Plastic Bearings

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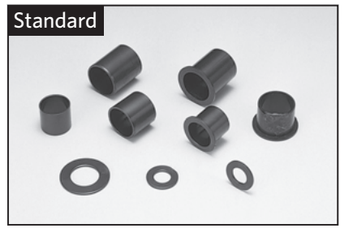
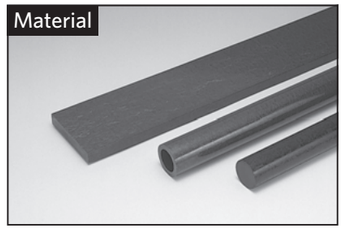
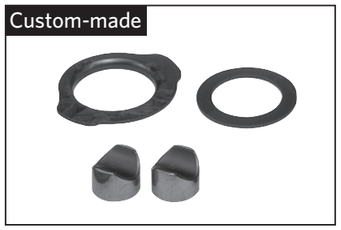
Oiles 80 Oil-impregnated polyacetal bearings



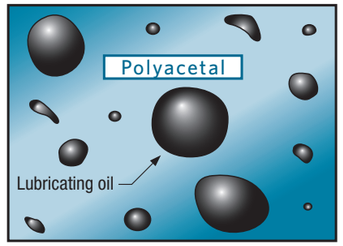




Feature

RoHS2 ELV Lead Free

- Serviceable without the need for lubrication.
- Has superior load resistance and wear resistance.
- Features low coefficient of friction and superior speed characteristics.
- Prevents stick slips and squeak noises.
- Injection-molded and can be made in complicated shapes. Good mass productivity.
- Standard products and materials for machining are available in various sizes.
- For a low volatile organic compound type, Oiles 80-LVF is available on order.



Image

Service range

Lubrication condition	Dry
Service temperature range ℃	−40～+80
Allowable max. pressure P N/mm² {kgf/cm²}	17.5 {179}
Allowable max. velocity V m/s {m/min}	0.85 {51}
Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min}	2.45 {1,500}

※These are values of the typical grade Oiles 80.

Mechanical properties

Specific gravity	ASTM D 792	——	1.39
Tensile strength	ASTM D 638	N/mm² {kgf/cm²}	51.0 {520}
Tensile elongation at break	ASTM D 638	%	60
Flexural property	ASTM D 790	N/mm² {kgf/cm²}	76.5 {780}
Flexural modulus	ASTM D 790	N/mm² {kgf/cm²}	2,650 {27,000}
Compressive stress 1% deformation 10% deformation	ASTM D 695	N/mm² {kgf/cm²}	21.1 {215} 81.9 {835}
Hardness	ASTM D 785	HRM	72
Izod impact strength (with notch)	ASTM D 256	J/m {kgfcm/cm}	58.8 {6.00}
Co-efficient of linear expansion	ASTM D 696	×10⁻⁵ ℃⁻¹	8～13
Deflection temperature under load 1.82 MPa	ASTM D 648	℃	110
Melting point	DSC	℃	165
UL incombustibility	UL94	File No.E78113	HB (Note)

※The values shown above are typical values, not the standard values.
(Note) Excludes 80M, 80P, 80S and 80-LVF.

Lathe turning

Cutting tool	carbide tool (JIS)	
	Relief angle	5～10°
	Rake angle	10～20°
	Nose radius (mm)	0.20～0.40
Condition	Speed (m/min)	100～250
	Cut depth (mm)	0.10～0.50
	Feed (mm/rev)	0.05～0.20

Attention should be paid to dimensional variances due to thermal expansion, chucking, and bend of the material.

※Contact us for grinding and milling information.

Machining accuracy (bushing)

I.D.	O.D.	Length
class 8 to 9	class 7 to 8	class 9 to 10

Classes here are in JIS standard.

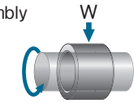
This product demonstrates satisfactory performance at the slide surface roughness of Rz6.3 to 12.5μm.

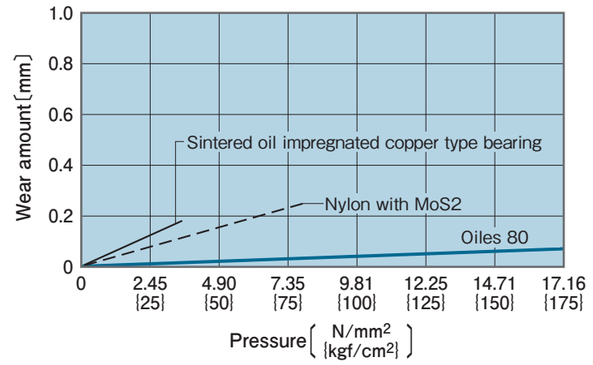
Dimensions may change due to thermal expansion, chucking pressure, moisture absorption deformation, etc. High accuracy is ensured if the product is installed on the housing and then ground.

Test data

Journal rotation test

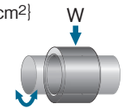
<Testing conditions>
Bearing dimension : φ35×φ38× ℓ 20
Pressure : 0.39N/mm² {4.0kgf/cm²} is added every 5minutes
Velocity : 1.133m/s {68.0m/min}
Lubrication : grease is applied at the time of assembly

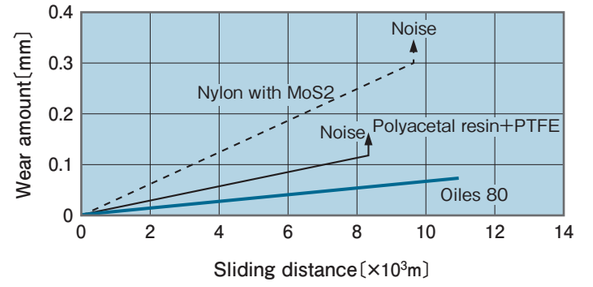




Journal oscillation test

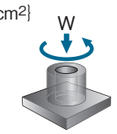
<Testing conditions>
Bearing dimension : φ40×φ50× ℓ 30
Mating material : S45C (surface roughness Rz1.5μm)
Pressure : 4.4N/mm² {45.0kgf/cm²}
Velocity : 0.02m/s {1.2m/min}
Oscillating cycle : 72cpm
Oscillating angle : 24°
Lubrication : grease is applied at the time of assembly

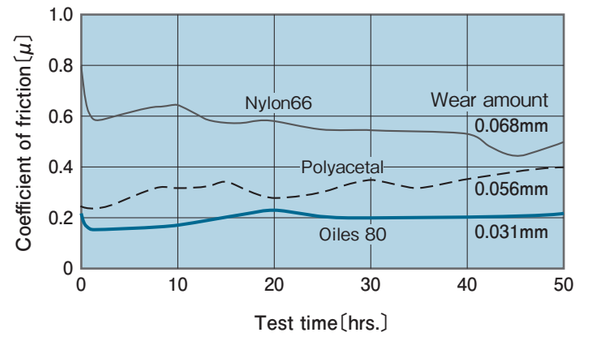




Thrust rotation test

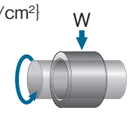
<Testing conditions>
Mating material : S45C (surface roughness Rz3μm)
Pressure : 2.94N/mm² {30.0kgf/cm²}
Velocity : 0.167m/s {10.0m/min}
Test time : 50hrs.
Lubrication : dry

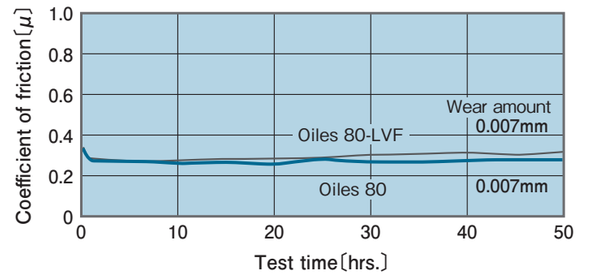




Journal rotation test

<Testing conditions>
Bearing dimension : φ10×φ14×ℓ10
Mating material : SUJ2 (surface roughness approx. Ra0.1μm)
Pressure : 0.98N/mm2 {10kgf/cm²}
Volocity : 0.17m/s {10m/min}
Test time : 50hrs.
Lubricataion : dry





80B Oiles 80 Bushings

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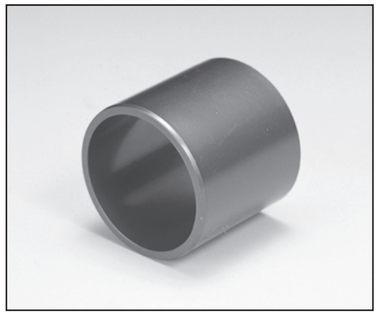
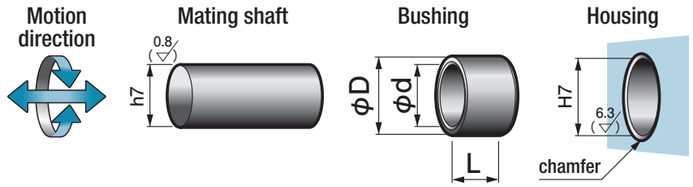
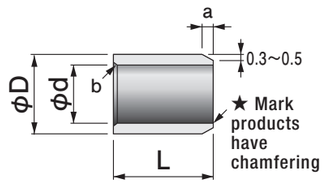


Specify Part No. by required I.D. and length.
(e.g.) I.D. is 15mm and length is 10mm.

80B - 1510
Part No.





a: Chamfering for O.D.

ϕd	~6	~35	~50	
a	※	1	2	(mm)

b: Chamfering for I.D.

ϕd	~10	~35	~40	~50	
b	C0.3	R0.4	R0.6	R0.8	(mm)

※: O.D. chamfering for the bushing I.D. of Φ6 or smaller

L	2	~4	~10	
a	0.3	0.5	1(Note)	(mm)

(Note) 80B-0406 : 0.5、80B-0604 : 1

- The Oiles 80 bushings are injection-molded.
- The inner diameter tolerances are the values after pressing into a ring gauge of ϕ D ±0.002.
- A stopper is needed at the temperature of 0˚C or less, since the bushing is dislocated due to thermal shrinkage.

Shaft		Housing		I.D.		O.D.		Length L Tolerance $^{0}_{-0.3}$ (◉ 80B-1510 Tolerance $^{0}_{-0.5}$)						
Length	h7 Tolerance	diameter	H7 Tolerance	ϕd	Tolerance	ϕD	Tolerance	2	3	4	5	6	8	10
2	$^{0}_{-0.010}$	4	$^{+0.012}_{0}$	2	$^{+0.065}_{+0.015}$	4	$^{+0.107}_{+0.032}$	0202	0203	0204				
3	$^{0}_{-0.010}$	5	$^{+0.012}_{0}$	3	$^{+0.080}_{+0.030}$	5	$^{+0.107}_{+0.032}$		0303	0304	0305	0306		
4	$^{0}_{-0.012}$	6	$^{+0.012}_{0}$	4	$^{+0.095}_{+0.045}$	6	$^{+0.107}_{+0.032}$		0403	0404	0405	0406		
5	$^{0}_{-0.012}$	7	$^{+0.015}_{0}$	5	$^{+0.095}_{+0.045}$	7	$^{+0.157}_{+0.045}$		0503	0504	0505	0506	0508	
6	$^{0}_{-0.012}$	8	$^{+0.015}_{0}$	6	$^{+0.095}_{+0.045}$	8	$^{+0.157}_{+0.045}$			0604	0605	0606	0608	0610
7	$^{0}_{-0.015}$	9	$^{+0.015}_{0}$	7	$^{+0.095}_{+0.045}$	9	$^{+0.157}_{+0.045}$				0705	0706	0708	0710
8	$^{0}_{-0.015}$	10	$^{+0.015}_{0}$	8	$^{+0.120}_{+0.060}$	10	$^{+0.157}_{+0.045}$				0805	0806	0808	0810
9	$^{0}_{-0.015}$	11	$^{+0.018}_{0}$	9	$^{+0.120}_{+0.060}$	11	$^{+0.193}_{+0.058}$				0905	0906		0910
10	$^{0}_{-0.015}$	12	$^{+0.018}_{0}$	10	$^{+0.120}_{+0.060}$	12	$^{+0.193}_{+0.058}$				1005	1006	1008	1010
12	$^{0}_{-0.018}$	14	$^{+0.018}_{0}$	12	$^{+0.120}_{+0.060}$	14	$^{+0.193}_{+0.058}$					1206	1208	1210
14	$^{0}_{-0.018}$	16	$^{+0.018}_{0}$	14	$^{+0.120}_{+0.060}$	16	$^{+0.193}_{+0.058}$							1410
15	$^{0}_{-0.018}$	17	$^{+0.018}_{0}$	15	$^{+0.120}_{+0.060}$	17	$^{+0.193}_{+0.058}$							◉1510
16	$^{0}_{-0.018}$	18	$^{+0.018}_{0}$	16	$^{+0.120}_{+0.060}$	18	$^{+0.193}_{+0.058}$							1610
18	$^{0}_{-0.018}$	20	$^{+0.021}_{0}$	18	$^{+0.120}_{+0.060}$	20	$^{+0.221}_{+0.071}$							1810
20	$^{0}_{-0.021}$	23	$^{+0.021}_{0}$	20	$^{+0.145}_{+0.075}$	23	$^{+0.221}_{+0.071}$							
22	$^{0}_{-0.021}$	25	$^{+0.021}_{0}$	22	$^{+0.145}_{+0.075}$	25	$^{+0.231}_{+0.081}$							
24	$^{0}_{-0.021}$	27	$^{+0.021}_{0}$	24	$^{+0.145}_{+0.075}$	27	$^{+0.231}_{+0.081}$							
25	$^{0}_{-0.021}$	28	$^{+0.021}_{0}$	25	$^{+0.170}_{+0.090}$	28	$^{+0.231}_{+0.081}$							
28	$^{0}_{-0.021}$	32	$^{+0.025}_{0}$	28	$^{+0.170}_{+0.090}$	32	$^{+0.290}_{+0.095}$							
30	$^{0}_{-0.021}$	34	$^{+0.025}_{0}$	30	$^{+0.170}_{+0.090}$	34	$^{+0.290}_{+0.095}$							
32	$^{0}_{-0.025}$	36	$^{+0.025}_{0}$	32	$^{+0.215}_{+0.115}$	36	$^{+0.290}_{+0.095}$							
35	$^{0}_{-0.025}$	39	$^{+0.025}_{0}$	35	$^{+0.215}_{+0.115}$	39	$^{+0.290}_{+0.095}$							
38	$^{0}_{-0.025}$	42	$^{+0.025}_{0}$	38	$^{+0.215}_{+0.115}$	42	$^{+0.340}_{+0.115}$							
40	$^{0}_{-0.025}$	44	$^{+0.025}_{0}$	40	$^{+0.215}_{+0.115}$	44	$^{+0.340}_{+0.115}$							
45	$^{0}_{-0.025}$	50	$^{+0.025}_{0}$	45	$^{+0.235}_{+0.135}$	50	$^{+0.340}_{+0.115}$							
50	$^{0}_{-0.025}$	55	$^{+0.030}_{0}$	50	$^{+0.235}_{+0.135}$	55	$^{+0.430}_{+0.130}$							

Length L Tolerance $^{0}_{-0.5}$							I.D.
12	15	20	25	30	40	50	ϕd
							2
							3
							4
							5
							6
							7
0812	0815						8
0912	0915						9
1012	1015	1020					10
1212	1215	1220					12
1412	1415	1420					14
1512	1515	1520	1525	1530			15
1612	1615	1620	1625	1630			16
1812	1815	1820	1825	1830			18
	2015	2020	2025	2030			20
		2220		2230			22
	2415	2420	2425				24
	2515	2520	2525	2530			25
		2820	2825	2830			28
		3020	3025	3030	3040		30
		3220★		3230★	3240★		32
		3520	3525★	3530★	3540★		35
		3820		3830	3840		38
		4020	4025	4030	4040	4050	40
		4520		4530	4540	4550	45
		5020		5030	5040	5050	50

⚠ The dimensional tolerances are the values measured at +25℃.

80F Oiles 80 Flange Bushings

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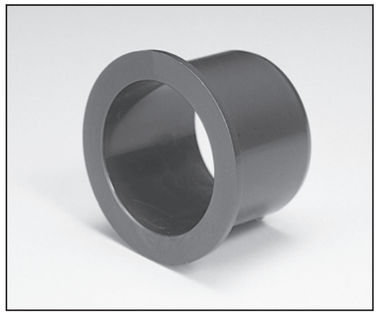
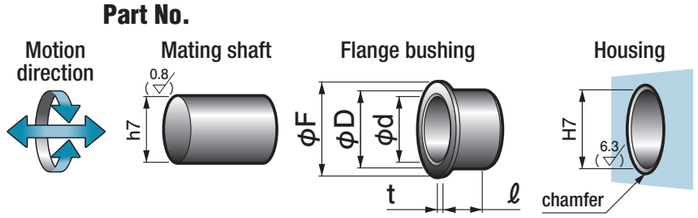
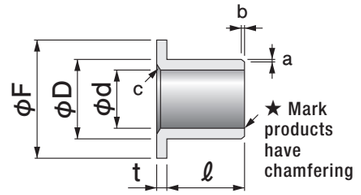


Specify Part No. by required I.D. and length.
(e.g.) I.D. is 15mm and length is 10mm.

80F - 1510
Part No.





a b: Chamfering for O.D.

φd	2	~35	~50	
a	0.3	0.3	0.5	
b	(Note)	1	2	(mm)

(Note) ℓ2mm:0.3、ℓ3/4mm:0.5

c: Chamfering for I.D.

φd	~10	~35	~40	~50	
c	C0.3	R0.4	R0.6	R0.8	(mm)

- The Oiles 80 bushings are injection-molded.
- The inner diameter tolerances are the values after pressing into a ring gauge of φ D ±0.002.
- A stopper is needed at the temperature of 0°C or less, since the bushing is dislocated due to thermal shrinkage.

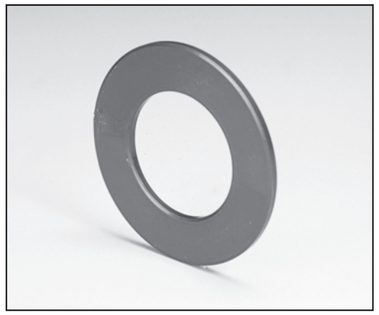
I.D.		O.D.		Flange			Length ℓ Tolerance $^{0}_{-0.3}$							
φd	Tolerance	φD	Tolerance	φF	t	Tolerance	2	3	4	5	6	7	8	10
2	$^{+0.065}_{+0.015}$	4	$^{+0.107}_{+0.032}$	6	1	$^{0}_{-0.10}$	0202	0203	0204					
3	$^{+0.080}_{+0.030}$	5	$^{+0.107}_{+0.032}$	8	1	$^{0}_{-0.10}$		0303	0304	0305	0306			
4	$^{+0.095}_{+0.045}$	6	$^{+0.107}_{+0.032}$	9	1	$^{0}_{-0.10}$		0403	0404	0405	0406			
5	$^{+0.095}_{+0.045}$	7	$^{+0.157}_{+0.045}$	10	1	$^{0}_{-0.10}$		0503	0504	0505	0506	0507		
6	$^{+0.095}_{+0.045}$	8	$^{+0.157}_{+0.045}$	12	1	$^{0}_{-0.10}$		0603		0605	0606		0608	0610
7	$^{+0.095}_{+0.045}$	9	$^{+0.157}_{+0.045}$	13	1	$^{0}_{-0.10}$		0703		0705		0707		0710
8	$^{+0.120}_{+0.060}$	10	$^{+0.157}_{+0.045}$	15	1	$^{0}_{-0.10}$		0803		0805	0806		0808	0810
9	$^{+0.120}_{+0.060}$	11	$^{+0.193}_{+0.058}$	16	1	$^{0}_{-0.10}$		0903		0905	0906			0910
10	$^{+0.120}_{+0.060}$	12	$^{+0.193}_{+0.058}$	18	1	$^{0}_{-0.10}$		1003		1005	1006		1008	1010
12	$^{+0.120}_{+0.060}$	14	$^{+0.193}_{+0.058}$	20	1	$^{0}_{-0.10}$					1206		1208	1210
14	$^{+0.120}_{+0.060}$	16	$^{+0.193}_{+0.058}$	22	1	$^{0}_{-0.10}$								1410
15	$^{+0.120}_{+0.060}$	17	$^{+0.193}_{+0.058}$	23	1	$^{0}_{-0.10}$								1510
16	$^{+0.120}_{+0.060}$	18	$^{+0.193}_{+0.058}$	24	1	$^{0}_{-0.10}$								1610
18	$^{+0.120}_{+0.060}$	20	$^{+0.221}_{+0.071}$	26	1	$^{0}_{-0.10}$								1810
20	$^{+0.145}_{+0.075}$	23	$^{+0.221}_{+0.071}$	31	1.5	$^{0}_{-0.15}$								2010
22	$^{+0.145}_{+0.075}$	25	$^{+0.231}_{+0.081}$	33	1.5	$^{0}_{-0.15}$								2210
25	$^{+0.170}_{+0.090}$	28	$^{+0.231}_{+0.081}$	36	1.5	$^{0}_{-0.15}$								2510
30	$^{+0.170}_{+0.090}$	34	$^{+0.290}_{+0.095}$	42	2	$^{0}_{-0.15}$								3010
32	$^{+0.215}_{+0.115}$	36	$^{+0.290}_{+0.095}$	46	2	$^{0}_{-0.15}$								
35	$^{+0.215}_{+0.115}$	39	$^{+0.290}_{+0.095}$	49	2	$^{0}_{-0.15}$								3510
38	$^{+0.215}_{+0.115}$	42	$^{+0.340}_{+0.115}$	52	2	$^{0}_{-0.15}$								
40	$^{+0.215}_{+0.115}$	44	$^{+0.340}_{+0.115}$	54	2	$^{0}_{-0.15}$								
45	$^{+0.235}_{+0.135}$	50	$^{+0.340}_{+0.115}$	60	2.5	$^{0}_{-0.15}$								
50	$^{+0.235}_{+0.135}$	55	$^{+0.430}_{+0.130}$	65	2.5	$^{0}_{-0.15}$								

Length ℓ Tolerance $^{0}_{-0.5}$							I.D.
12	15	20	25	30	40	50	φd
							2
							3
							4
							5
							6
							7
0812	0815						8
0912	0915						9
1012	1015	1020					10
1212	1215	1220					12
1412	1415	1420					14
1512	1515	1520	1525	1530			15
1612	1615	1620	1625	1630			16
1812	1815	1820	1825	1830			18
2012	2015	2020	2025	2030			20
	2215	2220	2225	2230			22
2512	2515	2520	2525	2530			25
3012		3020	3025	3030	3040		30
		3220★	3225★	3230★	3240★		32
3512★		3520	3525★	3530	3540		35
		3820		3830	3840		38
4012		4020	4025	4030	4040	4050	40
		4520	4525	4530	4540	4550	45
		5020		5030	5040	5050	50

⚠ The dimensional tolerances are the values measured at +25℃.

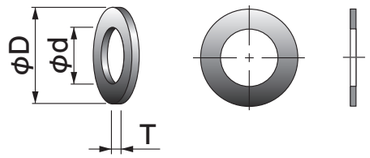
80W Oiles 80 Washers

RoHS2 ELV Lead Free



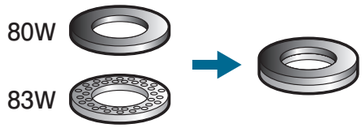
Specify Part No. by required I.D.
(e.g.) I.D. is 15mm.

80W - 15
Part No.



● "If the mating part has coarse surface"
"If foreign matter may be put on the bearing surface"
"If the coefficient of friction should be especially low"

The "plain washers" specified in JIS B1256 may be used as the mating part. In the above cases, however, plastic-to-plastic sliding with overlapped the 80W and 83W is effective.

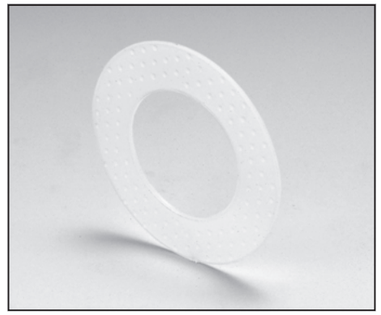


● It is recommended to apply multi-purpose lithium grease of consistency NLGI grade 2 to 0.

