FRIMET

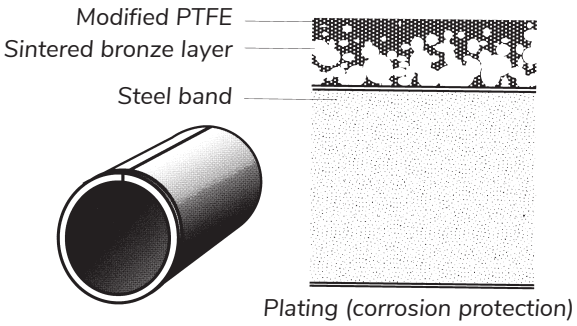
Multilayer Bearing PTFE

JOHNSON METALL AB

Construction

FRIMET bearings are self-lubricating and consist of three layers as shown in the illustration.

- *PTFE surface layer with low friction.*
- *Sintered bronze layer with thickness 0.25–0.30 mm.*
- *Low carbon steel layer with thickness 0.5–2.5 mm depending on the size of the bearing. The surface is plated for corrosion protection.*



Properties

FRIMET bearings combine, in the best possible way, the mechanical properties of steel, the thermal conductivity of bronze and the low friction of PTFE. The following properties apply to unlubricated bearings:

- *Maximum permissible surface pressure 140 N/mm2.*
- *Maximum permissible sliding speed 2.5 m/s.*
- *Working temperature from -200°C to +280°C*.*
- *Thermal conductivity 46 W/m°K.*
- *Friction coefficient 0.03–0.25.*
- *Lead free according to 2000/53/EC.*
- *Clean liquids such as oil or water increase the permissible values of sliding speed and surface pressure.*
- *The friction coefficient is not affected by the "stick-slip" effect.*
- *High chemical resistance to industrial liquids and gases.*

For further information on **FRIMET** and its use, please contact our tribologists.

** High temperature reduces loadability.*

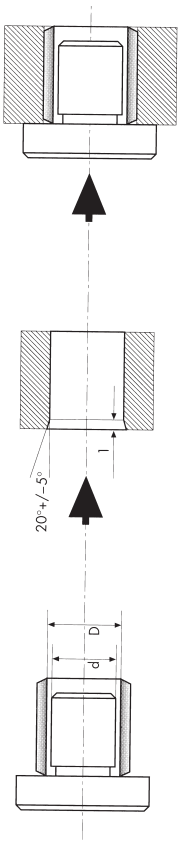
Installation

The bearings are assembled by press fitting.
For information on installation tolerances, see table.

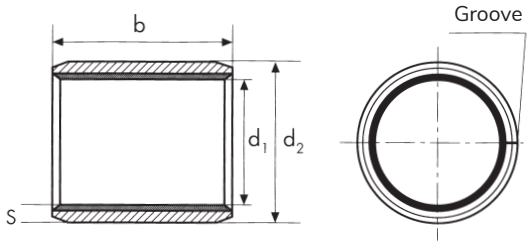
The following points are recommended:

- *Make an input chamfer of 1 mm x 20°.*
- *Deburr carefully.*
- *Lubricate the outside of the bearing before pressing in.*
- *Carefully check the alignment between bearing and seat.*

If possible, use a press mandrel of the correct size. Assembly can be done with hydraulic or mechanical tools. The pressing force (in N) is shown in the table on the next page. L is the length of the bearing.



