



F-Bush
Flanged bronze bearings
acc. to DIN ISO 4379

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

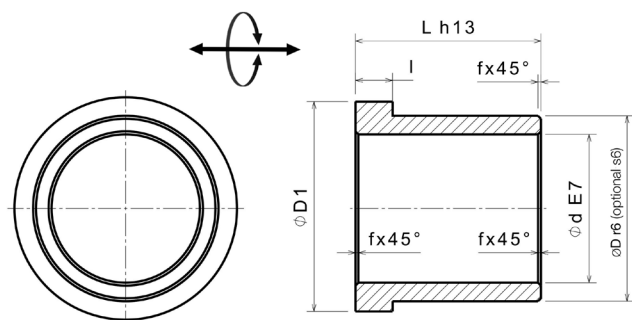
SANKYO products are manufactured in our own plants and distributed worldwide.

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!



Properties:

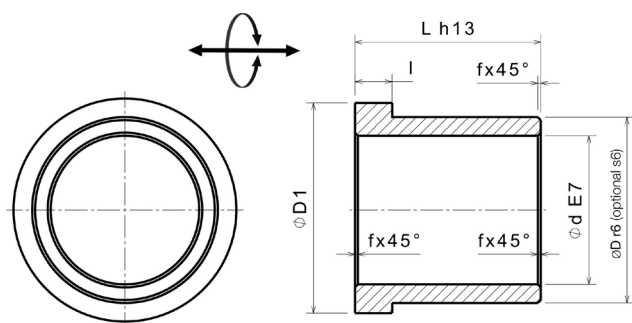
Base material	Hard bronze
Self-lubricating	No
Max. surface pressure P	80 N/mm ²
Max. sliding speed v	20 m/min
Operating temperature	-50°C / +200°C (max. 300°C)
Friction coefficient	0,16

Article no.:	Article name:	Inner Ø d:	Outer Ø D:	Length L:	D1 :	l:	f:
996008010	F 8-14-10	8	14	10	18	3	0,3
996010010	F 10-16-10	10	16	10	20		
996012010	F 12-18-10	12	18	10	22		0,5
996012015	F 12-18-15			15			
996012020	F 12-18-20			20			
996014010	F 14-20-10	14	20	10	25		
996014015	F 14-20-15			15			
996014020	F 14-20-20			20			
996015010	F 15-21-10	15	21	10	27		
996015015	F 15-21-15			15			
996015020	F 15-21-20			20			
996016012	F 16-22-12	16	22	12	28		
996016015	F 16-22-15			15			
996016020	F 16-22-20			20			
996018012	F 18-24-12	18	24	12	30		
996018020	F 18-24-20			20			
996018030	F 18-24-30			30			
996020015	F 20-26-15	20	26	15	32		
996020020	F 20-26-20			20			
996020030	F 20-26-30			30			
996022015	F 22-28-15	22	28	15	34		
996022020	F 22-28-20			20			
996022030	F 22-28-30			30			
996024015	F 24-30-15	24	30	15	36		
996024020	F 24-30-20			20			
996024030	F 24-30-30			30			
996025020	F 25-32-20	25	32	20	38	4	
996025030	F 25-32-30			30			
996025040	F 25-32-40			40			
996027020	F 27-34-20	27	34	20	40		
996027030	F 27-34-30			30			
996027040	F 27-34-40			40			
996028020	F 28-36-20	28	36	20	42		
996028030	F 28-36-30			30			
996028040	F 28-36-40			40			
996030020	F 30-38-20	30	38	20	44		
996030030	F 30-38-30			30			
996030040	F 30-38-40			40			

F-Bush - Flanged bronze bearings acc. to DIN ISO 4379



Article informationen



Properties:

Base material	Hard bronze
Self-lubricating	No
Max. surface pressure P	80 N/mm ²
Max. sliding speed v	20 m/min
Operating temperature	-50°C / +200°C (max. 300°C)
Friction coefficient	0,16

Article no.:	Article name:	Inner Ø d:	Outer Ø D:	Length L:	D1 :	l:	f:										
996032020	F 32-40-20	32	40	20	46	4	0,8										
996032030	F 32-40-30			30													
996032040	F 32-40-40			40													
996033020	F 33-42-20	33	42	20	48	5											
996033030	F 33-42-30			30													
996033040	F 33-42-40			40													
996035030	F 35-45-30	35	45	30	50			5									
996035040	F 35-45-40			40													
996035050	F 35-45-50			50													
996036030	F 36-46-30	36	46	30	52				5								
996036040	F 36-46-40			40													
996036050	F 36-46-50			50													
996038030	F 38-48-30	38	48	30	54					5							
996038040	F 38-48-40			40													
996038050	F 38-48-50			50													
996040030	F 40-50-30	40	50	30	58						5						
996040040	F 40-50-40			40													
996040060	F 40-50-60			60													
996042030	F 42-52-30	42	52	30	60							5					
996042040	F 42-52-40			40													
996042060	F 42-52-60			60													
996045030	F 45-55-30	45	55	30	63								5				
996045040	F 45-55-40			40													
996045060	F 45-55-60			60													
996048040	F 48-58-40	48	58	40	66									5			
996048050	F 48-58-50			50													
996048060	F 48-58-60			60													
996050040	F 50-60-40	50	60	40	68										7,5		
996050050	F 50-60-50			50													
996050060	F 50-60-60			60													
996055040	F 55-65-40	55	65	40	73											7,5	
996055050	F 55-65-50			50													
996055070	F 55-65-70			70													
996060040	F 60-75-40	60	75	40	83												7,5
996060060	F 60-75-60			60													
996060080	F 60-75-80			80													
996065050	F 65-80-50	65	80	50	88		1										
996065060	F 65-80-60			60													