Part No.	I.D.		O.D.		Thickness	
	ϕd	Tolerance	ϕD	Tolerance	T	Tolerance
80W-08	8.5	±0.3	17	±0.3	1.5	±0.1
80W-10	10.5	±0.3	24	±0.3	2.0	±0.1
80W-12	12.5	±0.3	28	±0.3	2.0	±0.1
80W-15	15	±0.3	28	±0.3	2.0	±0.1
80W-17	17	±0.3	30	±0.3	2.0	±0.1
80W-21	21	±0.3	37	±0.3	2.0	±0.1
80W-23	23	±0.3	39	±0.3	2.0	±0.1
80W-25	25	±0.3	44	±0.3	2.0	±0.1

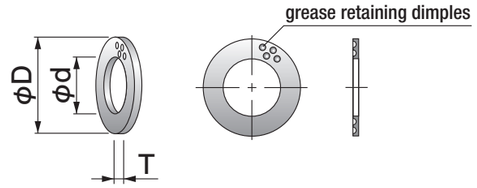
83W Oiles 83 Washers

RoHS2 ELV Lead Free



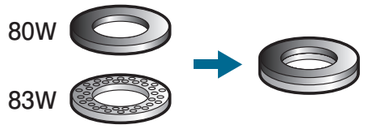
Specify Part No. by required I.D.
(e.g.) I.D. is 15mm.

83W - 15
Part No.



● "If the mating part has coarse surface"
"If foreign matter may be put on the bearing surface"
"If the coefficient of friction should be especially low"

The "plain washers" specified in JIS B1256 may be used as the mating part. In the above cases, however, plastic-to-plastic sliding with overlapped the 80W and 83W is effective.

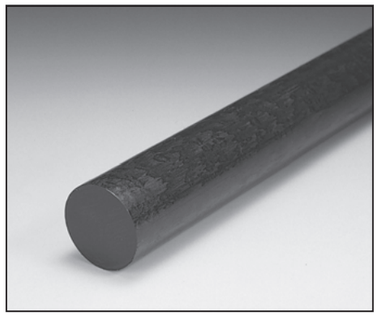


● It is recommended to apply multi-purpose lithium grease of consistency NLGI grade 2 to 0.

Part No.	I.D.		O.D.		Thickness	
	ϕd	Tolerance	ϕD	Tolerance	T	Tolerance
83W-08	8.5	±0.3	17	±0.3	1	±0.1
83W-10	10.5	±0.3	24	±0.3	1	±0.1
83W-12	12.5	±0.3	28	±0.3	1	±0.1
83W-15	15	±0.3	28	±0.3	1	±0.1
83W-17	17	±0.3	30	±0.3	1	±0.1
83W-21	21	±0.3	37	±0.3	1	±0.1
83W-23	23	±0.3	39	±0.3	1	±0.1
83W-25	25	±0.3	44	±0.3	1	±0.1

80M Oiles 80 Bar Stock

RoHS2 ELV Lead Free



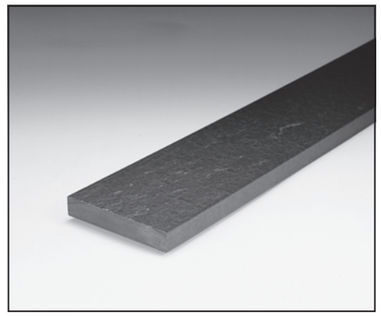
Specify Part No. by required diameter.
(e.g.) Diameter is 36mm.

80M - 35
Part No.

Part No.	Diameter		Length
	φD	Tolerance	L
80M-06	6.5	±0.4	500
80M-10	11	±0.4	500
80M-15	17	±0.4	500
80M-20	21.5	±0.4	500
80M-25	26	±0.4	500
80M-30	31.5	±0.4	500
80M-35	36	±0.5	500
80M-40	41.5	±0.5	500
80M-45	46.5	±0.5	500
80M-50	52	±0.5	500
80M-55	57	±0.5	500
80M-60	61.5	±0.6	500
80M-65	67	±0.6	500

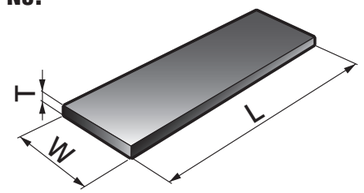
80P Oiles 80 Plate Material

RoHS2 ELV Lead Free



Specify Part No. by required thickness.
(e.g.) Plate thickness is 11mm.

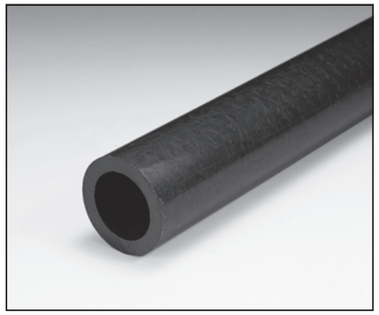
80P - 11
Part No.



Part No.	Thickness		Width		Length
	T	Tolerance	W	Tolerance	L
80P-08	8	±0.2	105	±0.5	1,000
80P-11	11	±0.2	80	±0.5	1,000
80P-13	13	±0.2	105	±0.5	1,000
80P-18	18	±0.3	105	±0.5	1,000

80S Oiles 80 Pipe Stock

RoHS2 ELV Lead Free

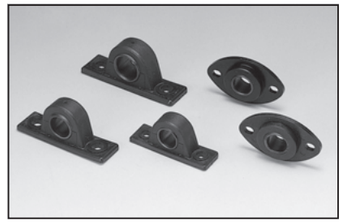


Specify Part No. by required I.D. and O.D.
(e.g.) I.D. is 48.5mm and O.D. is 62.5mm.

80S - 5060
Part No.

Part No.	I.D.		O.D.		Length
	φd	Tolerance	φD	Tolerance	L
80S-2030	19	±0.4	31.5	±0.4	500
80S-2535	24	±0.4	36.5	±0.4	500
80S-3040	28.5	±0.5	42	±0.5	500
80S-3545	34	±0.5	47	±0.5	500
80S-3550	34	±0.5	52	±0.5	500
80S-4055	38	±0.5	56.5	±0.5	500
80S-4060	38	±0.5	62.5	±0.5	500
80S-4560	43	±0.5	62.5	±0.5	500
80S-4565	43	±0.5	67	±0.6	500
80S-5060	48.5	±0.5	62.5	±0.5	500
80S-5065	48.5	±0.5	67	±0.6	500
80S-5070	48.5	±0.5	72.5	±0.6	500
80S-5565	53.5	±0.6	67.5	±0.6	500
80S-5570	53.5	±0.6	72.5	±0.6	500
80S-5575	53.5	±0.6	78	±0.6	500
80S-6075	58.5	±0.6	78	±0.6	500

Oiles Pillow 80 Unit bearings



RoHS2 ELV Lead Free

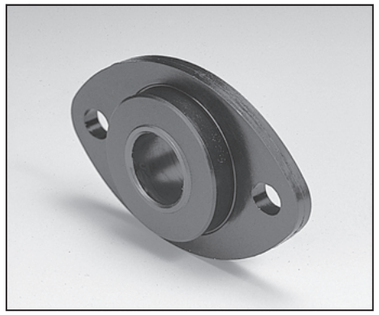
Feature

- Has the same features as 80.
- Demonstrates superior sliding performance in sliding motion.
- The whole bearing unit is made of plastic. Small, lightweight, and superior corrosion resistance.
- The standard products are available in various sizes.

Service range		
Operating condition	Intermittent	Continuous
Service temperature range ℃	−20～+60	
Allowable max. pressure P N/mm² {kgf/cm²}	2.0 {21}	
Allowable max. velocity V m/s {m/min}	0.40 {24}	0.25 {15}
Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min}	0.50 {306}	0.30 {184}

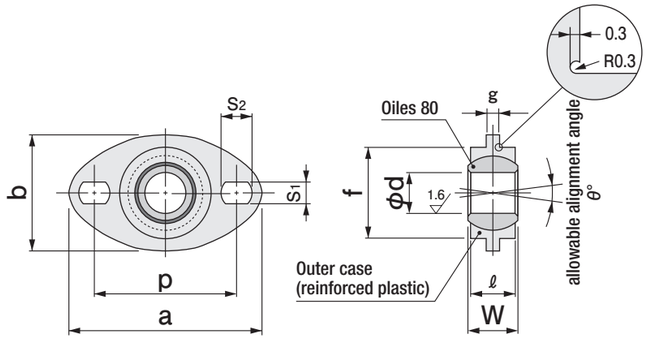
80FL Oiles Pillow 80 Flange Units

RoHS2 ELV Lead Free



Specify Part No. by required I.D.
(e.g.) Diameter is 12mm.

80FL - 12
Part No.



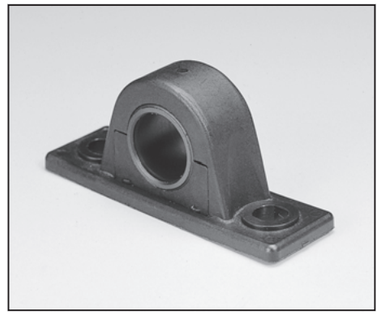
- The recommended shaft dimension and finishing grade are h7 and Rz3.2μm or less, respectively. The shaft dimension of e7 is recommended if used at the temperature of 0˚C (32°F) or less.
- Apply grease or oil to the sliding surface.
- Use bolts and washers to mount the product.
- The allowable tightening torques shown in parentheses are the values if no washer is used.
- Find the surface pressure from the pressure receiving area (φd×W), refer to the service ranges shown on page 78, find the allowable load, and choose the proper size.

Part No.	I.D.		Outer dimensions					Mounting hole					θ°	Bolt size	Tightening torque (kgf・cm)
	φd	Tolerance	a	b	W	f	Tolerance	g	ℓ	p	S_1	S_2			
80FL-06	6	+0.068 +0.020	38	20	7	14	0 −0.070	2.5	6	26	4.5	5	13	M4	20 (10)
80FL-08	8	+0.083 +0.025	42	24	10	19	0 −0.084	2.5	9	30	4.5	5	10	M4	25 (15)
80FL-10	10	+0.083 +0.025	48	28	11	22	0 −0.084	3	10	35	5.5	6	8	M5	35 (20)
80FL-12	12	+0.102 +0.032	56	34	13	27	0 −0.100	3	12	42	6.5	7	7	M6	55 (40)
80FL-15	15	+0.102 +0.032	64	40	16	31	0 −0.100	4	15	48	6.5	7.5	6	M6	90 (55)
80FL-17	17	+0.124 +0.040	75	45	18	35	0 −0.160	4.5	16	56	8.5	9.5	11	M8	110 (70)
80FL-20	20	+0.124 +0.040	82	50	20	38	0 −0.160	5	18	63	8.5	10	9	M8	140 (90)

⚠ The dimensional tolerances are the values measured at +25˚C.

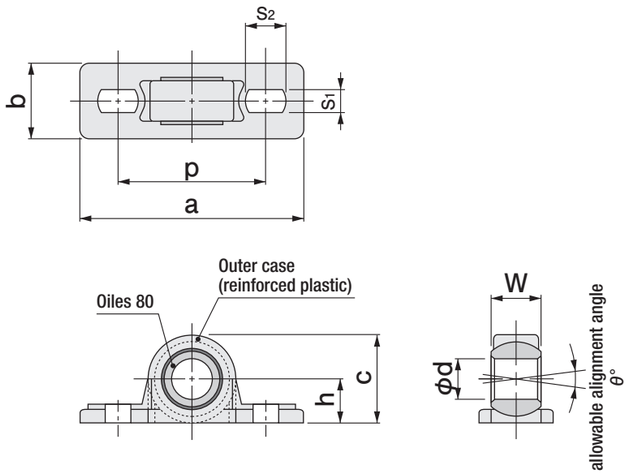
80UP Oiles Pillow 80 Pillow Type Units

RoHS2 ELV Lead Free



Specify Part No. by required I.D.
(e.g.) Diameter is 12mm.

80UP - 12
Part No.

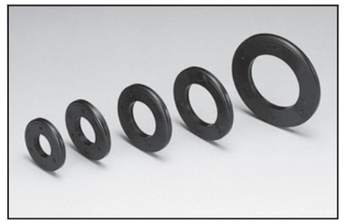


- The recommended shaft dimension and finishing grade are h7 and Rz3.2μm or less, respectively. The shaft dimension of e7 is recommended if used at the temperature of 0˚C (32°F) or less.
- Apply grease or oil to the sliding surface.
- Use bolts and washers to mount the product.
- The allowable tightening torques shown in parentheses are the values if no washer is used.
- Find the surface pressure from the pressure receiving area (φd×W), refer to the service ranges shown on page 78, find the allowable load, and choose the proper size.

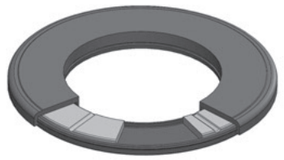
Part No.	I.D.		Outer dimensions					Form			θ°	Bolt size	Tightening torque (kgf・cm)
	φd	Tolerance	a	b	W	h	c	p	S_1	S_2			
80UP-06	6	+0.068 +0.020	39	12	7	7	14	26	4.5	5	13	M4	20 (15)
80UP-08	8	+0.083 +0.025	45	15	10	9	18	30	4.5	5	10	M4	30 (20)
80UP-10	10	+0.083 +0.025	53	16	11	11	22	36	5.5	6	8	M5	45 (30)
80UP-12	12	+0.102 +0.032	60	18	13	13	26	42	6.5	7	7	M6	75 (50)
80UP-15	15	+0.102 +0.032	67	21	16	15	30	48	6.5	7.5	6	M6	90 (60)
80UP-17	17	+0.124 +0.040	80	24	18	17	34	56	8.5	9.5	11	M8	120 (75)
80UP-20	20	+0.124 +0.040	88	26	20	19	38	63	8.5	10	9	M8	150 (90)

⚠ The dimensional tolerances are the values measured at +25˚C.

Oiles PS Bearings Plastic sliding bearing units



RoHS2 ELV Lead Free



Feature

- Low coefficient of friction. Maintains smooth operating conditions.
- Features low torque variations when starting and stopping and prevents stick slips.
- Has unit structure that slides inside the bearing. Wear of the bearing and the wear characteristics are not affected by the material or surface conditions of the mating parts.
- Demonstrates superior sliding performance in intermittent and sliding operations.
- The whole bearing unit is made of plastic. Small, lightweight, and superior corrosion resistance.
- The standard products are available in various sizes.

Service range

Standard product

Part No.	Service range			
	Allowable max. load W N {kgf}	Allowable max. revolution N s^{-1} {rpm}	Allowable max. WN value N・s^{-1} {kgf・rpm}	Service temperature range ℃
PST-163605	11,700 {1,194}	4.00 {240}	1,470 { 9,000}	−40～+80
PST-204205	16,600 {1,694}	3.50 {210}	1,630 { 9,980}	
PST-254705	19,600 {2,000}	3.00 {180}	1,790 {10,959}	
PST-305205	22,500 {2,296}	2.50 {150}	1,790 {10,959}	
PST-406805	41,100 {4,194}	2.00 {120}	2,450 {15,000}	
PST-507805	49,000 {5,000}	1.50 { 90}	2,450 {15,000}	

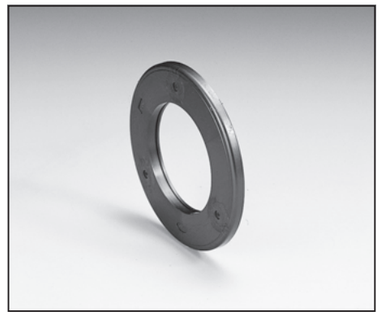
(Notes) ※The WN values are the products of the loads and revolutions in operation.
※In oscillating motion, the revolution N found using the conversion expression below must be not more than the allowable maximum revolution.
※Contact us for loads in the radial direction.

Revolution $N = (\theta \div 180) \times n$

N: revolution s^{-1} {rpm}
θ: oscillation angle °
n: oscillation cycle speed s^{-1} {cpm}

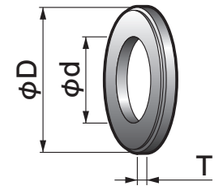
PST Oiles PS Bearings

RoHS2 ELV Lead Free



Specify Part No. by required I.D., O.D., and thickness.
(e.g.) I.D. is 25mm, O.D. is 47mm, and thickness is 5mm.

PST - 254705
Part No.



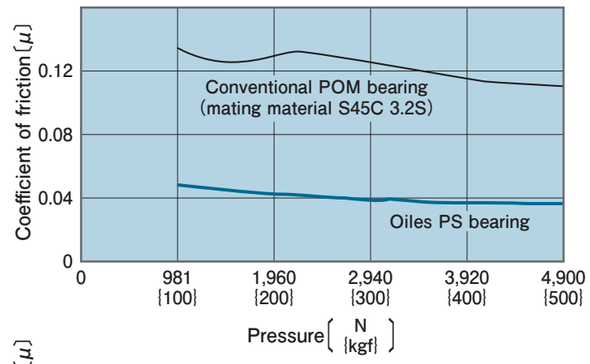
Part No.	I.D.		O.D.	Thickness	
	ϕd	Tolerance	ϕD	T	Tolerance
PST-163605	16	$^{+0.18}_{0}$	36	5	±0.5
PST-204205	20	$^{+0.21}_{0}$	42	5	±0.5
PST-254705	25	$^{+0.21}_{0}$	47	5	±0.5
PST-305205	30	$^{+0.21}_{0}$	52	5	±0.5
PST-406805	40	$^{+0.25}_{0}$	68	5	±0.5
PST-507805	50	$^{+0.25}_{0}$	78	5	±0.5

⚠ The dimensional tolerances are the values measured at +25℃.

Test data

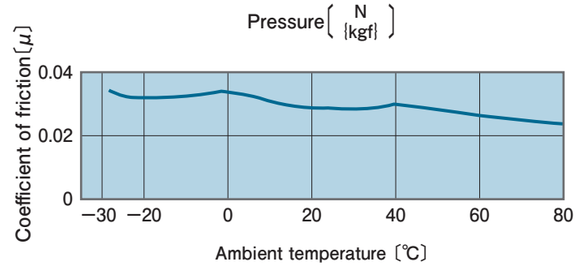
Thrust oscillation test (Loading test)

<Testing condtions>
Test sample : PST-204205
Rotational frequency : $1s^{-1}$
Oscillating cycle : 60cpm
Oscillating angle : ±40°
Ambient temperature : 23℃

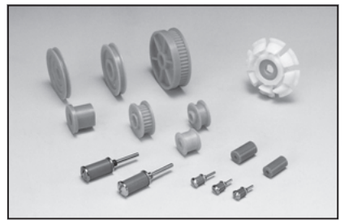


Thrust oscillation test (Temperature dependence)

<Testing conditions>
Test sample : PST-204205
Rotational frequency : $1s^{-1}$
Oscillating cycle : 60cpm
Thrust load : 2,450N {250kgf}
Oscillating angle : ±40°



Oiles Lutech S Oil-impregnated polyacetal bearings with fillers



RoHS2 ELV Lead Free

Feature

- Serviceable without the need of lubrication and demonstrates superior friction characteristics under light-load and high-speed conditions.
- Features low coefficient of friction and superior speed characteristics.
- Prevents stick slips and squeak noises.
- Injection-molded and can be made in complicated shapes. Has good mass productivity.

Service range

Lubrication condition	Dry
Service temperature range ℃	−40～+80
Allowable max. pressure P N/mm² {kgf/cm²}	5.0 {51}
Allowable max. velocity V m/s {m/min}	1.65 {99}
Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min}	2.45 {1,500}

Mechanical properties

Specific gravity	ASTM D 792	——	1.36
Tensile strength	ASTM D 638	N/mm² {kgf/cm²}	44.1 {450}
Tensile elongation at break	ASTM D 638	%	30
Flexural property	ASTM D 790	N/mm² {kgf/cm²}	60.8 {620}
Flexural modulus	ASTM D 790	N/mm² {kgf/cm²}	2,110 {21,500}
Compressive stress 1% deformation 10% deformation	ASTM D 695	N/mm² {kgf/cm²}	15.7 {160} 74.0 {755}
Hardness	ASTM D 785	HRM	75
Izod impact strength (with notch)	ASTM D 256	J/m {kgfcm/cm}	39.2 {4.00}
Co-efficient of linear expansion	ASTM D 696	×10⁻⁵ ℃⁻¹	8～13
Melting point	DSC	℃	165
UL incombustibility	UL94	File No.E78113	HB

※The values shown above are typical values, not the standard values.

Test data

Journal rotation test

<Testing conditions>

Mating material : stainless steel
(surface roughness Rz0.8μm)

Pressure : 0.098N/mm²{1.0kgf/cm²}

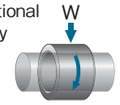
Velocity : 0.783m/s{47.0m/min}

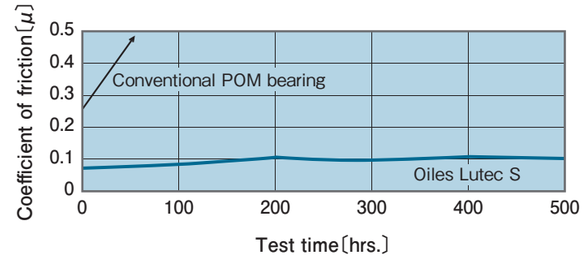
Rotation : 3,000rpm

Test time : 500hrs.

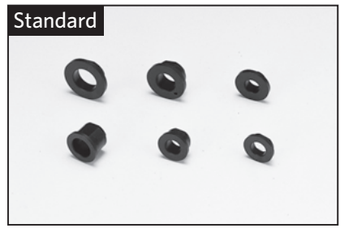
Mode of operation : reversing rotational direction every minute

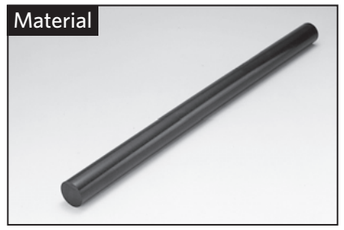
Lubrication : dry





Oiles Lutech E Conductive polyacetal bearings





Feature

- Electrically conductive.
- Serviceable without the need for lubrication and demonstrates superior friction characteristics in light-load and high-speed conditions.
- Features low coefficient of friction and superior wear resistance.
- Prevents stick slips and squeak noises.
- Non-rotating type standard products are available for replacement of sintered bearings.

RoHS2 ELV Lead Free

Service range

Lubrication condition	Dry
Service temperature range ℃	−40～+80
Allowable max. pressure P N/mm² {kgf/cm²}	9.81 {100}
Allowable max. velocity V m/s {m/min}	0.83 {50}
Allowable max. PV value N/mm²・m/s {kgf/cm²・m/min}	0.327 {200}

Lathe turning

Cutting tool	carbide tool (JIS)		Condition	Speed (m/min)	100～250
	Relief angle	5～10°		Cut depth (mm)	0.10～0.50
	Rake angle	10～20°		Feed (mm/rev)	0.05～0.20
	Nose radius (mm)	0.20～0.40			

Attention should be paid to dimensional variances due to thermal expansion, chucking, and bend of the material.

Machining accuracy (bushing)

I.D.	O.D.	Length
class 8 to 9	class 7 to 8	class 9 to 10

Classes here are in JIS standard.

This product demonstrates satisfactory performance at the slide surface roughness of Rz6.3 to 12.5μm.

Dimensions may change due to thermal expansion, chucking pressure, moisture absorption deformation, etc. High accuracy is ensured if the product is installed on the housing and then ground.

Mechanical properties

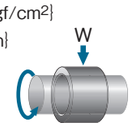
Mechanical properties			Lutech E	Lutech E-02
Specific gravity	ASTM D 792	——	1.47	1.38
Tensile strength	ASTM D 638	N/mm² {kgf/cm²}	47.5 {484}	42.9 {438}
Tensile elongation at break	ASTM D 638	%	3.2	23
Flexural property	ASTM D 790	N/mm² {kgf/cm²}	76.2 {777}	71.9 {733}
Flexural modulus	ASTM D 790	N/mm² {kgf/cm²}	3,007 {36,670}	2,595 {26,459}
Compressive stress 1% deformation 10% deformation	ASTM D 695	N/mm² {kgf/cm²}	21.7 {221} 88.9 {907}	——
Hardness	ASTM D 785	HRM	95	90
Izod impact strength (with notch)	ASTM D 256	J/m {kgfcm/cm}	33 {3.36}	31 {3.16}
Co-efficient of linear expansion	ASTM D 696	×10⁻⁵ ℃⁻¹	8～13	8～13
Deflection temperature under load 1.82 MPa	ASTM D 648	℃	118	117
Melting point	DSC	℃	165	——
Volume resistivity	ASTM D 257	Ωm {Ω・cm}	0.504 {5.04×10}	0.308 {3.08×10}
Surface resistivity	ASTM D 257	Ω	5.31×10²	2.21×10²
UL incombustibility	UL94	File No.E78113	HB	HB

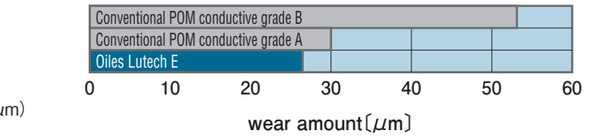
※The values shown above are typical values, not the standard values.

