

Drystar Outline

SO#936FR

Lead Free RoHS

Drystar

Straight Type

SO#936FR

Lead Free RoHS

Features

It is the bearing which has sintered porosity of bronze powder on the steel back plate, with improved self-lubrication and wear resistance by adding polytetrafluoro-ethylene (PTFE), which has small friction coefficient, and special filler through impregnation.

- Lead-free bearing which can be used without lubrication.
- Excellent sliding performance under high load and impact load.
- Excellent in wear resistance and long life.
- Suitable for sliding motion and continued motion Stick-slip hardly occurs. Silent operation can be achieved.

Precautions for use

- Do not grind the bushing inner surface or the outer diameter to change the size.
- Polish the surface of the mating surface to the value better than $3 \mu\text{mRmax}$.
- Offset the joint of the bushing as far as possible from the maximum load point.
- To press fit the bushing, press fit it vertically into the housing.
- Special lock is not required for Drystar.
- Initial lubrication can make the product life longer.

Operation Range

Lubricating Condition	Max. Allowable Load P N/mm ²				Operation Range Temperature °C
	Very Slow Movement	Rotation, Oscillation or Sliding	Change of Load 100,000 Times or Less	Change of Load 10 million Times or More	
No lubrication	147	59	29	15	-200 ~ +280

Physical Properties

Compression Strength Mpa	Linear Expansion Coefficient $\times 10^{-6}/^{\circ}\text{C}$		Thermal Conductivity W/(m·K)
	Parallel to Bearing Surface	Vertical to Bearing Surface	
304	11	30	42

Dimensions and tolerance for press-fit of bushing and how to obtain maximum press-fit force F (general formula)

$$F \approx 0.8tL \delta \text{ max}$$

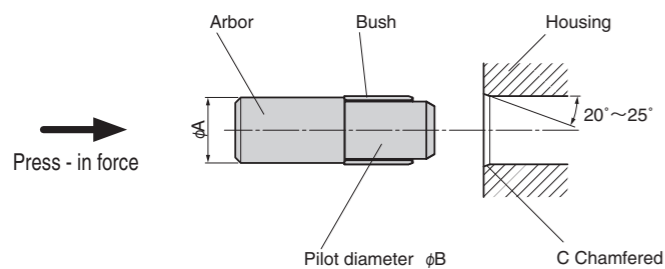
even t : Bush thickness(mm)

L : Bush length(mm)

$\delta \text{ max}$: Circumferential maximum stress (N)

$$= 18.6 \times 10^4 \times \frac{\text{Max. Bush Dia} - \text{Housing Dia}}{\text{Max. Bush Dia}}$$

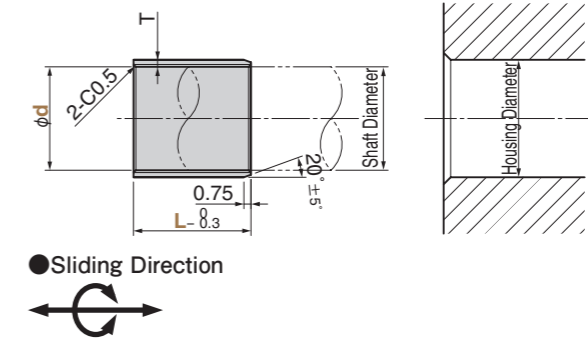
For max bush dia., use the value measured with "GO ring gauge"



- Arbor dia = Housing I.D. - (0.2 ~ 0.4 mm)
- Pilot dia = Bush I.D. - (0.2 ~ 0.3 mm)
- Housing chamfering procedures (C value)

Housing dia	C value
$\phi 30$ or less	0.8mm
$\phi 30 \leq \phi 50$	1.2mm
$\leq \phi 50$	1.6mm

LBM



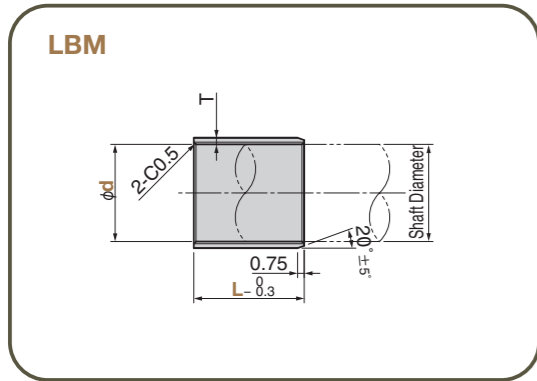
Material SO#936 FR

Housing I.D.	H7	Shaft		Dimension of Bushing				Catalog No.	d	L
		O.D.	Tolerance	Tolerance I.D. after press-fit	O.D.	Tolerance	Thickness T			
5		3	-0.025 -0.034	3		5				03 04 05 06
	+0.012 0				+0.062 0		+0.047 +0.017			03 04 05 06
6		4		4		6				03 04 05 06 08
7		5	-0.025 -0.037	5		7				03 04 05 06 08
8		6		6		8	+0.053 +0.023	1.0	0 -0.025	LBM 06 07 08 10 12
	+0.015 0				+0.065 0					05 06 07 08 10 12
9		7	-0.025 -0.040	7		9				04 05 06 07 08 10 12
10		8		8		10	+0.055 +0.025			04 05 06 07 08 10 12 15

* Tolerance I.D. after press-fit is for reference only.

