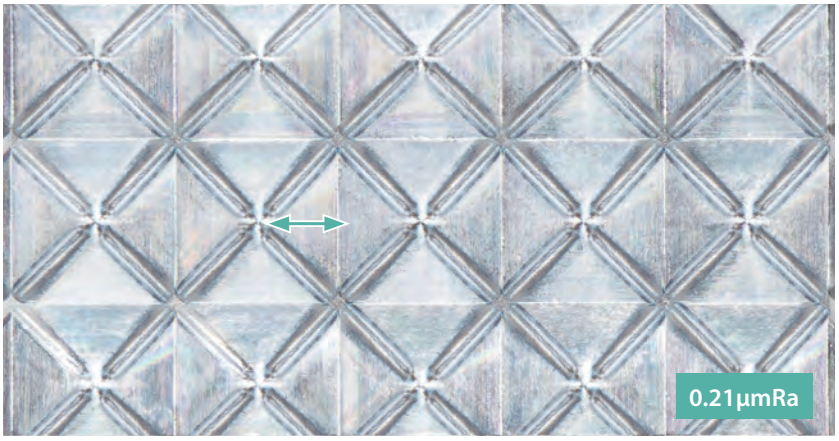
(User evaluation)



Cutting Conditions

	Roughing	Roughing	Medium Roughing	Medium Roughing	Medium Finishing	Finishing
Tool	R0.5 2KMBL0100-0250-S4	R0.3 2KMB0060-0090-S4		R0.2 2KMB0040-0060-S4	R0.2 2KMB0040-0060-S4	R0.2 2KMB0040-0060-S4
No. of Revolutions n (min^{-1})	15,000	15,000	18,000	18,000	18,000	18,000
Vf (mm/min)	600	300	300	150	150	150
ap (mm)	0.035	0.025	0.03	0.02	0.01	0.005
Thickness (mm)	0.2	0.2	0.1	0.1	0.05	0
Cutting Time (min)	8	18	9	21	46	49 x 2 pcs

Finished Surface

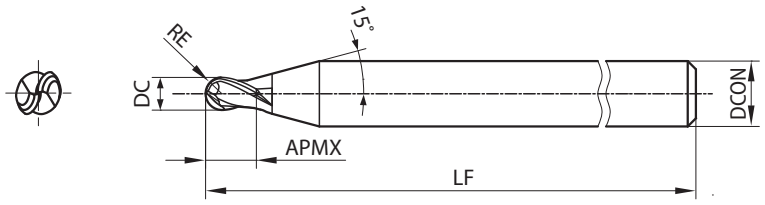


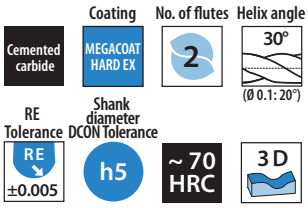
Edge Condition

Roughing and Medium Roughing R0.3

Finishing R0.2

Standard Type





Description	Stock	Dimensions (mm)				
		RE	DC	APMX	DCON	LF
2KMB0010-0010-S4	●	R0.05	0.1	0.1	4	50
2KMB0015-0015-S4	●	R0.075	0.15	0.15	4	50
2KMB0020-0020-S4	●	R0.1	0.2	0.2	4	50
2KMB0030-0030-S4	●	R0.15	0.3	0.3	4	50
2KMB0040-0060-S4	●	R0.2	0.4	0.6	4	50
2KMB0050-0080-S4	●	R0.25	0.5	0.8	4	50
2KMB0060-0090-S4	●	R0.3	0.6	0.9	4	50
2KMB0080-0120-S4	●	R0.4	0.8	1.2	4	50
2KMB0100-0150-S4	●	R0.5	1	1.5	4	50
2KMB0150-0230-S4	●	R0.75	1.5	2.3	4	50
2KMB0200-0300-S4	●	R1	2	3	4	60
2KMB0250-0380-S6	●	R1.25	2.5	3.8	6	60
2KMB0300-0500-S6	●	R1.5	3	5	6	60
2KMB0400-0600-S4	●	R2	4	6	4	70
2KMB0400-0600-S6	●	R2	4	6	6	70
NEW 2KMB0500-0800-S6	●	R2.5	5	8	6	70
NEW 2KMB0600-1000-S6	●	R3	6	10	6	80

The ball radius is based on 1/2 of the actual outer diameter.
Neck angle is a reference value.
Standard type is not a strong back taper shape.

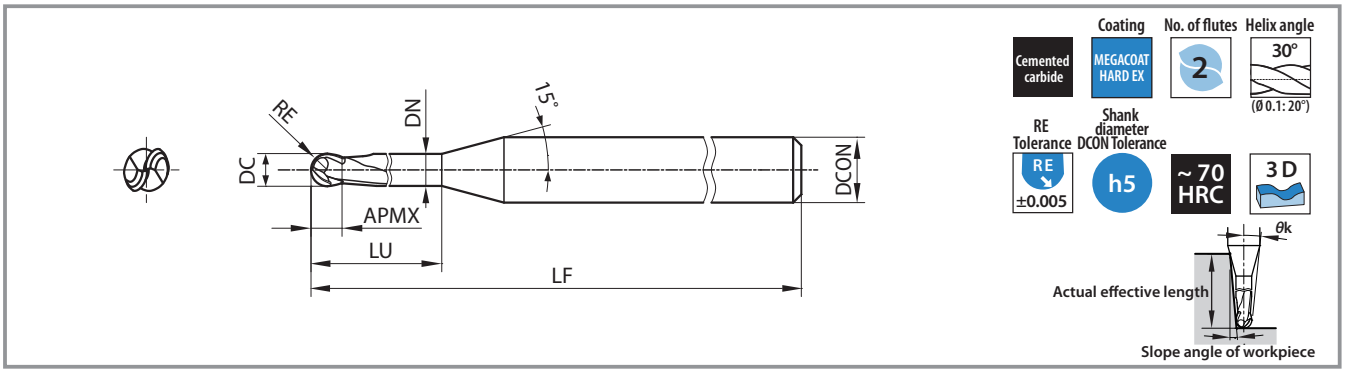
● : Standard Stock

Description's View

Example: 2KMBL0100-0500-S4

2KMB	L	0100	-	0500	-	S4
Product Name For Precision Die (Fine Machining) Solid Ball Nose End Mill 2-Flute	Type None: Standard Type L: Long Neck Type	Outer Diameter DC ø1.0		Standard Type: Flute Length (APMX) Long Neck Type: Length Under Neck (LU) 0500 : LU 5mm		Shank Diameter DCON ø 4.0