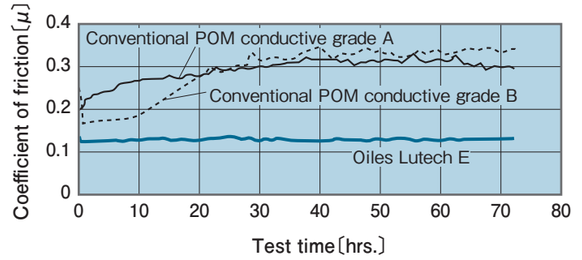
Test data

Journal rotation test

<Testing conditions>
Bearing dimension : φ10×φ14×ℓ10
Mating material : S45C (surface roughness Rz0.8μm)
Pressure : 0.98N/mm² {10.0kgf/cm²}
Velocity : 0.17m/s {10.0m/min}
Test time : 72hrs.

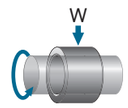


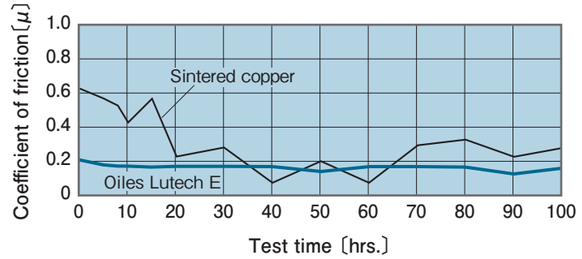




Journal rotation test

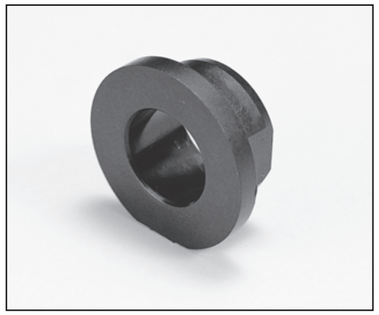
<Testing conditions>
Bearing dimension : φ10×φ14×ℓ10
Mating material : SUS303
Pressure : 0.20N/mm² {2.0kgf/cm²}
Velocity : 0.03m/s {2.0m/min}
Test time : 100hrs.





LED Oiles Lutech E Bushings

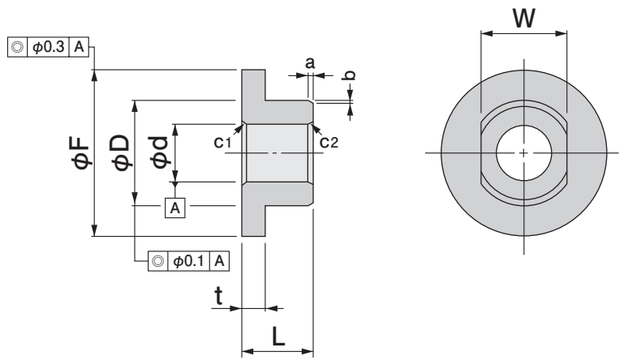
RoHS2 ELV Lead Free



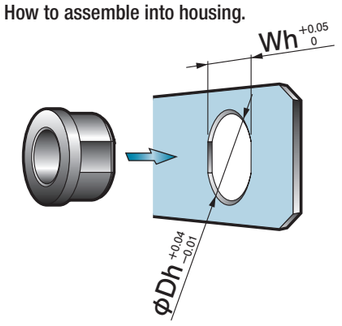
● The both sides of the outer diameter are cut.

Specify Part No. by required I.D. and length.
(e.g.) I.D. is 6mm and length is 6mm.

LED - 0606
Part No.



■ How to assemble into housing.



φDh and Wh are recommended mating hole dimension.

a b: Chamfering for O.D.

a	1
b	0.3

(mm)

c: Chamfering for I.D.

c1	C0.3
c2	C0.5

(mm)

LED-0635

a	0.5
b	0.2
c1	C0.3
c2	C0.5

(mm)

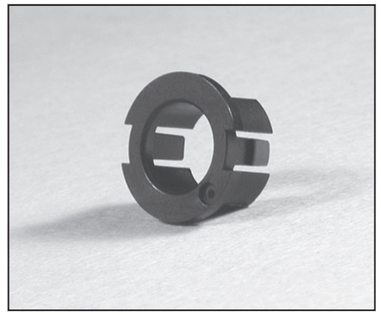
Part No.	I.D.		O.D.		W	Tolerance	Flange			Length	
	φd	Tolerance	φD	Tolerance			φF	t	Tolerance	L	Tolerance
LED-0404	4	+0.05 0	8	−0.01 −0.06	5.8	0 −0.1	10	1.0	±0.1	4	±0.2
LED-0605	6	+0.05 0	9	−0.01 −0.06	7.8	0 −0.1	14	2.0	±0.1	5	±0.2
LED-0635	6	+0.05 0	10	−0.01 −0.06	8.8	0 −0.1	12	1.5	±0.1	3.5	±0.2
LED-0606	6	+0.05 0	10	−0.01 −0.06	8.8	0 −0.1	12	1.5	±0.1	6	±0.2
LED-0895	8	+0.05 0	11	−0.01 −0.06	9.8	0 −0.1	13	1.5	±0.1	9.5	±0.2
LED-0807	8	+0.05 0	12	−0.01 −0.06	10.8	0 −0.1	16	2.0	±0.1	7	±0.2
LED-1005	10	+0.05 0	14	−0.01 −0.06	12.8	0 −0.1	18	2.0	±0.1	5	±0.2

※The effective range of the outer diameter tolerance is up to 3 mm from the flange bottom.
※The recommended clearance is 0.030 to 0.095 mm for each dimension.

⚠ The dimensional tolerances are the values measured at +25℃.

LES Oiles Lutech E-02 Snap-fit Bushings

RoHS2 ELV Lead Free

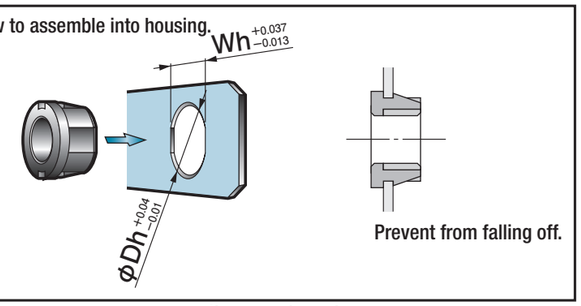


● The both sides of the outer diameter are cut.

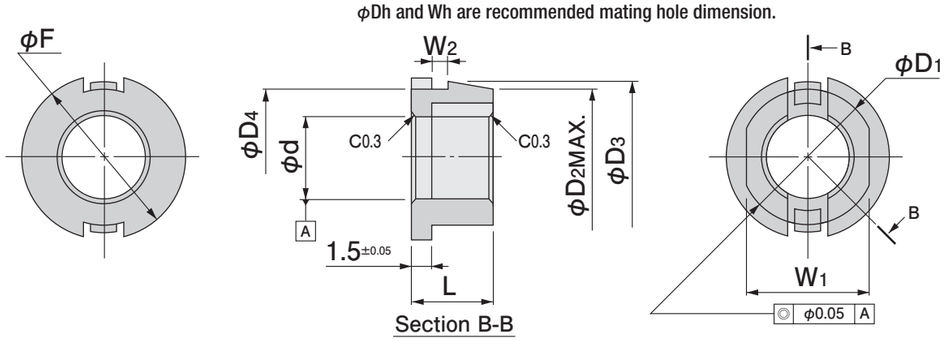
Specify Part No. by required I.D. and W2 dimension.
(e.g.) I.D. is 6mm and W2 dimention is 1.6mm.

LES - 0616
Part No.

■ How to assemble into housing.



φDh and Wh are recommended mating hole dimension.



Part No.	I.D.		O.D.						Flange	Length		W1	Tolerance	W2	Tolerance
	φd	Tolerance	φD1	Tolerance	φD2 MAX.	φD3	Tolerance	φD4	φF	L	Tolerance				
LES-0608	6	+0.05 0	10	−0.01 −0.06	9.9	11	+0.1 0	10	12	6	±0.2	9	−0.013 −0.049	0.8	+0.2 +0.1
LES-0612	6	+0.05 0	10	−0.01 −0.06	9.9	11	+0.1 0	10	12	6	±0.2	9	−0.013 −0.049	1.2	+0.2 +0.1
LES-0616	6	+0.05 0	10	−0.01 −0.06	9.9	11	+0.1 0	10	12	6	±0.2	9	−0.013 −0.049	1.6	+0.2 +0.1
LES-0812	8	+0.05 0	12	−0.01 −0.06	11.9	13	+0.1 0	12	14	7	±0.2	10	−0.013 −0.049	1.2	+0.2 +0.1
LES-0816	8	+0.05 0	12	−0.01 −0.06	11.9	13	+0.1 0	12	14	7	±0.2	10	−0.013 −0.049	1.6	+0.2 +0.1
LES-0820	8	+0.05 0	12	−0.01 −0.06	11.9	13	+0.1 0	12	14	7	±0.2	10	−0.013 −0.049	2.0	+0.2 +0.1

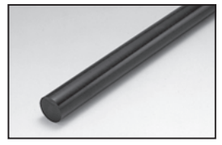
※The recommended clearance is 0.030 to 0.095 mm for each dimension.
※When used in a hole made in a sheet-metal, the snap fit is scraped by burrs made when punching. It is recommended to remove burrs with a grinder before use.

⚠ The dimensional tolerances are the values measured at +25℃.

LEM Oiles Lutech E Bar Stock

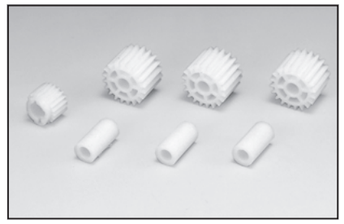
RoHS2 ELV Lead Free

Specify Part No. by required diameter.
(e.g.) Diameter is 31.5mm. **LEM - 30**
Part No.



Part No.	Diameter		Length
	φD	Tolerance	L
LEM-20	21.5	±0.4	500
LEM-30	31.5	±0.4	500
LEM-40	41.5	±0.5	500
LEM-50	52	±0.5	500

Oiles Lutech GP Polyacetal bearings with fillers



RoHS2 ELV Lead Free

Feature

- Serviceable without the need for lubrication.
- Plastic parts may be used as mating parts.
- Features low coefficient of friction and low variations caused by loads.
- Prevents abnormal noises in plastic-to-plastic sliding applications.
- Has superior wear resistance.
- Injection-molded and can be made in complicated shapes. Has good mass productivity.

Service range

Mating material	Plastic	Metal
Lubrication condition	Dry	
Service temperature range ℃	−40～+80	
Allowable max. pressure P N/mm² {kgf/cm²}	3.92 {40}	9.81 {100}
Allowable max. velocity V m/s {m/min}	0.33 {20}	0.67 {40}
Allowable max. PV value N/mm²・m/s {kgf/cm²・m/min}	0.163 {100}	0.327 {200}

Mechanical properties

Specific gravity	ASTM D 792	——	1.35
Tensile strength	ASTM D 638	N/mm² {kgf/cm²}	48.0 {490}
Tensile elongation at break	ASTM D 638	%	40
Flexural property	ASTM D 790	N/mm² {kgf/cm²}	64.8 {661}
Flexural modulus	ASTM D 790	N/mm² {kgf/cm²}	2,006 {20,471}
Hardness	ASTM D 785	HRM	65
Izod impact strength (with notch)	ASTM D 256	J/m {kgfcm/cm}	36.8 {3.75}
Deflection temperature under load 1.82 MPa	ASTM D 648	℃	107
UL incombustibility	UL94	File No.E78113	HB

※The values shown above are typical values, not the standard values.

Test data

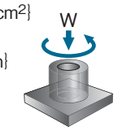
Thrust load test

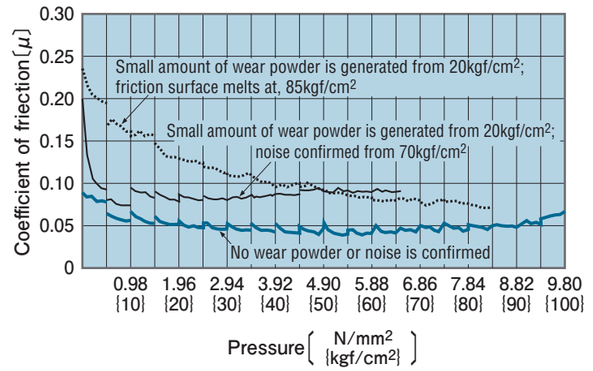
<Testing conditions>

Test sample :
- Lutech GP against Lutech GP
- Company A POM against Company A POM
- Company B POM against Company B POM

Pressure : Load is increased by 0.49N/mm²{5.0kgf/cm²} every 15 min.

Velocity : 0.0167m/s{1.0m/min}





Journal rotation test

<Testing condtions>

Bearing dimension : φ10×φ14×ℓ10

Mating material : POM(M90-44)

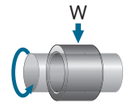
Pressure : 0.07N/mm²{0.72kgf/cm²}

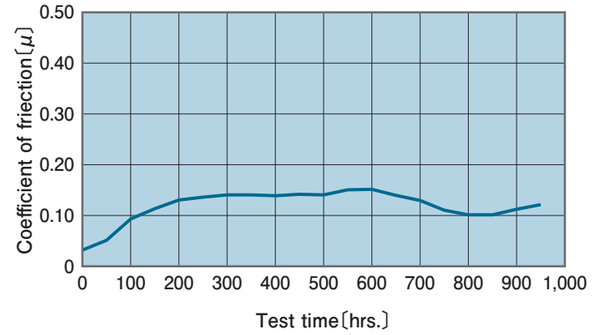
Velocity : 0.15m/s{9.0m/min}

Test time : 950hrs.

Lubrication : dry

Wear amount : 0.018mm





Thrust rotation test

<Testing condtions>

Mating material : POM(M90-44)

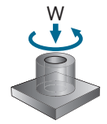
Pressure : 0.49N/mm²{5.0kgf/cm²}

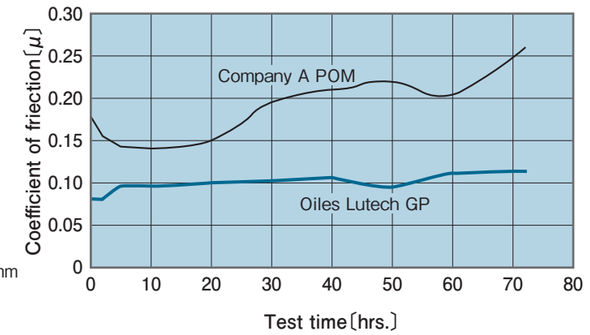
Velocity : 0.0167m/s{1.0m/min}

Test time : 72hrs.

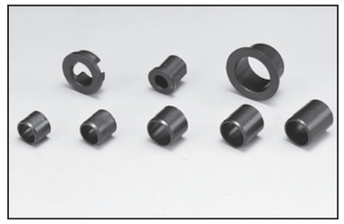
Lubrication : dry

Wear amount :
Lutech GP : 0.0 / mating material : 0.0mm
Company A POM : 0.020 / mating material : 0.005mm





Oiles 480 Oil-impregnated polyacetal bearings reinforced with carbon fibers.



RoHS2 ELV Lead Free

Feature

- Serviceable without the need for lubrication.
- Non-organic filler improves strength.
- Demonstrates superior wear resistance in abrasive conditions.
- Serviceable under water.
- Features superior speed characteristics.
- Injection-molded and can be made in complicated shapes. Has good mass productivity.

Service range

Lubrication condition	Dry
Service temperature range ℃	−40～+120
Allowable max. pressure P N/mm² {kgf/cm²}	19.5 {199}
Allowable max. velocity V m/s {m/min}	0.65 {39}
Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min}	3.25 {1,990}

※These are values of the typical grade Oiles 480.

Mechanical properties

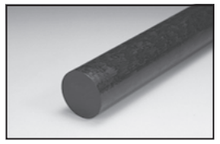
			480-01	480-02
Specific gravity	ASTM D 792	——	1.45	1.44
Tensile strength	ASTM D 638	N/mm² {kgf/cm²}	41.5 {423}	101.8 {1,038}
Tensile elongation at break	ASTM D 638	%	23	2.1
Flexural property	ASTM D 790	N/mm² {kgf/cm²}	67.6 {689}	143.0 {1,458}
Flexural modulus	ASTM D 790	N/mm² {kgf/cm²}	3,730 {38,000}	7,130 {72,700}
Hardness	ASTM D 785	HRM	69	74
Izod impact strength (with notch)	ASTM D 256	J/m {kgfcm/cm}	39.2 {4.00}	45.8 {4.67}
Co-efficient of linear expansion	ASTM D 696	×10⁻⁵ ℃⁻¹	2～10	3～10
Deflection temperature under load 1.82 MPa	ASTM D 648	℃	108	157
Melting point	DSC	℃	165	165
UL incombustibility	UL94	File No.E78113	——	HB

※The values shown above are typical values, not the standard values.
※For lathe turning or machining accuracy refer to page 67.

48M Oiles 480 Bar Stock

RoHS2 ELV Lead Free

Specify Part No. by required diameter.
(e.g.) Diameter is 31.5mm. **48M - 30**
Part No.



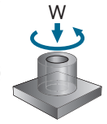
Part No.	Diameter φD	Tolerance	Length L
48M-20	21.5	±0.4	500
48M-30	31.5	±0.4	500
48M-40	41.5	±0.5	500
48M-50	52	±0.5	500

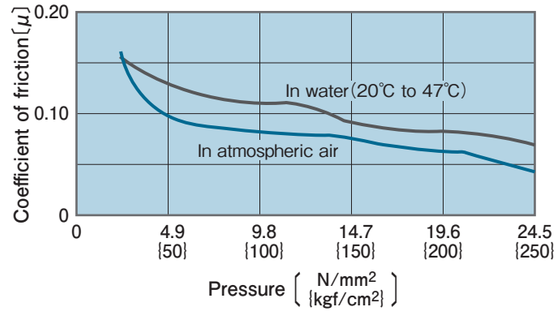
※Standard bar stock is 480-01.

480-02 Test data

Thrust rotation test

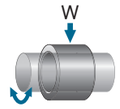
<Testing conditions>
Mating material : S45C (surface roughness Rz3μm)
Pressure : 2.45 to 24.5N/mm² {25.0 to 250.0kgf/cm²}
(1.23N/mm² {12.5kgf/cm²} is added every 5 minutes.)
Velocity : 0.208m/s {12.5m/min}
Atmosphere : atmospheric air, In water (20℃ to 47℃)

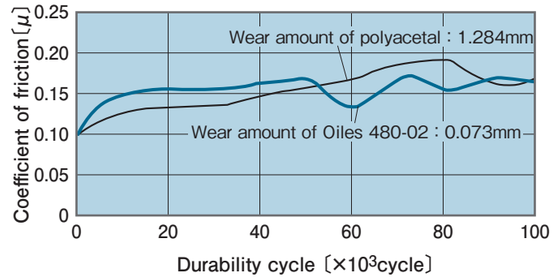




Journal oscillation test

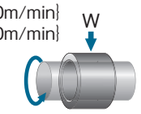
<Testing conditions>
Bearing dimension : φ30×φ38×ℓ45
Mating material : SUP7 (surface roughness Rt18.7 to 23.2μm)
Pressure : 2.90N/mm² {30.0kgf/cm²}
Velocity : 0.0183m/s {1.1m/min}
Oscillating cycle : 70cpm
Oscillating angle : ±15°
Durability cycle : 100,000cycle
Lubrication : grease is applied at assembly

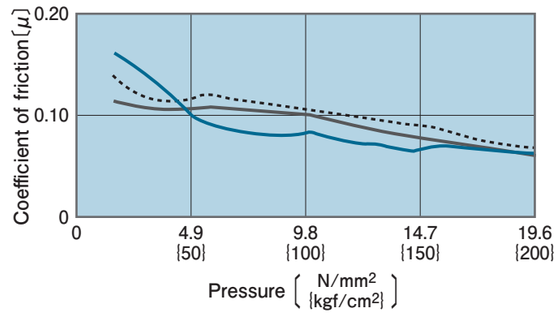




Journal rotation test

<Testing conditions>
Bearing dimension : φ40×φ50×ℓ30
Mating material : S45C (surface roughness Rz3μm)
Pressure : 1.96 to 19.6N/mm² {20.0 to 200.0kgf/cm²}
(0.98N/mm² {10.0kgf/cm²}、 is added every 10 minutes.)
Velocity : ----- 0.0167m/s {1.0m/min}
—— 0.0500m/s {3.0m/min}
—— 0.0833m/s {5.0m/min}
Lubrication : dry





Oiles 81 Oil-impregnated polyolefin bearings

RoHS2 ELV Lead Free

Feature

- Serviceable without the need for lubrication.
- Features low coefficient of friction and superior impact resistance performance.
- Demonstrates superior wear resistance in abrasive conditions due to foreign matter, coarse surfaces of mating parts, rust, etc.
- Injection-molded and can be made in complicated shapes. Has good mass productivity.

Service range	81-12	81-20
Lubrication condition	Dry	
Service temperature range ℃	−60～+60	−60～+60
Allowable max. pressure P N/mm² {kgf/cm²}	5.0 {51}	3.0 {31}
Allowable max. velocity V m/s {m/min}	0.25 {15}	0.50 {30}
Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min}	0.80 {489}	0.80 {489}

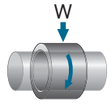
Mechanical properties			81-12	81-20
Specific gravity	ASTM D 792	——	1.00	0.97
Tensile strength	ASTM D 638	N/mm² {kgf/cm²}	26.5 {270}	32.4 {330}
Tensile elongation at break	ASTM D 638	%	200	10
Flexural property	ASTM D 790	N/mm² {kgf/cm²}	22.5 {230}	33.3 {340}
Flexural modulus	ASTM D 790	N/mm² {kgf/cm²}	980 {10,000}	1,550 {15,800}
Compressive stress 1% deformation Compressive stress 10% deformation	ASTM D 695	N/mm² {kgf/cm²}	8.3 {85} 26.5 {270}	10.8 {110} 26.5 {270}
Hardness	ASTM D 785	HRR	35	60
Izod impact strength (with notch)	ASTM D 256	J/m {kgfcm/cm}	147 {15.0}	98.1 {10.0}
Co-efficient of linear expansion	ASTM D 696	×10⁻⁵ ℃⁻¹	11～13	11～13
Deflection temperature under load 0.45 MPa	ASTM D 648	℃	——	85
Melting point	DSC	℃	137	130 (Note)
UL incombustibility	UL94	File No.E78113	——	HB

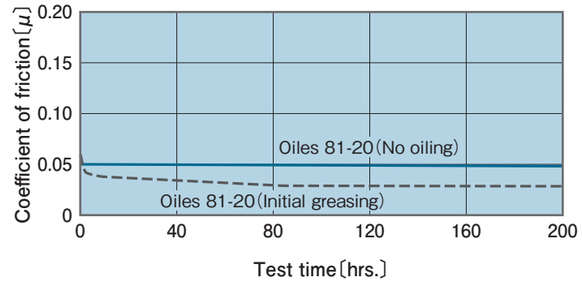
※The values shown above are typical values, not the standard values.
(Note) values by vicat softening point (ASTM D 1525)

81-20 Test data

Journal bearing rotation test

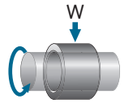
<Testing condtions>
Bearing dimension : $\phi 35 \times \phi 38 \times \ell 20$
Mating material : SUS303
(surface roughness Rz1.6μm)
Pressure : 0.316N/mm² {3.0kgf/cm²}
Velocity : 0.130m/s {7.8m/min} (120rpm)
Test time : 200hrs.

