



## **SOBS**

### **Spherical bearings**

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## Stepping forward together with our customers

For more than 50 years, **SANKYO OILLESS** has been one of the leading manufacturers of maintenance-free sliding elements. As a leading supplier and pioneer in the production of stamping and press tool components for the automotive industry, **SANKYO OILLESS** supplies an products for many other applications such as mold making, engineering, packaging, heavy industry, aerospace and many more.

The technologies developed by **SANKYO OILLESS** have reduced or eliminated friction, wear and tear. In addition, **SANKYO OILLESS** provides services and quality products to offer you the best possible solutions for your requirements at all times.

## The benefits of slide bearings versus roller bearings

In a variety of applications, designers are increasingly replacing roller bearings with slide bearings. In addition to ease of installation and cost effectiveness, slide bearings offer a number of distinct advantages. Slide bearings require less installation space, have a larger load bearing capacity, are maintenance-free or require little maintenance, are easier to assemble and are less susceptible to noise and vibration.

The following list gives an overview of the general advantages of bearings compared to bearings.

### Slide bearing

- Higher load bearing capacity and reduced footprint
- Higher resistance to vibration and increased lifetime
- Easier installation
- Lower installation costs
- Increased shaft tolerances possible
- Compensates misalignment and reduces the edge load

### Roller bearing

- sensitive to shock, vibration and edge load
- high costs for bearings, housings, counterfaces and - fixing materials
- large space required
- is prone to noise development

## Technologies for top performance

SANKYO products are manufactured in our own plants and distributed worldwide.

We offer high quality maintenance-free sliding elements acc. to international standards and standards for use in

- pressing tools
- injection molds
- general engineering

As an experienced specialist, we have the appropriate know-how in tribology to always offer the best solutions for your needs. We supply a large portfolio of lubrication-free sliding elements and also offer custom products acc. to customer drawing.

Quality and performance are our constant commitment!

## Bushes with solid lubricant (spherical bearing)

For a good distribution of the solid lubricant between the sliding element and the sliding partner, a small sliding gap is needed. This happens once by abrasion and by swelling from the depots in the micrometer range. As a result, pairing with clearance „0“ is not possible using our bronze lubricants with solid lubricant, which would inevitably result in jamming.

Prerequisites for this are:

	Medium load	High load
Housing	H7	N7
Shaft	g6	e7

### Attention:

The graphite cannot be deposited on the entire surface with very small movements. Please contact the technical department if you want to realise very small movements.

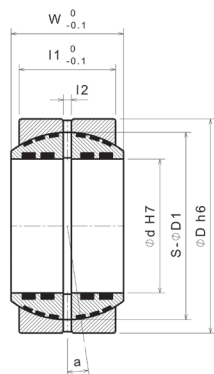
## Sliding partners

Suitable sliding partners for Sankyo Oilless Bushes and Plates are **gas nitrated or hardened steel** alloys with **HRC > 35**.

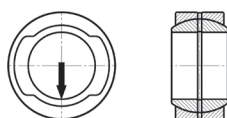
In order to ensure an optimal sliding behaviour, the difference in hardness between the sliding material and sliding partner should at least be **100 HB**.

The surface roughness of the sliding partner should be **Rz = 3...6,3 µm (grinding)**.

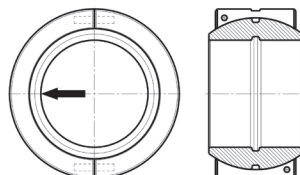
If guides, like in large dies of punching tools, are continuously moved apart during operation, the counterpart partner should be provided with correspondingly generous centering chamfers.



A - (d= 15-95)



B - (d>95)



### Properties:

Base material	Special brass (SO#50SP2)
Self-lubricating	Yes
Lubricant	Graphite
Max. surface pressure P	100 N/mm <sup>2</sup>
Max. sliding speed v	30 m/min
Max. P*v-Wert	200 N/mm <sup>2</sup> x m/min
Operating temperature	-50°C / +200°C (max. 300°C)
Friction coefficient	0,07