Long Neck Type

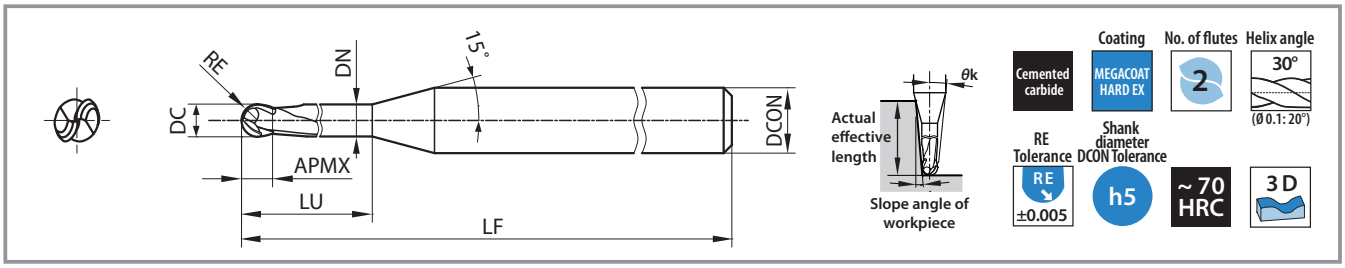


Description	Stock	Dimensions (mm)							Interference Angle	Actual effective length for slope angle of workpiece				
		RE	DC	APMX	LU	DN	DCON	LF	θk	0.5°	1°	1.5°	2°	3°
2KMBL0010-0020-S4	●	R0.05	0.1	0.07	0.2	0.09	4	45	14.68°	0.22	0.23	0.23	0.24	0.25
2KMBL0010-0030-S4	●				0.3				14.49°	0.32	0.33	0.34	0.35	0.38
2KMBL0010-0050-S4	●				0.5				14.13°	0.53	0.55	0.56	0.58	0.63
2KMBL0015-0030-S4	●	R0.075	0.15	0.1	0.3	0.14	4	45	14.53°	0.32	0.33	0.34	0.35	0.37
2KMBL0015-0050-S4	●				0.5				14.17°	0.53	0.54	0.56	0.58	0.62
2KMBL0015-0100-S4	●				1				13.33°	1.05	1.08	1.12	1.16	1.24
2KMBL0020-0030-S4	●	R0.1	0.2	0.15	0.3	0.19	4	45	14.58°	0.32	0.33	0.34	0.35	0.37
2KMBL0020-0050-S4	●				0.5				14.2°	0.53	0.54	0.56	0.58	0.62
2KMBL0020-0075-S4	●				0.75				13.76°	0.79	0.81	0.84	0.86	0.93
2KMBL0020-0100-S4	●				1				13.35°	1.04	1.08	1.11	1.15	1.24
2KMBL0020-0125-S4	●				1.25				12.96°	1.3	1.35	1.39	1.44	1.55
2KMBL0020-0150-S4	●				1.5				12.59°	1.56	1.61	1.67	1.73	1.86
NEW 2KMBL0020-0175-S4	●				1.75				12.24°	1.82	1.88	1.94	2.01	2.17
NEW 2KMBL0020-0200-S4	●				2				11.91°	2.08	2.15	2.22	2.3	2.48
NEW 2KMBL0020-0250-S4	●				2.5				11.3°	2.6	2.68	2.78	2.88	3.1
2KMBL0030-0050-S4	●	R0.15	0.3	0.2	0.5	0.29	4	45	14.28°	0.53	0.54	0.55	0.57	0.6
2KMBL0030-0060-S4	●				0.6				14.09°	0.63	0.65	0.66	0.68	0.73
2KMBL0030-0075-S4	●				0.75				13.82°	0.78	0.81	0.83	0.86	0.91
2KMBL0030-0100-S4	●				1				13.39°	1.04	1.07	1.11	1.14	1.22
2KMBL0030-0125-S4	●				1.25				12.99°	1.3	1.34	1.38	1.43	1.54
2KMBL0030-0150-S4	●				1.5				12.61°	1.56	1.61	1.66	1.72	1.85
2KMBL0030-0175-S4	●				1.75				12.25°	1.82	1.88	1.94	2.01	2.16
2KMBL0030-0200-S4	●				2				11.91°	2.08	2.14	2.22	2.29	2.47
NEW 2KMBL0030-0225-S4	●				2.25				11.59°	2.33	2.41	2.49	2.58	2.78
NEW 2KMBL0030-0250-S4	●				2.5				11.29°	2.59	2.68	2.77	2.87	3.09
NEW 2KMBL0030-0300-S4	●				3				10.72°	3.11	3.21	3.32	3.44	3.71
NEW 2KMBL0030-0350-S4	●				3.5				10.21°	3.63	3.75	3.88	4.02	4.33
NEW 2KMBL0030-0400-S4	●				4				9.75°	4.14	4.28	4.43	4.59	4.95
2KMBL0040-0050-S4	●	R0.2	0.4	0.3	0.5	0.39	4	45	14.35°	0.52	0.54	0.55	0.56	0.59
2KMBL0040-0080-S4	●				0.8				13.79°	0.83	0.86	0.88	0.91	0.96
2KMBL0040-0100-S4	●				1				13.44°	1.04	1.07	1.1	1.14	1.21
2KMBL0040-0150-S4	●				1.5				12.63°	1.56	1.61	1.66	1.71	1.83
2KMBL0040-0200-S4	●				2				11.91°	2.07	2.14	2.21	2.29	2.46
2KMBL0040-0250-S4	●				2.5				11.27°	2.59	2.68	2.76	2.86	3.08
2KMBL0040-0300-S4	●				3				10.69°	3.11	3.21	3.32	3.44	3.7
NEW 2KMBL0040-0350-S4	●				3.5				10.17°	3.63	3.74	3.87	4.01	4.32
NEW 2KMBL0040-0400-S4	●				4				9.7°	4.14	4.28	4.43	4.59	4.94
NEW 2KMBL0040-0450-S4	●				4.5				9.27°	4.66	4.81	4.98	5.16	5.56
NEW 2KMBL0040-0500-S4	●				5				8.87°	5.18	5.35	5.54	5.74	6.19

The ball radius is based on 1/2 of the actual outer diameter.
Neck angle is a reference value.
Be careful not to interfere with the workpiece.

● : Standard Stock

Long Neck Type



Description	Stock	Dimensions (mm)							Interference Angle	Actual effective length for slope angle of workpiece				
		RE	DC	APMX	LU	DN	DCON	LF	θk	0.5°	1°	1.5°	2°	3°
2KMBL0050-0100-S4	●	R0.25	0.5	0.35	1	0.49	4	45	13.49°	1.04	1.07	1.1	1.13	1.2
2KMBL0050-0150-S4	●				1.5				12.65°	1.56	1.6	1.65	1.7	1.82
2KMBL0050-0200-S4	●				2				11.91°	2.07	2.14	2.21	2.28	2.44
2KMBL0050-0250-S4	●				2.5				11.25°	2.59	2.67	2.76	2.85	3.07
2KMBL0050-0300-S4	●				3				10.66°	3.11	3.21	3.31	3.43	3.69
2KMBL0050-0350-S4	●				3.5				10.13°	3.62	3.74	3.87	4	4.31
2KMBL0050-0400-S4	●				4				9.65°	4.14	4.28	4.42	4.58	4.93
NEW 2KMBL0050-0450-S4	●				4.5				9.21°	4.66	4.81	4.98	5.15	5.55
NEW 2KMBL0050-0500-S4	●				5				8.81°	5.17	5.35	5.53	5.73	6.17
NEW 2KMBL0050-0550-S4	●				5.5				8.44°	5.69	5.88	6.08	6.3	6.79
NEW 2KMBL0050-0600-S4	●				6				8.1°	6.21	6.42	6.64	6.88	7.42
2KMBL0060-0100-S4	●	R0.3	0.6	0.45	1	0.59	4	45	13.54°	1.04	1.06	1.09	1.12	1.19
2KMBL0060-0150-S4	●				1.5				12.67°	1.55	1.6	1.65	1.7	1.81
2KMBL0060-0200-S4	●				2				11.91°	2.07	2.13	2.2	2.27	2.43
2KMBL0060-0250-S4	●				2.5				11.23°	2.59	2.67	2.75	2.85	3.05
2KMBL0060-0300-S4	●				3				10.63°	3.11	3.2	3.31	3.42	3.67
2KMBL0060-0350-S4	●				3.5				10.08°	3.62	3.74	3.86	4	4.3
2KMBL0060-0400-S4	●				4				9.59°	4.14	4.27	4.42	4.57	4.92
2KMBL0060-0450-S4	●				4.5				9.15°	4.66	4.81	4.97	5.15	5.54
2KMBL0060-0500-S4	●				5				8.74°	5.17	5.34	5.52	5.72	6.16
NEW 2KMBL0060-0550-S4	●				5.5				8.37°	5.69	5.88	6.08	6.3	6.78
NEW 2KMBL0060-0600-S4	●				6				8.03°	6.21	6.41	6.63	6.87	7.4
NEW 2KMBL0060-0700-S4	●				7				7.42°	7.24	7.48	7.74	8.02	8.65
NEW 2KMBL0060-0800-S4	●				8				6.9°	8.27	8.55	8.85	9.17	9.89
2KMBL0070-0200-S4	●	R0.35	0.7	0.5	2	0.69	4	45	11.91°	2.07	2.13	2.19	2.26	2.42
2KMBL0070-0400-S4	●				4				9.54°	4.14	4.27	4.41	4.56	4.91
2KMBL0080-0200-S4	●	R0.4	0.8	0.6	2	0.78	4	45	11.88°	2.09	2.15	2.21	2.28	2.43
2KMBL0080-0300-S4	●				3				10.53°	3.12	3.22	3.32	3.43	3.67
2KMBL0080-0400-S4	●				4				9.46°	4.15	4.29	4.43	4.58	4.92
2KMBL0080-0500-S4	●				5				8.58°	5.19	5.36	5.53	5.73	6.16
2KMBL0080-0600-S4	●				6				7.85°	6.22	6.43	6.64	6.88	7.4
NEW 2KMBL0080-0700-S4	●				7				7.24°	7.26	7.49	7.75	8.03	8.65
NEW 2KMBL0080-0800-S4	●				8				6.71°	8.29	8.56	8.86	9.18	9.89
NEW 2KMBL0080-1000-S4	●				10				5.86°	10.36	10.7	11.08	11.48	12.38
2KMBL0090-0200-S4	●	R0.45	0.9	0.65	2	0.88	4	45	11.88°	2.09	2.14	2.2	2.27	2.42
2KMBL0090-0400-S4	●				4				9.4°	4.15	4.28	4.42	4.57	4.9
2KMBL0090-0600-S4	●				6				7.77°	6.22	6.42	6.64	6.87	7.39

The ball radius is based on 1/2 of the actual outer diameter.
Neck angle is a reference value.
Be careful not to interfere with the workpiece.