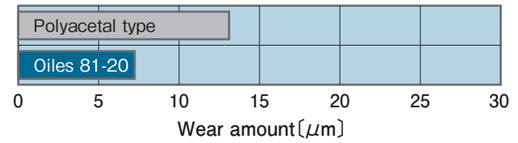


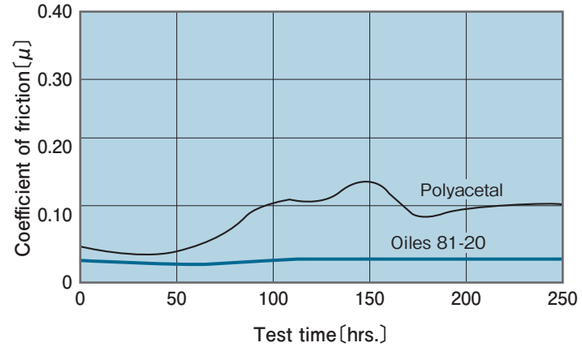


Journal rotation test

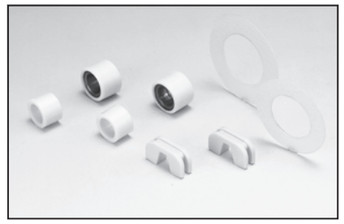
<Testing conditions>
Mating material : SUS303
(surface roughness Rz1.6μm)
Pressure : 1.96N/mm² {20.0kgf/cm²}
Velocity : 0.047m/s {2.8m/min} (90rpm)
Test time : 250hrs.







Oiles 83 Polyamide bearings with fillers



RoHS2 ELV Lead Free

Feature

- Serviceable without the need for lubrication.
- The non-organic-fiber-filled grade products feature high strength, superior impact resistance, and low linear expansion coefficient.
- Features superior wear resistance and heat resistance.
- Demonstrates superior wear resistance in abrasive conditions due to foreign matter, coarse surfaces of mating parts, rust, etc.
- Injection-molded and can be made in complicated shapes. Has good mass productivity.

Service range	83-24	83-90
Lubrication condition	Dry	
Service temperature range ℃	−40～+140	−40～+140
Allowable max. pressure P N/mm² {kgf/cm²}	10.0 {102}	19.5 {199}
Allowable max. velocity V m/s {m/min}	0.35 {21}	0.35 {21}
Allowable max. PV value N/mm²・m/s {kgf/cm²・m/min}	1.00 {612}	2.45 {1,500}

83-24 Test data

Thrust test

<Testing condtions>

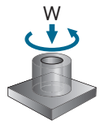
Mating material : S45C (surface roughness Rz3μm)

Pressure : 0.98N/mm² {10.0kgf/cm²}
1.96N/mm² {20.0kgf/cm²}

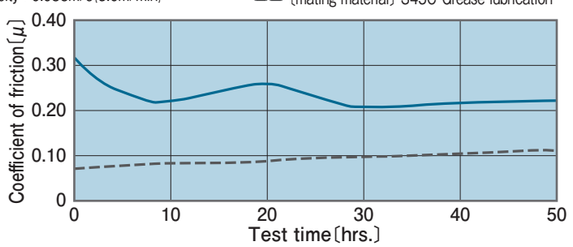
Velocity : 0.083m/s {5m/min}
0.033m/s {2m/min}

Test time : 50hrs.

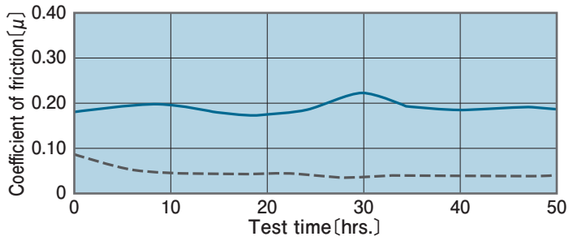
Lubrication : grease lubrication, Dry



Contact pressure : 0.98N/mm² {10.0kgf/cm²} — {mating material} S45C・Dry
Velocity : 0.083m/s {5.0m/min} -- {mating material} S45C・Grease lubrication



Contact pressure : 1.96N/mm² {20.0kgf/cm²} — {mating material} S45C・Dry
Velocity : 0.033m/s {2.0m/min} -- {mating material} S45C・Grease lubrication



Mechanical properties			83-24	83-90
Specific gravity	ASTM D 792	——	1.23	1.40
Tensile strength	ASTM D 638	N/mm² {kgf/cm²}	80.4 {820}	117 {1,190}
Tensile elongation at break	ASTM D 638	%	5	2
Flexural property	ASTM D 790	N/mm² {kgf/cm²}	123 {1,250}	190 {1,940}
Flexural modulus	ASTM D 790	N/mm² {kgf/cm²}	2,840 {29,000}	6,760 {69,000}
Compressive stress 1% deformation	ASTM D 695	N/mm² {kgf/cm²}	——	38.2 {390}
Compressive stress 10% deformation			——	108 {1,100}
Hardness	ASTM D 785	HRM	80	86
Izod impact strength (with notch)	ASTM D 256	J/m {kgfcm/cm}	——	64 {6.5}
Co-efficient of linear expansion	ASTM D 696	×10⁻⁵ ℃⁻¹	——	2～4
Deflection temperature under load 1.82 MPa	ASTM D 698	℃	176	213
Melting point	DSC	℃	292	225
UL incombustibility	UL94	File No.E78113	HB	——

※The values shown above are typical values, not the standard values.

83-90 Test data

Journal oscillation test

<Testing conditions>

Bearing dimension : φ40×φ50× ℓ 30

Mating material : S45C (surface roughness Rz1.5μm)

Pressure : 19.6N/mm² {200.0kgf/cm²}

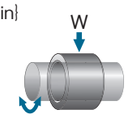
Velocity : 0.007m/s {0.42m/min}

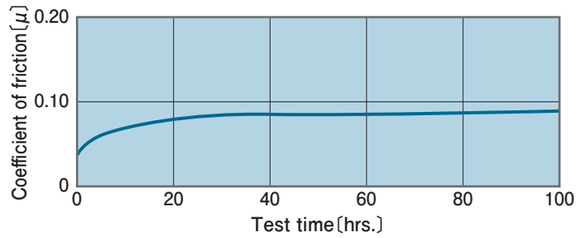
Oscillating cycle : 10cpm

Oscillating angle : ±35°

Test time : 100hrs.

Lubrication : grease is applied at assembly





Journal oscillation test

<Testing conditions>

Bearing dimension : φ125×φ140× ℓ 32

Mating material : S45C

Contact pressure : 13.4N/mm² {137.0kgf/cm²}

Velocity : 0.004m/s {0.24m/min}

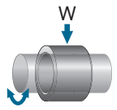
Oscillating cycle : 6cpm

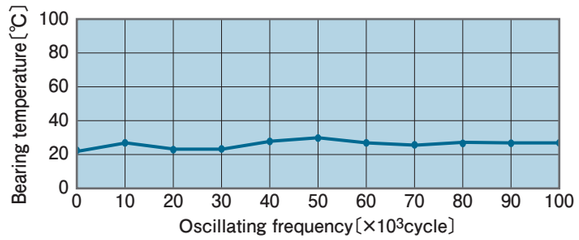
Oscillating angle : 18°

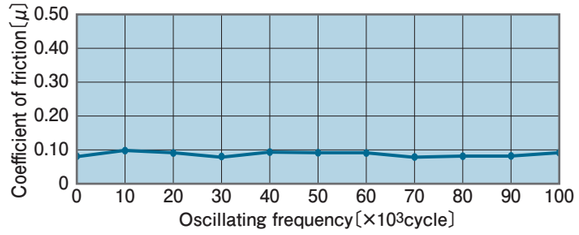
Oscillating frequency : 100,000cycle

Test time : 278hrs.

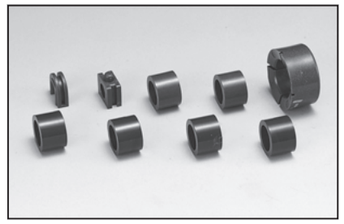
Lubrication : grease is applied at assembly







Oiles 88 Oil-impregnated polyester bearings



RoHS2 ELV Lead Free

Feature

- Serviceable without the need for lubrication.
- Features low coefficient of friction and superior impact resistance.
- Features superior vibration-proof and soundproof characteristics.
- Injection-molded and can be made in complicated shapes. Has good mass productivity.

Service range	88-02	88-71
Lubrication condition	Dry	
Service temperature range ℃	−40～+140	−40～+140
Allowable max. pressure P N/mm² {kgf/cm²}	14.5 {148}	17.5 {179}
Allowable max. velocity V m/s {m/min}	0.85 {51}	0.85 {51}
Allowable max. PV value N/mm²・m/s {kgf/cm²・m/min}	2.45 {1,500}	2.45 {1,500}

Mechanical properties			88-02	88-71
Specific gravity	ASTM D 792	——	1.35	1.20
Tensile strength	ASTM D 638	N/mm² {kgf/cm²}	37.3 {380}	55.4 {565}
Tensile elongation at break	ASTM D 638	%	30	30
Flexural property	ASTM D 790	N/mm² {kgf/cm²}	57.8 {590}	79.9 {815}
Flexural modulus	ASTM D 790	N/mm² {kgf/cm²}	1,760 {18,000}	2,160 {22,000}
Compressive stress 1% deformation	ASTM D 695	N/mm² {kgf/cm²}	13.7 {140}	22.1 {225}
Compressive stress 10% deformation			49.0 {500}	86.8 {885}
Hardness	ASTM D 785	HRM	52	80
Izod impact strength (with notch)	ASTM D 256	J/m {kgfcm/cm}	49.0 {5.0}	118 {12.0}
Co-efficient of linear expansion	ASTM D 696	×10⁻⁵ ℃⁻¹	6～12	6
Deflection temperature under load 1.82 MPa	ASTM D 648	℃	56	——
Melting point	DSC	℃	224	220
UL incombustibility	UL94	File No.E78113	HB	——

※The values shown above are typical values, not the standard values.

88-02 Test data

Thrust test

<Testing conditions>

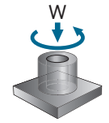
Mating material : S45C (surface roughness Rz3μm)

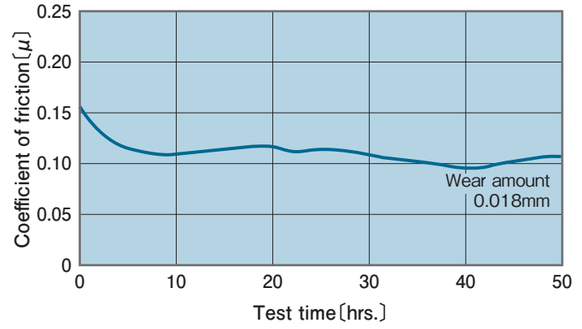
Pressure : 5.88N/mm² {60.0kgf/cm²}

Velocity : 0.083m/s {5.0m/min}

Test time : 50hrs.

Lubrication : dry





Journal oscillation test

<Testing conditions>

Mating material : FCD500 (surface roughness Rz1.5μm)

Pressure : 14.7N/mm² {150.0kgf/cm²}

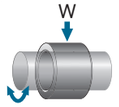
Velocity : 0.028m/s {1.67m/min}

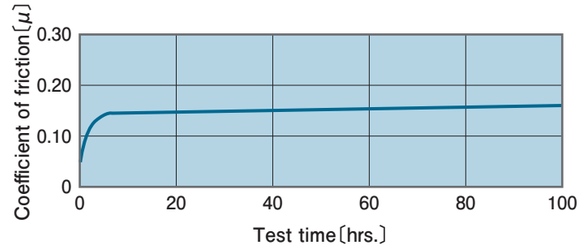
Oscillating cycle : 60cpm

Oscillting angle : ±20°

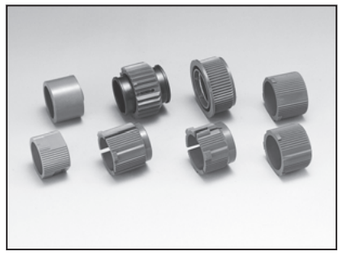
Test time : 100hrs.

Lubrication : grease is applied at assembly





Oiles 88 Elastomer Polyester elastomer

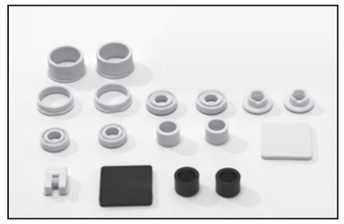


Feature

- Among thermo-plastic elastomer, the Oiles 88 elastomer features superior high temperature characteristics and is applicable to wide temperature range from low to high temperatures.
- Has superior wear resistance. Demonstrates outstanding resistance against abrasive wear caused by dust and coarse mating surface, in particular.
- Has rubber elasticity and flexibility, superior impact resistance, and large noise suppressing and vibration-proof effects.
- Features superior oil resistance, chemical resistance and aging resistance among elastomer type flexible plastic.

Mechanical properties			88-91
Specific gravity	ASTM D 792	——	1.22
Tensile strength	ASTM D 638	N/mm² {kgf/cm²}	33.3 {340}
Tensile elongation at break	ASTM D 638	%	400
Tear strength	ASTM D 6301	N/mm² {kgf/cm²}	15.7 {160}
Hardness	ASTM D 2240	Shore D	57
VICAT softeninig point	ASTM D 1525	℃	190
Melting point	DSC	℃	212

Oiles 88-03 PBT bearings with fillers



RoHS2 ELV Lead Free

Best suited for aluminum shaft bearings!!

Feature

- Serviceable without the need for lubrication.
- Soft metal (such as aluminum) may be used as mating shafts.
- Features higher heat resistance than PE, POM, etc.
- Injection-molded and can be made in complicated shapes. Has good mass productivity.

Service range

Lubrication condition	Dry
Service temperature range ℃	−40～+120
Allowable max. pressure P N/mm² {kgf/cm²}	9.81 {100}
Allowable max. velocity V m/s {m/min}	1.67 {100}
Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min}	0.327 {200}

※Soft metal such as aluminum alloy can be used as a mating shaft.

Mechanical properties

Specific gravity	ASTM D 792	——	1.27
Tensile strength	ASTM D 638	MPa {kgf/cm²}	49.6 {505.8}
Tensile elongation at break	ASTM D 638	%	4.2
Flexural property	ASTM D 790	MPa {kgf/cm²}	79.9 {814.8}
Flexural modulus	ASTM D 790	MPa {kgf/cm²}	2,578 {26,288}
Compressive stress 1% deformation Compressive stress 10% deformation	ASTM D 695	MPa {kgf/cm²}	22.8 {232.5} 71.8 {732.2}
Modulus of compressive elasticity	ASTM D 695	MPa {kgf/cm²}	2,175 {22,179}
Hardness	ASTM D 785	HRM	72.5
Izod impact strength (with notch)	ASTM D 256	J/m {kgfcm/cm}	27.7 {2.8}
Water absorption rate	ASTM D 570	%	0.05
Deflection temperature under load 1.82 MPa	ASTM D 648	℃	68
Co-efficient of linear expansion	ASTM D 696	×10⁻⁵ ℃⁻¹	10～17
UL incombustibility	UL94	File No.E78113	HB

※The values shown above are typical values, not the standard values.

88-03 Test data

Journal rotation test

<Testing conditions>

Bearing dimension : φ10×φ14×ℓ10

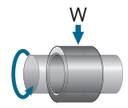
Mating material : aluminum alloy (A5056)

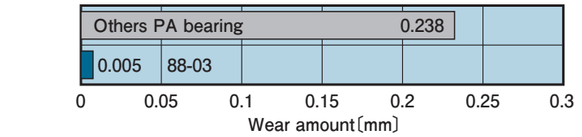
Pressure : 0.98N/mm² {10kgf/cm²}

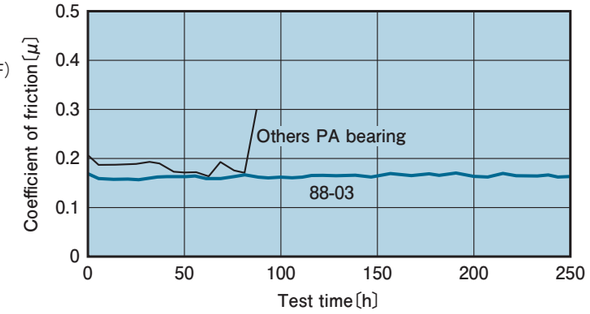
Velocity : 0.25m/s {15m/min}

Test time : 200h (intermittent, 12s ON and 1s OFF)

Lubrication : dry







Journal bearing rotation test

<Testing conditions>

Bearing dimension : φ10×φ14×ℓ10

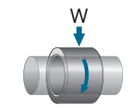
Mating material : aluminum alloy
(A5056 surface roughness Ra0.6μm)

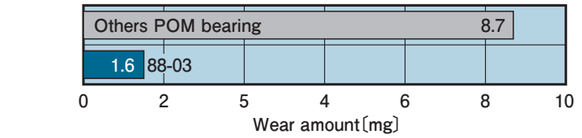
Pressure : 0.98N/mm² {10kgf/cm²}

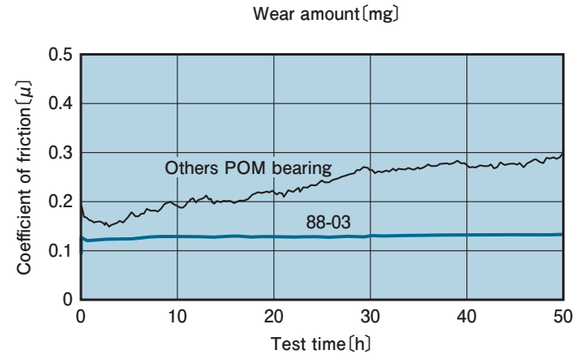
Velocity : 0.17m/s {10m/min}

Test time : 50h

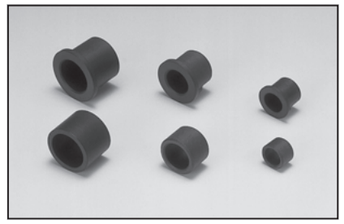
Lubrication : dry







Oiles Glitron F PTFE bearings with fillers



RoHS2 ELV Lead Free

Feature

- Serviceable without the need for lubrication completely.
- Features low static coefficient of friction when starting and causes no stick slips in operation.
- Features wear resistance and maintains low coefficient of friction under high-speed conditions.
- Applicable to wide temperature ranges from low to high temperatures.
- Has superior chemical resistance.
- Soft metal (such as aluminum) may be used as mating shafts.
- Has superior cutting and machining characteristics.
- Standard products and materials for machining are available in various sizes.

Service range

Lubrication condition	Dry
Service temperature range ℃	−200～+200
Allowable max. pressure P N/mm² {kgf/cm²}	7.0 {71}
Allowable max. velocity V m/s {m/min}	1.65 {99}
Allowable max. PV value N/mm²・m/s {kgf/cm²・m/min}	1.00 {612}

Mechanical properties

Specific gravity	ASTM D 792	——	2.25
Tensile strength	ASTM D 638	N/mm² {kgf/cm²}	13.1 {134}
Tensile elongation at break	ASTM D 638	%	150
Compressive stress 1% deformation	ASTM D 695	N/mm² {kgf/cm²}	10.5 {107}
Compressive stress 10% deformation	ASTM D 695	N/mm² {kgf/cm²}	23.0 {235}
Hardness	ASTM D 785	HRR	25
Co-efficient of linear expansion	ASTM D 696	×10⁻⁵ ℃⁻¹	9～11
Deflection temperature under load 0.45 MPa	ASTM D 648	℃	254
Deflection temperature under load 1.82 MPa	ASTM D 648	℃	96
Melting point	DSC	℃	327
Volume resistivity	ASTM D 257	Ωm {Ω・cm}	3.04 (3.04×10²)
Surface resistivity	ASTM D 257	Ω	8.35×10²

※The values shown above are typical values, not the standard values.

Lathe turning

Cutting tool	carbide tool (JIS)	
	Relief angle	5～10°
	Rake angle	10～20°
	Nose radius (mm)	0.20～0.40
Condition	Speed (m/min)	100～250
	Cut depth (mm)	0.10～0.50
	Feed (mm/rev)	0.05～0.20

Attention should be paid to dimensional variances due to thermal expansion, chucking, and bend of the material.

※Contact us for grinding and milling information.

Machining accuracy (bushing)

I.D.	O.D.	Length
class 8 to 9	class 7 to 8	class 9 to 10

Classes here are in JIS standard.

This product demonstrates satisfactory performance at the slide surface roughness of Rz6.3 to 12.5μm.

Dimensions may change due to thermal expansion, chucking pressure, moisture absorption deformation, etc. High accuracy is ensured if the product is installed on the housing and then ground.

Test data

Journal rotation test

<Testing conditions>

Bearing dimension : φ10×φ14×ℓ10

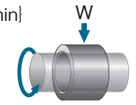
Mating material : SUS303
(surface roughness Rz1.2μm)

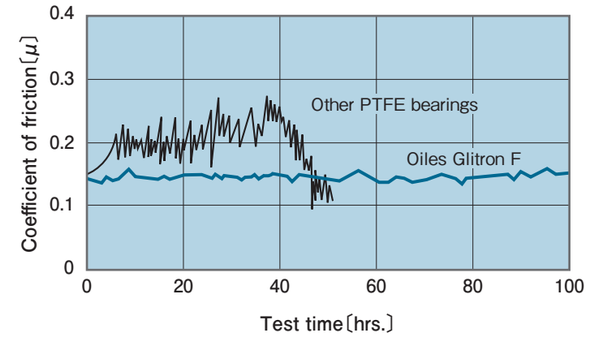
Pressure : 1.96N/mm² {20.0kgf/cm²}

Velocity : 0.500m/s {30.0m/min}

Test time : 100hrs.

Lubrication : dry





Journal rotation test

<Testing conditions>

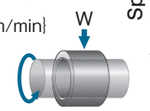
Bearing dimension : φ10×φ14×ℓ10

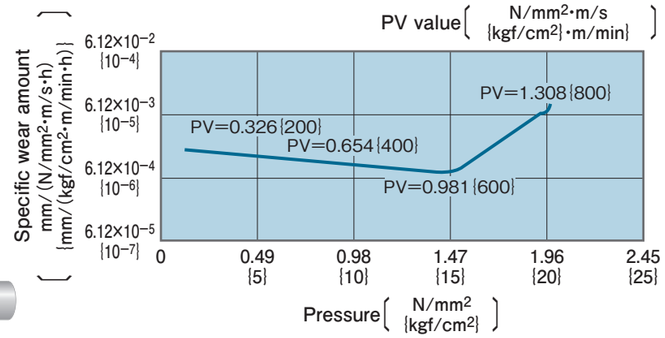
Mating material : SUS303
(surface roughness Rz1.2μm)

Pressue : 0.49 to 1.96N/mm²
{5.0 to 20.0kgf/cm²}

Velocity : 0.667m/s {40.0m/min}

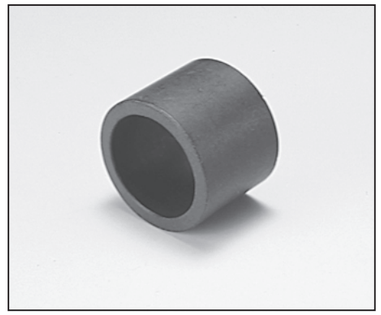
Lubrication : dry





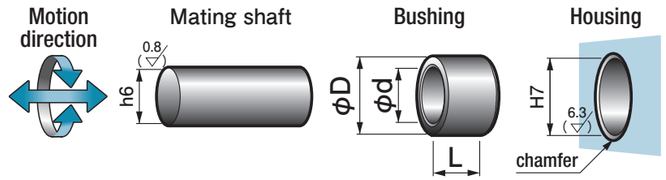
77B Oiles Glitron F Bushings

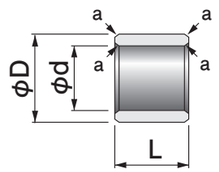
RoHS2 ELV Lead Free



Specify Part No. by required I.D. and length.
(e.g.) I.D. is 9mm and length is 10mm.