Order **Catalog No.** **LBM** **d** - **L**
05 - **08**

Resin Sliding Materials



Order **Catalog No.** **LBM** **d** - **L**
20 - 25

Operation Range

Lubricating Condition	Max. Allowable Load P N/mm ²				Operation Range Temperature °C
	Very Slow Movement	Rotation, Oscillation or Sliding	Change of Load 100,000 Times or Less	Change of Load 10 million Times or More	
No lubrication	147	59	29	15	-200 ~ +280

Physical Properties

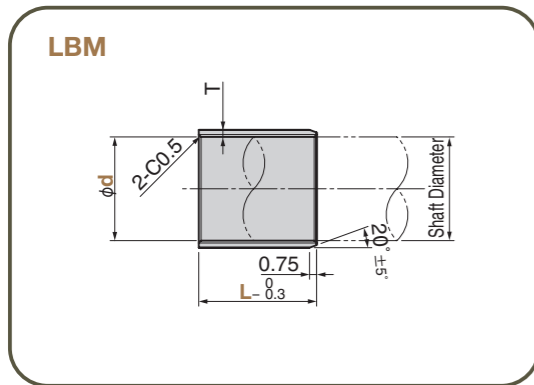
Compression Strength Mpa	Linear Expansion Coefficient × 10 ⁻⁶ /°C		Thermal Conductivity W/ (m · K)
	Parallel to Bearing Surface	Vertical to Bearing Surface	
304	11	30	42

Housing I.D.	H7	Shaft O.D.	Tolerance	Dimension of Bushing				Catalog No.	d	L
				Tolerance I.D. after press-fit	O.D.	Tolerance	Thickness T			
11		9		9	11				09	06 10 06 07 08
12		10	-0.025 -0.040	10	12				10	10 12 15 20 06 08 10 20
14		12		12	14				12	12 15 20 25 08
15	+0.018 0	13		13	15		1.0	0 -0.025	LBM	13 12 15 20 08 10 20
16		14	-0.025 -0.043	14	16					14 12 15 20 08 10 20
17		15		15	17					15 12 15 20 25

* Tolerance I.D. after press-fit is for reference only.

Housing I.D.	H7	Shaft O.D.	Tolerance	Dimension of Bushing				Catalog No.	d	L
				Tolerance I.D. after press-fit	O.D.	Tolerance	Thickness T			
18	+0.018 0	16		16	18					10 12 15 20 25 10 15 20 10 12 15 20 25 30 10 15 20 25 30
19		17	-0.025 -0.043	17	19		1.0	0 -0.025		17 15 20 10 12 15 20 25 30 10 15 20 25 30
20		18		18	20					18 15 20 25 30 10 15 20 25 30
22		19		19	22					19 15 20 10 12 15 20 25 30 10 12 15 20 25 30
23		20		20	23					20 15 20 25 30 10 12 15 20 25 30
25	+0.021 0	22		22	25					22 20 25 30 15 20 25 30
27		24		24	27				LBM	15 20 25 30 10 12 15 20 25 30
28		25	-0.025 -0.046	25	28					25 20 25 30 35 40 15 20 25 30 10 12 15 20 25 30
30		26		26	30					26 20 25 30 10 12 15 20 25 30
32		28		28	32					28 20 25 30 10 12 15 20 25 30
34	+0.025 0	30		30	34					30 25 30 35 40 50

* Tolerance I.D. after press-fit is for reference only.



Order **Catalog No.** **LBM** **d** **60** **L** **60**

Operation Range

Lubricating Condition	Max. Allowable Load P N/mm ²				Operation Range Temperature °C
	Very Slow Movement	Rotation, Oscillation or Sliding	Change of Load 100,000 Times or Less	Change of Load 10 million Times or More	
No lubrication	147	59	29	15	-200 ~ +280

Physical Properties

Compression Strength Mpa	Linear Expansion Coefficient × 10 ⁻⁶ /°C		Thermal Conductivity W/ (m · K)
	Parallel to Bearing Surface	Vertical to Bearing Surface	
304	11	30	42

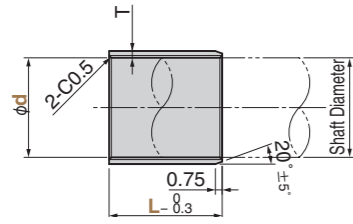
Housing I.D.	H7	Shaft O.D.	Tolerance	Dimension of Bushing				Catalog No.	d	L
				Tolerance I.D. after press-fit	O.D.	Tolerance	Thickness T			
35		31		31	35			31	15 25 30 40	
36		32		32	36			32	15 20 25 30 40 50	
39	+0.025 0	35	-0.025 -0.050	35	39	+0.085 0	+0.115 +0.075	2.0	0 -0.030	LBM 35 40 50
42		38		38	42			38	20 25 30 35 40	
44		40		40	44			40	12 15 20 25 30 35 40 50	

* Tolerance I.D. after press-fit is for reference only.