Article no.:	Article name:	Innen-Ø d:	Außen-Ø D:	Width W:	I1:	S-Ø D1:	I2:	Angle a:
11320150	SOBS 015	15	26	12	9	22	4	8°
11320200	SOBS 020	20	32	16	14	28		4°
11320250	SOBS 025	25	42	21	18	36		5°
11320300	SOBS 030	30	50	27	23	44		6°
11320350	SOBS 035	35	55	30	26	49		5°
11320400	SOBS 040	40	62	33	28	55		6°
11320450	SOBS 045	45	72	36	31	62		5°
11320500	SOBS 050	50	80	42	36	70		
11320550	SOBS 055	55	90	47	40	80		6°
11320600	SOBS 060	60	100	53	45	90		
11320650	SOBS 065	65	105	55	47	94		5°
11320700	SOBS 070	70	110	58	50	99		
11320750	SOBS 075	75	120	64	55	105		6°
11320800	SOBS 080	80	130	70	60	115		
11320850	SOBS 085	85	135	74	63	120		
11320900	SOBS 090	90	140	76	65	125		
11320950	SOBS 095	95	150	82	70	135	6	5°
11321000	SOBS 100	100	160	88	75	145		
11321100	SOBS 110	110	170	93	80	155		
11321150	SOBS 115	115	180	98	85	165		
11321200	SOBS 120	120	190	105	90	170		6°
11321300	SOBS 130	130	200	110	95	180		5°
11321400	SOBS 140	140	210	90	70	180		7°
11321500	SOBS 150	150	220	120	105	200		5°
11321600	SOBS 160	160	230	105	80	200		8°
11321800	SOBS 180	180	260	105	80	225		6°
11322000	SOBS 200	200	290	130	100	250		7°
11322200	SOBS 220	220	320	135	100	275	9	8°
11322400	SOBS 240	240	340	140	100	300		



### Finishing

**SANKYO OILLESS** - bronze is easy to machine. Basically, there is no great difference between the machining of our products and normal steel. No special tools are required but be sure to use sharp and preferably new tools.

### Milling

The use of cooling lubricants is recommended by using HSS or carbide tools. First pre-roughing to approx. distance of 0,3mm to nominal. In general: Milling / rough machining with little effort, slow forward feed, at high rotation-speeds and small depths of cut.

### Drilling

The use of cooling lubricants is recommended by using HSS or carbide tools. Drill as with normal steel and if it's necessary increase the forward feed with same rotation-speed. Flat plates have to be drilled from backside and countersink on the sliding surface if it's necessary to drill through a solid-lubricant depot.

### Grinding

The use of cooling lubricants is recommended by working with grinding wheels.

<b>Grain size</b>	46 - 60
<b>Material</b>	Silicon carbid
<b>Rotation speed</b>	1500 U/min
<b>Working speed</b>	30 m/min

### Reaming

The use of cooling lubricants is recommended by using HSS reamers. Proceed as with normal steel and if it's necessary increase the forward feed with same rotation-speed.

### Turning

<b>Example (up to 100mm)</b>	<b>External turning</b>	<b>Internal turning</b>
<b>Rotation speed</b>	approx. 1000 U/min	approx. 500 U/min
<b>Feed rate</b>	ca. 0,1 m/min	approx. 0,07 m/min
<b>Tool</b>	Carbide	Carbide

## Custom-made products

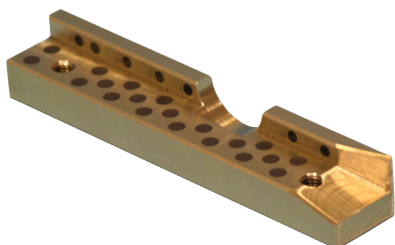
Beside to the big variety of standard products, we offer custom-made rotation- and milled-parts. We are producing these products out of steel or with our special Sankyo bronze with solid lubrication. Also, it is possible to get standard products with modifications. We only need your drawing or 3D-model with the assembly situation, like load cases and operating conditions, to prove the feasibility.

Our expert team will gladly advise you, also at your side. You can contact the department „Engineering“ by:

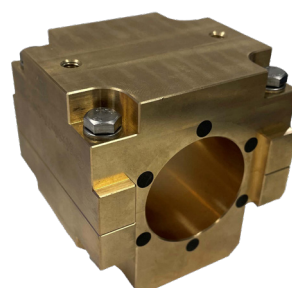
Tel.: [+49 2103 584 800](tel:+492103584800)

E-Mail: [technik@de.sankyo-oilless.com](mailto:technik@de.sankyo-oilless.com)