Radial bearings straight

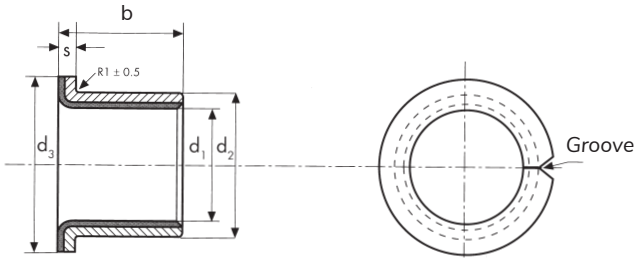


Please state when ordering: **FRIMET, STRAIGHT $d_1$xb**
Limited inventory

Dim. in mm		Tolerances					Length b±0.25 mm																							
d_1	d_2	S Min Max	Shaft		Housing		3	4	5	6	8	10	12	15	20	25	30	35	40	45	50	55	60	70	80	100	115
3	4.5	0.750	h6	0/–0.006	H6	+0.008	•		•	•																	
4	5.5	0.730		0/–0.008		0		•		•		•															
5	7			–0.010					•		•	•															
6	8			–0.022		0.015		•		•	•	•															
8	10			–0.013		0				•	•	•	•														
10	12			–0.028							•	•	•	•	•												
12	14										•	•	•	•	•	•											
13	15	1.005				+0.018						•			•												
14	16	0.980				0						•	•	•	•	•											
15	17			–0.016								•	•	•	•	•											
16	18			–0.034								•	•	•	•	•											
17	19													•	•												
18	20													•	•	•											
20	22					+0.021						•		•	•												
20	23					0						•		•	•	•	•										
22	25	1.505												•	•	•	•										
24	27	1.475	f7											•	•	•	•										
24	28			–0.020										•	•	•	•										
25	28			–0.041									•	•	•	•	•										
28	32													•	•	•	•										
30	34	2.005				+0.025						•		•	•	•	•		•								
32	36	1.970				0									•		•		•								
35	39														•		•	•	•								
40	44			–0.025											•		•		•		•						
45	50			–0.050											•		•		•	•	•						
50	55														•	•	•		•		•		•				
55	60	2.505													•	•	•		•	•		•	•				
60	65	2.460		–0.030		+0.030									•		•		•				•	•			
65	70			–0.060	H7	0											•		•					•			
70	75																		•				•	•			
75	80																		•		•		•	•	•		
80	85			0/–0.046																			•		•	•	
85	90																•						•			•	
90	95																						•			•	
95	100	2.490				+0.035																	•			•	
100	105	2.440		0		0															•		•	•	•	•	•
105	110			–0.054																			•			•	•
110	115																						•			•	•
115	120																				•		•	•			
120	125																				•		•			•	
125	130																						•			•	
130	135		h8																				•			•	
135	140					+0.040																	•		•	•	
140	145					0																	•			•	
145	150																						•				
150	155			0																					•	•	
155	160			–0.063																			•				
160	165																						•		•	•	
165	170																						•			•	
170	175	2.465																					•			•	
180	185	2.415																					•			•	
190	195					+0.046																	•			•	
200	205					0																	•				
210	215			0																						•	
220	225			–0.072																						•	
230	235																						•				
240	245					+0.050																				•	
250	255			0		0																				•	
300	305			–0.081																						•	

Radial bearings flange

Please state when ordering:
FRIMET, FLANGE d1xb
Limited inventory



Dimensions in mm

d_1	d_2	d_3 (±0.5)	b (±0.25)	s (–0.2)
6	8	12	4	1
6	8	12	7	1
6	8	12	8	1
8	10	15	5.5	1
8	10	15	7.5	1
8	10	15	9.5	1
10	12	18	7	1
10	12	18	9	1
10	12	18	12	1
10	12	18	17	1
12	14	20	7	1
12	14	20	9	1
12	14	20	12	1
12	14	20	17	1
14	16	22	12	1
14	16	22	17	1
15	17	23	9	1
15	17	23	12	1

Dimensions in mm

d1	d2	d_3 (±0.5)	b (±0.25)	s (–0.2)
15	17	23	17	1
16	18	24	12	1
16	18	24	17	1
18	20	26	12	1
18	20	26	17	1
18	20	26	22	1
20	23	30	11.5	1.5
20	23	30	16.5	1.5
20	23	30	21.5	1.5
25	28	35	11.5	1.5
25	28	35	16.5	1.5
25	28	35	21.5	1.5
30	34	42	16	2
30	34	42	26	2
35	39	47	16	2
35	39	47	26	2
40	44	53	16	2
40	44	53	26	2
45	50	58	16	2.5
45	50	58	26	2.5

When assembling bearings >50 mm, a mounting ring should be used. Its diameter should be 0.3 to 0.4 mm greater than the diameter of the bearing.

If the bearing is to be secured by gluing, a good quality glue must be used. Make sure that no glue gets onto the bearing surface.