● : Standard Stock

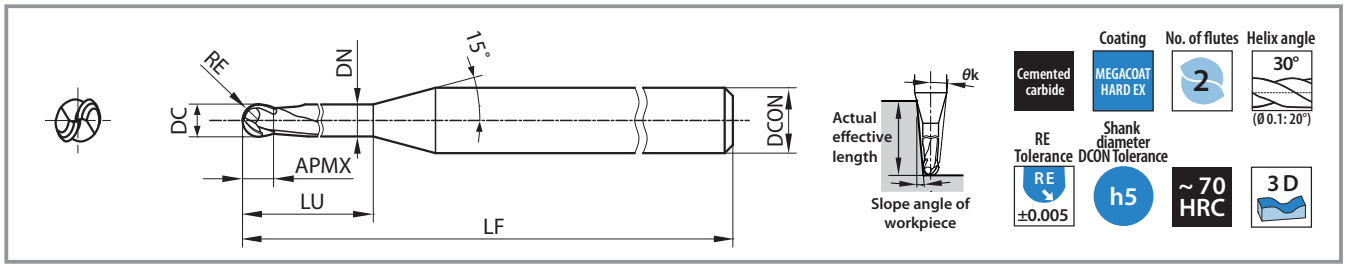
Long Neck Type

Description	Stock	Dimensions (mm)							Interference Angle	Actual effective length for slope angle of workpiece				
		RE	DC	APMX	LU	DN	DCON	LF	θk	0.5°	1°	1.5°	2°	3°
2KMBL0100-0200-S4	●	R0.5	1	0.75	2	0.98	4	45	11.88°	2.08	2.14	2.2	2.26	2.41
2KMBL0100-0250-S4	●				2.5				11.12°	2.6	2.67	2.75	2.84	3.03
2KMBL0100-0300-S4	●				3				10.45°	3.12	3.21	3.31	3.41	3.65
2KMBL0100-0400-S4	●				4				9.33°	4.15	4.28	4.42	4.56	4.89
2KMBL0100-0500-S4	●				5				8.42°	5.19	5.35	5.52	5.71	6.14
2KMBL0100-0600-S4	●				6				7.68°	6.22	6.42	6.63	6.86	7.38
2KMBL0100-0700-S4	●				7				7.05°	7.25	7.49	7.74	8.01	8.62
NEW 2KMBL0100-0800-S4	●				8				6.52°	8.29	8.56	8.85	9.16	9.86
NEW 2KMBL0100-0900-S4	●				9				6.06°	9.32	9.63	9.96	10.31	11.11
NEW 2KMBL0100-1000-S4	●				10				5.66°	10.35	10.7	11.07	11.46	12.35
NEW 2KMBL0100-1200-S4	●				12				5.01°	12.42	12.84	13.28	13.76	14.84
NEW 2KMBL0100-1300-S4	●				13				4.73°	13.45	13.91	14.39	14.91	16.08
2KMBL0120-0240-S4	●	R0.6	1.2	0.9	2.4	1.18	4	45	11.22°	2.49	2.56	2.63	2.71	2.88
2KMBL0120-0400-S4	●				4				9.19°	4.15	4.27	4.4	4.55	4.87
2KMBL0120-0600-S4	●				6				7.49°	6.22	6.41	6.62	6.85	7.35
2KMBL0120-0800-S4	●				8				6.31°	8.28	8.55	8.84	9.15	9.84
NEW 2KMBL0120-1000-S4	●				10				5.46°	10.35	10.69	11.05	11.45	12.33
NEW 2KMBL0120-1200-S4	●				12				4.81°	12.42	12.83	13.27	13.75	14.81
NEW 2KMBL0120-1400-S4	●				14			50	4.3°	14.48	14.97	15.49	16.05	17.3
NEW 2KMBL0120-1600-S4	●				16				3.88°	16.55	17.11	17.7	18.35	19.79
2KMBL0140-0800-S4	●	R0.7	1.4	1	8	1.37	4	45	6.08°	8.3	8.56	8.85	9.15	9.84
2KMBL0140-1200-S4	●				12			50	4.59°	12.43	12.84	13.28	13.75	14.81
2KMBL0150-0300-S4	●	R0.75	1.5	1.1	3	1.47	4	45	10.17°	3.13	3.21	3.3	3.4	3.61
2KMBL0150-0400-S4	●				4				8.92°	4.16	4.28	4.41	4.55	4.85
2KMBL0150-0600-S4	●				6				7.15°	6.23	6.42	6.63	6.85	7.34
2KMBL0150-0800-S4	●				8				5.97°	8.3	8.56	8.84	9.15	9.83
2KMBL0150-1000-S4	●				10				5.12°	10.36	10.7	11.06	11.45	12.31
2KMBL0150-1200-S4	●				12				4.48°	12.43	12.84	13.28	13.75	14.8
NEW 2KMBL0150-1400-S4	●				14			50	3.98°	14.5	14.98	15.49	16.04	17.29
NEW 2KMBL0150-1600-S4	●				16				3.59°	16.57	17.12	17.71	18.34	19.77
NEW 2KMBL0150-1800-S4	●				18			55	3.26°	18.63	19.26	19.93	20.64	22.26
NEW 2KMBL0150-2000-S4	●				20				2.99°	20.7	21.4	22.14	22.94	-
2KMBL0160-0800-S4	●	R0.8	1.6	1.2	8	1.57	4	45	5.84°	8.3	8.56	8.84	9.14	9.82
2KMBL0160-1200-S4	●				12				4.37°	12.43	12.84	13.27	13.74	14.79
2KMBL0200-0300-S4	●	R1	2	1.5	3	1.97	4	45	9.81°	3.12	3.19	3.27	3.36	3.55
2KMBL0200-0400-S4	●				4				8.39°	4.15	4.26	4.38	4.51	4.79
2KMBL0200-0600-S4	●				6				6.5°	6.22	6.4	6.6	6.81	7.28
2KMBL0200-0800-S4	●				8				5.3°	8.29	8.54	8.82	9.11	9.77
2KMBL0200-1000-S4	●				10				4.48°	10.36	10.68	11.03	11.41	12.25
2KMBL0200-1200-S4	●				12				3.87°	12.42	12.82	13.25	13.71	14.74
2KMBL0200-1300-S4	●				13				3.63°	13.46	13.89	14.36	14.86	15.98
2KMBL0200-1400-S4	●				14			50	3.41°	14.49	14.96	15.47	16.01	17.23
2KMBL0200-1600-S4	●				16				3.05°	16.56	17.1	17.68	18.31	19.71
NEW 2KMBL0200-1800-S4	●				18			55	2.76°	18.63	19.24	19.9	20.61	-
NEW 2KMBL0200-2000-S4	●				20				2.52°	20.69	21.38	22.11	22.91	-
NEW 2KMBL0200-2200-S4	●				22			60	2.32°	22.76	23.52	24.33	25.21	-
NEW 2KMBL0200-2500-S4	●				25			65	2.07°	25.86	26.73	27.66	28.66	-

The ball radius is based on 1/2 of the actual outer diameter.
Neck angle is a reference value.
Be careful not to interfere with the workpiece.