## Examples



Custom-made products



Prefabricated dividable bush set to add a thread at the customer's site



Special design of a special spindle nut



Large bushings for all applications

## Material data

Material		SO#50SP2*	SO#50SP5	SO#50SP7	SO#50SP8	SO#50SP13	SO#50B
		<i>Hard brass with graphite</i>	<i>Alu-bronze with graphite</i>	<i>Alu-bronze with graphite</i>	<i>Hard brass with graphite</i>	<i>Bronze with graphite</i>	<i>Red brass with graphite</i>
Self-lubricating		Yes	Yes	Yes	Yes	Yes	Yes
Lubricant		Graphite	Graphite	Graphite	Graphite	Graphite	Graphite
Max. surface pressure [ N/mm <sup>2</sup> ]		100	100	120	130	120	50
Max. sliding speed [ m/min ]		30	10	10	15	10	50
Max. P*v-Wert [ N/mm <sup>2</sup> * m/min ]		200	150	200	200	200	100
Temperature [ °C ]	Standard Max	-50 / +200 +300	-50 / +200 +300	-50 / +200 +300	-50 / +200 +300	-50 / +200 +300	-50 / +200 +400
Friction coefficient**	initial long term	0,15 0,07	0,15 0,07	0,15 0,07	0,15 0,07	0,2 0,15	0,15 0,07
Brinell hardness [ HB ]		>210	>210	>260	220 ~ 260	>280	>60
Further information							
Elongation [ % ]		>12	>18	>2	>3	>0,5	>15
Density [ kg/dm <sup>3</sup> ]		7,9	7,7	7,8	7,8	7,2	8,7
Tensile strength [ N/mm <sup>2</sup> ]		>755	>686	>833	>700	>550	>195
Yield strength [ N/mm <sup>2</sup> ]		>412	>372	>509	-	-	>105
E-Module [ N/mm <sup>2</sup> ]		97000	108000	123600	108000	145000	96000
Thermal expansion [ 10 <sup>-5</sup> * grd.-1 ]		1,9	1,6	1,6	1,9	1,71	1,8

\*: Material used according to SANKYO OILLESS standards

\*\*: against steel, hardened and grinded



Tin bronze	Sinter-bronze	SO#50PB	CuSn8	SO#50S45C	SO#50F	Polyacetal
		<i>Ton bronze</i>	<i>acc. to DIN 17662</i>	<i>Steel with graphite</i>	<i>Grey cast iron with graphite</i>	<i>Plastic</i>
No	Yes	No	No	Yes	Yes	No
-	Oil	-	-	Graphite	Graphite	Graphite
80	50	80	40	30	5	25 35 (with oil)
20	300	50	120	10	10	50 200 (with oil)
-	96	100	-	80	50	100 200 (with oil)
-50 / +200 +300	-12 / +90	-50 / +200 +300	-200 / +200	-50 / +150	-50 / +150	-50 / +80
0,16	0,09	0,15 0,07	-	0,01	-	-
>80	>25	>80	-	>375	160 ~ 220	115 (HRR)
n						
>6	-	>5	-	19	-	73
8,7	6,5 ~ 7,0	8,2	8,8	7,8	7,1 ~ 7,3	1,4
>295	-	>295	-	>690	>250	69
>161	-	>161	-	-	-	-
108000	-	108000	115000	-	-	-
1,8	-	1,8	-	1,1	1	7,7

## Chemical resistance

### Water

Material	SO#50SP2 SO#50SP8	SO#50B	SO#50SP5 SO#50SP7 SO#50SP13 SO#50AIB	SO#50F	SO#50S45C	Polyacetal
	<i>High strength brass casting</i>	<i>Red brass</i>	<i>Alu-bronze</i>	<i>Grey cast</i>	<i>Steel</i>	<i>Red brass mit FSS</i>
<b>Fresh Water</b>	○	◎	◎	X	◎	○
<b>Sea Water</b>	△	○	○	X	◎	○

### Acid

Material	SO#50SP2 SO#50SP8	SO#50B	SO#50SP5 SO#50SP7 SO#50SP13 SO#50AIB	SO#50F	SO#50S45C	Polyacetal
	<i>High strength brass casting</i>	<i>Red brass</i>	<i>Alu-bronze</i>	<i>Grey cast</i>	<i>Steel</i>	
<b>Alcohol</b>	◎	◎	◎	-	◎	-
<b>Formic acid</b>	-	-	-	-	-	X
<b>Chlorine (dry)</b>	◎	◎	◎	-	◎	-
<b>Chlorine (wet)</b>	X	△	△	-	-	-
<b>Chromic acid</b>	X	X	X	X	-	-
<b>Acetic acid</b>	X	X	◎ (20°C) △ (118°C)	X	◎	○
<b>Hydrochloric acid</b>	-	○	○	X	-	X
<b>Concentrated hydrochloric acid</b>	X	X	△	X	X	-
<b>Lactic acid</b>	X	X	X	X	○	X
<b>Phenol</b>	-	-	-	-	-	X
<b>Phosphoric acid</b>	X	○	○	X	△	X
<b>Nitric acid</b>	X	X	X	X	○	-
<b>Sulfuric acid (40-80%)</b>	X	△	△	X	△	X* △**
<b>Sulfuric acid (80-95%)</b>	X	○	○	X	△	X* △**
<b>Diluted hydrochloric acid</b>	△	-	-	-	-	X
<b>Hydrogen peroxide</b>	△	○	○	X	○	-

\*: High concentration

\*\* : Low concentration

Explanation		
◎: Preferred	○: no problem in use	△: Affected
X: Not allowed for use	-: unknown	

