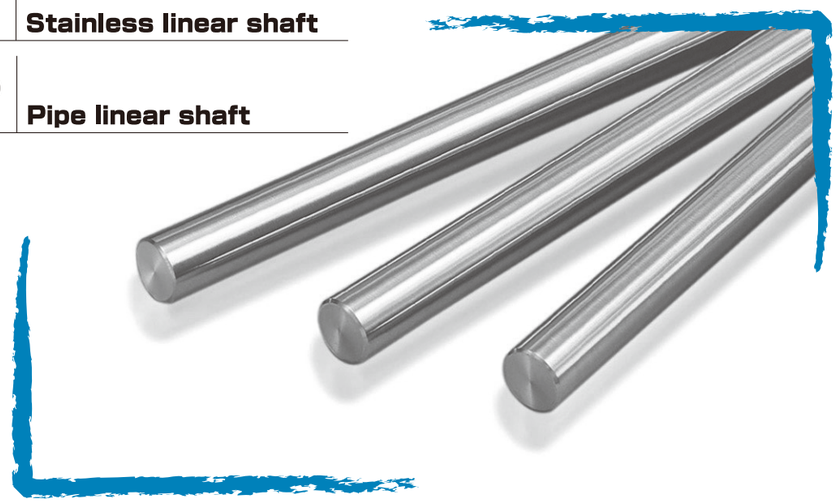
Linear Shaft

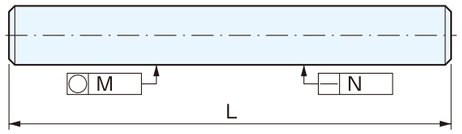
The linear shaft is used as a guide for straight-line back-and-forth motion mechanisms. Therefore linear shafts should have superior abrasion resistance and should be high-precision products that satisfy the standard of geometrical tolerance such as cylindricity and circularity. We highly recommend using our linear shafts, which we pride for their high-precision.

YS	**Linear shaft**
YSS	**Stainless linear shaft**
YSP	**Pipe linear shaft**



The precision standard of Linear shaft

◎Circularity and straightness



●Circularity

D		Straightness
Be over	And under	N
	3	0.02/100
3	18	0.02/100
18	50	0.01/100

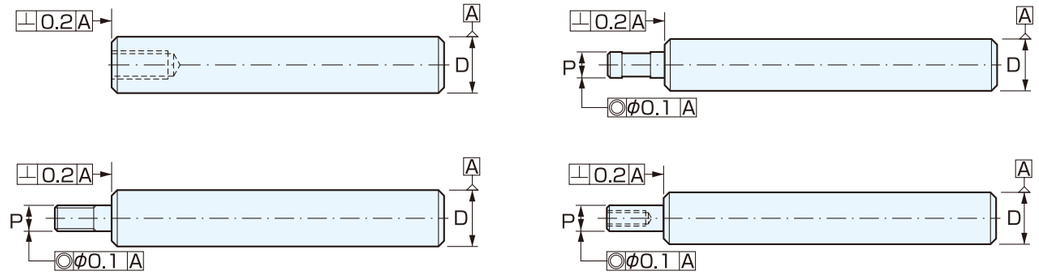
●Circulality of D

D		Straightness
Be over	And under	M
	3	0.004
3	10	0.004
10	30	0.005
30	50	0.006

●Allowance

L		Allowance
Be over	And under	
	3	±0.1
3	6	±0.1
6	30	±0.2
30	120	±0.3
120	400	±0.5
400	1000	±0.8
1000	1500	±1.2