● : Standard Stock

Long Neck Type



Description	Stock	Dimensions (mm)							Interference Angle	Actual effective length for slope angle of workpiece				
		RE	DC	APMX	LU	DN	DCON	LF	θk	0.5°	1°	1.5°	2°	3°
2KMBL0250-0600-S4	●	R1.25	2.5	2.3	6	2.45	4	45	5.61°	6.25	6.43	6.61	6.81	7.27
2KMBL0250-0800-S4	●				8				4.45°	8.32	8.57	8.83	9.11	9.75
2KMBL0250-1000-S4	●				10				3.69°	10.39	10.7	11.05	11.41	12.24
2KMBL0250-1500-S4	●				15			50	2.59°	15.55	16.05	16.59	17.16	-
2KMBL0250-2000-S4	●				20			55	1.99°	20.72	21.4	22.13	-	-
NEW 2KMBL0250-2500-S4	●				25			65	1.62°	25.89	26.75	27.67	-	-
NEW 2KMBL0250-3000-S4	●				30			70	1.36°	31.06	32.1	-	-	-
2KMBL0300-0600-S6	●	R1.5	3	2.5	6	2.9	6	60	8.3°	6.34	6.51	6.69	6.88	7.32
2KMBL0300-0800-S6	●				8				6.97°	8.41	8.65	8.91	9.18	9.81
2KMBL0300-1000-S6	●				10				6°	10.47	10.79	11.12	11.48	12.29
2KMBL0300-1200-S6	●				12				5.27°	12.54	12.93	13.34	13.78	14.78
2KMBL0300-1400-S6	●				14				4.69°	14.61	15.07	15.56	16.08	17.27
2KMBL0300-1600-S6	●				16				4.23°	16.68	17.21	17.77	18.38	19.75
2KMBL0300-2000-S6	●				20			65	3.54°	20.81	21.48	22.21	22.98	24.73
2KMBL0300-2500-S6	●				25			70	2.94°	25.98	26.83	27.75	28.73	-
2KMBL0350-1500-S6	●	R1.75	3.5	2.8	15	3.4	6	60	3.96°	15.63	16.12	16.64	17.2	18.45
2KMBL0350-2000-S6	●				20			65	3.1°	20.8	21.47	22.18	22.94	24.66
2KMBL0350-2500-S6	●				25			70	2.55°	25.97	26.81	27.72	28.69	-
2KMBL0350-3000-S6	●				30			75	2.17°	31.14	32.16	33.26	34.44	-
2KMBL0400-0800-S6	●	R2	4	3	8	3.9	6	65	5.76°	8.39	8.61	8.85	9.11	9.69
2KMBL0400-1000-S6	●				10				4.8°	10.46	10.75	11.07	11.41	12.17
2KMBL0400-1200-S6	●				12				4.11°	12.52	12.89	13.28	13.71	14.66
2KMBL0400-1400-S6	●				14				3.6°	14.59	15.03	15.5	16.01	17.14
2KMBL0400-1500-S6	●				15				3.39°	15.63	16.1	16.61	17.16	18.39
2KMBL0400-2000-S6	●				20				2.62°	20.79	21.45	22.15	22.91	-
2KMBL0400-2500-S6	●				25			70	2.13°	25.96	26.8	27.69	28.66	-
2KMBL0400-3000-S6	●				30			75	1.8°	31.13	32.15	33.23	-	-
2KMBL0400-3500-S6	●				35			80	1.56°	36.3	37.49	38.78	-	-
NEW 2KMBL0500-1000-S6	●	R2.5	5	3.5	10	4.8	6	70	2.94°	10.63	10.92	11.22	11.55	-
NEW 2KMBL0500-1500-S6	●				15				1.95°	15.8	16.27	16.76	-	-
NEW 2KMBL0500-2000-S6	●				20				1.46°	20.97	21.61	-	-	-
NEW 2KMBL0500-2500-S6	●				25				1.16°	26.14	26.96	-	-	-
NEW 2KMBL0500-3000-S6	●				30			80	0.97°	31.31	-	-	-	-
NEW 2KMBL0500-4000-S6	●				40			90	0.73°	41.64	-	-	-	-
NEW 2KMBL0600-1000-S6	●	R3.0	6	6	10	5.7	6	70	-	-	-	-	-	-
NEW 2KMBL0600-1500-S6	●				15				-	-	-	-	-	-
NEW 2KMBL0600-2000-S6	●				20				-	-	-	-	-	-
NEW 2KMBL0600-2500-S6	●				25				-	-	-	-	-	-
NEW 2KMBL0600-3000-S6	●				30			80	-	-	-	-	-	-
NEW 2KMBL0600-3500-S6	●				35			85	-	-	-	-	-	-
NEW 2KMBL0600-4000-S6	●				40			90	-	-	-	-	-	-
NEW 2KMBL0600-5000-S6	●				50			120	-	-	-	-	-	-
NEW 2KMBL0600-6000-S6	●				60				-	-	-	-	-	-

The ball radius is based on 1/2 of the actual outer diameter.
Neck angle is a reference value.
Be careful not to interfere with the workpiece.

● : Standard Stock

Reference Cutting Conditions Table

Standard Type

		Prehardened steel NAK(35-45HRC)				Prehardened steel/Hardened steel STAVAX・SKD61(45-55HRC)				Hardened steel SKD11(55-62HRC)				Hardened steel Powder high-speed steel・SKH (62-66HRC)				Hardened steel Powder high-speed steel (66-70HRC)			
Ball Radius RE (mm)	Flute Length APMX (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)
R0.05	0.1	50,000	200	0.008	0.008	40,000	170	0.006	0.006	40,000	110	0.003	0.006	40,000	70	0.002	0.006	40,000	60	0.002	0.003
R0.075	0.15	50,000	240	0.008	0.008	40,000	200	0.006	0.006	40,000	170	0.003	0.006	40,000	110	0.002	0.006	40,000	90	0.002	0.003
R0.1	0.2	50,000	480	0.015	0.031	40,000	400	0.011	0.022	40,000	350	0.011	0.011	40,000	260	0.003	0.006	40,000	170	0.003	0.003
R0.15	0.3	50,000	550	0.015	0.046	40,000	460	0.011	0.033	40,000	400	0.011	0.022	40,000	330	0.006	0.011	40,000	250	0.003	0.006
R0.2	0.6	50,000	1,320	0.031	0.092	40,000	1,100	0.022	0.066	40,000	900	0.022	0.055	40,000	530	0.011	0.022	36,000	480	0.01	0.022
R0.25	0.8	50,000	1,580	0.046	0.108	40,000	1,320	0.033	0.077	40,000	1,100	0.028	0.055	40,000	660	0.017	0.033	32,000	500	0.011	0.022
R0.3	0.9	50,000	2,110	0.077	0.154	40,000	1,760	0.055	0.11	40,000	1,320	0.033	0.066	30,000	790	0.022	0.055	27,000	590	0.022	0.055
R0.4	1.2	50,000	2,900	0.154	0.231	40,000	2,420	0.11	0.165	40,000	1,980	0.077	0.11	30,000	1,320	0.055	0.11	25,500	990	0.033	0.11
R0.5	1.5	45,000	3,300	0.154	0.462	40,000	2,750	0.11	0.33	30,000	2,200	0.11	0.22	25,000	1,540	0.088	0.11	21,500	1,160	0.055	0.11
R0.75	2.3	35,000	3,960	0.231	0.462	30,000	3,300	0.165	0.33	30,000	2,750	0.11	0.33	25,000	2,200	0.11	0.22	20,000	1,650	0.066	0.22
R1	3	25,000	3,960	0.308	0.77	25,000	3,300	0.22	0.55	25,000	2,750	0.22	0.55	20,000	2,200	0.165	0.33	16,000	1,650	0.11	0.33
R1.25	3.8	25,000	3,960	0.462	0.924	25,000	3,300	0.33	0.66	20,000	2,750	0.22	0.55	18,000	2,200	0.165	0.44	15,500	1,650	0.11	0.44
R1.5	5	22,000	3,960	0.308	0.968	20,000	3,300	0.22	0.88	18,000	2,750	0.22	0.66	14,000	2,200	0.22	0.55	13,000	1,650	0.132	0.55
R2	6	22,000	3,960	0.462	1.815	20,000	3,300	0.33	1.65	16,000	2,750	0.22	0.88	12,000	2,200	0.22	0.66	10,500	1,650	0.165	0.66
R2.5	8	20,000	3,960	0.462	1.815	18,000	3,300	0.33	1.65	12,000	2,750	0.22	1.32	9,500	2,200	0.22	0.77	8,500	1,650	0.176	0.77
R3	10	18,000	3,960	0.462	2.42	16,000	3,300	0.33	2.2	8,000	2,750	0.33	1.32	7,000	2,200	0.22	1.1	6,000	1,650	0.176	1.1

Available for titanium alloy machining

If chatter occurs, adjust cutting conditions as necessary.
Pay particular attention to cutting condition settings and tool passes in areas where cutting load is high, such as corners.
Adjust the number of revolutions and feed rate at the same rate.
Oil mist coolant is recommended.
If the diameter is less than ø1 or L/D (aspect ratio) is more than 8, adjust the feed rate to 50% or less and cutting width (ae) to 30% or less depending on the situation.

