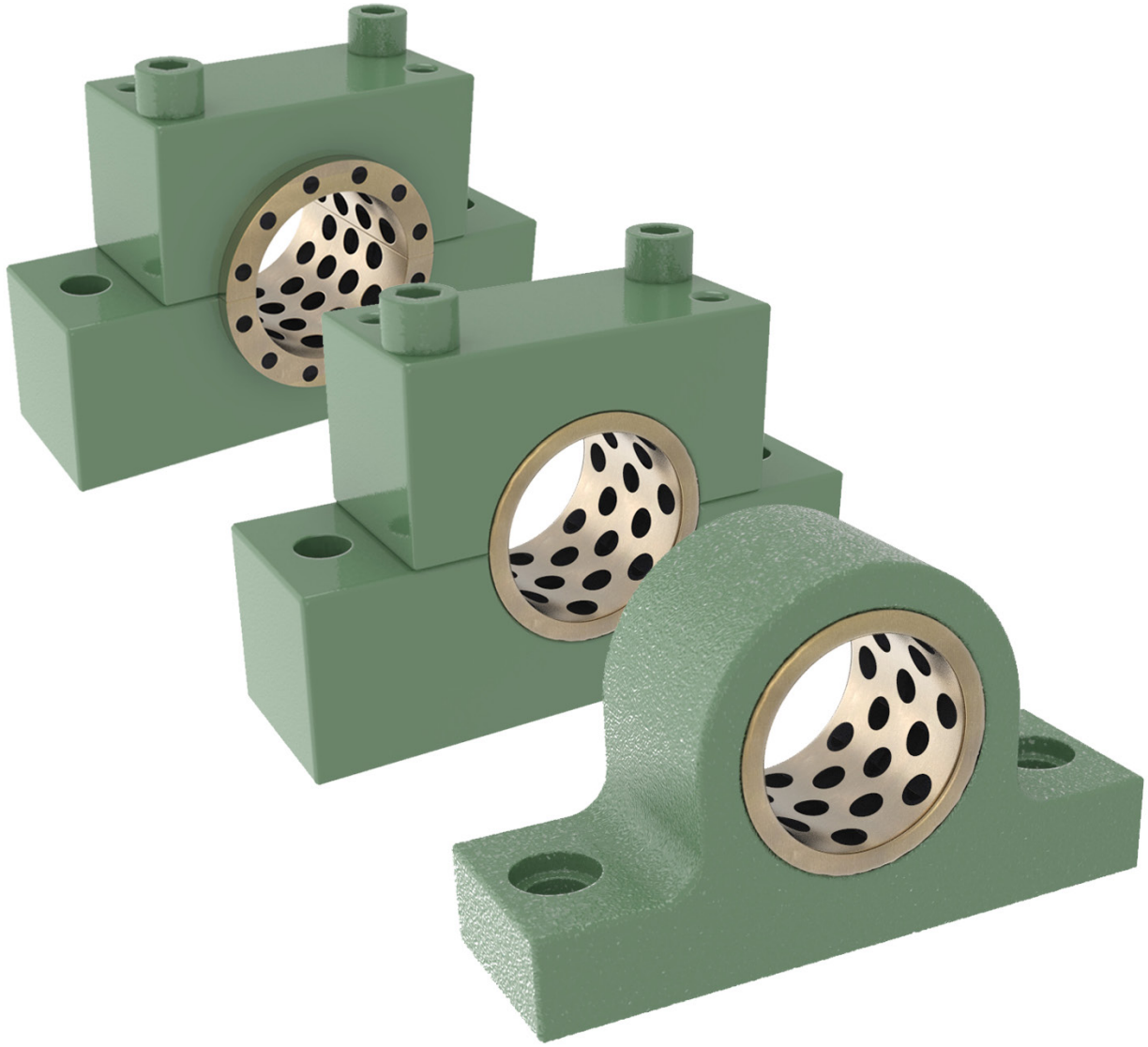
SANKYO OILLESS Industry GmbH



BOG, BO & BOT
Pillow block bearings

Stepping foreard 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 footperint
- 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!

Bushings with graphite

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.

