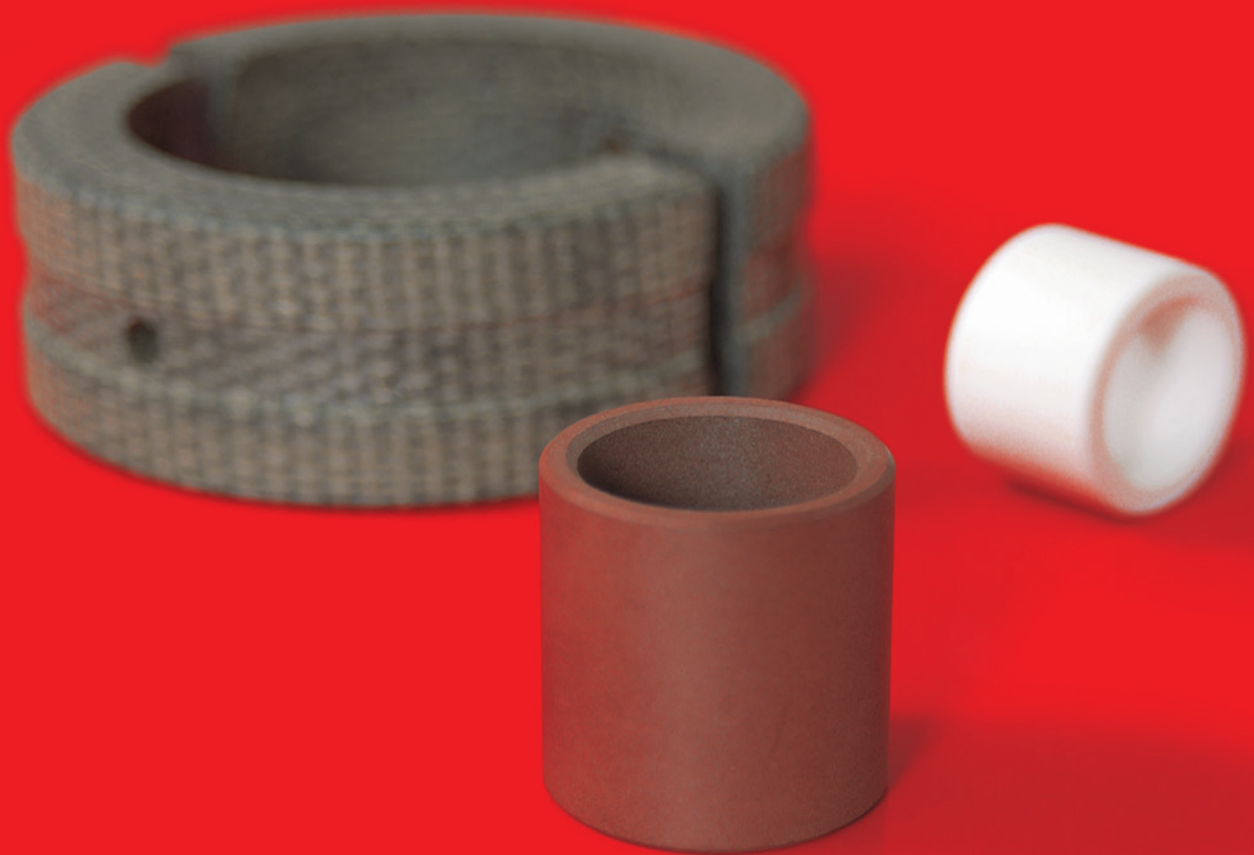


Plastic Bushings / Plain Bearings



UKB200

Being self-lubricating, it moves smoothly in dry conditions, with high wear-resistance. (Wear-resistance is even better under conditions with oil, grease, etc.)



UKB522

This bushing can be used under a wide range of conditions, such as non-lubricated, water-lubricated, intermittent moisture, etc. It is a bearing which results in less damage to the partnering shaft.



UKB131MS

This bushing demonstrates special wear-resistance in fresh water, sea water, and oil.