77B - 0910
Part No.





a: Chamfering (mm)

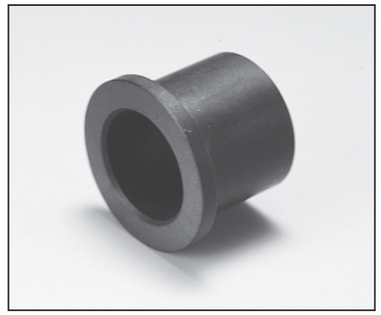
φd	~6	~18	~50
a	C0.3	C0.5	C0.8

I.D.		O.D.		Length L Tolerance $^{0}_{-0.25}$											I.D. tolerance after press fitting (reference)
φd	Tolerance	φD	Tolerance	3	5	6	8	10	15	20	25	30	40	50	
3	$^{+0.183}_{+0.133}$	6	$^{+0.09}_{+0.04}$	0303	0305										$^{+0.124}_{+0.074}$
4	$^{+0.183}_{+0.133}$	7	$^{+0.09}_{+0.04}$		0405	0406	0408								$^{+0.126}_{+0.076}$
5	$^{+0.183}_{+0.133}$	8	$^{+0.09}_{+0.04}$		0505	0506	0508	0510							$^{+0.126}_{+0.076}$
6	$^{+0.186}_{+0.136}$	9	$^{+0.09}_{+0.04}$		0605	0606	0608	0610							$^{+0.129}_{+0.079}$
7	$^{+0.198}_{+0.148}$	11	$^{+0.10}_{+0.05}$				0708								$^{+0.132}_{+0.082}$
8	$^{+0.202}_{+0.152}$	12	$^{+0.10}_{+0.05}$				0808	0810	0815						$^{+0.136}_{+0.086}$
9	$^{+0.205}_{+0.155}$	13	$^{+0.10}_{+0.05}$					0910							$^{+0.139}_{+0.089}$
10	$^{+0.215}_{+0.165}$	14	$^{+0.10}_{+0.05}$				1008	1010	1015						$^{+0.149}_{+0.099}$
12	$^{+0.218}_{+0.168}$	16	$^{+0.10}_{+0.05}$					1210	1215	1220					$^{+0.152}_{+0.102}$
15	$^{+0.240}_{+0.170}$	21	$^{+0.10}_{+0.05}$					1510	1515	1520					$^{+0.176}_{+0.106}$
16	$^{+0.240}_{+0.170}$	22	$^{+0.10}_{+0.05}$						1615	1620	1625				$^{+0.176}_{+0.106}$
17	$^{+0.250}_{+0.180}$	23	$^{+0.10}_{+0.05}$						1715						$^{+0.186}_{+0.116}$
18	$^{+0.250}_{+0.180}$	24	$^{+0.10}_{+0.05}$						1815	1820					$^{+0.186}_{+0.116}$
20	$^{+0.310}_{+0.190}$	26	$^{+0.11}_{+0.06}$						2015	2020	2025	2030			$^{+0.236}_{+0.116}$
25	$^{+0.310}_{+0.190}$	31	$^{+0.11}_{+0.06}$							2520	2525	2530			$^{+0.238}_{+0.118}$
30	$^{+0.310}_{+0.190}$	36	$^{+0.11}_{+0.06}$							3020	3025	3030			$^{+0.238}_{+0.118}$
40	$^{+0.340}_{+0.200}$	48	$^{+0.11}_{+0.06}$									4030	4040		$^{+0.268}_{+0.128}$
50	$^{+0.350}_{+0.210}$	60	$^{+0.11}_{+0.06}$										5040	5050	$^{+0.280}_{+0.140}$

⚠ The dimensional tolerances are the values measured at +25℃.

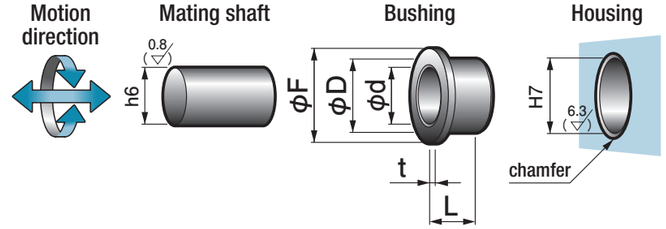
77F Oiles Glitron F Flange Bushings

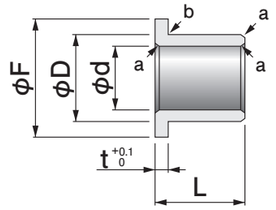
RoHS2 ELV Lead Free



Specify Part No. by required I.D. and length.
(e.g.) I.D. is 9mm and length is 10mm.

77F - 0910
Part No.





a: Chamfering (mm)

φd	~6	~18	~50
a	C0.3	C0.5	C0.8
b	R0.2		

I.D.		O.D.		Flange		Length L Tolerance $^{0}_{-0.25}$										I.D. tolerance after press fitting (reference)
φd	Tolerance	φD	Tolerance	φF	t	5	6	8	10	15	20	25	30	40	50	
3	$^{+0.183}_{+0.133}$	6	$^{+0.09}_{+0.04}$	9	1.5	0305										$^{+0.124}_{+0.074}$
4	$^{+0.183}_{+0.133}$	7	$^{+0.09}_{+0.04}$	9	1.5		0406	0408								$^{+0.126}_{+0.076}$
5	$^{+0.183}_{+0.133}$	8	$^{+0.09}_{+0.04}$	11	1.5		0506	0508	0510							$^{+0.126}_{+0.076}$
6	$^{+0.186}_{+0.136}$	9	$^{+0.09}_{+0.04}$	12	1.5		0606	0608	0610							$^{+0.129}_{+0.079}$
7	$^{+0.198}_{+0.148}$	11	$^{+0.10}_{+0.05}$	15	2.0				0710							$^{+0.132}_{+0.082}$
8	$^{+0.202}_{+0.152}$	12	$^{+0.10}_{+0.05}$	16	2.0		0806	0808	0810	0815						$^{+0.136}_{+0.086}$
9	$^{+0.205}_{+0.155}$	13	$^{+0.10}_{+0.05}$	17	2.0				0910							$^{+0.139}_{+0.089}$
10	$^{+0.215}_{+0.165}$	14	$^{+0.10}_{+0.05}$	18	2.0			1008	1010	1015						$^{+0.149}_{+0.099}$
12	$^{+0.218}_{+0.168}$	16	$^{+0.10}_{+0.05}$	20	2.0				1210	1215	1220					$^{+0.152}_{+0.102}$
15	$^{+0.240}_{+0.170}$	21	$^{+0.10}_{+0.05}$	27	3.0				1510	1515	1520					$^{+0.176}_{+0.106}$
16	$^{+0.240}_{+0.170}$	22	$^{+0.10}_{+0.05}$	28	3.0				1610	1615	1620	1625				$^{+0.176}_{+0.106}$
17	$^{+0.250}_{+0.180}$	23	$^{+0.10}_{+0.05}$	29	3.0						1720					$^{+0.186}_{+0.116}$
18	$^{+0.250}_{+0.180}$	24	$^{+0.10}_{+0.05}$	30	3.0					1815	1820					$^{+0.186}_{+0.116}$
20	$^{+0.310}_{+0.190}$	26	$^{+0.11}_{+0.06}$	32	3.0					2015	2020	2025				$^{+0.236}_{+0.116}$
25	$^{+0.310}_{+0.190}$	31	$^{+0.11}_{+0.06}$	37	3.0						2520	2525	2530			$^{+0.238}_{+0.118}$
30	$^{+0.310}_{+0.190}$	36	$^{+0.11}_{+0.06}$	42	3.0						3020		3030			$^{+0.238}_{+0.118}$
40	$^{+0.340}_{+0.200}$	48	$^{+0.11}_{+0.06}$	56	4.0								4030	4040		$^{+0.268}_{+0.128}$
50	$^{+0.350}_{+0.210}$	60	$^{+0.11}_{+0.06}$	70	5.0									5040	5050	$^{+0.280}_{+0.140}$

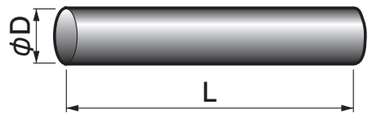
⚠ The dimensional tolerances are the values measured at +25℃.

77M Oiles Glitron F Bar Stock

RoHS2 ELV Lead Free

Specify Part No. by required diameter.
(e.g.) Diameter is 28.8mm.

77M - 28
Part No.



Part No.	Diameter		Length
	ϕD	Tolerance	L
77M-5	5	+1.5 +0.5	500
77M-7	7	+1.0 +0.3	500
77M-9	9.6	+2.0 0	500
77M-12	12.5	+2.0 0	500
77M-14	14.4	+2.0 0	500
77M-16	16.3	+2.0 0	500
77M-19	19.2	+2.0 0	500
77M-24	24	+2.0 0	500
77M-28	28.8	+2.0 0	500

Part No.	Diameter		Length
	ϕD	Tolerance	L
77M-33	33.6	+2.0 0	500
77M-38	38.4	+4.0 0	500
77M-49	49	+4.0 0	100
77M-58	58	+2.0 0	100
77M-68	68	+2.0 0	100
77M-82	82	+2.0 −0.5	100
77M-88	88	+2.0 0	100
77M-98	98	+2.0 0	100

77SH Oiles Glitron F Skiving Sheet

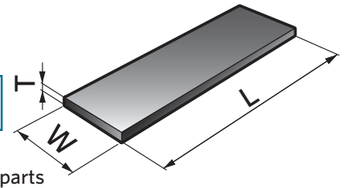
RoHS2 ELV Lead Free

Custom-made product

Specify Part No. by required width and thickness. Custom-made product
(e.g.) Wide is 100mm, thickness is 0.3mm, and length is 3m.

77SH - 1000310
Part No.

Skiving sheet with adhesion tape is available



Applications
Washers, slide tape, other machinery parts

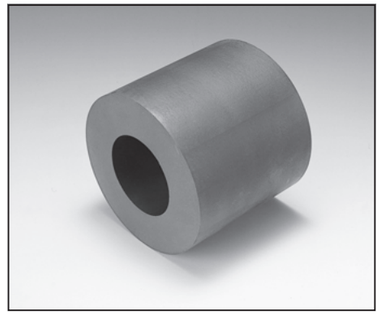
Part No.	Width		Thickness		Max. length
	W	Tolerance	T	Tolerance	L (m)
77SH-500210	50	+5 0	0.2	±0.05	10
77SH-1000310	100	+5 0	0.3	±0.05	10
77SH-150055	150	+5 0	0.5	±0.05	5
77SH-200085	200	+5 0	0.8	±0.05	5
77SH-200105	200	+5 0	1.0	±0.1	5

Part No.	Width		Thickness		Max. length
	W	Tolerance	T	Tolerance	L (m)
77SH-50121	50	+5 0	1.2	±0.1	1
77SH-100151	100	+5 0	1.5	±0.1	1
77SH-100201	100	+5 0	2.0	±0.1	1

※Unit: 1m

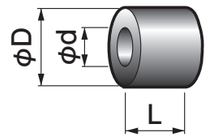
77S Oiles Glitron F Bushings

RoHS2 ELV Lead Free



Specify Part No. by required I.D. and O.D.
(e.g.) I.D. is 68mm and O.D. is 117mm.

77S - 68117
Part No.



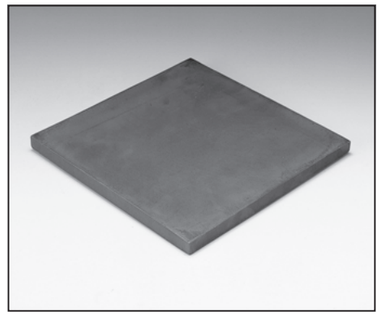
Part No.	I.D.		O.D.		Length
	ϕd	Tolerance	ϕD	Tolerance	L
77S-1120	11	0 −1.0	20	+2.0 0	500
77S-1933	19	0 −1.0	33	+2.0 0	500
77S-1940	19	0 −1.0	40	+2.0 0	500

〈Thick type〉

Part No.	I.D.		O.D.		Length
	ϕd	Tolerance	ϕD	Tolerance	L
77S-58118	58	+1.0 0	118	+2 0	100
77S-68117	68	0 −1.0	117	+2 0	100
77S-78156	78	+1.0 0	156	+2 0	100

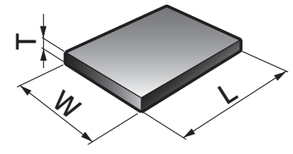
77P Oiles Glitron F Plate Material

RoHS2 ELV Lead Free



Specify Part No. by required width and thickness.
(e.g.) Wide is 200mm and thickness is 6mm.

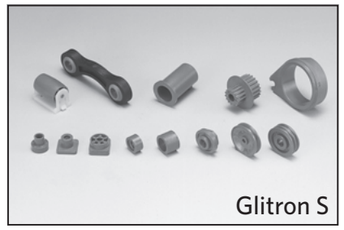
77P - 2006
Part No.



Part No.	Width		Thickness		Length
	W	Tolerance	T	Tolerance	L
77P-2006	200	+10.0 0	6	+2.0 0	200
77P-2011	200	+10.0 0	11	+2.0 0	200

Oiles Glitron S/SE

Polyphenylene sulfide bearings with fillers


Glitron S

Glitron SE

RoHS2 ELV (Glitron SE) Lead Free

Feature

- Serviceable completely without the need for lubrication.
- Features small difference between the static and dynamic coefficient of frictions and offers stable friction characteristics free from stick slips.
- Features low coefficient of friction and superior wear resistance.
- Applicable to wide temperature ranges from low to high temperatures.
- Has superior chemical resistance.
- Soft metal (such as aluminum) may be used as mating shafts.
- Injection-molded and has good mass productivity. Features superior dimensional stability, allowing high-precision designs.
- Has antistatic-level conductivity. [Glitron SE]
- The standard products in various sizes applicable to miniature bearings are available. [Glitron SE]

Service range	
Lubrication condition	Dry
Service temperature range ℃	−60～+200
Allowable max. pressure P N/mm² {kgf/cm²}	14.5 {148}
Allowable max. velocity V m/s {m/min}	2.50 {150}
Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min}	0.65 {398}

Mechanical properties			Glitron S	Glitron SE
Specific gravity	ASTM D 792	——	1.6	1.6
Tensile strength	ASTM D 638	N/mm² {kgf/cm²}	53.9 {550}	41.3 {421.1}
Tensile elongation at break	ASTM D 638	%	2.50	0.99
Flexural property	ASTM D 790	N/mm² {kgf/cm²}	83.3 {850}	62.9 {641.6}
Flexural modulus	ASTM D 790	N/mm² {kgf/cm²}	3,430 {35,000}	3,430 {35,000}
Compressive stress 5% deformation	ASTM D 695	N/mm² {kgf/cm²}	68.6 {700}	72.4 {739}
Hardness	ASTM D 785	HRR	110	116
Izod impact strength (with notch)	ASTM D 256	J/m {kgfcm/cm}	14.7 {1.50}	15.2 {1.55}
Co-efficient of linear expansion	ASTM D 696	$\times10^{-5}$ ℃$^{-1}$	7	7
Deflection temperature under load 1.82 MPa	ASTM D 648	℃	150	167
Melting point	DSC	℃	281	281
Volume resistivity	ASTM D 257	Ωm {Ω · cm}	——	2.4×10^{2} {2.4×10^{4}}
Surface resistivity	ASTM D 257	Ω	——	1.67×10^{5}
UL incombustibility	UL94	File No.E78113	V-0	V-0

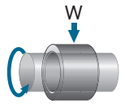
※The values shown above are typical values, not the standard values.

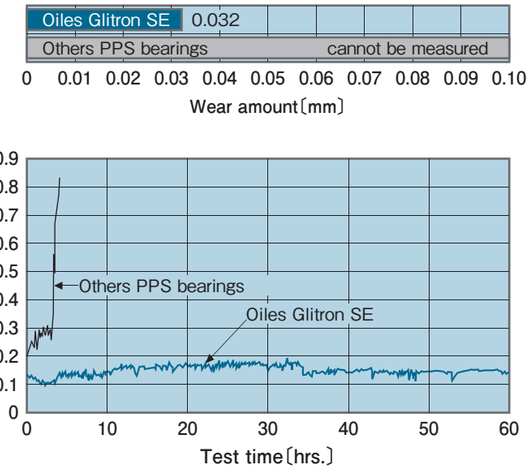
Oiles Glitron S/SE Polyphenylene sulfide bearings with fillers

Test data

Journal rotation test

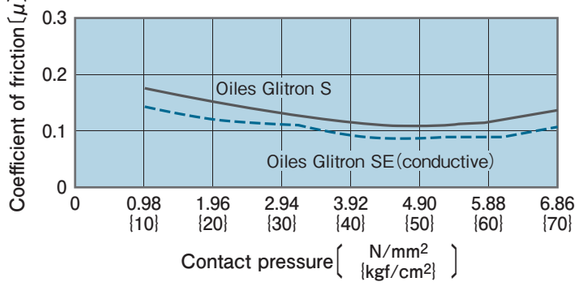
<Testing conditions>
Bearing dimension : $\phi 10 \times \phi 14 \times \ell 10$
Mating material : SUS440 (surface roughness Ra0.2μm)
Pressure : 0.245N/mm^2 {2.5kgf/cm^2}
Velocity : 1.049m/s (2,000rpm) {62.8m/min}
Test time : 60hrs.
Lubrication : dry





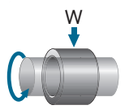
Thrust test

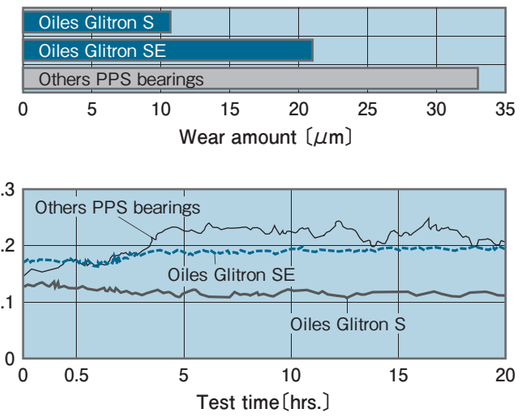
<Testing conditions>
Mating material : SUS303
(surface roughness Rz1.2μm)
Velocity : 0.167m/s {10.0m/min}
Lubrication : dry



Journal rotation test

<Testing conditions>
Mating material : SUS303
(surface roughness Rz1.2μm)
Pressure : 0.98N/mm^2 {10.0kgf/cm^2}
Velocity : 0.333m/s {20.0m/min}
Test time : 20hrs.
Lubrication : dry

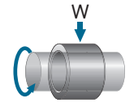


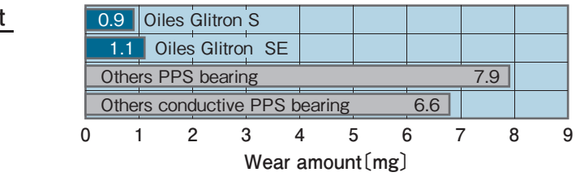


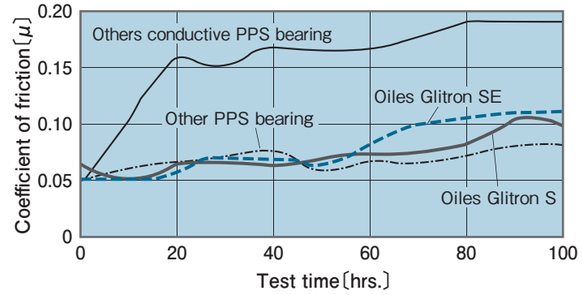
Test data

High temperature journal rotation test

<Testing conditions>
Mating material : aluminium (A5056)
Pressure : 0.98N/mm^2 {10.0kgf/cm^2}
Velocity : 0.06m/s {3.6m/min}
Atmospheric temperature : 160℃
Test time : 100hrs.
Lubrication : dry

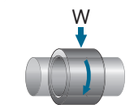


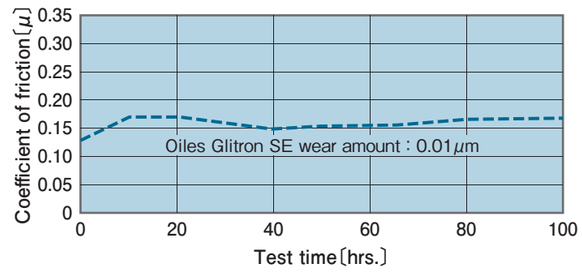




High velocity journal bearing rotation test

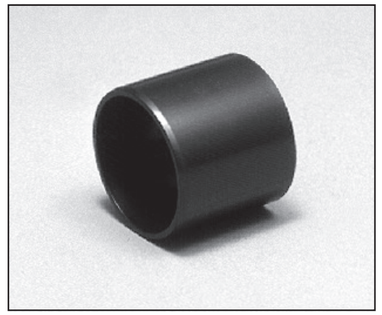
<Testing conditions>
Mating material : SUS303
(surface roughness Rz2.5μm)
Pressure : 0.49N/mm^2 {5.0kgf/cm^2}
Velocty : 0.67m/s {40.0m/min}
Test time : 100hrs.
Lubrication : dry





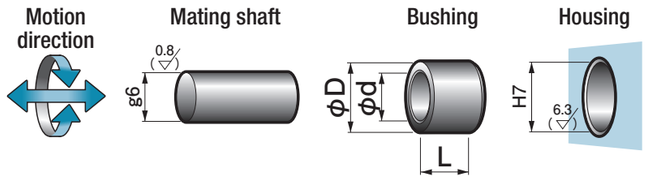
GEB Oiles Glitron SE Bushings

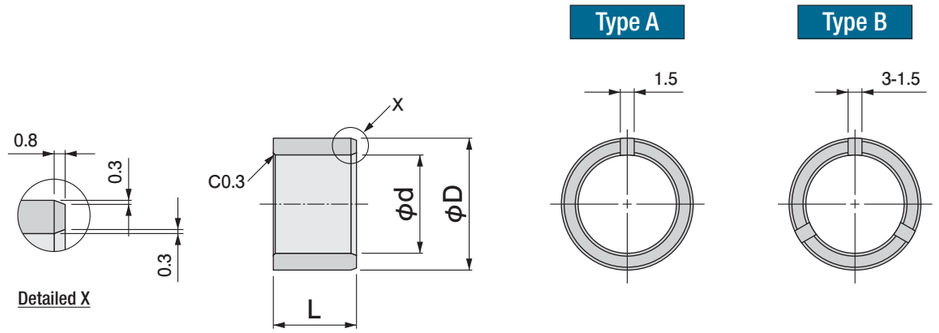
RoHS2 ELV Lead Free



Specify Part No. by required I.D., O.D. and Length.
(e.g.) I.D. is 10mm, O.D. is 14mm, and length is 10mm.

GEB - 1010
Part No.





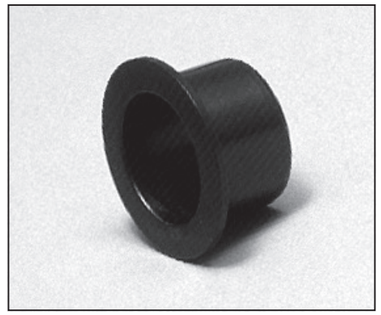
Part No.	I.D.※		O.D.		Length		Type
	ϕd	Tolerance	ϕD	Tolerance	L	Tolerance	
GEB-0305	3	+0.070 +0.040	6	+0.052 +0.012	5	0 −0.10	A
GEB-0405	4	+0.070 +0.040	7	+0.055 +0.015	5	0 −0.10	A
GEB-0505	5	+0.070 +0.040	8	+0.055 +0.015	5	0 −0.10	A
GEB-0605	6	+0.070 +0.040	9	+0.055 +0.015	5	0 −0.10	A
GEB-0808	8	+0.075 +0.040	12	+0.068 +0.018	8	0 −0.10	A
GEB-1010	10	+0.095 +0.060	14	+0.068 +0.018	10	0 −0.10	A
GEB-1210	12	+0.100 +0.060	16	+0.068 +0.018	10	0 −0.10	A
GEB-1515	15	+0.100 +0.060	19	+0.068 +0.018	15	0 −0.15	B
GEB-1615	16	+0.100 +0.060	20	+0.071 +0.021	15	0 −0.15	B
GEB-2020	20	+0.110 +0.060	25	+0.081 +0.021	20	0 −0.15	B
GEB-2525	25	+0.110 +0.060	30	+0.081 +0.021	25	0 −0.15	B
GEB-3030	30	+0.130 +0.060	35	+0.095 +0.025	30	0 −0.20	B

※The inner diameter tolerances are the values after pressing into a ring gauge of ϕD ±0.002.

⚠ The dimensional tolerances are the values measured at +25℃.

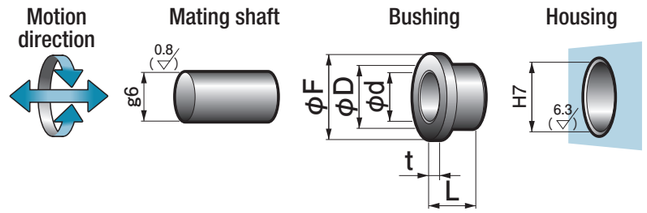
GEF Oiles Glitron SE Flange Bushings

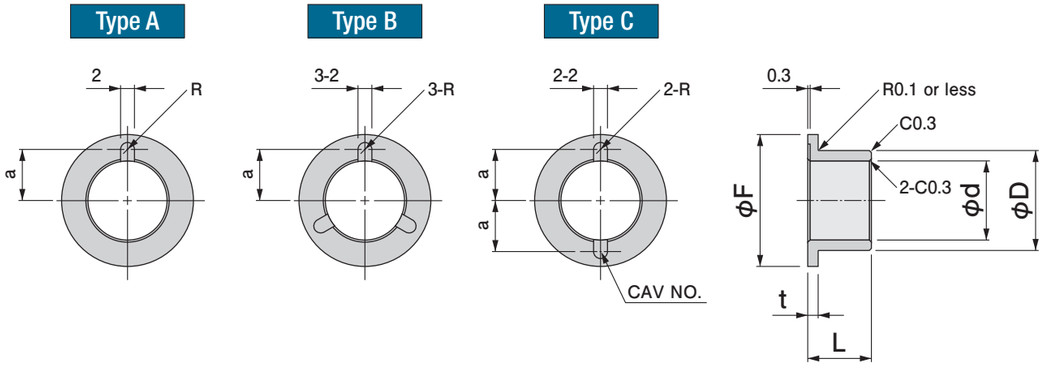
RoHS2 ELV Lead Free



Specify Part No. by required I.D., O.D. and Length.
(e.g.) I.D. is 10mm, O.D. is 14mm, and length is 8mm.