Article no.:	Article name:	Inner Ø d:	Outer Ø D:	Length L:	D1 :	l:	f:
996065080	F 65-80-80	65	80	80	88	7,5	1
996070050	F 70-85-50	70	85	50	95		
996070070	F 70-85-70			70			
996070090	F 70-85-90			90			
996075050	F 75-90-50	75	90	50	100		
996075070	F 75-90-70			70			
996075090	F 75-90-90			90			
996080060	F 80-95-60	80	95	60	105		
996080080	F 80-95-80			80			
996080100	F 80-95-100			100			
996085060	F 85-100-60	85	100	60	110		
996085080	F 85-100-80			80			
996085100	F 85-100-100	85	100	100	110		
996090060	F 90-110-60	90	110	60	120	10	
996090120	F 90-110-120			120			
996095060	F 95-115-60	95	115	60	125		
996095100	F 95-115-100			100			
996095120	F 95-115-120			120			
996100080	F 100-120-80	100	120	80	130		
996100100	F 100-120-100			100			
996100120	F 100-120-120			120			
996110080	F 110-130-80	110	130	80	140		
996110100	F 110-130-100			100			
996110120	F 110-130-120			120			
996120100	F 120-140-100	120	140	100	150		
996120120	F 120-140-120			120			
996120150	F 120-140-150			150			
996130100	F 130-150-100	130	150	100	160	2	
996130120	F 130-150-120			120			
996130150	F 130-150-150			150			
996140100	F 140-160-100	140	160	100	170		
996140150	F 140-160-150			150			
996140180	F 140-160-180			180			
996150120	F 150-170-120	150	170	120	180		
996150150	F 150-170-150			150			
996150180	F 150-170-180			180			
996160120	F 160-185-120	160	185	120	200		13
996160150	F 160-185-150			150			
996160180	F 160-185-180			180			
996180150	F 180-210-150	180	210	150	220		15
996180180	F 180-210-180			180			
996180250	F 180-210-250			250			
996200180	F 200-230-180	200	230	180	240		
996200200	F 200-230-200			200			
996200250	F 200-230-250			250			

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

Custom-made products

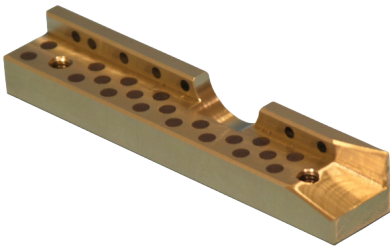
Beside to the big variety of standard products, we offer custom-made rotation- and milled-parts. We are producing these products out of steel or with our special Sankyo bronze with solid lubrication. Also, it is possible to get standard products with modifications. We only need your drawing or 3D-model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

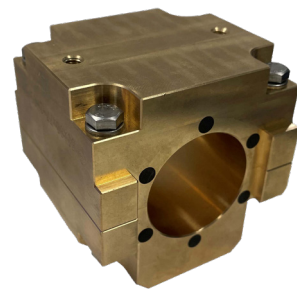
Tel.: [+49 2103 584 800](tel:+492103584800)

E-Mail: technik@de.sankyo-oilless.com

Examples



Custom-made products



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



Special design of a special spindle nut



Large bushings for all applications

F-Bush - Flanged bronze bearings acc. to DIN ISO 4379



General and technical information

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 ²]		100	100	120	130	120	50
Max. sliding speed [m/min]		30	10	10	15	10	50
Max. P*v-Wert [N/mm ² * m/min]		200	150	200	200	200	100
Temperature [°C]	<i>Standard Max</i>	-50 / +200 +300	-50 / +200 +300	-50 / +200 +300	-50 / +200 +300	-50 / +200 +300	-50 / +200 +400
Friction coefficient**	<i>initial long term</i>	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 ³]		7,9	7,7	7,8	7,8	7,2	8,7
Tensile strength [N/mm ²]		>755	>686	>833	>700	>550	>195
Yield strength [N/mm ²]		>412	>372	>509	-	-	>105
E-Module [N/mm ²]		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
		<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