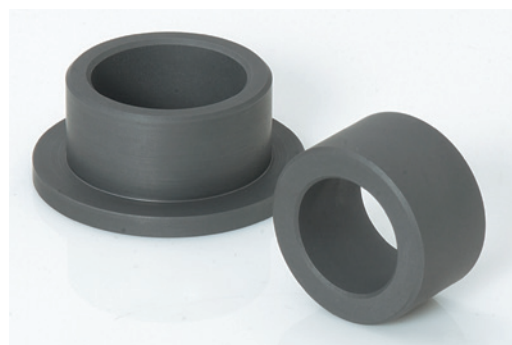
UKB252HG

This plain bearing exhibits superior performance under higher temperatures.



Carbon (Graphite)

This plain bearing can be used under even higher temperatures than our UKB252HG. Moreover, it can be used for any desired purpose which various environments : in water, within chemical-solutions, etc.



Tetrafluoroethylene

(UKB494,UKB424,UKB430)

A PTFE bearing with excellent sliding-properties and wear-resistance. It can handle all of the following conditions: dry, in water, in oil, in chemical-solutions.



Thermoplastics

Kashima will propose the most suitable plastics depending on conditions such as temperature, environment, utilization, etc.



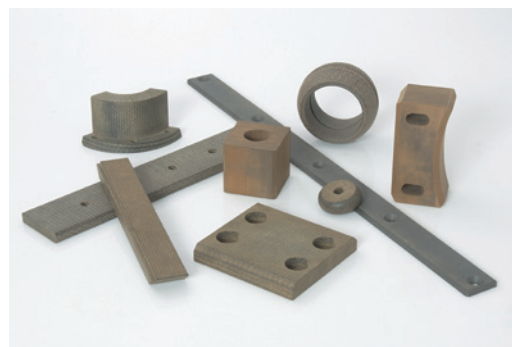
Metal-backed Plain Bearings

In order to achieve measurements as precise as possible, or in case of frequent impacts, we recommend metal-backed, plastic plain bearings. As the exterior is metal, the outer-diameter can be made with extreme precision. Due to the interior being plastic, this component can be extremely thin, tailorable to most needs.



Diverse Shapes

Kashima contributes to maintenance-free systems with various shapes fitting a variety of designs, such as liners, tender-rails, cube-bushings, split-bushings, etc. These products play a role in reducing the number of parts, reducing weight, etc.



Types and Properties of Plain Bearings

Type of Plastic		Thermosetting (Phenol)				Tetrafluoroethylene (PTFE)			Carbon (Graphite)
Material Number		UKB200	UKB522	UKB131MS	UKB252HG	UKB494	UKB424	UKB430	UKB67C
Merits		Most suitable for completely dry usage	For sites with irregular moisture, e.g., vapor	Submersion in water	For temp. between 150°C and 250°C	Excelling at wear-resistance, immersion in water and in chemical-solutions, (black color)	Excelling at wear-resistance and load-bearing (red-brown color)	Does not harm soft partnering corresponding shafts	For continuous usage up to 350°C; For stable-measuring demands
Density		1.5	1.5	1.4	1.8	2.1	2.3	1.84	1.77
Compressive Strength	⊥(Mpa)	230	226	265	334	6.3 (1% Deformation)	–	9.2 (1% Deformation)	185
	//(Mpa)	147	118	187	147	6.0 (1% Deformation)	9.8 (1% Deformation)		
Flexural Strength	⊥(Mpa)	118	98	128	147	–	–	–	60
	//(Mpa)	83	–	–	166				
Impact Strength	⊥(J/m)	157	108	245	421	–	–	–	–
	//(J/m)	132	–	–	284				
Cleavage Strength	(N)	5737	–	–	5737	–	–	–	–
Hardness	(Rockwell M)	100	98	98	111	60-64 (Shore)	65 (Shore)	64 (Shore)	70 (Shore)
Linear Thermal-Expansion Coefficient	⊥(x10 ⁻⁶ /°C)	3.59	5.0	4.5	3.59	8.4~10.8	6.0~11.0	8.3~12.9	0.35
	//(x10 ⁻⁶ /°C)	1.80	3.0	3.0	1.80				
Water-Absorption Swelling Rate	⊥(%)	1.0	0.9	1.0	1.0	0	0	0	–
	//(%)	0.5	0.2	0.2	0.5				
Heat-Resistance / Temperature (Recommended Continual Use Temp.)	(°C)	200	130	130	300	260	260	260	350
	(°C)	(150)	(110)	(110)	(250)	(150)	(150)	(150)	(350)
(Caution)		No Insulation Capability				Do NOT Burn			Avoid Impacts