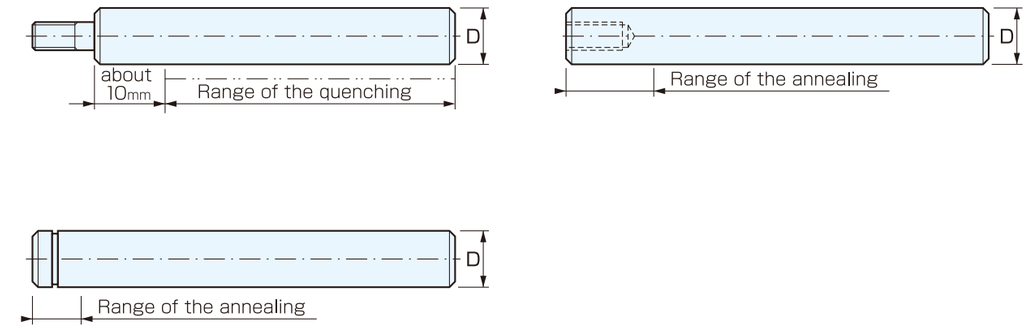
◎Concentricity and perpendicularity



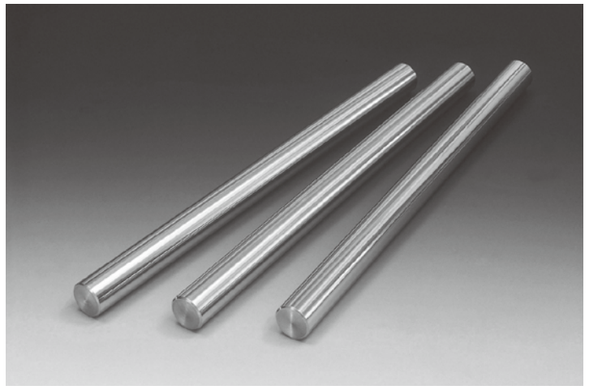
Linear shaft Material • hardness • Surface treatment

Form		Material	hardening treatment	Hardness	Surface treatment	Hardening Depth
Linear shaft	YS	SUJ2	Induction hardening	and over HRC60	P22	0.5㎜ to 1.5㎜
	YSS	QPD5(Equivalent of SUS440C)		and over HRC56		
Pipe linear shaft	YSP	SUJ2		and over HRC60		

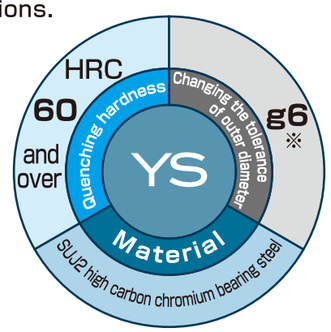
●Range of the induction hardening



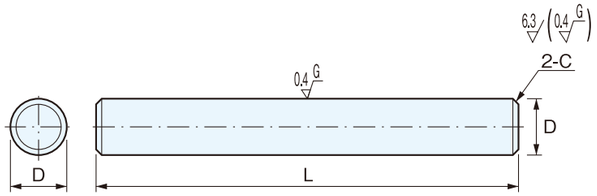
YS LINEAR SHAFT



- We use SUJ2 that excels for abrasion resistant. It is induction hardening shaft and available for comprehensive use such as straight-line motion and rotating motion.
- We make the products accompany machining also.
- Please ask about the dimension except notations.



※We prepare the SUJ2 shafts of g6 tolerance as standard products. However we can make other shafts of specialized tolerance.

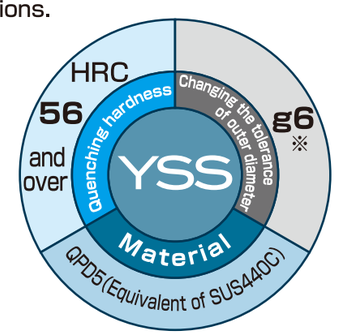


Standard stock products　Option

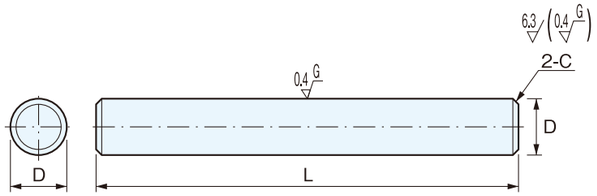
Form	Dg6		Length L(mm) 100 200 300 400 500 600 700 800 900 1000 1500 2000 2500 3000	Effective case depth (mm)
YS	3	−0.002/−0.008		0.5 and over
	4	−0.004 −0.012		
	5			
	6			
	8	−0.005 −0.014		
	10			
	12	−0.006 −0.017		1.0 and over
	13			
	15			
	16			
	20	−0.007 −0.020		
	25			
	30			
	35	−0.009 −0.025		
	40			
	50			
	60	−0.010 −0.029		1.5 and over
	80			
	100	−0.012/−0.034		

YSS STAINLESS LINEAR SHAFT

- We use martensitic stainless steel QPD5 (equivalent of SUS440C) It has superior corrosion resistance, abrasion resistance and rigidity.
- We make the products accompany machining also.
- Please ask about the dimension except notations.



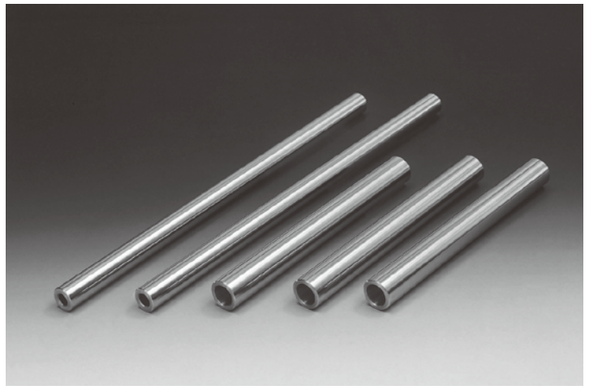
※We prepare the SUJ2 shafts of g6 tolerance as standard products. However we can make other shafts of specialized tolerance.