Bronze bushings with for example type SOB, narrows in the bore after insertion of the tolerance range F7 to a tolerance range H7. Prerequisites for this are:

- H7 *(the tolerance of the housing bore)*
- a corresponding wall thickness of the housing
- the control of the best wall strength of the socket
-

From the experience of the most diverse use cases, the following tolerance fields should be used when against run partner preferred:

- h6 *(for the highest precision in cutting tool / mold construction)*
- f7, e7 *(for highest accuracy in general engineering)*
- d8, e8 *(for highest accuracy in general engineering)*
- e8 + D9 *(for highest accuracy in general engineering)*

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**.

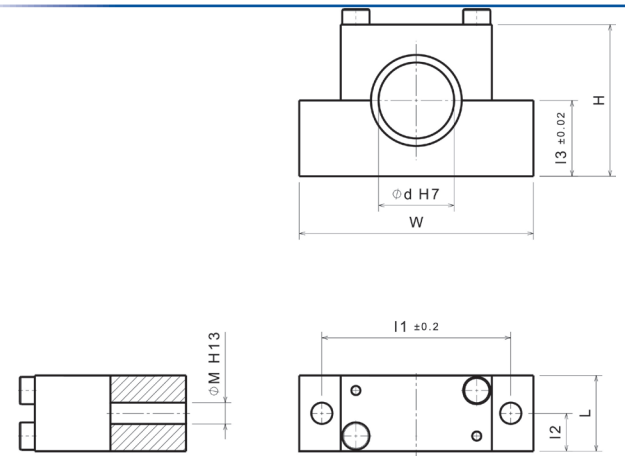
In order to ensure an optimal sliding beahaviour, the difference in hardeness between the sliding material and sliding partner should at least be **100 HB**.

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.

BOG, BO & BOT - Pillow block bearings

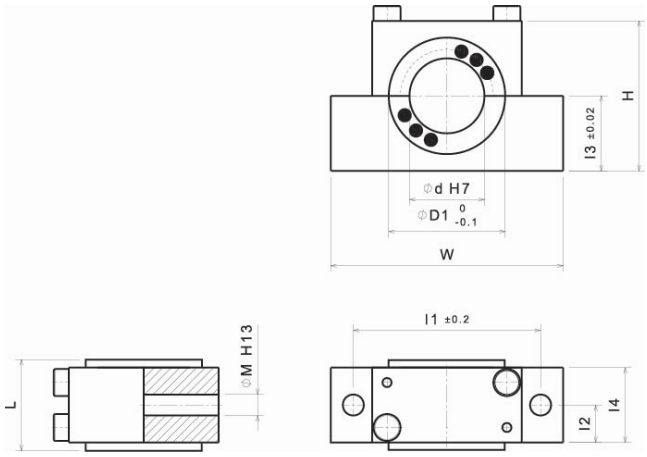
Article informationen



Properties:

Base material	Special brass (SO#50SP2)
Self-lubricating	Yes
Lubricant	Graphite
Max. surface pressure P	100 N/mm²
Max. sliding speed v	30 m/min
Max. P*v-Wert	200 N/mm² x m/min
Operating temperature	-50°C / +150°C (max. 300°C)
Friction coefficient	0,07

Article no.:	Article name:	Inner Ø d:	Width W:	Length L:	Height H:	l1:	l2:	l3:	M (DIN EN 20273):
62500146	BO-20	20	85	20	40	62	10	20	M6
62500147	BO-25	25	100	25	50	75	12,5	25	M8
62500148	BO-30	30	110	30	60	85	15	30	
62500149	BO-40	40	130	40	70	105	20	40	M10
62500150	BO-50	50	155	50	100	125	25	50	M12



