

QZAK

SHAFTS FOR LINEAR MOTION

ROLLING BEARINGS

S.SC series SP.NP series

SQ series



- High-precision ground and hardened (HrC60) shafts
- Shafts exclusively used for linear motion ball bearings
- Pipe shafts for lightweight uses
- Standard shafts which are quickly delivered at reasonable price
- Stainless steel standard shafts

We have been engaged in the manufacture of specialty, high-precision ground and hardened shafts for linear motion ball bearings for a long time. Their production requires many different manufacturing processes and the use of advanced technology in fields like material selection, heat treatment, strain elimination and the all-around precision machining. Since the shafts must be manufactured to match the inner race of the linear motion ball bearings, care must be given, in the following areas, to achieve high performance: 1) strength, 2) rigidity, 3) accurate specifications, 4) cylindrical specs, 5) out of roundness specs, 6) sway, 7)

concentricity, 8) hardness and 9) surface roughness. As reduction in machine weights is getting required these days, pipe shafts have rapidly become popular.

Making full use of our long-nourished technology, we have established the standards of high-precision hardened ground shafts as shown in the following tables. We produce them as the standard shafts and have them in stock. We also manufacture pipe shafts and custom-made shafts. We hope you enjoy using this variety of shafts.

Kind of shafts

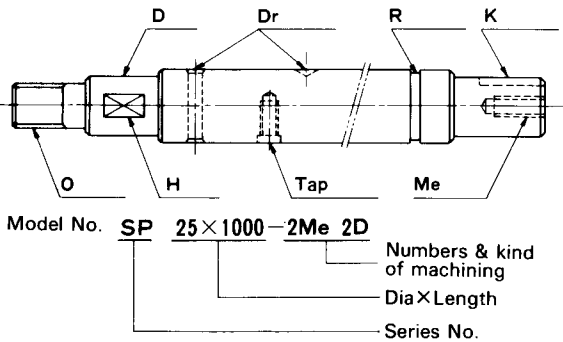
- S Series:** standard shafts in the full length
- SC Series:** shafts cut to the requested length from the standard shafts
- SP Series:** shafts cut to the requested length from the standard shafts and specially machined such as steps, female thread, stepped male thread and planning
- NP Series:** shafts custom-made from stock in case the standard shafts shown above are not suitable
- SS Series:** standard shafts made of stainless steel SUS440C
- PS Series:** standard pipe shafts made of SUJ-2
- SQ Series:** Tempered shaft ends. Quick delivery series.

1. As for the material, SUJ-2 is used for solid and pipe shafts, and SUS440C for stainless shafts.
2. The surface hardness is around HRC 58-63.
3. High-frequency induction hardening is used. The standard hardening depth is 1–2 mm.
4. Surface roughness is 1.5 S. or less.
5. In case anti-corrosion treatment is necessary, hard chromium plating (0.01mm deep) will be used. Shafts made of SUS 440C are also available.
6. The shaft's outside diameter is normally set to keep a tolerance of about a 10 μm clearance between itself and the linear motion ball bearing, if a stricter to tolerance is needed, we also manufacture shafts having closer outer diameter tolerances (For instance h₅, h₆ types).
7. Pipe shafts are recommended if you are aiming for lightweight machinery or need big diameter shafts. About a 40 to 50% weight reduction is possible compared with solid shafts.
8. We have standard gauge shafts in stock (3–60mm) whose overall length is shown on another table, if the shaft length you need is within these dimensions we will machine to your specifications and deliver them. If possible, on your request we will also make shaft lengths outside the set dimensions.
9. Standard sway is less than the value calculated by the following formula:

$$y = 2XL/d (\mu m) \quad y: \text{maximum sway of shaft}$$

$$d: \text{diameter of shaft} \quad L: \text{length of shaft}$$
 We also manufacture shafts with the highest precision whose sway is a half of the value.
10. We manufacture specially customized shafts based on your specifications with regard to steps, male thread, female thread, boring, planing, ring groove, key groove, OP tap and the like.

Designated numbers



Outer diameter tolerance

Table 121 :

Shaft Dia	Ordinary Clearance	Tight Clearance
	f6~g6	h6
3	-0.009	0
4	-0.017	-0.008
5		
6		0
8		-0.009
10	-0.010	
12	-0.019	0
16		-0.011
20		
25	-0.010	0
30A	-0.021	-0.013
30B		
35		
40	-0.012	0
50A	-0.025	-0.016
50B		
60		0
80	-0.015	-0.019
	-0.031	0
100		-0.022

Table 122 :

J I S No.	Chemical Analysis %							
	C	Si	Mn	P	S	Cr	Ni	Cu
SUJ-2	0.95~ 1.10	0.15~ 0.35	<0.50	<0.025	<0.025	1.30~ 1.60	<0.25	<0.25
SUS440C	0.95~ 1.20	<1.00	<1.00	<0.040	<0.030	16.00~ 18.00		

S series (Linear Shaft)

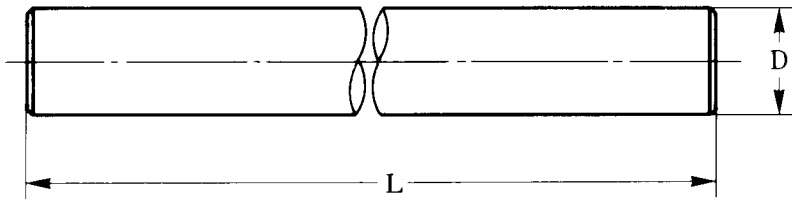
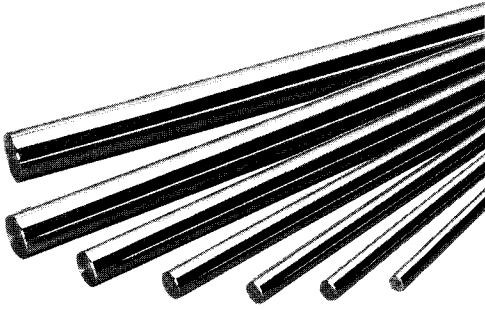


Table 125 : Linear Shaft S Series Stock Table

Model No.	Outside Diameter Tolerance (μm)		Standard Length (mm)																
	Max	Min	50	100	150	200	250	300	350	400	450	500	600	700	800	1000	1300	1500	2000
S- 6	-10	-19	○	○	○	○	○	○	○	○	○	○	○	○	○				
S- 8	-10	-19	○	○	○	○	○	○	○	○	○	○	○	○	○				
S-10	-10	-19		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
S-12	-10	-19		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
S-13	-10	-19		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
S-16	-10	-19		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S-20	-10	-20				○	○	○	○	○	○	○	○	○	○	○	○	○	○
S-25	-10	-20				○	○	○	○	○	○	○	○	○	○	○	○	○	○
S-30	-10	-20						○	○	○	○	○	○	○	○	○	○	○	○
S-35	-10	-22								○	○	○	○	○	○	○	○	○	○
S-40	-10	-22										○	○	○	○	○	○	○	○
S-50	-12	-25										○	○	○	○	○	○	○	○
S-60	-15	-31										○	○	○	○	○	○	○	○

* Also, we can supply $\phi 80$, $\phi 100$

* Material : SUJ-2