Reference Cutting Conditions Table

Long Neck Type

		Prehardened steel NAK(35-45HRC)				Prehardened steel/Hardened steel STAVAX・SKD61(45-55HRC)				Hardened steel SKD11(55-62HRC)				Hardened steel Powder high-speed steel・SKH (62-66HRC)				Hardened steel Powder high-speed steel (66-70HRC)			
Ball Radius RE (mm)	Effective Length LU (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)
R0.05	0.2	50,000	170	0.005	0.008	40,000	140	0.003	0.006	40,000	110	0.002	0.006	40,000	80	0.002	0.003	40,000	60	0.002	0.003
	0.3	50,000	130	0.005	0.008	40,000	110	0.003	0.006	40,000	80	0.002	0.006	40,000	60	0.002	0.003	40,000	50	0.002	0.003
	0.5	50,000	100	0.003	0.005	40,000	80	0.002	0.003	40,000	60	0.001	0.003	40,000	30	0.001	0.002	40,000	20	0.001	0.002
R0.075	0.3	50,000	240	0.005	0.008	40,000	200	0.003	0.006	40,000	170	0.002	0.006	40,000	110	0.002	0.003	40,000	80	0.002	0.003
	0.5	50,000	200	0.005	0.008	40,000	170	0.003	0.006	40,000	130	0.002	0.006	40,000	80	0.002	0.003	40,000	60	0.002	0.003
	1	46,000	100	0.003	0.005	40,000	80	0.002	0.003	40,000	60	0.001	0.003	40,000	30	0.001	0.002	40,000	20	0.001	0.002
R0.1	0.3	50,000	470	0.015	0.015	40,000	390	0.011	0.011	40,000	330	0.007	0.006	40,000	220	0.003	0.003	40,000	170	0.003	0.003
	0.5	50,000	420	0.012	0.015	40,000	350	0.009	0.011	40,000	310	0.006	0.006	40,000	200	0.003	0.003	40,000	150	0.003	0.003
	0.75	50,000	370	0.008	0.015	40,000	310	0.006	0.011	40,000	220	0.003	0.006	40,000	170	0.002	0.003	40,000	130	0.002	0.003
	1	50,000	340	0.005	0.008	40,000	280	0.003	0.006	40,000	180	0.002	0.003	40,000	130	0.001	0.002	40,000	100	0.001	0.002
	1.25	46,000	240	0.005	0.008	40,000	200	0.003	0.006	40,000	150	0.002	0.003	40,000	110	0.001	0.002	40,000	80	0.001	0.002
	1.5	46,000	200	0.005	0.008	40,000	170	0.003	0.006	40,000	130	0.002	0.003	40,000	90	0.001	0.002	40,000	70	0.001	0.002
	1.75	46,000	160	0.003	0.004	40,000	130	0.002	0.003	40,000	110	0.001	0.002	40,000	70	0.001	0.002	40,000	50	0.001	0.001
	2	46,000	130	0.003	0.004	40,000	110	0.002	0.003	40,000	90	0.001	0.002	40,000	60	0.001	0.001	40,000	40	0.001	0.001
	2.5	41,000	100	0.001	0.003	40,000	80	0.001	0.002	40,000	70	0.001	0.001	40,000	50	0.001	0.001	40,000	30	0.001	0.001
R0.15	0.5	50,000	470	0.015	0.023	40,000	390	0.011	0.017	40,000	330	0.008	0.011	40,000	310	0.003	0.006	40,000	230	0.003	0.006
	0.6	50,000	470	0.011	0.015	40,000	390	0.008	0.011	40,000	330	0.006	0.008	40,000	280	0.003	0.006	40,000	210	0.003	0.006
	0.75	50,000	430	0.011	0.015	40,000	360	0.008	0.011	40,000	310	0.006	0.008	40,000	250	0.003	0.006	40,000	190	0.003	0.006
	1	50,000	420	0.011	0.015	40,000	350	0.008	0.011	40,000	280	0.006	0.008	40,000	220	0.003	0.006	40,000	170	0.003	0.006
	1.25	50,000	410	0.008	0.011	40,000	340	0.006	0.008	40,000	220	0.003	0.006	40,000	180	0.002	0.003	40,000	140	0.002	0.003
	1.5	50,000	370	0.008	0.011	40,000	310	0.006	0.008	40,000	200	0.003	0.006	40,000	130	0.002	0.003	40,000	100	0.002	0.003
	1.75	46,000	260	0.005	0.008	40,000	220	0.003	0.006	40,000	170	0.002	0.003	40,000	110	0.002	0.002	40,000	80	0.002	0.002
	2	46,000	230	0.005	0.008	40,000	190	0.003	0.006	40,000	130	0.002	0.003	40,000	100	0.002	0.002	40,000	80	0.002	0.002
	2.25	46,000	230	0.003	0.004	40,000	190	0.002	0.003	40,000	110	0.001	0.002	40,000	90	0.001	0.001	40,000	70	0.001	0.001
	2.5	46,000	170	0.003	0.004	40,000	140	0.002	0.003	40,000	90	0.001	0.002	40,000	80	0.001	0.001	40,000	60	0.001	0.001
	3	46,000	140	0.001	0.004	40,000	120	0.001	0.003	40,000	80	0.001	0.002	40,000	70	0.001	0.001	40,000	50	0.001	0.001
	3.5	44,000	110	0.001	0.003	40,000	90	0.001	0.002	40,000	70	0.001	0.001	40,000	60	0.001	0.001	40,000	50	0.001	0.001
	4	37,000	100	0.001	0.003	40,000	80	0.001	0.002	40,000	60	0.001	0.001	40,000	50	0.001	0.001	40,000	40	0.001	0.001

Available for titanium alloy machining

If chatter occurs, adjust cutting conditions as necessary.
Pay particular attention to cutting condition settings and tool passes in areas where cutting load is high, such as corners.
Adjust the number of revolutions and feed rate at the same rate.
Oil mist coolant is recommended.
If the diameter is less than ø1 or L/D (aspect ratio) is more than 8, adjust the feed rate to 50% or less and cutting width (ae) to 30% or less depending on the situation.

Reference Cutting Conditions Table

Long Neck Type

		Prehardened steel NAK(35-45HRC)				Prehardened steel/Hardened steel STAVAX・SKD61(45-55HRC)				Hardened steel SKD11(55-62HRC)				Hardened steel Powder high-speed steel・SKH (62-66HRC)				Hardened steel Powder high-speed steel (66-70HRC)			
Ball Radius RE (mm)	Effective Length LU (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)
R0.2	0.5	50,000	1,060	0.046	0.077	40,000	880	0.033	0.055	40,000	790	0.033	0.033	40,000	640	0.01	0.022	36,000	480	0.01	0.022
	0.8	50,000	1,060	0.031	0.077	40,000	880	0.022	0.055	40,000	790	0.022	0.033	40,000	640	0.009	0.022	36,000	480	0.009	0.022
	1	50,000	1,060	0.031	0.077	40,000	880	0.022	0.055	40,000	790	0.022	0.033	40,000	640	0.009	0.022	36,000	480	0.009	0.022
	1.5	50,000	820	0.015	0.046	40,000	680	0.011	0.033	40,000	550	0.011	0.022	40,000	440	0.006	0.011	36,000	330	0.006	0.011
	2	50,000	660	0.015	0.031	40,000	550	0.011	0.022	40,000	420	0.011	0.011	40,000	330	0.006	0.008	36,000	250	0.006	0.008
	2.5	44,000	550	0.011	0.015	40,000	460	0.008	0.011	40,000	330	0.006	0.008	40,000	290	0.003	0.006	36,000	220	0.003	0.006
	3	37,000	400	0.011	0.015	40,000	330	0.008	0.011	40,000	260	0.006	0.008	40,000	220	0.003	0.006	36,000	170	0.002	0.003
	3.5	37,000	300	0.008	0.011	40,000	250	0.006	0.008	40,000	180	0.003	0.006	40,000	130	0.002	0.003	36,000	100	0.001	0.002
	4	37,000	220	0.008	0.008	30,000	180	0.006	0.006	30,000	130	0.003	0.003	30,000	100	0.002	0.003	27,000	80	0.001	0.001
	4.5	33,000	130	0.004	0.008	30,000	110	0.003	0.006	30,000	90	0.002	0.003	30,000	70	0.001	0.002	27,000	50	0.001	0.001
	5	33,000	100	0.003	0.004	30,000	80	0.002	0.003	30,000	60	0.001	0.002	30,000	40	0.001	0.002	27,000	30	0.001	0.001
R0.25	1	50,000	1,320	0.046	0.077	40,000	1,100	0.033	0.055	40,000	950	0.022	0.033	40,000	720	0.011	0.022	32,000	500	0.011	0.022
	1.5	50,000	1,130	0.031	0.077	40,000	940	0.022	0.055	40,000	790	0.011	0.033	40,000	570	0.008	0.022	32,000	400	0.008	0.022
	2	50,000	950	0.031	0.046	40,000	790	0.022	0.033	40,000	720	0.011	0.022	40,000	440	0.008	0.011	32,000	310	0.008	0.011
	2.5	45,500	790	0.015	0.031	40,000	660	0.011	0.022	40,000	580	0.008	0.011	40,000	400	0.006	0.008	32,000	280	0.006	0.008
	3	45,500	660	0.015	0.031	40,000	550	0.011	0.022	40,000	460	0.008	0.011	40,000	350	0.006	0.008	32,000	250	0.006	0.008
	3.5	45,000	550	0.011	0.015	40,000	460	0.008	0.011	40,000	400	0.006	0.008	40,000	310	0.003	0.006	32,000	220	0.003	0.006
	4	39,000	470	0.011	0.015	40,000	390	0.008	0.011	40,000	330	0.006	0.008	40,000	290	0.003	0.006	32,000	200	0.003	0.006
	4.5	35,000	400	0.008	0.008	40,000	330	0.006	0.006	40,000	290	0.003	0.003	40,000	240	0.002	0.003	32,000	170	0.001	0.002
	5	35,000	310	0.008	0.008	33,000	260	0.006	0.006	33,000	220	0.003	0.003	33,000	200	0.002	0.003	26,500	140	0.001	0.001
	5.5	31,500	260	0.004	0.008	30,000	220	0.003	0.006	30,000	180	0.002	0.003	30,000	130	0.001	0.002	24,000	90	0.001	0.001
	6	31,500	160	0.003	0.004	30,000	130	0.002	0.003	30,000	90	0.001	0.002	30,000	80	0.001	0.002	24,000	60	0.001	0.001
R0.3	1	50,000	1,850	0.077	0.154	40,000	1,540	0.055	0.11	40,000	1,100	0.033	0.066	30,000	790	0.022	0.055	27,000	590	0.022	0.055
	1.5	50,000	1,850	0.077	0.154	40,000	1,540	0.055	0.11	40,000	1,100	0.033	0.066	30,000	790	0.022	0.055	27,000	590	0.022	0.055
	2	50,000	1,850	0.077	0.154	40,000	1,540	0.055	0.11	40,000	1,100	0.033	0.066	30,000	790	0.022	0.055	27,000	590	0.022	0.055
	2.5	50,000	1,580	0.046	0.077	40,000	1,320	0.033	0.055	40,000	920	0.022	0.044	30,000	700	0.022	0.033	27,000	530	0.022	0.033
	3	50,000	1,580	0.046	0.077	40,000	1,320	0.033	0.055	40,000	920	0.022	0.044	30,000	700	0.022	0.033	27,000	530	0.022	0.033
	3.5	49,000	1,320	0.031	0.046	40,000	1,100	0.022	0.033	40,000	680	0.011	0.033	30,000	530	0.011	0.022	27,000	340	0.011	0.022
	4	49,000	1,320	0.031	0.046	40,000	1,100	0.022	0.033	40,000	680	0.011	0.033	30,000	530	0.011	0.022	27,000	340	0.011	0.022
	4.5	46,000	1,190	0.031	0.046	35,000	990	0.022	0.033	35,000	640	0.011	0.022	30,000	470	0.009	0.017	27,000	260	0.009	0.017
	5	40,000	950	0.015	0.031	30,000	790	0.011	0.022	30,000	550	0.008	0.017	30,000	440	0.008	0.011	27,000	240	0.008	0.011
	5.5	40,000	920	0.015	0.024	30,000	770	0.011	0.017	30,000	500	0.008	0.011	30,000	400	0.006	0.009	27,000	220	0.005	0.008
	6	40,000	660	0.011	0.015	30,000	550	0.008	0.011	30,000	420	0.006	0.008	30,000	350	0.004	0.007	27,000	190	0.003	0.006
	7	33,000	530	0.008	0.011	25,000	440	0.006	0.008	25,000	330	0.003	0.006	20,000	290	0.003	0.003	18,000	160	0.002	0.002
	8	27,500	420	0.004	0.008	25,000	350	0.003	0.006	25,000	290	0.003	0.003	20,000	240	0.002	0.003	18,000	130	0.001	0.002