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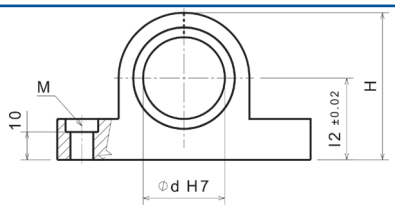
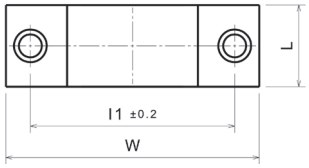
63500146	BOT-20	20	85	40	28	35	62	10	20	20	M6
63500147	BOT-25	25	100	50	33	40	75	12,5	25	25	M8
63500148	BOT-30	30	110	60	40	48	85	15	30	30	
63500149	BOT-40	40	130	70	50	60	105	20	40	40	M10
63500150	BOT-50	50	155	100	60	68	125	25	50	50	M12





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Article no.:	Article name:	Inner Ø d:	Width W:	Length L:	Height H:	l1:	l2:	M (ISO 4762):
61400141	BOG-20	20	85	40	20	62	20	M6
61400142	BOG-25	25	100	50	25	75	25	M8
61400143	BOG-30	30	110	58	30	85	30	
61400144	BOG-40	40	130	75	40	105	40	M10
61400145	BOG-50	50	155	90	50	125	50	M12

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.

Grain size	46 - 60
Material	Silicon carbid
Rotation speed	1500 U/min
Working speed	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

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

Material data

Material		SO#50SP2*	SO#50SP5	SO#50SP7	SO#50SP8	SO#50SP13	SO#50B
		Hard brass with graphite	*Alu-bronze with graphite*	*Alu-bronze with graphite*	*Hard brass with graphite*	*Bronze with graphite*	*Red brass with graphite*
Self-lubricating		Yes	Yes	Yes	Yes	Yes	Yes
Lubricant		Graphite	Graphite	Graphite	Graphite	Graphite	Graphite
Max. surface pressure *[N/mm²]*		100	100	120	130	120	50
Max. sliding speed *[m/min]*		30	10	10	15	10	50
Max. P*v-Wert *[N/mm² * m/min]*		200	150	200	200	200	100
Temperature *[°C]*	*Standard* *Max*	-50 / +150 +300	-50 / +150 +300	-50 / +150 +300	-50 / +150 +300	-50 / +150 +300	-50 / +150 +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 hardeness *[HB]*		>210	>210	>260	220 ~ 260	>280	>60
							Further informatio
Elongation *[%]*		>12	>18	>2	>3	>0,5	>15
Density *[kg/dm³]*		7,9	7,7	7,8	7,8	7,2	8,7
Tensile strength *[N/mm²]*		>755	>686	>833	>700	>550	>195
Yield strength *[N/mm²]*		>412	>372	>509	-	-	>105
E-Module *[N/mm²]*		97000	108000	123600	108000	145000	96000
Thermal expansion *[10-5 * 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
		Ton bronze	*acc. to DIN 17662*	*Steel with graphite*	*Grey cast iron with graphite*	*Plastic*
No	Yes	Yes	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	-12 / +90	-50 / +150 +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
	High strength brass casting	*Red brass*	*Alu-bronze*	*Grey cast*	*Steel*	*Red brass mit FSS*
Fresh Water	O	◎	◎	X	◎	O
Sea Water	△	O	O	X	◎	O

Acid

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

**: High concentration*

***: Low concentration*

Explanation		
◎: Preferred	O: 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
	High strength brass casting	*Red brass*	*Alu-bronze*	*Grey cast*	*Steel*	
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
	High strength brass casting	*Red brass*	*Alu-bronze*	*Grey cast*	*Steel*	
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#50AlB	SO#50F	SO#50S45C	Polyacetal
	High strength brass casting	*Red brass*	*Alu-bronze*	*Grey cast*	*Steel*	
Gasoline	◎	◎	◎	O	◎	O
Diesel	-	-	-	-	-	O
Crude oil	△	O	O	O	O	-
Lacquer	◎	◎	◎	△	-	-
Kerosene	◎	◎	◎	O	◎	-
Vegetable oil	◎	◎	◎	△	-	-
Lubricants	◎	◎	◎	◎	◎	O
Heavy oil	O	◎	◎	O	O	-
Animal oil	◎	◎	◎	-	-	-

Explanation		
◎: Preferred	O: 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 MoS2 (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 avoidded. Contact with organic and inorganic solvents must also be prevented, as this may destroy the solid lubricant.