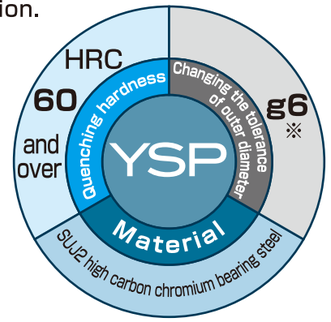
Standard stock products　Option

Form	Dg6		Length L(mm) 100 200 300 400 500 600 700 800 900 1000 1500 2000 2500 3000	Effective case depth (mm)
YSS	3	−0.002/−0.008		0.5 and over
	4	−0.004 −0.012		
	5			
	6			
	8	−0.005 −0.014		
	10			
	12	−0.006 −0.017		1.0 and over
	13			
	15			
	16			
	20	−0.007 −0.020		
	25			
	30			
	35	−0.009 −0.025		
	40			
	50			
	60	−0.010/−0.029		1.5 and over

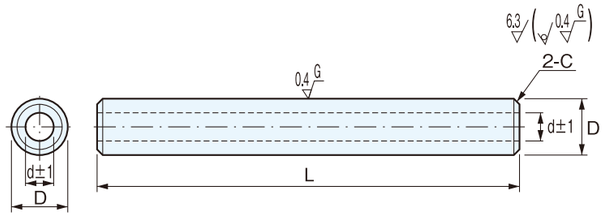
YSP PIPE LINEAR SHAFT



- The pipe linear shaft is most suitable for a case to attempt shaft itself of light-weighting and the use as duct lines such as the electric wiring.
- We make the products with machining work also.
- The tolerance of inner diameter is ±1 mm.
- Please contact us about the size of except notation.



※We prepare the SUJ2 shafts of g6 tolerance as standard products. However we can make other shafts of specialized tolerance.



Standard stock products　Option

Form	Dg6		Inner diameter d(mm)	Length L(mm) 100 200 300 400 500 600 700 800 900 1000 1500 2000 2500 3000	Effective case depth (mm)
YSP	6	−0.004/−0.012	2		0.8 and over
	8	−0.005 −0.014	3		
	10		4		
	12	−0.006 −0.017	6		1.0 and over
	13		7		
	16		8		
	20	−0.007 −0.020	10		
	20		14		
	25		15		
	30		16		
	35	−0.009 −0.025	19		
	40		20		
	50		26		
	60	−0.010 −0.029	30		1.5 and over
	80		52		

Surface treatment

You can various surface treatments.

Surface Treatments	Abrasion resistance	Corrosion resistance	Price	Delivery term	Color
Hard chrome plating	◎	○	△	○	Silver
Black oxide(Alkaline Blackening)	×	×	◎	◎	Black
Raydent ®	○	◎	○	○	Black
With electro less nickel plating	○	◎	×	△	Gold

◎excellent ○Good △No Good ×Bad

Characteristic of the surface treatment

Surface Treatments	Feature
Hard chrome plating(RoHS correspondence)	Good wear resistance.There is little frictional resistance.Film thickness designation from 1 μ to 30 μ is possible
Black oxide(Alkaline Blackening)	Corrosion resistance wear resistance is low.Cost is low.The color is luster of the black.
Raydent ®	Superthin film.Superior in long-term rust prevention.There is little influence on material.
With electro less nickel plating	Film thickness management is easy.Evenly construction.Corrosion resistance is good.

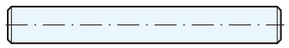
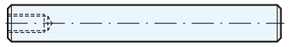
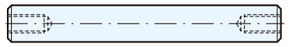
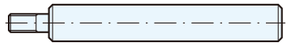
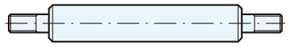
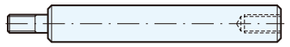
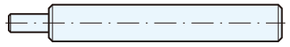
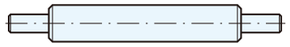
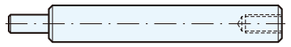
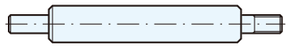
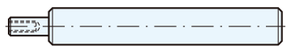
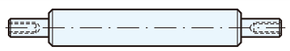
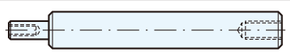
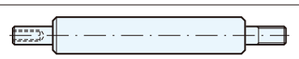
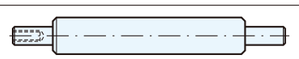
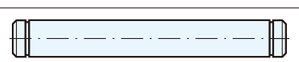
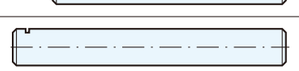
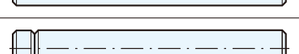
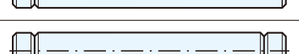
Other processing surface treatment　Heat treatment