Thermoplastic Resins

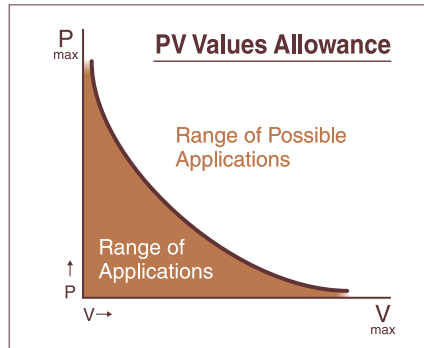
Material		POM (Polyacetal)	UHMWPE (Ultra High Molecular Weight Polyethylene)	PEEK (Polyetheretherketone)	PPS (Polyphenylenesulfide)	PI (Polyimide)
Density		1.41	0.94	1.32	1.35	1.43
Tensile Strength (Mpa)		61	44.1	98	93	86.2
Flexural Strength (Mpa)		89	–	170	147	110.3
Flexural Elasticity Modulus (Mpa)		2589	883~981	4021	3430	3102
Compression Strength (Mpa) (10% Deformation)		103	–	119	107	133.1
Izod Impact Strength (Notched) (J/m)		97	Will not fracture	77	19	42.7
Hardness		119 (Rockwell)	67~69 (HDD)	120 (Rockwell)	124 (Rockwell)	45-58 (Rockwell)
Volume-Resistance Characteristic (x10¹² Ω·cm)		9.0	10~19	5.0	5.0	4.5
Linear-Expansion Coefficient (%)	Saturation	0.7	<0.01	0.5	0.01	1.0-1.3
	24hrs	0.22		0.04		0.24
Volume-Resistance Characteristic (Ω·m)		>10 ¹²	10 ¹⁶	10 ¹⁴	10 ¹⁴	10 ¹⁴ -10 ¹⁵

(The above numerical values are general values. Please use them as a guide only.)

Application Limitations & PV Values

PV Values?

The amounts of P (Pressure) and V (Velocity) (Circular Velocity) indicate the range of possible bearing applications. (Diagram 1)



(Diagram 1)

Surface Pressure

Surface pressure (kgf/cm²) = radial load ÷ (bearing inner-diameter (cm) × bearing length (cm))

Speed Allowance (Circular Velocity)

Circular Velocity (m/sec) = shaft-diameter (mm) × 3.14 × rotational speed (rpm) ÷ 60,000

PV Value

PV Value = Surface Pressure × Circular Velocity

Range of Allowances and PV Value of Each Material

Material Number(UKB)		UKB200	UKB522	UKB131MS	UKB252HG	UKB67C	UKB494	UKB424	UKB430
V_{max}	Highest Speed Allowance (Dry) (m/sec)	1	1.5	5 (Immersed)	1	4	3	3	3
P_{max}	Highest Surface Pressure Allowance (Mpa)	8	10	19.6	8	3	3	3	3
Highest PV Value (Mpa·m/sec)	D Dry	1	1.5	–	1	0.5	1.5	1.5	1.5
	W Water-Lubrication	–	54	78	–	5	3	–	–
	G Grease	–	3	1.5	–	5	10	10	10