GEF - 1008
Part No.





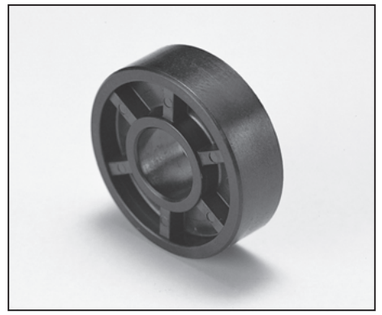
Part No.	I.D.※		O.D.		Length		Flange				Type	a
	ϕd	Tolerance	ϕD	Tolerance	L	Tolerance	ϕF	Tolerance	t	Tolerance		
GEF-0304	3	+0.070 +0.040	6	+0.052 +0.012	4	0 −0.10	9	0 −0.10	1.5	0 −0.10	A	3.0
GEF-0404	4	+0.070 +0.040	7	+0.055 +0.015	4	0 −0.10	10	0 −0.10	1.5	0 −0.10	A	3.5
GEF-0505	5	+0.070 +0.040	8	+0.055 +0.015	5	0 −0.10	11	0 −0.10	1.5	0 −0.10	A	4.0
GEF-0605	6	+0.070 +0.040	9	+0.055 +0.015	5	0 −0.10	12	0 −0.10	1.5	0 −0.10	C	4.5
GEF-0806	8	+0.075 +0.040	12	+0.068 +0.018	6	0 −0.10	16	0 −0.10	2.0	0 −0.10	A	5.5
GEF-1008	10	+0.095 +0.060	14	+0.068 +0.018	8	0 −0.10	18	0 −0.10	2.0	0 −0.10	A	6.5
GEF-1208	12	+0.100 +0.060	16	+0.068 +0.018	8	0 −0.10	20	0 −0.10	2.0	0 −0.10	B	7.5
GEF-1510	15	+0.100 +0.060	19	+0.068 +0.018	10	0 −0.10	23	0 −0.10	2.0	0 −0.10	B	9.0
GEF-1610	16	+0.100 +0.060	20	+0.071 +0.021	10	0 −0.10	24	0 −0.10	2.0	0 −0.10	B	9.5
GEF-2012	20	+0.110 +0.060	25	+0.081 +0.021	12	0 −0.15	30	0 −0.15	2.5	0 −0.15	B	11.5
GEF-2515	25	+0.110 +0.060	30	+0.081 +0.021	15	0 −0.15	35	0 −0.20	2.5	0 −0.15	B	14.0
GEF-3020	30	+0.130 +0.060	35	+0.095 +0.025	20	0 −0.20	40	0 −0.20	2.5	0 −0.15	B	16.5

※The inner diameter tolerances are the values after pressing into a ring gauge of ϕD ±0.002.

⚠ The dimensional tolerances are the values measured at +25℃.

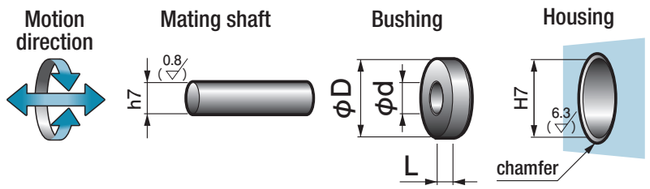
GSB Oiles Glitron SE Bushings

RoHS2 ELV Lead Free

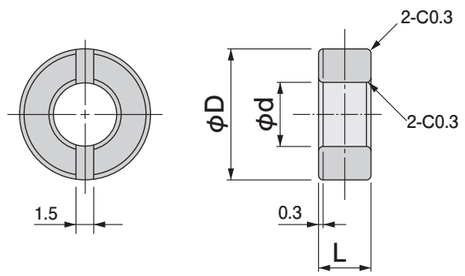


Specify Part No. by required I.D., O.D. and Length.
(e.g.) I.D. is 5mm, O.D. is 10mm, and length is 4mm.

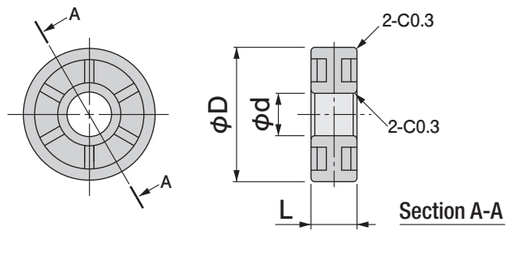
GSB - 051004
Part No.



Type A



Type B



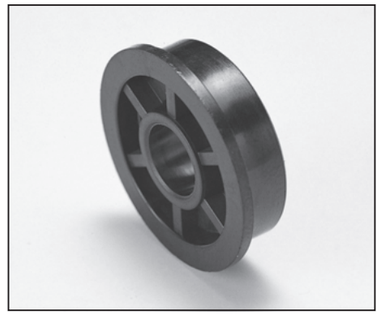
Part No.	I.D.		O.D.		Length		Allowable revolution s^{-1} {rpm}	Allowable load N {kgf}	Type	Ball bearing part code
	ϕd	Tolerance	ϕD	Tolerance	L	Tolerance				
GSB-031004	3	+0.09 +0.04	10	+0.05 0	4	0 −0.1	71.67 {4,300}	12 {1.2}	A	623
GSB-040803	4	+0.09 +0.04	8	+0.05 0	3	0 −0.1	53.33 {3,200}	12 {1.2}	A	—
GSB-041004	4	+0.09 +0.04	10	+0.05 0	4	0 −0.1	53.33 {3,200}	16 {1.6}	A	—
GSB-041104	4	+0.09 +0.04	11	+0.05 0	4	0 −0.1	53.33 {3,200}	16 {1.6}	A	694
GSB-041204	4	+0.09 +0.04	12	+0.05 0	4	0 −0.1	53.33 {3,200}	16 {1.6}	B	604
GSB-051004	5	+0.09 +0.04	10	+0.05 0	4	0 −0.1	41.67 {2,500}	20 {2.0}	A	—
GSB-051105	5	+0.09 +0.04	11	+0.05 0	5	0 −0.1	41.67 {2,500}	25 {2.6}	A	685
GSB-051405	5	+0.09 +0.04	14	+0.05 0	5	0 −0.1	41.67 {2,500}	25 {2.6}	B	605
GSB-051605	5	+0.09 +0.04	16	+0.05 0	5	0 −0.1	41.67 {2,500}	25 {2.6}	B	625
GSB-061003	6	+0.09 +0.04	10	+0.05 0	3	0 −0.1	35.00 {2,100}	18 {1.8}	A	676
GSB-061204	6	+0.09 +0.04	12	+0.05 0	4	0 −0.1	35.00 {2,100}	24 {2.4}	A	—
GSB-061305	6	+0.09 +0.04	13	+0.05 0	5	0 −0.1	35.00 {2,100}	29 {3.0}	A	686
GSB-061505	6	+0.09 +0.04	15	+0.05 0	5	0 −0.1	35.00 {2,100}	29 {3.0}	B	696
GSB-081235	8	+0.09 +0.04	12	+0.05 0	3.5	0 −0.1	26.67 {1,600}	27 {2.8}	A	678
GSB-081404	8	+0.09 +0.04	14	+0.05 0	4	0 −0.1	26.67 {1,600}	31 {3.2}	A	—
GSB-081605	8	+0.09 +0.04	16	+0.05 0	5	0 −0.1	26.67 {1,600}	39 {4.0}	B	—
GSB-082207	8	+0.09 +0.04	22	+0.05 0	7	0 −0.1	26.67 {1,600}	55 {5.6}	B	608

※Products with precision I.D. tolerances are available on order.

⚠ The dimensional tolerances are the values measured at +25℃.

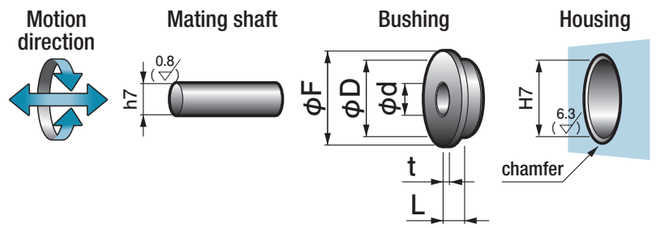
GSF Oiles Glitron SE Flange Bushings

RoHS2 ELV Lead Free

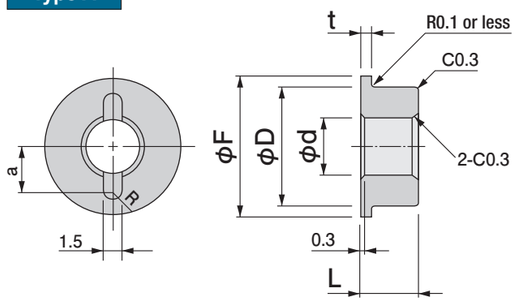


Specify Part No. by required I.D., O.D. and Length.
(e.g.) I.D. is 5mm, O.D. is 10mm, and length is 4mm.

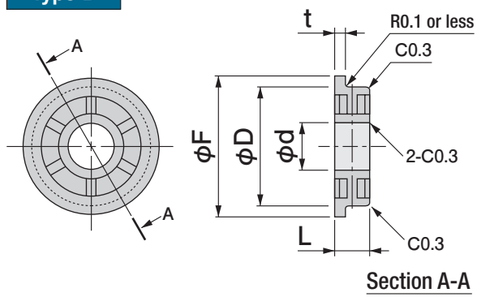
GSF - 051004
Part No.



Type A



Type B

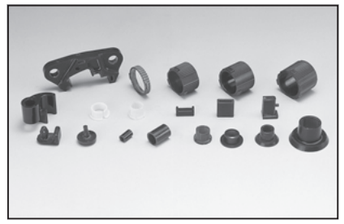


Part No.	I.D.		O.D.		Length		Flange			a	Allowable revolution s^{-1} {rpm}	Allowable load N {kgf}	Type	Ball bearing part code
	ϕd	Tolerance	ϕD	Tolerance	L	Tolerance	ϕF	t	Tolerance					
GSF-040803	4	+0.09 +0.04	8	+0.05 0	3	0 −0.1	9.2	0.6	0 −0.1	2.8	53.33 {3,200}	12 {1.2}	A	—
GSF-040904	4	+0.09 +0.04	9	+0.05 0	4	0 −0.1	10.3	1.0	0 −0.1	3.0	53.33 {3,200}	16 {1.6}	A	684
GSF-041104	4	+0.09 +0.04	11	+0.05 0	4	0 −0.1	12.5	1.0	0 −0.1	—	53.33 {3,200}	16 {1.6}	A	694
GSF-041204	4	+0.09 +0.04	12	+0.05 0	4	0 −0.1	13.5	1.0	0 −0.1	—	53.33 {3,200}	16 {1.6}	B	604
GSF-051004	5	+0.09 +0.04	10	+0.05 0	4	0 −0.1	11.6	0.8	0 −0.1	3.5	41.67 {2,500}	20 {2.0}	A	—
GSF-051105	5	+0.09 +0.04	11	+0.05 0	5	0 −0.1	12.5	1.0	0 −0.1	4.0	41.67 {2,500}	25 {2.6}	A	685
GSF-051304	5	+0.09 +0.04	13	+0.05 0	4	0 −0.1	15.0	1.0	0 −0.1	—	41.67 {2,500}	20 {2.0}	B	695
GSF-061003	6	+0.09 +0.04	10	+0.05 0	3	0 −0.1	11.2	0.6	0 −0.1	3.8	35.00 {2,100}	18 {1.8}	A	—
GSF-061204	6	+0.09 +0.04	12	+0.05 0	4	0 −0.1	13.6	0.8	0 −0.1	4.6	35.00 {2,100}	24 {2.4}	A	—
GSF-061305	6	+0.09 +0.04	13	+0.05 0	5	0 −0.1	15.0	1.1	0 −0.1	—	35.00 {2,100}	29 {3.0}	A	686
GSF-061505	6	+0.09 +0.04	15	+0.05 0	5	0 −0.1	17.0	1.2	0 −0.1	—	35.00 {2,100}	29 {3.0}	B	696
GSF-081235	8	+0.09 +0.04	12	+0.05 0	3.5	0 −0.1	13.6	0.8	0 −0.1	5.0	26.67 {1,600}	27 {2.8}	A	678
GSF-081404	8	+0.09 +0.04	14	+0.05 0	4	0 −0.1	15.6	0.8	0 −0.1	5.6	26.67 {1,600}	31 {3.2}	A	—
GSF-081605	8	+0.09 +0.04	16	+0.05 0	5	0 −0.1	18.0	1.0	0 −0.1	—	26.67 {1,600}	39 {4.0}	B	688
GSF-082207	8	+0.09 +0.04	22	+0.05 0	7	0 −0.1	25.0	1.5	0 −0.1	—	26.67 {1,600}	55 {5.6}	B	608

※Products with precision I.D. tolerances are available on order.

⚠ The dimensional tolerances are the values measured at +25℃.

Oiles 50 Polyurethane bearings



RoHS2 ELV Lead Free

Feature

- Has superior wear resistance. Demonstrates outstanding resistance against abrasive wear caused by dust and coarse mating surface, in particular.
- Has rubber elasticity and flexibility, superior impact resistance, and large vibration-proof and noise suppressing effects.
- Has superior cold resistance, weather resistance and ozone resistance.
- Injection-molded and can be made in complicated shapes.

Types of Oiles 50

Series	Type	Kind	Hardness (Note) HDA	Hardness (Note) HDD	Heat resistant temp.	Characteristics
P1000	Adipate Type Polyurethane Elastomer	P1085	85	——	80℃	• Light load • Impact resistance
		P1090	90	——		
		P1095	95	46		
		P1098	98	53		
P5000	Caprolactone Type Polyurethane Elastomer	P5085	85	——	80℃	• Light to mid load • Water reisitance • Heat resistance
		P5090	90	——		
		P5095	95	46		
		P5098	98	53		
P5000D		P5059D	——	59	100℃	• Heavy load • Water reisitance • Heat resistance
		P5064D	——	64		
		P5068D	——	68		
		P5074D	——	74		

(Note) hardness : JIS K 7215durometer hardness
HDA-type A durometer hardness
HDD-type D durometer hardness

OILES 50 P1000 series

Mechanical properties			P1085	P1090	P1095	P1098
Specific gravity	JIS K 7311	——	1.21	1.22	1.22	1.23
Tensile strength	JIS K 7311	N/mm² {kgf/cm²}	43.1 {440}	43.1 {440}	45.1 {460}	45.1 {460}
Tensile elongtion at break	JIS K 7311	%	610	600	550	550
Tear strength	JIS K 7311	N/mm {kgf/cm}	113 {115}	127 {130}	147 {150}	157 {160}
VICAT softening point	JIS K 7206	℃	110	118	122	125

※The values shown above are typical values, not the standard values.

OILES 50 P5000 series

Mechanical properties			P5085	P5090	P5095	P5098
Specific gravity	JIS K 7311	——	1.17	1.18	1.18	1.19
Tensile strength	JIS K 7311	N/mm² {kgf/cm²}	44.1 {450}	46.1 {470}	47.1 {480}	49.0 {500}
Tensile elongtion at break	JIS K 7311	%	550	500	500	500
Tear strength	JIS K 7311	N/mm {kgf/cm}	118 {120}	137 {140}	147 {150}	157 {160}
VICAT softening point	JIS K 7206	℃	116	130	131	141

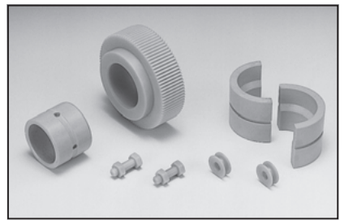
※The values shown above are typical values, not the standard values.

OILES 50 P5000D series

Mechanical properties			P5059D	P5064D	P5068D	P5074D
Specific gravity	JIS K 7311	——	1.20	1.21	1.23	1.23
Tensile strength	JIS K 7311	N/mm² {kgf/cm²}	49.0 {500}	51.0 {520}	52.0 {530}	52.0 {530}
Tensile elongtion at break	JIS K 7311	%	450	400	350	350
Tear strength	JIS K 7311	N/mm {kgf/cm}	177 {181}	206 {210}	235 {240}	275 {281}
VICAT softening point	JIS K 7206	℃	143	145	147	151

※The values shown above are typical values, not the standard values.

Oiles Aramid M/F1 Aromatic polyamide bearings



RoHS2 ELV Lead Free Made-to-order

Feature of Aramid M

- Has superior heat resistance and maintains mechanical characteristics even in continuous operations at high temperatures.
- Easily machinable. Has superior mechanical characteristics and electric insulation.
- Has superior performances such as radiant ray resistance, hydrolysis resistance, fire resistance, no gas production in vacuum, etc.
- The standard products in various ball shapes and materials for machining are available.

Aramid M Mechanical properties

Specific gravity	JIS K 6911	——	1.3	Compressive strength	JIS K 6911	N/mm² {kgf/cm²}	235 {2,400}
Water absorption rate	JIS K 7209	wt%	0.48 (Note 1)	Modulus of compressive elasticity	JIS K 6911	N/mm² {kgf/cm²}	3,923 {4×10⁴}
	——	%	2 (Note 2)	Hardness	JIS K 7202	HRM	123
Heat resistance	Dry furnace	——	200℃ for 20 days No Weight and dimensional changes. No bending.	Izod impact strength	ASTM D 256	J/m {kgfcm/cm}	without notch 255 {26} with notch 27.5 {2.8}
Solder dip resistance	JIS C 6481	——	270℃, 30 seconds, OK	Surface resistivity	JIS K 6911	Ω	8.9×10¹⁵
			300℃, 30 seconds, OK	Volume resistivity	JIS K 6911	Ωm {Ω・cm}	3×10¹³ {3×10¹⁵}
Co-efficient of linear expansion	——	×10⁻⁵ ℃⁻¹	3.6	Insulation breakdown	JIS K 6911 T/P thickness 1mm	kV/mm	25
Thermal conductivity	——	W/(m/k) {Cal/sec・cm℃}	12.1×10⁻³ {3.47×10⁻⁴}	Dielectric constant	JIS K 6911	——	4.5
Tensile elongation	——	%	2	Dielectric tangent	JIS K 6911	——	0.019
Tensile strength	JIS K 7161-1, -2	N/mm² {kgf/cm²}	98 {1,000}	UL incombustibility	UL94	File No.E78113	V-0
Flexural property	ASTM D 790	N/mm² {kgf/cm²}	147 {1,500}				

※The values shown above are typical values, not the standard values.
(Note 1) Weight variation rate when dipped in water for 24 hours
(Note 2) Saturated dimension variation rate in water (at the room temperature). It is 4% when the water temperature is 50℃ (122°F) or more. Dimensional variation due to water absorption should be taken into consideration when designing.

Lathe turning

Cutting tool			Condition		
carbide tool・diamond (JIS)			Speed (m/min)	60～150
Relief angle	5～10°		Cut depth (mm)	0.05～0.10
Rake angle	5～10°		Feed (mm/rev)	0.05～0.20
Nose radius (mm)	0.40～0.80			

Attention should be paid to dimensional variances due to thermal expansion, chucking, and bend of the material. Edges are subject to chipping when machining. Chamfer the edges in advance, apply patch plates, or take other proper measures.
※Contact us for grinding and milling information.

Machining accuracy (bushing)

I.D.	O.D.	Length
class 8 to 9	class 7 to 8	class 9 to 10

Classes here are in JIS standard.
This product demonstrates satisfactory performance at the slide surface roughness of Rz6.3 to 12.5μm.
Dimensions may change due to thermal expansion, chucking pressure, moisture absorption deformation, etc. High accuracy is ensured if the product is installed on the housing and then ground.

Feature of Aramid F1

- Inherits the heat resistance and high hardness from the Oiles Aramid M and features improved wear resistance and low friction characteristics necessary for bearings.
- Has superior heat resistance even in continuous operations at high temperatures.

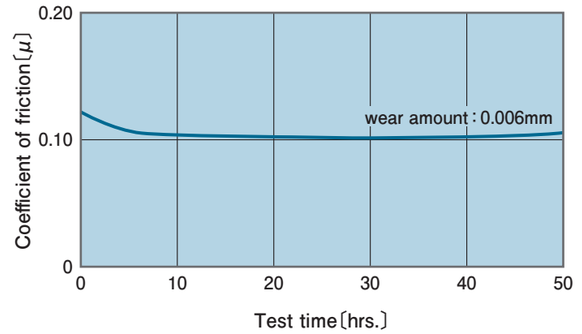
Aramid F1 Mechanical properties

Tensile strength	JIS K 7161-1, -2	N/mm² {kgf/cm²}	Room temp 86.4 {881} 100℃ 68.6 {699} 200℃ 57.3 {584}	Compressive strength	JIS K 6911	N/mm² {kgf/cm²}	207.0 {2,110.2}
				Co-efficient of linear expansion	——	×10⁻⁵ ℃⁻¹	4.4 (30～200℃)
				Hardness	JIS K 7202	HRM	115
Elongation	——	%	1.5	Izod impact strength (with notch)	ASTM D 256	J/m {kgfcm/cm}	29.4 {3.0}
Flexural property	ASTM D 256	N/mm² {kgf/cm²}	131.5 {1,341}				

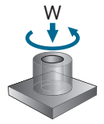
※The values shown above are typical values, not the standard values.

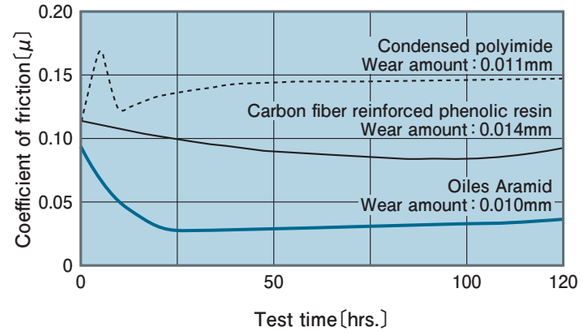
Test data

Thrust test
<Testing conditions>
Pressure : 2.94N/mm² {30kgf/cm²}
Velocity : 0.033m/s {2m/min}
Test time : 50hrs.
Lubrication : Lithium grease



Thrust test
<Testing conditions>
Pressure : 2.94N/mm² {30kgf/cm²}
Velocity : 0.033m/s {2m/min}
Test time : 120hrs.
Lubrication : Turbine oil

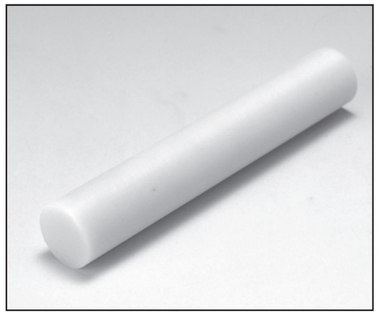




※The Oiles Aramid M shows superior sliding performances in lubricated conditions.

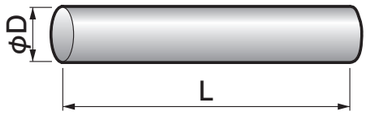
AMM Oiles Aramid M Bar Stock

RoHS2 ELV Lead Free



Specify Part No. by required diameter.
(e.g.) Diameter is 20mm.

AMM - 20
Part No.