Surface treatment	Alumite(white and black)	Parkerizing	Zinc Plating	Black chrome plating
	Hard Alumite	Unichrome Plating	Nickel plating	Ceramic Sraying

Heat treatment	Induction hardening	Vacuum Hardening	Tufftride	Thermal Refining
	Immersion Quenching	Nitriding	Carburizing and Quenching	Annealing

LINEAR SHAFT

YS・YSS Selection table

Pages	Figure		形式と材質・外径 SUJ2	形式と材質・外径 QPD5 (Equivalent of SUS440C)
25	Straight		YSAA φ3～φ50	YSSAA
26	One end tapped		YSBA φ4～φ50	YSSBA
27	Both ends tapped		YSBB φ4～φ50	YSSBB
28	One end threaded		YSCA φ3～φ50	YSSCA
29	Both ends threaded		YSCC φ3～φ50	YSSCC
30	One end threaded, another end tapped		YSCB φ4～φ50	YSSCB
31	One end stepped		YSDA φ3～φ50	YSSDA
32	Both ends stepped		YSDD φ3～φ50	YSSDD
33	One end stepped, another end tapped		YSDB φ4～φ50	YSSDB
34	One end stepped, another end threaded		YSDC φ3～φ50	YSSDC
35	One end stepped and tapped		YSEA φ8～φ50	YSSEA
36	Both ends stepped and tapped		YSEE φ8～φ50	YSSEE
37	One end stepped and tapped, another end tapped		YSEB φ8～φ50	YSSEB
38	One end stepped and tapped, another end threaded		YSEC φ8～φ50	YSSEC
39	One end stepped and tapped, another end stepped		YSED φ8～φ50	YSSED
40	Retaining ring groove on one end		YSFA φ3～φ30	YSSFA
41	Retaining ring grooves on both ends		YSFF φ3～φ30	YSSFF
42	One end stepped and grooved		YSGA φ6～φ50	YSSGA
43	Plate grooved		YSHA φ6～φ50	YSSHA
44	One end V grooved		YSJA φ6～φ50	YSSJA
45	Both ends V grooved		YSJJ φ6～φ50	YSSJJ
46	Tapped on generating line		YSKK φ10～φ50	YSSKK

YSP Selection table

Pages	Figure		形式と材質・外径 SUJ2
47	Pipe straight		YSPAA φ6～φ50
48	Pipe one end tapped		YSPBA φ6～φ50
49	Pipe both ends tapped		YSPBB φ6～φ50
50	Pipe one end threaded		YSPCA φ6～φ40
51	Pipe both ends threaded		YSPCC φ6～φ40
52	Pipe one end threaded, another end threaded		YSPCB φ6～φ40
53	Pipe one end stepped		YSPDA φ6～φ50
54	Pipe both ends stepped		YSPDD φ6～φ50
55	Pipe one end stepped, another end tapped		YSPDB φ6～φ50
56	Pipe one end stepped, another end threaded		YSPDC φ6～φ40

Specified method of form

Material·Figure — Outer diameter D — (Pipe Inner diameter d) — Length L — Machining — Additional machining

YSP — 20 — 10 — 650 — H — h5

Material·Figure

Choose materials and surface treatmen and the shape.

Material・Surface treatment	Form
SUJ2	YS
QPD5(SUS440C相当品)	YSS
SUJ2 Pipe	YSP

Machining form	Form
Straight	A
Tapped	B
Threaded	C
Stepped	D
Stepped and tapped	E
Retaining ring grooves	F
Stepped and grooved	G
Plate grooved	H
V grooved	J
Tapped on generating line	K

Outer diameter D Appoint the outer diameter of the shaft.

(Pipe Inner diameter d) Aappoint the inside diameter of the pipe.Please fill in numerical value after d sign.

Length L Appoint length by a 1mm unit.

Machining

Form	Contents
H・G	The length of the step. The position of the ditch.
M・N	Diameter of the screw.
V・Z	Diameter of the screw.
P・Q	Diameter of the step.

Additional machining

Form	Contents
g5・h5	The outer diameter clearance is changed to the clearance (g5, h5) by standard g6.
LCK	Changing L dimensional tolerance.
YCK	Changing Y dimensional tolerance.
HCA・HCB	Can turn it with a spanner. Write position dimensions later.
DCA・DCB	To carry out planing.Write position and cut width dimensions later.
PON・QON	Undercut machining of external thread.There is no numerical designation.
MSP・NSP	Thin screw switch to female screw. Write screw dimensions later.
PBP・QBP・PSP・QSP	Thin screw switch to male screw. Write screw dimensions later.