Please inquire about POM, UHMW, PEEK, PPS, PI

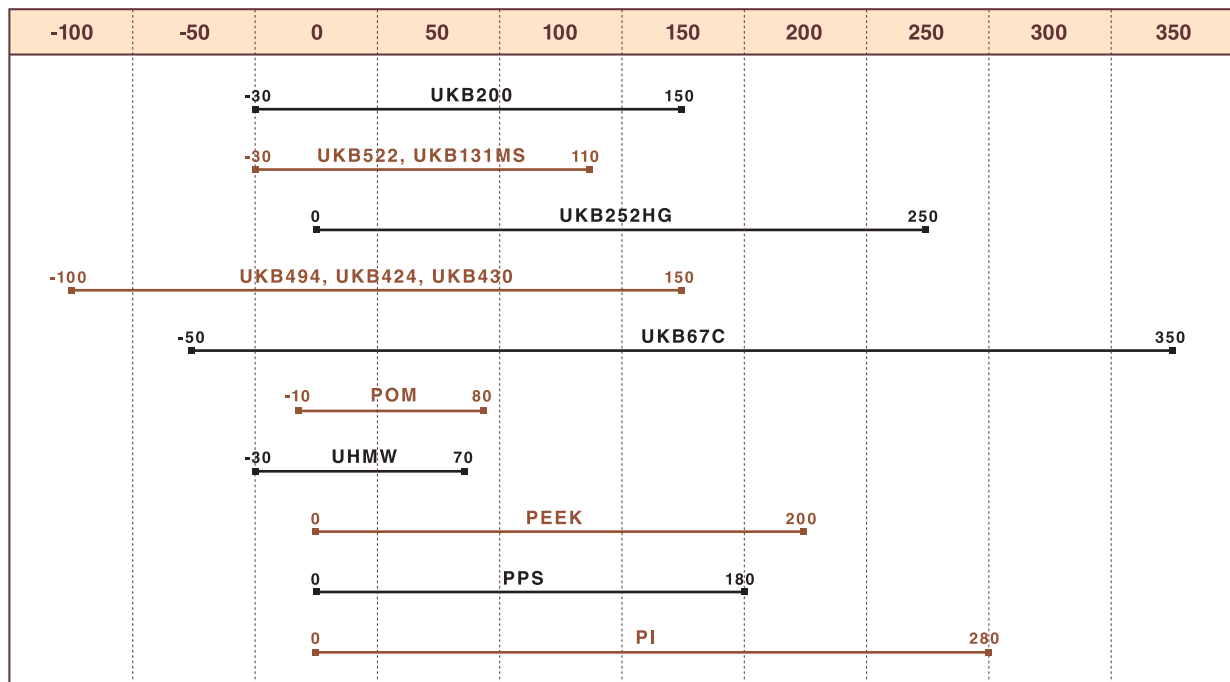
Friction Coefficient (Representative value)

	UKB200	UKB522	UKB131MS	UKB252HG	UKB494	UKB424	UKB430
Dry	0.2~0.4	0.15~0.3	–	0.2~0.4	0.1~0.3	0.1~0.36	0.06~0.23
Water-Lubrication	0.08~0.15	0.04~0.12	0.05~0.13	–	<0.3	<0.36	<0.13
Grease	0.05~0.16	0.08~0.2	0.08~0.20	0.05~0.16	0.01~0.05 (Oil-Lubrication)		

Material Selection Based on Purpose

Irregular Moisture	Dry	In Water / In Sea-water	In Chemical Solution	Food
	UKB200			
UKB522				
		UKB131MS		
	UKB252HG			
	UKB494			
	UKB424		UKB424	
	UKB430		UKB430	
UKB67C				
	POM			POM
UHMW				
	PEEK		PEEK	
		PPS		
	PI			

Material Selection Based on Temperature (Recommended)



Materials Suitable for Food

Tetrafluoroethylene (PTFE) Plastic : UKB494, UKB424, UKB

Thermoplastic : POM, UHMWPE, PEEK, PPS

Carbon (Graphite) : UKB67C

Chemical-Resistance Ability

Material	Acid	Alkali	Organic Solvent
(Thermosetting Plastic: Phenol) UKB200 · UKB522 · UKB131MS · UKB252HG	○	○	◎
	Not resistant to strong acid or strong alkali		Resistant to most organic solvents
(Tetrafluoroethylene (PTFE)) UKB494 · UKB424 · UKB430	◎	◎	◎
	Can bathe in common chemicals or organic solvents (However, may be harmed in some cases, depending on type of filling material)		
(Carbon (Graphite)) UKB67C	◎	◎	◎
	Resistant (except for some types of strong acids and strong alkalis)		Resistant
POM	△	△	△
	Resistant to weak alkalis (only) and weak organic solvents		
UHMWPE	◎	◎	◎
	Resistant (except for a few types of strong acids)		Resistant
PEEK	◎	◎	◎
	Mostly Resistant (except for a few types)		
PPS	◎	◎	◎
	Mostly Resistant (except for a few types)		
PI	△	△	◎
	Resistant to weak alkalis (only)		Resistant