Available for titanium alloy machining

If chatter occurs, adjust cutting conditions as necessary.
Pay particular attention to cutting condition settings and tool passes in areas where cutting load is high, such as corners.
Adjust the number of revolutions and feed rate at the same rate.
Oil mist coolant is recommended.
If the diameter is less than ø1 or L/D (aspect ratio) is more than 8, adjust the feed rate to 50% or less and cutting width (ae) to 30% or less depending on the situation.

Reference Cutting Conditions Table

Long Neck Type

		Prehardened steel NAK(35-45HRC)				Prehardened steel/Hardened steel STAVAX・SKD61(45-55HRC)				Hardened steel SKD11(55-62HRC)				Hardened steel Powder high-speed steel・SKH (62-66HRC)				Hardened steel Powder high-speed steel (66-70HRC)			
Ball Radius RE (mm)	Effective Length LU (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)
R0.35	2	50,000	2,110	0.108	0.154	40,000	1,760	0.077	0.11	40,000	1,430	0.055	0.088	30,000	1,100	0.033	0.077	27,000	770	0.022	0.055
	4	49,000	1,720	0.062	0.092	40,000	1,430	0.044	0.066	40,000	900	0.033	0.044	30,000	660	0.017	0.022	27,000	360	0.011	0.022
R0.4	2	50,000	2,640	0.154	0.231	40,000	2,200	0.11	0.165	40,000	1,760	0.077	0.11	30,000	1,320	0.055	0.11	25,500	990	0.033	0.11
	3	50,000	2,640	0.154	0.231	40,000	2,200	0.11	0.165	40,000	1,760	0.077	0.11	30,000	1,320	0.055	0.055	25,500	990	0.033	0.055
	4	50,000	2,110	0.077	0.154	40,000	1,760	0.055	0.11	40,000	1,320	0.055	0.055	30,000	950	0.033	0.055	25,500	710	0.022	0.055
	5	50,000	2,110	0.077	0.077	40,000	1,760	0.055	0.055	40,000	1,100	0.033	0.055	30,000	680	0.022	0.033	25,500	510	0.017	0.033
	6	43,000	1,580	0.046	0.077	30,000	1,320	0.033	0.055	30,000	840	0.022	0.033	25,000	620	0.011	0.022	21,500	370	0.011	0.022
	7	40,000	1,320	0.031	0.046	30,000	1,100	0.022	0.033	30,000	750	0.011	0.022	25,000	570	0.008	0.011	21,500	340	0.006	0.01
	8	35,500	1,080	0.015	0.031	30,000	900	0.011	0.022	30,000	660	0.008	0.011	25,000	530	0.006	0.011	21,500	320	0.005	0.008
	10	27,500	600	0.008	0.008	25,000	500	0.006	0.006	25,000	420	0.003	0.003	20,000	350	0.002	0.003	17,000	210	0.002	0.002
R0.45	2	50,000	2,900	0.154	0.308	40,000	2,420	0.11	0.22	30,000	1,980	0.088	0.165	30,000	1,430	0.066	0.11	27,000	1,000	0.033	0.11
	4	48,500	2,380	0.077	0.185	40,000	1,980	0.055	0.132	30,000	1,540	0.044	0.088	25,000	990	0.033	0.055	22,500	740	0.022	0.055
	6	41,000	1,580	0.054	0.077	30,000	1,320	0.039	0.055	25,000	880	0.028	0.039	20,000	660	0.017	0.028	18,000	430	0.011	0.022
R0.5	2	46,000	3,300	0.154	0.462	40,000	2,750	0.11	0.33	30,000	2,200	0.11	0.22	25,000	1,540	0.088	0.11	21,500	1,160	0.055	0.11
	2.5	46,000	3,300	0.154	0.462	40,000	2,750	0.11	0.33	30,000	2,200	0.11	0.22	25,000	1,540	0.088	0.11	21,500	1,160	0.055	0.11
	3	46,000	3,300	0.154	0.462	40,000	2,750	0.11	0.33	30,000	2,200	0.11	0.22	25,000	1,540	0.088	0.11	21,500	1,160	0.055	0.11
	4	46,000	3,300	0.154	0.308	40,000	2,750	0.11	0.22	30,000	1,980	0.055	0.165	25,000	1,320	0.055	0.11	21,500	990	0.033	0.11
	5	40,000	2,640	0.077	0.231	30,000	2,200	0.055	0.165	25,000	1,760	0.044	0.11	20,000	1,010	0.033	0.055	17,000	760	0.022	0.055
	6	39,000	2,380	0.077	0.154	30,000	1,980	0.055	0.11	25,000	1,320	0.044	0.055	20,000	810	0.022	0.055	17,000	610	0.017	0.055
	7	33,500	1,580	0.062	0.092	30,000	1,320	0.044	0.066	25,000	1,050	0.033	0.044	20,000	750	0.022	0.033	17,000	560	0.011	0.033
	8	33,500	1,320	0.062	0.092	30,000	1,100	0.044	0.066	25,000	950	0.033	0.044	20,000	620	0.022	0.033	17,000	430	0.01	0.02
	9	33,500	1,080	0.046	0.077	25,000	900	0.033	0.055	20,000	830	0.022	0.033	18,000	550	0.011	0.022	15,500	390	0.008	0.01
	10	33,500	1,000	0.046	0.077	25,000	830	0.033	0.055	20,000	680	0.022	0.033	18,000	500	0.011	0.022	15,500	330	0.008	0.008
	12	28,500	790	0.015	0.046	20,000	660	0.011	0.033	18,000	570	0.008	0.022	16,000	440	0.006	0.011	14,000	290	0.004	0.006
	13	24,500	660	0.013	0.031	20,000	550	0.009	0.022	18,000	460	0.006	0.011	16,000	390	0.003	0.007	14,000	250	0.002	0.004

Available for titanium alloy machining

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Adjust the number of revolutions and feed rate at the same rate.
Oil mist coolant is recommended.
If the diameter is less than ø1 or L/D (aspect ratio) is more than 8, adjust the feed rate to 50% or less and cutting width (ae) to 30% or less depending on the situation.