## Chemical resistance

### Alkali

Material	SO#50SP2 SO#50SP8	SO#50B	SO#50SP5 SO#50SP7 SO#50SP13 SO#50AIB	SO#50F	SO#50S45C	Polyacetal
	<i>High strength brass casting</i>	<i>Red brass</i>	<i>Alu-bronze</i>	<i>Grey cast</i>	<i>Steel</i>	
Ammonia (dry)	◎	◎	◎	O	◎ (20°C) X (Gas)	X
Ammonia (wet)	X	X	X	O	◎ (20°C) X (Gas)	X
Ammonia (liquid)	X	X	X	-	◎	X
Iron chloride	X	O	O	X	△	-
Potassium hydroxide	O	O	O	-	-	-
Calcium chloride	X	O	O	△	O	-
Calcium hydroxide	O	◎	◎	O	-	O
Sodium hydroxide	O	O	O	-	◎	-
Sulfur (dry)	◎	O	O	△	-	O
Sulfur (wet)	X	X	X	△	-	O

### Solvent

Material	SO#50SP2 SO#50SP8	SO#50B	SO#50SP5 SO#50SP7 SO#50SP13 SO#50AIB	SO#50F	SO#50S45C	Polyacetal
	<i>High strength brass casting</i>	<i>Red brass</i>	<i>Alu-bronze</i>	<i>Grey cast</i>	<i>Steel</i>	
Acetone	◎	◎	◎	O	◎	△
Benzene	-	-	-	-	-	△
Ethylene glycol	O	◎	◎	△	-	-
Carbon tetrachloride (dry)	◎	◎	◎	X	◎	-
Carbon tetrachloride (wet)	X	O	O	X	-	-
Methyl alcohol	◎	◎	◎	O	O	△
Toluene	◎	◎	◎	O	-	-

Explanation		
◎: Preferred	O: no problem in use	△: Affected
X: Not allowed for use	-: unknown	

## Chemical resistance

### Grease and others

Material	SO#50SP2 SO#50SP8	SO#50B	SO#50SP5 SO#50SP7 SO#50SP13 SO#50AIB	SO#50F	SO#50S45C	Polyacetal
	<i>High strength brass casting</i>	<i>Red brass</i>	<i>Alu-bronze</i>	<i>Grey cast</i>	<i>Steel</i>	
Gasoline	◎	◎	◎	○	◎	○
Diesel	-	-	-	-	-	○
Crude oil	△	○	○	○	○	-
Lacquer	◎	◎	◎	△	-	-
Kerosene	◎	◎	◎	○	◎	-
Vegetable oil	◎	◎	◎	△	-	-
Lubricants	◎	◎	◎	◎	◎	○
Heavy oil	○	◎	◎	○	○	-
Animal oil	◎	◎	◎	-	-	-

Explanation		
◎: Preferred	○: no problem in use	△: Affected
X: Not allowed for use	-: unknown	

## Maintenance and lubrication

Before inserting the sliding elements, clear the mounting surfaces of the housing. An oil film on the back surface will make it easier to mount the bearing. Before mounting the axle, lubricate the sliding surfaces with a light greasy film to avoid wear of the inlet and to activate the solid lubricant.

The following greases should be preferred:

ELKALUB GLS 364	ELKALUB	120°C	For the food industry
ELKALUB GLS 595/N2	ELKALUB	300°C	For the food industry
ELKALUB GLS 993 H1	ELKALUB	150°C	For the food industry
GLEITMO 805	FUCHS	110°C	
ALTEMP QNB 50	KLÜBER	150°C	
Klüberalfa DH 3-350	KLÜBER	230°C	
Klüberfood NH1 CH 2-150	KLÜBER	250°C	For the food & pharmaceutical industry
Klübertemp GR AR 555	KLÜBER	250°C	
PARALIQ P 68	KLÜBER	100°C	For the food & pharmaceutical industry
Gadus S2 V100 2	SHELL	130°C	
Gadus S3 V100 2	SHELL	160°C	
Multi-purpose grease Nr.12511	PRESSOL	80°C	

**The greases have to be free of Additives like MoS<sub>2</sub> (molybdenum disulfide) and EP.**

The work to be carried out is usually limited to an inspection of the wear in the period from ½ to 2 years, depending on the duration of use and load. After each disassembly, a single re-greasing should be carried out, but the sintered sliding film of solid lubricant should not be removed. Continuous introduction of lubricant is not necessary, as the parts are maintenance-free under consideration of the application criteria for sliding elements made of bronze with solid lubricant.

## Transport and storage

The parts are to be stored dust-free and dry, mechanical damages during transport and storage are to be avoided. Contact with organic and inorganic solvents must also be prevented, as this may destroy the solid lubricant.