Inquire about details of solvents and chemicals

Basic Designs of Bearings

	Phenol, PEEK, PPS, PI Group		POM		Polyethylene Group		PTFE		Processing-machinery tolerance	
	Clearance	Shrinkage	Clearance	Shrinkage	Clearance	Shrinkage	Clearance	Shrinkage	Maximum	Average
10 or less	0.10	0.06	0.1	0.05	0.1	0.05	0.07	0.08	0.06	0.10
18 or less, but over 10	0.12	0.07	0.14	0.09	0.14	0.10	0.08	0.10		
30 or less, but over 18	0.13	0.09	0.16	0.11	0.18	0.13	0.09		0.13	0.08
40 or less, but over 30	0.16	0.11	0.19	0.14	0.20	0.16	0.10	0.17		0.10
50 or less, but over 40			0.22	0.18	0.24	0.20	0.11		0.11	0.14
80 or less, but over 50	0.18	0.12	0.25	0.23	0.35	Outer-diameter of 0.3 ~ 0.5%	0.13	0.17	0.12	0.16
120 or less, but over 80	0.22	0.14	0.31	0.27	0.45		0.16	0.24	0.14	0.18
180 or less, but over 120	0.26	0.17	Please ask		0.55	Please ask	0.20	0.35	0.16	0.20
250 or less, but over 180	0.32	0.20			0.25		0.50	0.18	0.24	

1) Take heat-expansion into account in conditions exceeding 50°C. 2) Standard is based on H7 inner-diameter of housing, h7 shaft-diameter. 3) Temperature standard is 25°C.

Water-Absorption Expansion-Lubrication Amount

Amount of Change $\Delta dw = (\text{Outer-diameter} - \text{Inner-diameter}) \times (\text{expansion-lubrication ratio in the direction vertical to the plane})$

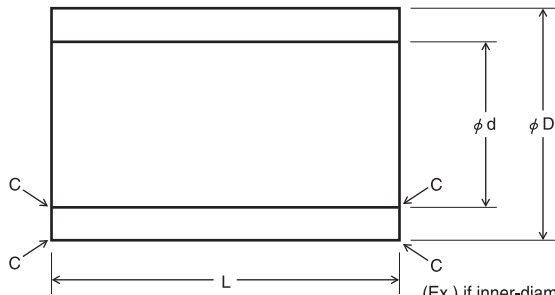
Heat-Expansion Amount

Amount of Change $\Delta dt = (\text{Outer-diameter} - \text{Inner-diameter}) \times (\text{heat-wave expansion coefficient in the direction vertical to the plane}) \times (\text{environment temperature} - 25^\circ\text{C})$

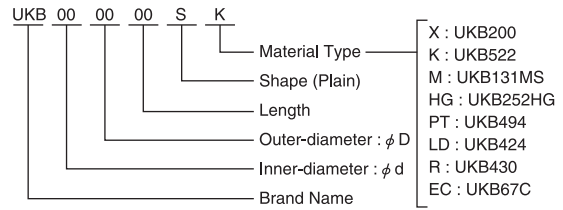
Regarding the Corresponding Shaft

Bearing performance is affected greatly by the material of the shaft, as well as the hardness and roughness of its surface. It is necessary to select suitable material according to usage of the bearings. In general, such shaft materials as S45C, SNC2, SCM are suitable, but in cases where the SUS type is required, there are times when damage may occur. (UKB430 does not harm the SUS type.) When a hardness greater than HB120 is desirable, there are times when Tetrafluoroethylene (PTFE) type plastic bearings suffer a large amount of wearing by surfaces such as hard chrome plating and ceramic coating. A surface-roughness under 3.2 S $\nabla\nabla\nabla$ is preferable.

Standard Diagram of UKB Bushings



Product Name

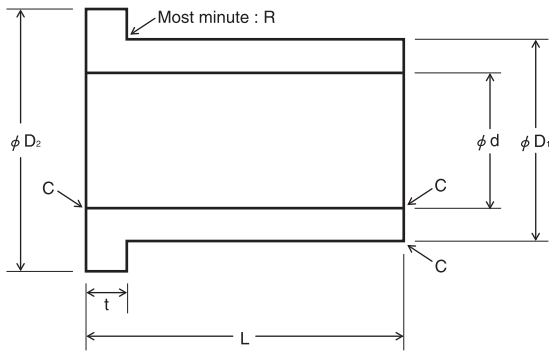


(Ex.) if inner-diameter: 10 outer-diameter: 14 length: 20; then the product name would be: UKB101420SK
 if inner-diameter: 5 outer-diameter: 8 length: 8 ; then the product name would be: UKB050808SPT