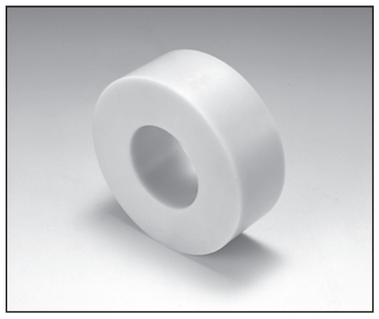


Part No.	Diameter		Length
	ϕD	Tolerance	L
AMM-08	8	+2.5 0	100
AMM-10	10	+2.5 0	100
AMM-15	15	+2.5 0	100

Part No.	Diameter		Length
	ϕD	Tolerance	L
AMM-20	20	+2.5 0	200
AMM-30	30	+2.5 0	200
AMM-40	40	+2.5 0	200
AMM-50	50	+2.5 0	200
AMM-60	60	+2.5 0	200

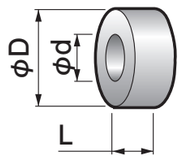
AMS Oiles Aramid M Bushings

RoHS2 ELV Lead Free



Specify Part No. by required I.D. and O.D.
(e.g.) I.D. is 20mm and O.D. is 60mm.

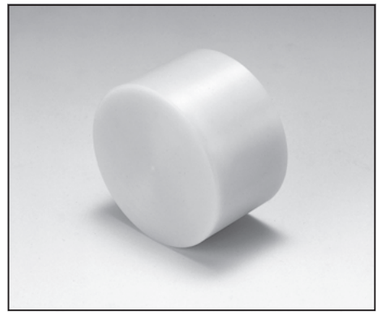
AMS - 2060
Part No.



Part No.	I.D.		O.D.		Length
	ϕd	Tolerance	ϕD	Tolerance	L
AMS-1030	10	−1.0 −3.0	30	+3.0 +1.0	35
AMS-2060	20	−1.0 −3.0	60	+3.0 +1.0	35
AMS-50100	50	−1.0 −3.0	100	+3.0 +1.0	35
AMS-100160	100	−1.0 −3.0	160	+3.0 +1.0	35

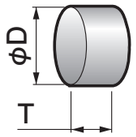
AMD Oiles Aramid M Discs

RoHS2 ELV Lead Free



Specify Part No. by required diameter.
(e.g.) Diameter is 60mm.

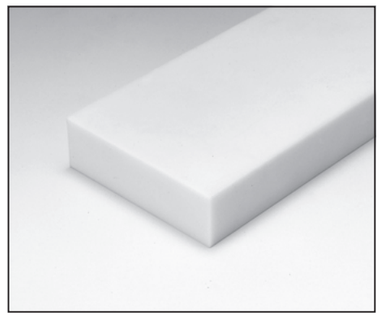
AMD - 60
Part No.



Part No.	Diameter		Length
	ϕD	Tolerance	T
AMD-30	30	+3.0 +1.0	35
AMD-60	60	+3.0 +1.0	35
AMD-100	100	+3.0 +1.0	35
AMD-160	160	+3.0 +1.0	35

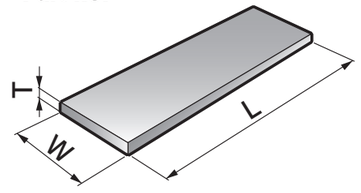
AMP Oiles Aramid M Plate Material

RoHS2 ELV Lead Free



Specify Part No. by required width, length and thickness.
(e.g.) With is 100mm, length is 200mm, and thickness is 20mm.

AMP - 10020020
Part No.



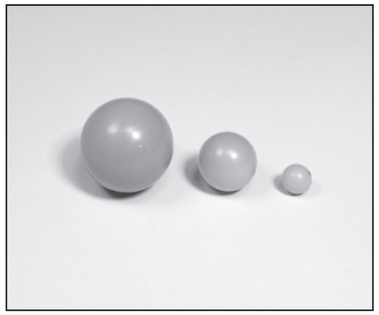
Part No.	Width		Length		Thickness	
	W	Tolerance	L	Tolerance	T	Tolerance
AMP-10010010	100	+5.0 +1.0	100	+5.0 +1.0	10	+3.0 +1.0
AMP-10010015	100	+5.0 +1.0	100	+5.0 +1.0	15	+3.0 +1.0
AMP-10020015	100	+5.0 +1.0	200	+5.0 +1.0	15	+3.0 +1.0
AMP-10020020	100	+5.0 +1.0	200	+5.0 +1.0	20	+3.0 +1.0
AMP-10020030	100	+5.0 +1.0	200	+5.0 +1.0	30	+3.0 +1.0

※Maximum thickness is 60mm for the width of 100 and 200mm types.

Part No.	Width		Length		Thickness	
	W	Tolerance	L	Tolerance	T	Tolerance
AMP-20020020	200	+5.0 +1.0	200	+ 5.0 + 1.0	20	+3.0 +1.0
AMP-20020030	200	+5.0 +1.0	200	+ 5.0 + 1.0	30	+3.0 +1.0
AMP-12030020	120	+5.0 +1.0	300	+15.0 + 5.0	20	+3.0 +1.0
AMP-12030030	120	+5.0 +1.0	300	+15.0 + 5.0	30	+3.0 +1.0

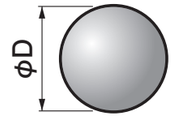
ABG Oiles Aramid M Balls

RoHS2 ELV Lead Free



Specify Part No. by required size.
(e.g.) Diameter is 5.556mm (7/32 in).

ABG - 55
Part No.

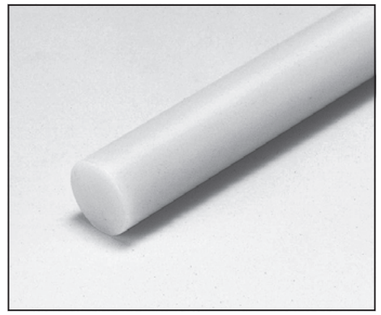


Part No.	Diameter ϕD				Sphericity
	inch	mm	Tolerance	Lot diameter variation (max)	max
ABG-31	1/8	3.175	±50μm	10μm	5μm
ABG-39	5/32	3.969	±50μm	10μm	5μm
ABG-55	7/32	5.556	±50μm	10μm	5μm
ABG-71	9/32	7.144	±50μm	15μm	7μm
ABG-95	3/8	9.525	±50μm	15μm	7μm
ABG-127	1/2	12.700	±50μm	15μm	7μm

⚠ The dimensional tolerances are the values measured at +25℃.

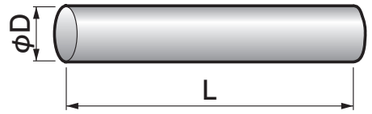
AF1M Oiles Aramid F1 Bar Stock

RoHS2 ELV Lead Free



Specify Part No. by required diameter.
(e.g.) Diameter is 20mm.

AF1M - 20
Part No.

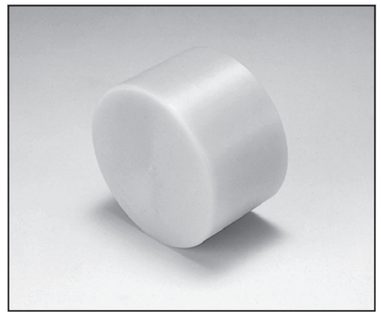


Part No.	Diameter		Length
	ϕD	Tolerance	L
AF1M-08	8	+2.5 0	100
AF1M-10	10	+2.5 0	100
AF1M-15	15	+2.5 0	100

Part No.	Diameter		Length
	ϕD	Tolerance	L
AF1M-20	20	+2.5 0	200
AF1M-30	30	+2.5 0	200
AF1M-40	40	+2.5 0	200
AF1M-50	50	+2.5 0	200
AF1M-60	60	+2.5 0	200

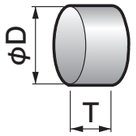
AF1D Oiles Aramid F1 Discs

RoHS2 ELV Lead Free



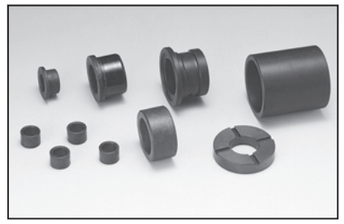
Specify Part No. by required diameter.
(e.g.) Diameter is 100mm.

AF1D - 100
Part No.



Part No.	Diameter		Thickness
	ϕD	Tolerance	T
AF1D-100	100	+3.0 +1.0	35
AF1D-160	160	+3.0 +1.0	35

Oiles 250 Phenolic bearings



RoHS2 ELV Lead Free

Feature

- Reduces the frequency of lubrication.
- Maintains oil film, resulting in improved wear resistance.
- Has superior foreign matter immersion characteristics, impact resistance, and noise suppressing characteristics.
- Has superior chemical resistance and corrosion resistance.
- Materials for machining are also available.

Service range

Lubrication condition	Periodic lubrication	Oil lubrication
Service temperature range ℃	−40～+100	
Allowable max. pressure P N/mm² {kgf/cm²}	20 {204}	
Allowable max. velocity V m/s {m/min}	3.35 {201}	15.00 {900}
Allowable max. PV value N/mm²・m/s {kgf/cm²・m/min}	2.45 {1,500}	3.25 {1,990}

Condition: in atmosphere, bushing, shaft rotation.

Lathe turning

Cutting tool			Condition		
	carbide tool (JIS)・diamond (JIS)			Speed (m/min)	60～150
	Relief angle	5～10°		Cut depth (mm)	0.05～0.10
	Rake angle	5～10°		Feed (mm/rev)	0.05～0.20
	Nose radius (mm)	0.40～0.80			

Attention should be paid to dimensional variances due to thermal expansion, chucking, and bend of the material.
※Contact us for grinding and milling information.

Machining accuracy (bushing)

I.D.	O.D.	Length
class 8 to 9	class 7 to 8	class 9 to 10

Classes here are in JIS standard.

This product demonstrates satisfactory performance at the slide surface roughness of Rz6.3 to 12.5μm.

Dimensions may change due to thermal expansion, chucking pressure, moisture absorption deformation, etc. High accuracy is ensured if the product is installed on the housing and then ground.

Mechanical properties

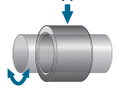
Mechanical properties			250-03	250-06	250-07	250-17
Specific gravity	JIS K 6911	——	1.3～1.4	1.3～1.4	1.3～1.4	1.3～1.4
Tensile strength	JIS K 6911	N/mm² {kgf/mm²}	45 {4.6}	50 {5.1}	110 {11.2}	95 {9.7}
Flexural property	JIS K 6911	N/mm² {kgf/mm²}	70 {7.1}	100 {10.2}	110 {11.2}	105 {10.7}
Compressive strength	JIS K 6911	N/mm² {kgf/mm²}	124 {12.7}	——	195 {19.9}	——
Radial crushing strength	JIS Z 2507	N/mm² {kgf/mm²}	50 {5.1}	124 {12.7}	175 {17.9}	165 {16.8}
Hardness	JIS K 6911	HRM	91	60	95	100
Izod impact strength (with notch)	JIS K 6911	J/m {kgf·cm/cm}	78.5 {8}	196 {20}	157 {16}	186 {19}
Co-efficient of linear expansion	ASTM D 696	×10⁻⁵ ℃⁻¹	2～3	2～3	2～3	2～3
Swelling rate	——	%	1.5 (room temperature)	——	1.5 (room temperature)	0.6 (room temperature)
	——	%	3.0 (water temperature is 50℃)	——	3.6 (water temperature is 80℃)	1.2 (water temperature is 50℃)
Shape of base material (Note)	——	——	chip and others	sheet	sheet	sheet

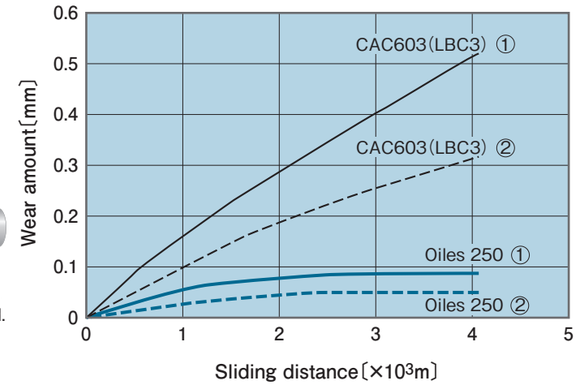
※The values shown above are typical values, not the standard values.
(Note) Shape of base material→chip and others : Shape of base material→sheet
When chip-shaped base material is used, the tensile strength, compression strength and impact strength are measured at right angles to the forming direction and the bending strength is measured in parallel with the forming direction. When sheet-shaped base material is used, the bending strength, compression strength and impact strength are measured at right angles to the layers and the tensile strength is measured in parallel with the layers.

Test data

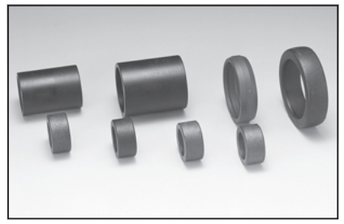
Effect of foreign matter (casting sand)

<Testing conditions>
Bearing dimension : φ40×φ50×ℓ30
Mating material : S45C quenched
(45HRC、surface roughness Rz3μm)
Pressure : 19.6N/mm² {200.0kgf/cm²}
Velocity : 0.014m/s {0.84m/min}
Oscillating cycle : 60cpm
Oscillating angle : ±10°
Lubrication : ① 1.8 gram lithium grease blended with 5% foreign particle is applied.
② Lithium grease 1.8 gram is applied.





Oiles 425 Phenolic bearings for underwater applications



RoHS2 ELV Lead Free

Certified according to NIPPON KAIJI KYOKAI as the material of Nonmetallic rudder bearing.

Feature

- Has superior wear resistance.
- Has superior foreign matter immersion characteristics, impact resistance, and noise suppressing characteristics.
- Has superior chemical resistance, and corrosion resistance.
- Usable in water or chemicals.
- The 250 material for machining may be used. Contact us about the handling methods.

Service range

Lubrication condition	underwater
Service temperature range ℃	room temperature
Allowable max. pressure **P** N/mm² {kgf/cm²}	15 {153}
Allowable max. velocity **V** m/s {m/min}	15 {900}
Allowable max. **PV** value N/mm²・m/s {kgf/cm²・m/min}	4.90 {3,000}

Condition: underwater, bushing, shaft rotation.
※Contact us about the handling besides normal temperatures.

Lathe turning

Cutting tool	carbide tool (JIS)・diamond (JIS)		Condition	Speed (m/min)	60～150
	Relief angle	5～10°		Cut depth (mm)	0.05～0.10
	Rake angle	5～10°		Feed (mm/rev)	0.05～0.20
	Nose radius (mm)	0.40～0.80			

Attention should be paid to dimensional variances due to thermal expansion, chucking, and bend of the material.
※When used in water, fitting must be design considering swelling characteristic. Please add swelling correction value at page 349-350,when you set a fitting.
※Contact us for grinding and milling information.

Machining accuracy (bushing)

I.D.	O.D.	Length
class 8 to 9	class 7 to 8	class 9 to 10

Classes here are in JIS standard.

This product demonstrates satisfactory performance at the slide surface roughness of Rz6.3 to 12.5μm.

Dimensions may change due to thermal expansion, chucking pressure, moisture absorption deformation, etc. High accuracy is ensured if the product is installed on the housing and then ground.

Mechanical properties

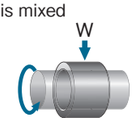
			425-03	425-06	425-07	425-17
Specific gravity	JIS K 6911	——	1.3～1.4	1.3～1.4	1.3～1.4	1.3～1.4
Tensile strength	JIS K 6911	N/mm² {kgf/mm²}	45 {4.6}	50 {5.1}	110 {11.2}	95 {9.7}
Flexural property	JIS K 6911	N/mm² {kgf/mm²}	70 {7.1}	100 {10.2}	110 {11.2}	105 {10.7}
Compressive strength	JIS K 6911	N/mm² {kgf/mm²}	124 {12.7}	——	195 {19.9}	——
Radial crushing strength	JIS Z 2507	N/mm² {kgf/mm²}	50 {5.1}	124 {12.7}	175 {17.9}	165 {16.8}
Hardness	JIS K 6911	HRM	91	60	95	100
Izod impact strength (with notch)	JIS K 6911	J/m {kgf·cm/cm}	78.5 {8}	196 {20}	157 {16}	186 {19}
Co-efficient of linear expansion	ASTM D 696	×10⁻⁵ ℃⁻¹	2～3	2～3	2～3	2～3
Swelling rate	—— ——	% %	1.5 (room temperature) 3.0 (water temperature is 50℃)	—— ——	1.5 (room temperature) 3.6 (water temperature is 80℃)	0.6 (room temperature) 1.2 (water temperature is 50℃)
Shape of base material (Note)	——	——	chip and others	sheet	sheet	sheet

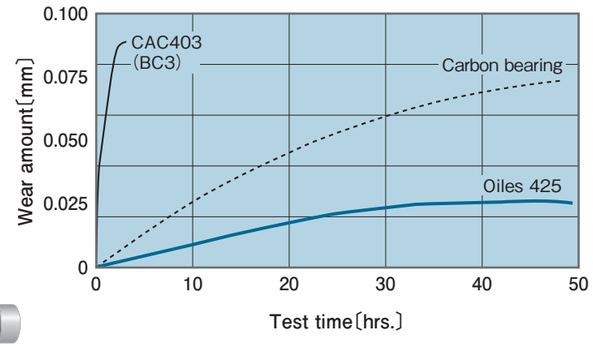
※The values shown above are typical values, not the standard values.
(Note) Shape of base material→chip and others : Shape of base material→sheet
When chip-shaped base material is used, the tensile strength, compression strength and impact strength are measured at right angles to the forming direction and the bending strength is measured in parallel with the forming direction. When sheet-shaped base material is used, the bending strength, compression strength and impact strength are measured at right angles to the layers and the tensile strength is measured in parallel with the layers.

Test data

Journal rotation test in water

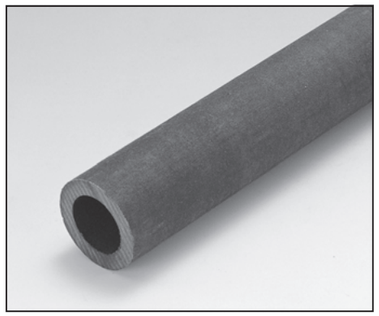
<Testing conditions>
Bearing dimension : φ120×φ150×ℓ120
Mating material : SUS420J
(surface roughness Rz3μm)
Pressure : 0.4N/mm² {4.0kgf/cm²}
Velocity : 7.5m/s {450.0m/min}
Test time : 50hrs.
Lubrication : Foundry sand 0.1wt% is mixed in tap water





25S Oiles 250-07 (425-07) Pipe Stock

RoHS2 ELV Lead Free



Specify Part No. by required I.D. and O.D.
(e.g.) I.D. is 53mm and O.D. is 74mm.

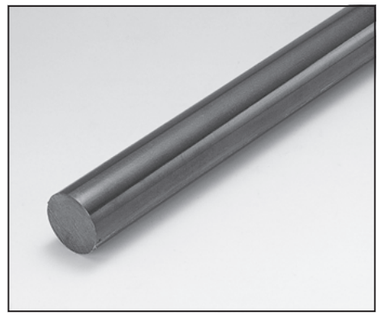
25S - 5374
Part No.

● The 250-07 pipe stock may be used as the 425-07 (for underwater use) if it is machined and processed with paraffin then.

Part No.	I.D.		O.D.		Length
	φd	Tolerance	φD	Tolerance	L
25S-1932	19	±0.3	32	+2.0 0	500
25S-2437	24	±0.3	37	+2.0 0	500
25S-2944	29	±0.3	44	+2.0 0	500
25S-3447	34	±0.3	47	+2.0 0	500
25S-3952	39	±0.3	52	+2.0 0	500
25S-3958	39	±0.3	58	+2.0 0	500
25S-4362	43	±0.3	62	+2.0 0	500
25S-4972	49	±0.3	72	+2.0 0	500
25S-5374	53	±0.5	74	+2.0 0	500
25S-5882	58	±0.5	82	+2.0 0	500
25S-6384	63	±0.5	84	+2.0 0	500
25S-6889	68	±0.5	89	+2.0 0	500
25S-7395	73	±0.5	95	+2.0 0	500
25S-78103	78	±0.5	103	+3.0 0	1,000
25S-83108	83	±0.5	108	+3.0 0	1,000
25S-88113	88	±0.5	113	+3.0 0	1,000
25S-98123	98	±0.5	123	+3.0 0	1,000
25S-103128	103	±0.5	128	+3.0 0	1,000
25S-108133	108	±0.5	133	+3.0 0	1,000
25S-118143	118	±0.5	143	+3.0 0	1,000

25M Oiles 250-07 (425-07) Bar Stock

RoHS2 ELV Lead Free



Specify Part No. by required diameter.
(e.g.) Diameter is 40mm.

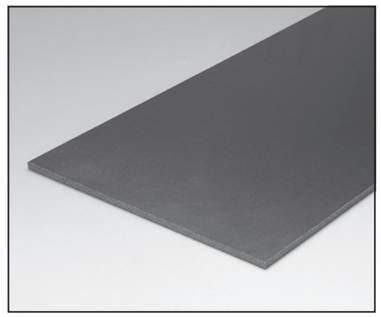
25M - 40
Part No.

● The 250-07 bar stock may be used as the 425-07 (for underwater use) if it is machined and process with paraffin then.

Part No.	Diameter		Thickness
	φD	Tolerance	L
25M-30	30	+2.0 +1.0	500
25M-40	40	+2.0 +1.0	500
25M-50	50	+2.5 +1.0	500
25M-60	60	+2.5 +1.0	500

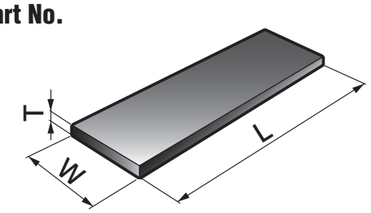
25P Oiles 250-07 (425-07) Plate Material

RoHS2 ELV Lead Free



Specify Part No. by required width and thickness.
(e.g.) Wide is 250mm, thickness is 11mm.

25P - 2511
Part No.

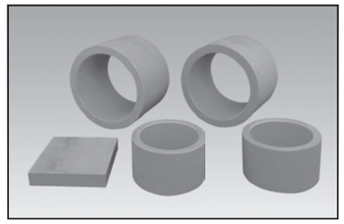


● The 250-07 plate material may be used as the 425-07 (for underwater use) if it is machined and processed with paraffin then.

Part No.	Width		Thickness		Length
	W	Tolerance	T	Tolerance	L
25P-2506	250	+10.0 + 1.0	6	+2.0 0	500
25P-2511	250	+10.0 + 1.0	11	+2.0 0	500
25P-2521	250	+10.0 + 1.0	21	+2.0 0	500

Oiles Fiberflon GH

Polyester bearings with fillers



RoHS2 ELV Lead Free

Feature

- This product can be used in air, water or seawater.
- Demonstrates superior wear resistance under micro-motion.
- Easy dimensional setting due to a low swelling rate.
- Lighter weight than metallic bearings, and easier assembly even with large diameter units.
- Also available in large diameters and plate shapes.

Service range

Lubrication condition	Dry
Service temperature range ℃	−40～+100
Allowable max. pressure P N/mm² {kgf/cm²}	49 (100) {500 (1,020)}
Allowable max. velocity V m/s {m/min}	0.15 {9}
Allowable max. PV value N/mm²・m/s {kgf/cm²・m/min}	1.2 {734}

Condition: in atmosphere, bushing, shaft rotation.
The values in parentheses are static bearing pressures, which are the bearing pressures in applications with no motion or very small motion (≦0.0017m/s).

Mechanical properties

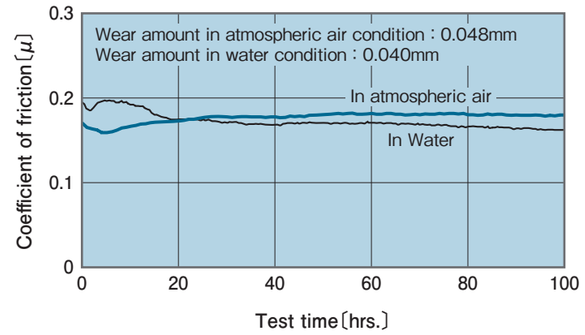
Specific gravity	JIS K 6911	—	1.3	Hardness (Note 2)	JIS K 6911	HRM	90
Tensile strength (Note 1)	JIS K 6911	N/mm²	125	Izod impact strength (Note 2)	JIS K 6911	J/m	1,200
Flexural property (Note 2)	JIS K 6911	N/mm²	95	Co-efficient of linear expansion (Note 2)	ASTM D 696	×10⁻⁵ ℃⁻¹	6-9
Compressive strength (Note 2)	JIS K 6911	N/mm²	300	Swelling rate (Note 2)	—	%	0.3

※The values shown above are typical values, not the standard values.
(Note 1) Measurements are taken in a direction parallel to the bearing layer.
(Note 2) Measurements are taken in a direction perpendicular to the bearing layer.