Housing I.D.	H7	Shaft O.D.	Tolerance	Dimension of Bushing				Catalog No.	d	L	
				Tolerance I.D. after press-fit	O.D.	Tolerance	Thickness T				Tolerance
50	+0.025 0	45		45	50	+0.105 0	+0.115 +0.075			45 20 25 30 35 40 50	
55		50		50	55				2.5	0 -0.040	12 15 20 25 30 35 40 50 60
60		55		55	60	+0.110 0					55 25 30 35 40 50 60
65	+0.030 0	60		60	65		+0.145 +0.095				15 30 35 40 50 60 70
70		65		65	70			LBM			30 40 50 60
75		70		70	75	+0.190 +0.060					70 40 50 60 70 80
80		75		75	80		+0.160 +0.095		2.47	0 -0.050	30 35 40 50 60 75 80 90
85		80		80	85						80 50 60 80
90	+0.035 0	85		85	90	+0.195 +0.060	+0.165 +0.100				85 40 50 60
95		90		90	95	+0.035 0					90 40 50 60 90
100		95		95	100		+0.180 +0.115				95 30 50

* Tolerance I.D. after press-fit is for reference only.

LBM

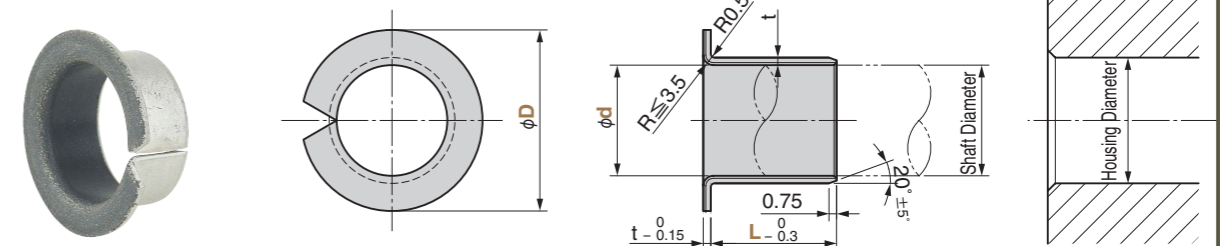


Order **Catalog No.** **LBM** **d** - **L**
100 - 30

Housing		Shaft		Dimension of Bushing				Catalog No.	d	L
I.D.	H7	O.D.	Tolerance	Tolerance I.D. after press-fit	O.D.	Tolerance	Thickness T			
									30	
									50	
105		100		100	105				70	
									80	
									95	
									100	
	+0.035 0								50	
110		105		105	110				90	
									100	
			+0.035 0						30	
									50	
115		110		110	115				70	
									100	
									30	
									50	
125		120		120	125		2.47	0 -0.050	70	
									95	
									100	
									50	
135		130		130	135				80	
									100	
	+0.040 0								50	
145		140		140	145				80	
									100	
			+0.035 -0.005						50	
155		150		150	155				80	
									100	
									50	
165		160		160	165				80	
									100	

* Tolerance I.D. after press-fit is for reference only.

LBMF



Sliding Direction

Material SO#936 FR

Operation Range

Lubricating Condition	Max. Allowable Load P N/mm ²				Operation Range Temperature °C
	Very Slow Movement	Rotation, Oscillation or Sliding	Change of Load 100,000 Times or Less	Change of Load 10 million Times or More	
No lubrication	147	59	29	15	-200 ~ +280

Physical Properties

Compression Strength Mpa	Linear Expansion Coefficient × 10 ⁻⁶ /°C		Thermal Conductivity W / (m · K)
	Parallel to Bearing Surface	Vertical to Bearing Surface	
304	11	30	42

Refer to P. 139 for caution in using

Order **Catalog No.** **LBMF** **d** - **D** - **L**
06 - 12 - 08

Housing		Shaft		Dimension of Bushing				Catalog No.	d	D	L
I.D.	H7	O.D.	Tolerance	Tolerance I.D. after press-fit	O.D.	Tolerance	Thickness t				
4.6		3	-0.025 -0.034	3	4.6	+0.047 +0.017	0.8		03	07	03
	+0.012 0										05
5.6		4		4	5.6				04	09	04
											06
7		5		5	7				05	10	05
											06
			-0.025 -0.037								04
											05
8		6		6	8	+0.053 +0.023		0 -0.025	LBMF	06	12
											06
	+0.015 0						1.0				08
											10
											05
9		7		7	9					07	13
											07
			-0.025 -0.040								10
											12
											06
10		8		8	10	+0.055 +0.025				08	15
											10
											12

* Tolerance I.D. after press-fit is for reference only.