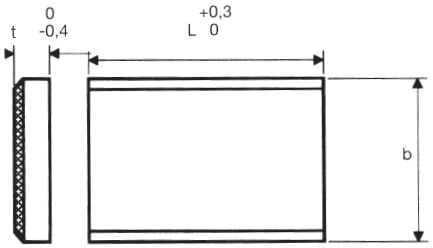
Bearing goods thickness in mm	Force, N
0.75-1.0	300 x L
1.5	500 x L
2.0	700 x L
2.5	900 x L

Band

Please state when ordering:
FRIMET, BAND Lxt
Limited inventory

Thickness series t

b mm	1 mm	2 mm	3 mm	4 mm	5 mm	6 mm
215		1.0				
245			1.5	2.0	2.5	3.0



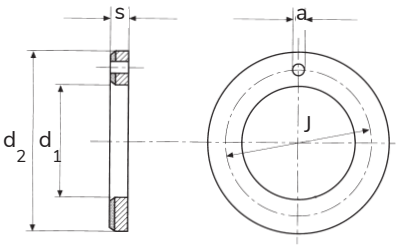
Longitudinal chamfers 6 mm

Supplied in lengths of 500 mm.

Unstocked and also other dimensions are delivered with delivery time as agreed.

Axial bearings

Please state when ordering:
FRIMET, AXIAL d_1
Limited inventory



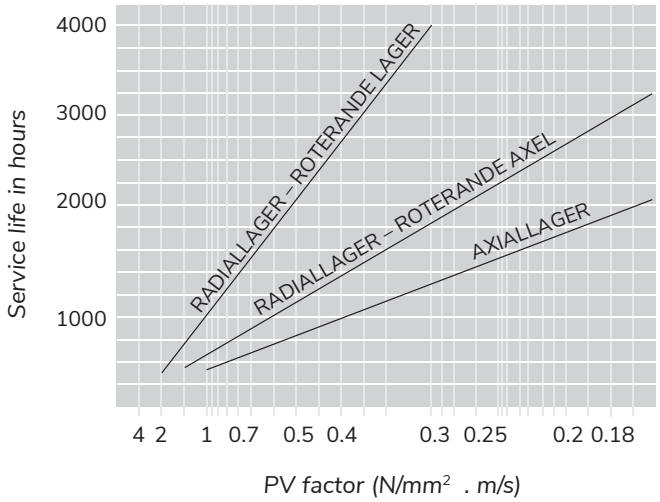
Axial bearings		Dimensions in mm		
d_1 (+0.25)	d_2 (–0.25)	s (–0.05)	J (±0.1)	a (+0.4 +0.1)
10	20	1.5	15	1.5
12	24	1.5	18	1.5
14	26	1.5	20	2
16	30	1.5	22	2
18	32	1.5	25	2
20	36	1.5	28	3
22	38	1.5	30	3
24	42	1.5	33	3
26	44	1.5	35	3
28	48	1.5	38	4
32	54	1.5	43	4
38	62	1.5	50	4
42	66	1.5	54	4
48	74	2	61	4
52	78	2	65	4
62	90	2	76	4

Design data

When designing with FRIMET bearings, consideration is primarily given to load and sliding speed. The surface pressure is calculated on the projected surface, i.e. bearing i.d. x bearing length. *The maximum permissible load is 140 N/mm^2.*

An increased temperature reduces loadability and permissible PV factor. At, for example, 100°C, the actual PV factor increases by 60% with a consequent reduction of bearing life. Thus, if the V speed is unchanged, the bearing load must be reduced in order not to reduce the service life.

The service life of the FRIMET bearing can also be given depending on the PV value (N/mm2 x m/s) as shown in the chart. In addition, factors such as working temperature, shaft material and its surface finish, environment, tolerances, etc. can affect the service life. In practice, it has been found that PV values of 2.5 to 3 are possible during a short period of time. We recommend 0.2 to 1.5 for static loads and 0.1 to 0.8 for dynamic loads.



Friction

The friction coefficient of FRIMET bearings depends mainly on load, sliding speed and working temperature. Important factors are also the mating material, its hardness and surface finish.

Sliding speed V m/s	Load P N/mm^2	Friction coefficient
< 0.001	140	0.03
0.001–0.005	140–60	0.04–0.07
0.005–0.05	60–10	0.07–0.1
0.05–0.5	10–1	0.1–0.15
0.5–2	< 1	0.15–0.20

Wear

During run-in, the mating material becomes coated with PTFE that is transferred from the bearing surface. Mating materials are normally steel but stainless steel, chrome-plated steel or hard anodised aluminium can extend the service life of FRIMET bearings.

The surface finish of mating materials should be better than 0.4 µm Ra.

For further information on FRIMET and its use, please contact our tribologists.

JOHNSON METALL AB

We are the Nordic countries' leading manufacturer of cast and machined bronze products for industrial applications. We offer a comprehensive range of everything from standard stocked products to custom-manufactured components. Our vision is to always be your obvious choice as a supplier.

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