Test data

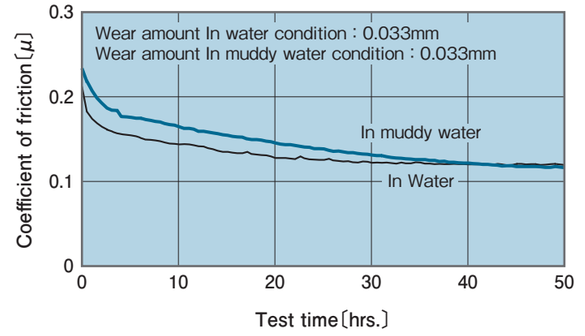
Journal oscillation test

<Testing conditions>
Environment : In atmospheric air, In water
Bearing dimension : $\phi 60 \times \phi 75 \times \ell 50$
Mating material : SUS403
Pressure : 24.5N/mm²
Velocity : 0.008m/s
Oscillating angle : ±2°
Oscillating cycle : 120cpm
Test time : 100hr
Lubrication : dry



Journal oscillation test

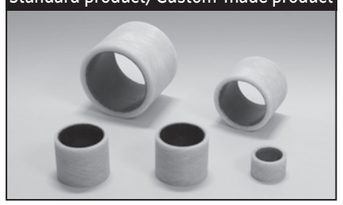
<Testing conditions>
Environment : In water, In muddy water
Bearing dimension : $\phi 60 \times \phi 75 \times \ell 50$
Mating material : SUS403
Pressure : 24.5N/mm²
Velocity : 0.008m/s
Oscillating angle : ±2°
Oscillating cycle : 120cpm
Test time : 50hr
Lubrication : dry



Oiles Fiberflon FW

Multi-layer polytetrafluoroethylene plastic bearings

Standard product/Custom-made product



RoHS2 ELV Lead Free

Feature

- Serviceable without the need for lubrication. Offers superior performance under high-load, low-speed conditions.
- Tolerates abrasive friction conditions. Also usable under fretting sliding conditions.
- Has superior chemical resistance.
- The standard products are available in various sizes.

Service range

Lubrication condition	Dry
Service temperature range ℃	−40～+120
Allowable max. pressure P N/mm² {kgf/cm²}	100 {1,020}
Allowable max. velocity V m/s {m/min}	0.15 {9}
Allowable max. PV value N/mm²・m/s {kgf/cm²・m/min}	1.20 {734}

Condition: in atmosphere, bushing, shaft rotation.

Mechanical properties

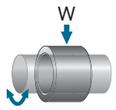
Specific gravity	JIS K 6911	——	1.37～1.38	Hardness	JIS K 6911	HRM 80
Tensile strength	JIS K 6911	N/mm² {kgf/mm²}	340 {34.7}	Izod impact strength (with notch)	JIS K 6911	J/m {kgf⁻cm/cm} 93.2 {9.5}
Compressive strength	JIS K 6911	N/mm² {kgf/mm²}	255 {26.0}			
Radial crushing strength	JIS Z 2507	N/mm² {kgf/mm²}	165 {16.8}	Co-efficient of linear expansion	ASTM D 696	×10⁻⁵ ℃⁻¹ 2～4

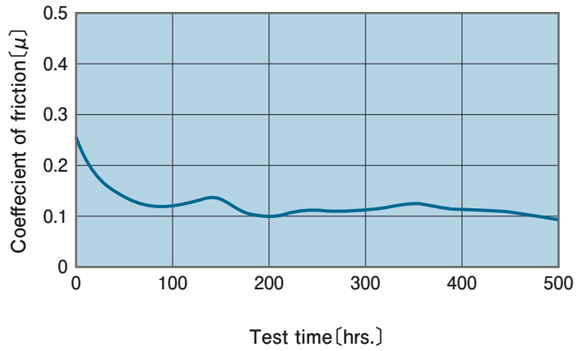
※The values shown above are typical values, not the standard values.

Test data

Journal oscillation test

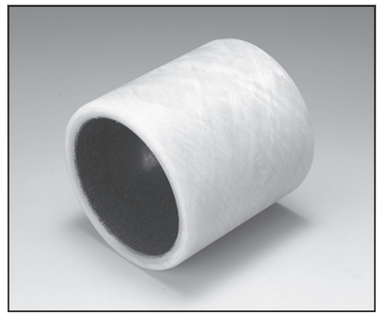
<Testing conditions>
Bearing dimension : φ60×φ75×ℓ25
Mating material : S45C(220HBW)
Pressure : 49.0N/mm²{500.0kgf/cm²}
Velocity : 0.0078m/s{0.47m/min}
Oscillating cycle : 5cpm
Oscillating angle : ±45°
Test time : 500hrs.
Lubrication : dry





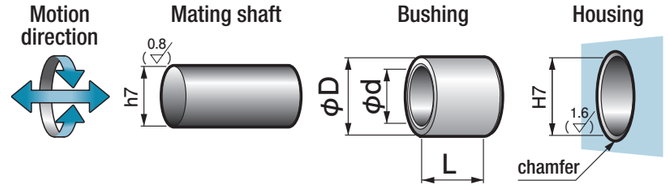
FFB Oiles Fiberflon FW Bushings

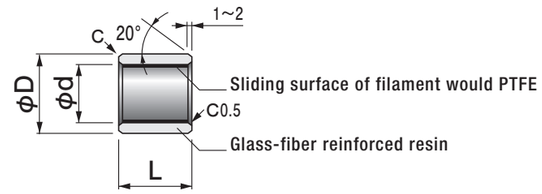
RoHS2 ELV Lead Free



Specify Part No. by required I.D., O.D. and Length.
(e.g.) I.D. is 50mm, O.D. is 60mm, and length is 50mm.

FFB - 506050
Part No.





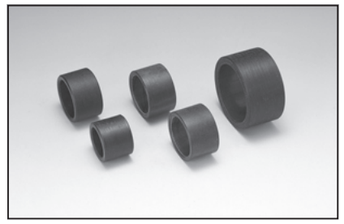
I.D.		O.D.		Length L Tolerance $^{0}_{-0.3}$								I.D. tolerance after press fitting (reference)
φd	Tolerance	φD	Tolerance	20	25	30	40	50	60	70	80	
20	+0.162 +0.110	28	+0.073 +0.040	202820		202830						+0.114 +0.062
25	+0.162 +0.110	35	+0.084 +0.045		253525	253530						+0.108 +0.056
30	+0.162 +0.110	40	+0.084 +0.045		304025	304030						+0.108 +0.056
35	+0.192 +0.120	45	+0.084 +0.045			354530	354540					+0.138 +0.066
40	+0.192 +0.120	50	+0.084 +0.045			405030	405040	405050				+0.138 +0.066
45	+0.192 +0.120	55	+0.096 +0.050				455540					+0.132 +0.060
50	+0.192 +0.120	60	+0.096 +0.050			506030	506040	506050	506060			+0.132 +0.060
60	+0.224 +0.140	75	+0.096 +0.050						607560	607570		+0.164 +0.080
70	+0.224 +0.140	85	+0.114 +0.060						708560	708570		+0.155 +0.071
80	+0.224 +0.140	100	+0.114 +0.060								8010080	+0.155 +0.071

※The I.D. tolerance after press fitting is for reference only.

⚠ The dimensional tolerances are the values measured at +25℃.

Oiles Fiberflon TR

Multi-layer polytetrafluoroethylene plastic bearings



RoHS2 ELV Lead Free

Feature

- Serviceable without the need for lubrication. Has superior wear resistance.
- Demonstrates the low coefficient of friction of the PTFE plastic as is.
- Offers superior performance under high-load, low-speed conditions.
- The sliding surface is made of cross-woven fabric hardened firmly with plastic to improve cold flow, disadvantage of PTFE, remarkably.
- Has superior heat, cold and chemical resistance.
- Backing materials are selectable according to applications.
- May be used in water and seawater.

Service range

Lubrication condition	Dry
Service temperature range ℃	−40～+120
Allowable max. pressure P N/mm² {kgf/cm²}	100 {1,020}
Allowable max. velocity V m/s {m/min}	0.15 {9}
Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min}	1.20 {734}

Condition: in atmosphere, bushing, shaft rotation.

Mechanical properties

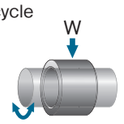
Specific gravity	JIS K 6911	——	1.4	Radial crushing strength	JIS Z 2507	N/mm² {kgf/mm²}	145 {14.8} (roll formed)
Tensile strength	JIS K 6911	N/mm² {kgf/mm²}	95 {9.7}	Hardness	JIS K 6911	HRM	80
Flexural property	JIS K 6911	N/mm² {kgf/mm²}	110 {11.2}	Izod impact strength (with notch)	JIS K 6911	J/m {kgf·cm/cm}	177 {18}
Compressive strength	JIS K 6911	N/mm² {kgf/mm²}	195 {19.9}	Co-efficient of linear expansion	ASTM D 696	×10⁻⁵ ℃⁻¹	2～3

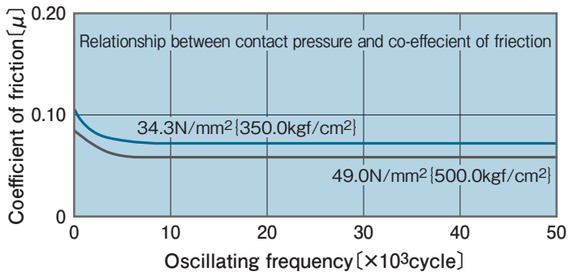
※The values shown above are typical values, not the standard values.

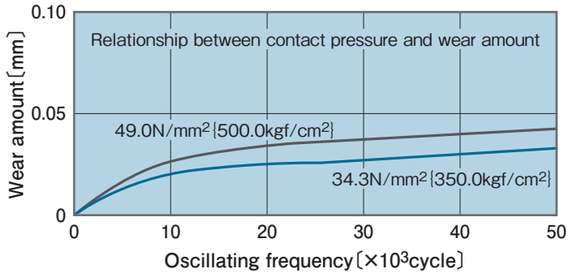
Test data

Journal oscillation test

<Testing conditions>
Bearing dimension : ϕ40×ϕ50×ℓ30
Mating material : S45C (surface roughness Rz2μm)
Pressure : 49.0N/mm² {500.0kgf/cm²}
34.3N/mm² {350.0kgf/cm²}
Velocity : 0.005m/s {0.31m/min}
Oscillating cycle : 5cpm
Oscillating angle : ±45°
Oscillating frequency : 50,000cycle
Test time : 167hrs.
Clearance : 0.170mm
Lubrication : dry

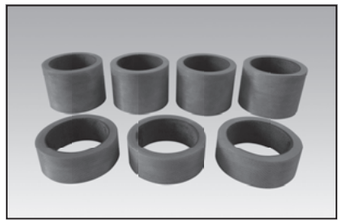






Oiles Fiberflon OH

Multi-layer polytetrafluoroethylene plastic bearings



RoHS2 ELV Lead Free

This product is registered in the New Technology Information System (NETIS) managed by MLIT.
Technology name : Solid-lubricant dispersed bearing FIBERFLON OH/Registration No. : KT-130060-VE (for water gates/underwater pumps)

Feature

- This product can be used in air, water or seawater.
- Demonstrates superior wear resistance under micro-motion.
- Thanks to the dual structure of the sliding layer and backing material (FRP:glass fiber), this product offers load bearing characteristics equivalent to those of metal bearings.
- Easy dimensional setting due to a low swelling rate.
- Machining on the inner surface is possible.

Service range

Lubrication condition	Dry
Service temperature range ℃	−40～+120
Allowable max. pressure P N/mm² {kgf/cm²}	49 (100) {500 (1,020)}
Allowable max. velocity V m/s {m/min}	0.15 {9}
Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min}	1.2 {734}

Condition: in atmosphere, bushing, shaft rotation.
The values in parentheses are static bearing pressures, which are the bearing pressures in applications with no motion or very small motion (≦0.0017m/s[0.1m/min]).

Mechanical properties

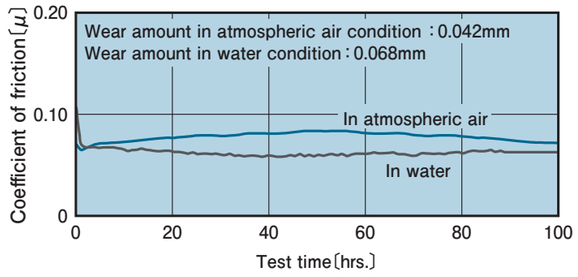
Specific gravity	JIS K 6911	——	1.7	Hardness	JIS K 6911	HRM	60
Tensile strength	JIS K 6911	N/mm² {kgf/mm²}	165 {16.8}	Izod impact strength (with notch)	JIS K 6911	J/m {kgf·cm/cm}	1,010 {103}
Compressive strength	JIS K 6911	N/mm² {kgf/mm²}	238 {24.3}	Co-efficient of linear expansion	ASTM D 696	×10⁻⁵ ℃⁻¹	5 ～ 8
Flexural property	JIS K 6911	N/mm² {kgf/mm²}	127 {13.0}	Swelling rate	——	%	0.35

※The values shown above are typical values, not the standard values.

Test data

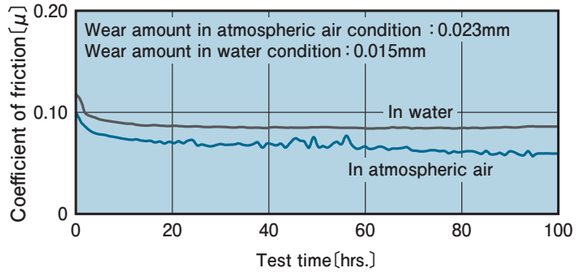
Journal oscillation test

<Testing conditions>
Environment: : In atmospheric air, In water
Bearing dimension : ϕ60×ϕ75×ℓ50
Mating material : SUS403
Pressure : 24.5N/mm²
Velocity : 0.019m/s
Oscillating angle : ±45°
Oscillating cycle : 12cpm
Test time : 100hr
Lubrication : dry

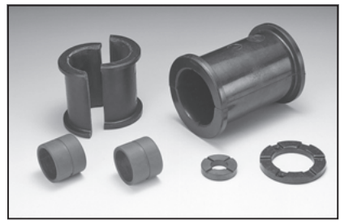


Journal oscillation test

<Testing conditions>
Environment: : In atmospheric air, In water
Bearing dimension : ϕ60×ϕ75×ℓ50
Mating material : SUS403
Pressure : 24.5N/mm²
Velocity : 0.0084m/s
Oscillating angle : ±2°
Oscillating cycle : 120cpm
Test time : 100hr
Lubrication : dry



Oiles 470-02/02W Carbon fiber composite bearings for underwater use



Feature

- Has self-lubricating performance. Demonstrates low coefficient of friction and superior wear performance especially in water, chemicals, or oil.
- Demonstrates superior wear performance and maintains stable performance even under abrasive conditions subject to soil, sand, foreign matter or rust on the mating parts.
- A multi-layer type (470-02W), which incorporates 470-02 on the sliding surface and 250 or 425 as the backing material is also available.
- The standard split metal for flocculators and bearing units are available on order.

Service range

Lubrication condition	underwater
Service temperature range ℃	−40～+90
Allowable max. pressure P N/mm² {kgf/cm²}	15 {153}
Allowable max. velocity V m/s {m/min}	16.5 {990}
Allowable max. PV value N/mm²・m/s {kgf/cm²・m/min}	8.15 {4,990}

Condition: underwater, bushing, shaft rotation.
※Contact us when temperature exceeds the range.

Mechanical properties

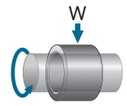
Specific gravity	JIS K 6911	——	1.4
Tensile strength	JIS K 6911	N/mm² {kgf/mm²}	45 {4.6}
Flexural property	JIS K 6911	N/mm² {kgf/mm²}	75 {7.7}
Compressive strength	JIS K 6911	N/mm² {kgf/mm²}	124 {12.7}
Radial crushing strength	JIS K 2507	N/mm² {kgf/mm²}	60 {6.1} (Compressed)
Hardness	JIS K 6911	HRM	103
Izod impact strength (with notch)	JIS K 6911	J/m {kgf·cm/cm}	58.8 {6}
Co-efficient of linear expansion	ASTM D 696	×10⁻⁵ ℃⁻¹	2～2.5
Swelling rate	——	%	1.0 (room temp)

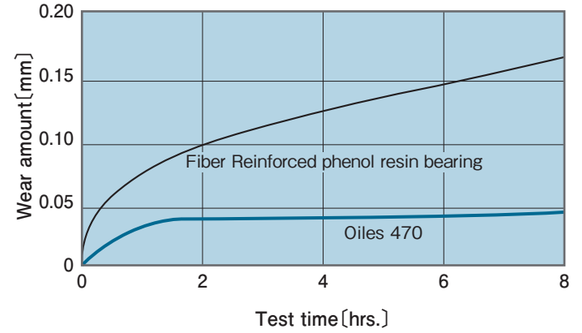
※The values shown above are typical values, not the standard values.

Test data

High speed underwater journal rotation test

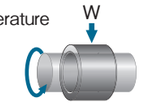
<Testing conditions>
Mating maerial : SUS403
Pressure : 1.96N/mm² {20.0kgf/cm²}
Velocity : 5m/s {300m/min}
Test time : 8hrs.
Atmosphere : purified water

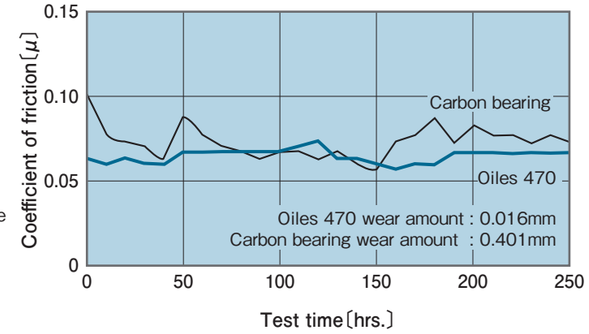




High speed underwater journal rotation test

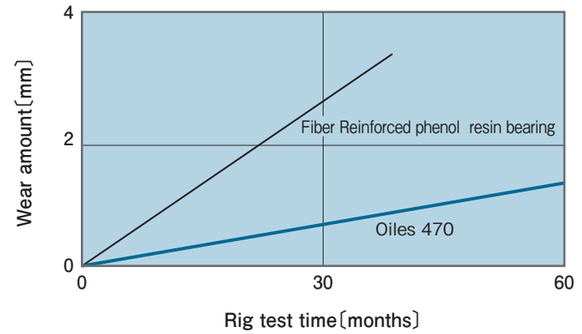
<Testing conditions>
Bearing dimension : φ60×φ75×ℓ60
Pressure : 0.13N/mm² {1.4kgf/cm²}
Velocity : 5.65m/s {339.0m/min}
Rotation frequency : 1,800rpm
Atmosphere : muddy water
(500 ppm of testing dust JIS grade 2 and 3 are blended equally as forreign partcle.)
Test temperature : room temperature
Duration : 250hrs.





Water processing machine

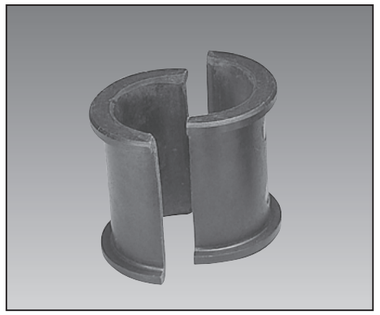
<Testing conditions>
Mating material : S45C
Pressure : 0.49N/mm² {5.0kgf/cm²}
Velocity : 0.067m/s {4.0m/min}
Atmosphere : muddy water



47H Split Bearings for Flocculator

Made-to-order

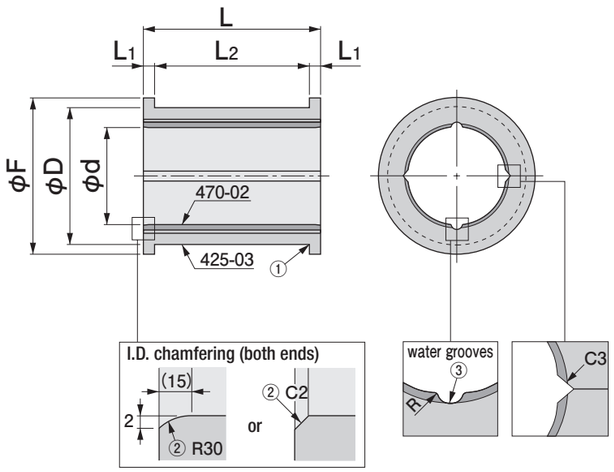
RoHS2 ELV Lead Free



- The recommended mating shaft should be hard chrome-plated (50μ or more) or stainless steel (or a shrinkage-fit sleeve).
- The dimensional tolerance of the mating shaft should be h7.
- This product is supplied in a set of two.
- This product is available on order.

Specify Part No. by required I.D., O.D. and Length.
(e.g.) I.D. is 90mm, O.D. is 120mm, and length is 120mm.

47H - 90120120
Part No.



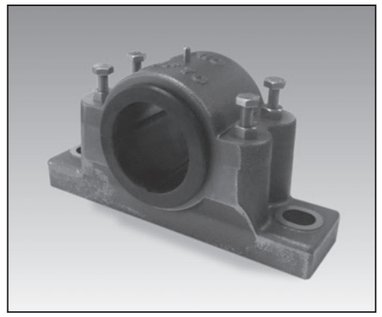
Part No.	I.D.		O.D.	Flange	Length				Chamfer・water grooves			Recommended housing I.D.	
	※ϕd	Tolerance	ϕD	ϕF	L	L1	L2	Tolerance	①	②	③	Size	Tolerance
47H-6076105	60	+0.6 +0.2	(76)	92	105	8	89	+0.5 0	2-R1	C2	R1.5	ϕ76	0 −0.14
47H-7086105	70	+0.6 +0.2	(86)	102	105	8	89	+0.5 0	2-R1	R30	R2.5	ϕ86	0 −0.14
47H-80105120	80	+0.8 +0.2	(105)	130	120	15	90	+0.6 0	2-R1	R30	R4	ϕ105	0 −0.14
47H-90120120	90	+0.8 +0.2	(120)	150	120	15	90	+0.6 0	2-R1	R30	R4	ϕ120	0 −0.14
47H-100130140	100	+0.8 +0.2	(130)	154	140	15	110	+0.6 0	2-R1	C2	R4	ϕ130	0 −0.14

※The inner diameters (ϕd) are the values measured when set in jigs of the minimum recommended housing inner diameters.
※The inner diameter of this product will change if it is stored for three months or more. Contact us when placing an order if it will be stored for three months or more.

UPF Flocculator Bearing Units

Made-to-order

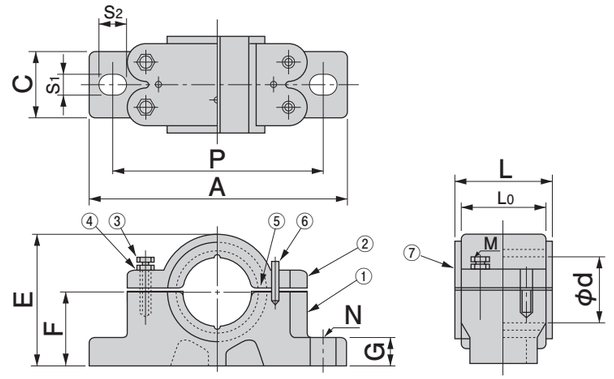
RoHS2 ELV Lead Free



- Bearing unit composed of a bearing set in a housing.
- The sliding surface is made of 470-02W featuring superior wear resistance.
- Exclusive for underwater use.
- This unit is not painted.
- The dimensional tolerance of the mating shaft should be h7.
- This product is available on order.
- Company name and Part No. are incused at the surface of housing (base).

Specify Part No. by required diameter.
(e.g.) Diameter is 90mm

UPF - 90
Part No.



	Part	Material
1	Base	FC250
2	Cover	FC250
3	Bolt	SUS304
4	Nut	SUS304
5	Knock pin	SUS304
6	Bearing	470-02W

Part No.	I.D.	Form							Mounting hole・Bolt				
	ϕd	A	C	L	L0	E	F	G	P	S1	S2	N	M
UPF-70	70	270	70	105	89	138	80	30	220	22	27	M20	M10
UPF-80	80	285	70	120	90	158	90	30	230	22	27	M20	M10
UPF-90	90	330	70	120	90	180	100	30	270	27	32	M24	M10
UPF-100	100	335	90	140	110	195	110	35	270	27	32	M24	M12

※The inner diameter of this product will change if it is stored for three months or more. Contact us when placing an order if it will be stored for three months or more.