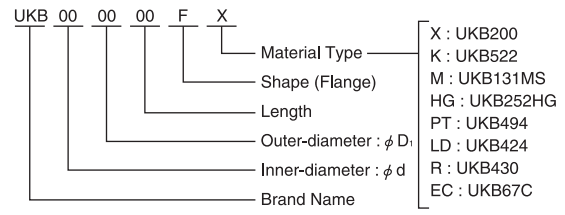
Shaft Diameter	Bearing Dimensions (mm)								
	Inner-diameter ϕd	Tolerance	Outer-diameter ϕD	Tolerance	Length L			Tolerance	C
5	5	+0.15 +0.05	8	+0.1 +0	6	8		0 -0.1	0.3
6	6		9		6	8	10		
7	7	+0.17 +0.07	11	+0.11 +0.01	8	10			
8	8		12		8	10	12		
9	9		13		10				
10	10		14		10	12	15	20	
12	12	+0.26 +0.16	16		10	12	15	20	
			18		10	12	15	20	
14	14		18		10	12	15	20	
		+0.28 +0.18	20	+0.13 +0.03	10	12	15	20	
15	15		19		10	12	15	20	
			21		10	12	15	20	
16	16		20		15	20	25		
			22		15	20	25		
17	17		21		15				
			23		15				
18	18		22		15	20	25		
			24		15	20	25		
20	20	+0.32 +0.22	24		20				
			26		20	25	30		
			30		20				0.5
22	22		26		20				0.3
			28		20				
25	25		29		25				
		+0.34 +0.24	31	+0.15 +0.05	25				
			35		20	25	30		0.5
28	28		32		20	25	30		0.3
			34		30				
30	30		36		25	30	40		
			40		25	30	40		0.5
32	32	+0.40 +0.30	38		30	40			0.3
			40		30				0.5
35	35		41		30	35	40		0.3
			43		35				0.5
			45		30	35	40		
38	38		44		20	30	40		0.3
40	40		48		30	40	50		0.5
			50		30	40	50		
45	45	+0.41 +0.31	53	+0.16 +0.06	30	40	50		
			55		30	40	50		
50	50		60		40	50			

(The above are tolerances for Phenol. Please inquire for other materials specifically.) ©Corresponding shaft dimension : h7 ©Housing dimension : H7

Standard Design on UKB Bearing with a Flange



Product Name



(Ex.) if inner-diameter: 10 outer-diameter: 14 (in this case see $\phi D1$) length: 15; then the product name would be: UKB101415FEC

Shaft Diameter	Bearing Dimensions (mm)										
	Inner-diameter ϕd	Tolerance	Outer-diameter ϕD_1	Tolerance	Outer-diameter ϕD_2	t	Length L			Tolerance	C
5	5	+0.15 +0.05	8	+0.1 +0	11	1.5	4	5	8	0 -0.1	0.3
6	6		9		12		5	6	8		
7	7	+0.17 +0.07	11	+0.11 +0.01	15	2	5	7	10		
8	8		12		16		6	8	10		
9	9		13		17		10				
10	10		14		18		10	12	15	20	
12	12	+0.26 +0.16	16		20		10	12	15	20	
14	14		18		22		10	12	15	20	
15	15	+0.28 +0.18	21	+0.13 +0.03	27	3	15	20	25		
16	16		22		28		15	20	25		
17	17		23		29		20				
18	18		24		30		20				
20	20	+0.32 +0.22	26		32		20	25	30		
22	22		28		34		20	25			
25	25	+0.34 +0.24	31	+0.15 +0.05	37		15	20	25	30	
28	28		34		40		30				
30	30		36		42		30	35	40		
32	32	+0.40 +0.30	40		48	4	30	35	40		0.5
35	35		43		51		30	40	50		
40	40		48		56		30	40	45	50	
45	45	+0.41 +0.31	53	+0.16 +0.06	61		30	40	50		
50	50		60		70	5	30	40	60		

(The above are tolerances for Phenol. Please inquire for other materials specifically.) ©Corresponding shaft dimension : h7 ©Housing dimension : H7

We produce non-standard sizes as well. Or, in the cases of immersion in water, sea-water, or chemical solutions, please append details and specifications when submitting an order. Moreover, please consult us about especially fine tolerances.

kashimabearings.com



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