Long Neck Type

		Prehardened steel NAK(35-45HRC)				Prehardened steel/Hardened steel STAVAX・SKD61(45-55HRC)				Hardened steel SKD11(55-62HRC)				Hardened steel Powder high-speed steel・SKH (62-66HRC)				Hardened steel Powder high-speed steel (66-70HRC)			
Ball Radius RE (mm)	Effective Length LU (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)
R0.6	2.4	39,500	3,300	0.154	0.462	30,000	2,750	0.11	0.33	30,000	2,200	0.11	0.22	25,000	1,760	0.088	0.11	21,500	1,320	0.055	0.11
	4	39,500	3,300	0.154	0.308	30,000	2,750	0.11	0.22	30,000	2,200	0.077	0.22	25,000	1,760	0.088	0.11	21,500	1,320	0.055	0.11
	6	39,500	2,640	0.108	0.154	30,000	2,200	0.077	0.11	25,000	1,760	0.055	0.11	20,000	1,320	0.033	0.077	17,000	860	0.022	0.077
	8	32,000	2,110	0.077	0.154	30,000	1,760	0.055	0.11	25,000	1,320	0.033	0.077	20,000	1,010	0.022	0.055	17,000	760	0.017	0.055
	10	29,500	1,580	0.046	0.108	20,000	1,320	0.033	0.077	20,000	950	0.022	0.055	18,000	750	0.011	0.033	15,500	560	0.01	0.03
	12	29,500	1,140	0.031	0.077	20,000	950	0.022	0.055	20,000	680	0.011	0.033	18,000	530	0.008	0.022	15,500	400	0.008	0.02
	14	25,000	790	0.031	0.046	18,000	660	0.022	0.033	18,000	440	0.011	0.022	16,000	330	0.006	0.011	14,000	250	0.005	0.01
	16	21,000	470	0.015	0.031	16,000	390	0.011	0.022	16,000	280	0.006	0.011	14,000	140	0.003	0.008	12,000	110	0.002	0.005
R0.7	8	28,000	3,300	0.123	0.246	30,000	2,750	0.088	0.176	20,000	1,980	0.055	0.123	20,000	1,100	0.033	0.088	17,000	830	0.022	0.055
	12	26,000	1,850	0.108	0.185	20,000	1,540	0.077	0.132	18,000	1,210	0.044	0.088	18,000	770	0.017	0.055	15,500	620	0.017	0.055
R0.75	3	36,000	3,960	0.231	0.462	30,000	3,300	0.165	0.33	30,000	2,750	0.11	0.33	25,000	2,200	0.11	0.22	20,000	1,650	0.066	0.22
	4	36,000	3,960	0.231	0.462	30,000	3,300	0.165	0.33	30,000	2,750	0.11	0.33	25,000	2,200	0.11	0.22	20,000	1,320	0.066	0.22
	6	36,000	3,960	0.231	0.308	30,000	3,300	0.165	0.22	30,000	2,200	0.11	0.22	25,000	1,760	0.11	0.11	20,000	990	0.066	0.11
	8	34,000	3,300	0.154	0.308	25,000	2,750	0.11	0.22	25,000	1,760	0.055	0.22	20,000	1,320	0.055	0.11	16,000	790	0.033	0.11
	10	34,000	3,300	0.154	0.154	25,000	2,750	0.11	0.11	25,000	1,320	0.055	0.11	20,000	950	0.055	0.055	16,000	570	0.033	0.055
	12	26,000	2,380	0.077	0.154	20,000	1,980	0.055	0.11	20,000	1,010	0.033	0.11	18,000	860	0.022	0.055	14,500	520	0.017	0.055
	14	23,000	1,580	0.077	0.108	20,000	1,320	0.055	0.077	20,000	900	0.033	0.055	18,000	720	0.022	0.033	14,500	430	0.012	0.016
	16	19,500	950	0.046	0.077	18,000	790	0.033	0.055	18,000	720	0.022	0.033	16,000	640	0.011	0.022	13,000	380	0.01	0.012
	18	19,500	730	0.031	0.062	16,000	610	0.022	0.044	16,000	440	0.013	0.028	14,000	440	0.009	0.017	11,500	260	0.007	0.01
	20	19,500	600	0.015	0.046	16,000	500	0.011	0.033	16,000	400	0.011	0.022	14,000	330	0.008	0.011	11,500	200	0.006	0.008
R0.8	8	31,000	3,300	0.154	0.308	25,000	2,750	0.11	0.22	20,000	2,200	0.077	0.165	18,000	1,760	0.055	0.11	14,500	790	0.033	0.11
	12	28,000	2,380	0.108	0.154	20,000	1,980	0.077	0.11	16,000	1,650	0.055	0.077	14,000	1,320	0.033	0.055	11,500	590	0.022	0.055

Available for titanium alloy machining

If chatter occurs, adjust cutting conditions as necessary.
Pay particular attention to cutting condition settings and tool passes in areas where cutting load is high, such as corners.
Adjust the number of revolutions and feed rate at the same rate.
Oil mist coolant is recommended.
If the diameter is less than ø1 or L/D (aspect ratio) is more than 8, adjust the feed rate to 50% or less and cutting width (ae) to 30% or less depending on the situation.

Reference Cutting Conditions Table

Long Neck Type

		Prehardened steel NAK(35-45HRC)				Prehardened steel/Hardened steel STAVAX・SKD61(45-55HRC)				Hardened steel SKD11(55-62HRC)				Hardened steel Powder high-speed steel・SKH (62-66HRC)				Hardened steel Powder high-speed steel (66-70HRC)			
Ball Radius RE (mm)	Effective Length LU (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)
R1	3	27,000	3,960	0.308	0.77	25,000	3,300	0.22	0.55	25,000	2,750	0.22	0.55	20,000	2,200	0.165	0.33	16,000	1,650	0.11	0.33
	4	27,000	3,960	0.308	0.77	25,000	3,300	0.22	0.55	25,000	2,750	0.22	0.55	20,000	2,200	0.165	0.33	16,000	1,650	0.11	0.33
	6	27,000	3,300	0.308	0.77	25,000	2,750	0.22	0.55	25,000	2,200	0.22	0.33	20,000	1,760	0.165	0.33	16,000	1,320	0.11	0.33
	8	27,000	2,640	0.308	0.462	20,000	2,200	0.22	0.33	18,000	1,760	0.11	0.22	16,000	1,320	0.11	0.22	13,000	990	0.066	0.165
	10	27,000	2,640	0.154	0.462	18,000	2,200	0.11	0.33	16,000	1,760	0.11	0.22	14,000	1,320	0.11	0.11	11,500	860	0.066	0.11
	12	22,500	2,110	0.154	0.308	16,000	1,760	0.11	0.22	14,000	1,320	0.11	0.11	12,000	1,030	0.055	0.11	10,000	670	0.033	0.11
	13	22,500	2,110	0.123	0.308	16,000	1,760	0.088	0.22	14,000	1,320	0.066	0.11	12,000	1,030	0.044	0.088	10,000	620	0.033	0.055
	14	22,500	2,110	0.108	0.231	16,000	1,760	0.077	0.165	14,000	1,320	0.055	0.088	12,000	1,030	0.033	0.077	10,000	520	0.033	0.055
	16	22,500	2,110	0.108	0.231	16,000	1,760	0.077	0.165	14,000	1,320	0.055	0.088	12,000	1,030	0.033	0.077	10,000	410	0.033	0.055
	18	21,500	1,850	0.077	0.154	14,000	1,540	0.055	0.11	12,000	1,100	0.033	0.055	10,000	940	0.022	0.033	8,000	380	0.02	0.025
	20	19,500	1,320	0.077	0.154	14,000	1,100	0.055	0.11	12,000	900	0.033	0.055	10,000	790	0.022	0.033	8,000	320	0.015	0.02
	22	17,500	1,130	0.046	0.123	14,000	940	0.033	0.088	12,000	770	0.022	0.055	10,000	660	0.022	0.022	8,000	260	0.012	0.015
	25	14,500	900	0.046	0.077	12,000	750	0.033	0.055	10,000	620	0.022	0.033	8,500	460	0.011	0.022	7,000	180	0.008	0.012
R1.25	6	24,000	3,700	0.462	0.77	20,000	3,080	0.33	0.55	20,000	2,530	0.22	0.55	18,000	2,200	0.165	0.44	15,500	1,650	0.11	0.44
	8	24,000	3,430	0.385	0.462	20,000	2,860	0.275	0.33	20,000	2,310	0.165	0.33	18,000	1,980	0.132	0.275	15,500	1,490	0.11	0.275
	10	24,000	3,300	0.308	0.462	20,000	2,750	0.22	0.33	20,000	2,200	0.165	0.22	18,000	1,760	0.11	0.165	15,500	1,230	0.066	0.165
	15	18,500	2,640	0.154	0.308	18,000	2,200	0.11	0.22	16,000	1,760	0.077	0.165	14,000	1,320	0.055	0.11	12,000	790	0.033	0.11
	20	17,000	1,980	0.108	0.231	16,000	1,650	0.077	0.165	14,000	1,320	0.055	0.11	10,000	1,100	0.033	0.055	8,500	660	0.033	0.055
	25	17,000	1,320	0.077	0.154	14,000	1,100	0.055	0.11	12,000	940	0.033	0.077	8,000	790	0.022	0.033	7,000	470	0.015	0.02
	30	13,000	950	0.046	0.108	12,000	790	0.033	0.077	10,000	700	0.022	0.055	7,000	640	0.011	0.022	6,000	380	0.008	0.012
R1.5	6	22,000	3,960	0.462	0.968	20,000	3,300	0.33	0.88	18,000	2,750	0.22	0.66	14,000	2,200	0.22	0.55	13,000	1,650	0.132	0.55
	8	22,000	3,960	0.462	0.968	20,000	3,300	0.33	0.88	18,000	2,750	0.22	0.66	14,000	2,200	0.22	0.55	13,000	1,650	0.132	0.55
	10	22,000	3,300	0.308	0.726	20,000	2,750	0.22	0.66	18,000	2,200	0.22	0.44	14,000	1,820	0.11	0.33	13,000	1,400	0.11	0.33
	12	22,000	3,300	0.308	0.726	20,000	2,750	0.22	0.66	18,000	2,200	0.22	0.44	14,000	1,820	0.11	0.33	13,000	1,240	0.066	0.33
	14	20,000	2,640	0.154	0.484	18,000	2,200	0.11	0.44	16,000	1,760	0.11	0.33	12,000	1,450	0.11	0.22	11,000	990	0.066	0.22
	16	20,000	2,640	0.154	0.484	18,000	2,200	0.11	0.44	16,000	1,760	0.11	0.33	12,000	1,450	0.11	0.22	11,000	990	0.066	0.22
	20	20,000	2,120	0.154	0.363	18,000	1,760	0.11	0.33	16,000	1,320	0.11	0.22	12,000	1,060	0.11	0.11	11,000	740	0.066	0.11
	25	18,000	1,590	0.154	0.242	16,000	1,320	0.11	0.22	14,000	1,010	0.077	0.165	10,000	880	0.055	0.077	9,000	620	0.053	0.077

Available for titanium alloy machining

If chatter occurs, adjust cutting conditions as necessary.
Pay particular attention to cutting condition settings and tool passes in areas where cutting load is high, such as corners.
Adjust the number of revolutions and feed rate at the same rate.
Oil mist coolant is recommended.
If the diameter is less than ø1 or L/D (aspect ratio) is more than 8, adjust the feed rate to 50% or less and cutting width (ae) to 30% or less depending on the situation.

Reference Cutting Conditions Table

		Prehardened steel NAK(35-45HRC)				Prehardened steel/Hardened steel STAVAX・SKD61(45-55HRC)				Hardened steel SKD11(55-62HRC)				Hardened steel Powder high-speed steel・SKH (62-66HRC)				Hardened steel Powder high-speed steel (66-70HRC)			
Ball Radius RE (mm)	Effective Length LU (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	No. of Revolutions n (min^{-1})	Feed Vf (mm/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)
R1.75	15	22,000	3,960	0.385	1.21	20,000	3,300	0.275	1.1	16,000	2,530	0.165	0.55	14,000	1,650	0.143	0.44	13,000	990	0.143	0.422
	20	20,000	3,300	0.278	0.726	18,000	2,750	0.198	0.66	15,000	1,980	0.11	0.33	12,000	1,320	0.11	0.22	11,000	790	0.11	0.22
	25	18,000	2,380	0.186	0.424	16,000	1,980	0.132	0.385	14,000	1,760	0.11	0.22	10,000	1,100	0.066	0.132	9,000	660	0.066	0.132
	30	15,500	1,980	0.154	0.303	14,000	1,650	0.11	0.275	11,000	1,050	0.077	0.165	9,000	880	0.055	0.088	8,500	530	0.055	0.088
R2	8	22,000	3,960	0.462	1.815	20,000	3,300	0.33	1.65	16,000	2,750	0.22	0.88	12,000	2,200	0.22	0.66	10,500	1,650	0.165	0.66
	10	22,000	3,960	0.462	1.815	20,000	3,300	0.33	1.65	16,000	2,750	0.22	0.88	12,000	2,200	0.22	0.66	10,500	1,650	0.165	0.66
	12	22,000	3,960	0.462	1.815	20,000	3,300	0.33	1.65	16,000	2,750	0.22	0.88	12,000	2,200	0.22	0.66	10,500	1,650	0.165	0.66
	14	22,000	3,960	0.462	1.815	20,000	3,300	0.33	1.65	16,000	2,200	0.22	0.88	12,000	1,760	0.22	0.66	10,500	1,320	0.132	0.66
	15	22,000	3,960	0.462	1.815	20,000	3,300	0.33	1.65	16,000	2,200	0.22	0.88	12,000	1,760	0.22	0.66	10,500	1,320	0.132	0.66
	20	18,000	3,170	0.308	1.21	16,000	2,640	0.22	1.1	14,000	1,980	0.11	0.66	10,000	1,540	0.11	0.44	8,500	1,000	0.088	0.44
	25	18,000	2,120	0.308	0.968	16,000	1,760	0.22	0.88	14,000	1,320	0.11	0.44	10,000	1,100	0.11	0.22	8,500	720	0.088	0.22
	30	15,500	2,120	0.154	0.363	14,000	1,760	0.11	0.33	10,000	1,320	0.077	0.22	10,000	1,100	0.055	0.165	8,500	720	0.055	0.165
	35	15,500	1,590	0.154	0.242	14,000	1,320	0.11	0.22	10,000	1,100	0.077	0.165	10,000	900	0.055	0.11	8,500	590	0.055	0.11
R2.5	10	20,000	3,960	0.462	1.815	18,000	3,300	0.33	1.65	12,000	2,750	0.22	1.32	9,500	2,200	0.22	0.77	8,500	1,650	0.176	0.77
	15	20,000	3,960	0.462	1.815	18,000	3,300	0.33	1.65	12,000	2,750	0.22	1.32	9,500	2,200	0.22	0.77	8,500	1,650	0.176	0.77
	20	20,000	3,960	0.462	1.452	15,000	3,300	0.33	1.32	10,000	2,200	0.22	1.1	8,000	1,760	0.165	0.66	7,000	1,320	0.132	0.66
	25	16,500	3,300	0.308	1.21	15,000	2,750	0.22	1.1	9,000	1,980	0.165	0.88	7,500	1,540	0.11	0.55	6,500	1,160	0.088	0.44
	30	13,500	2,640	0.308	0.968	12,000	2,200	0.22	0.88	8,000	1,650	0.165	0.55	6,500	1,100	0.11	0.33	6,000	830	0.088	0.264
	40	11,000	1,590	0.154	0.242	10,000	1,320	0.11	0.22	7,000	1,100	0.077	0.165	5,500	900	0.055	0.22	5,000	680	0.044	0.176
R3	10	18,000	3,960	0.462	2.42	16,000	3,300	0.33	2.2	8,000	2,750	0.33	1.32	7,000	2,200	0.22	1.1	6,000	1,650	0.176	0.88
	15	18,000	3,960	0.462	2.42	16,000	3,300	0.33	2.2	8,000	2,750	0.33	1.32	7,000	2,200	0.22	1.1	6,000	1,650	0.176	0.88
	20	18,000	3,960	0.462	2.42	16,000	3,300	0.33	2.2	8,000	2,750	0.33	1.32	7,000	2,200	0.22	1.1	6,000	1,650	0.176	0.88
	25	18,000	3,960	0.462	1.815	16,000	3,300	0.33	1.65	8,000	2,200	0.22	1.1	7,000	1,650	0.165	0.77	6,000	1,240	0.132	0.77
	30	18,000	3,960	0.308	1.815	14,000	3,300	0.22	1.65	7,500	2,200	0.22	1.1	6,500	1,650	0.165	0.77	6,000	1,070	0.132	0.77
	35	14,500	3,170	0.308	1.452	13,000	2,640	0.22	1.32	7,000	1,760	0.187	0.88	6,000	1,320	0.132	0.55	5,500	860	0.106	0.44
	40	13,500	2,380	0.308	1.21	12,000	1,980	0.22	1.1	6,500	1,320	0.165	0.66	5,500	1,100	0.11	0.44	5,000	720	0.088	0.352
	50	9,500	1,590	0.154	0.726	8,500	1,320	0.11	0.66	5,000	950	0.11	0.33	4,000	680	0.055	0.22	3,500	450	0.044	0.176
	60	7,000	800	0.108	0.363	6,000	660	0.077	0.33	3,500	500	0.055	0.165	2,500	330	0.033	0.077	2,500	210	0.026	0.062

Available for titanium alloy machining

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Adjust the number of revolutions and feed rate at the same rate.
Oil mist coolant is recommended.
If the diameter is less than ø1 or L/D (aspect ratio) is more than 8, adjust the feed rate to 50% or less and cutting width (ae) to 30% or less depending on the situation.

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