Tooling • Automation • Measurement

ROTARY LINEAR BEARINGS

Standard Rotolin MCR, MR, MS & ML Series Bearings

Technical Information

Construction
The outer sleeves are precision ground, high carbon chromium steel BS970: Part 1 1991 535 A99 or equivalent.
Balls of the same material are accurate to .00025mm.

Ball Retaining Cages
The cages are made of yellow brass and aluminium. Ball quantity depends on design load capacity within a given cross section.

Oil Seal
Rotolin bearings are fitted with nitrile oil seals, where applicable, which are moulded from quality synthetic rubber. The seals effectively close both ends of the bearings, serving the dual purpose of retaining the lubricant and protecting the working surface against abrasive grit, moisture and other foreign matter.

Preloading
Preloading is a condition in which the balls are slightly compressed, causing pressure to be exerted between the bearing sleeve and the shaft. This condition is, in effect a “press fit” although the balls can rotate about their own axes, according to the movement of the cage.
The relative longitudinal travel of the shaft is twice that of the ball cage because the balls travel an equal distance on the working surfaces of both the bearing sleeve and the shaft.

Spindles and Shafts
Shafts are made from “50” Carbon steel (070 M55), Induction hardened to a minimum of 60 HRC with a 1.5mm (.060¨) to 2.5mm (.100¨) depth of case according to the diameter of the shaft and the magnitude of loading. The shaft should be precision ground, round and parallel, within the recommended limits to provide the correct preload, with a surface finish not exceeding .25µm (10 micro inches).

Lubrication and Temperature Requirements
All bearings are supplied in rust preventative oil and should be cleaned and lubricated before use.
Good quality medium oils and light ball bearing greases have the advantage of greater surface cohesion. High grade light oil will allow a higher operating speed and greater sensitivity to movement.
Working temperatures under maximum load conditions should not exceed 120ºC although the bearings can operate safely at slightly higher temperatures and under decreased load conditions, with special lubricants.
For continuous high temperature operation, suitable grades of lithium grease should be used.

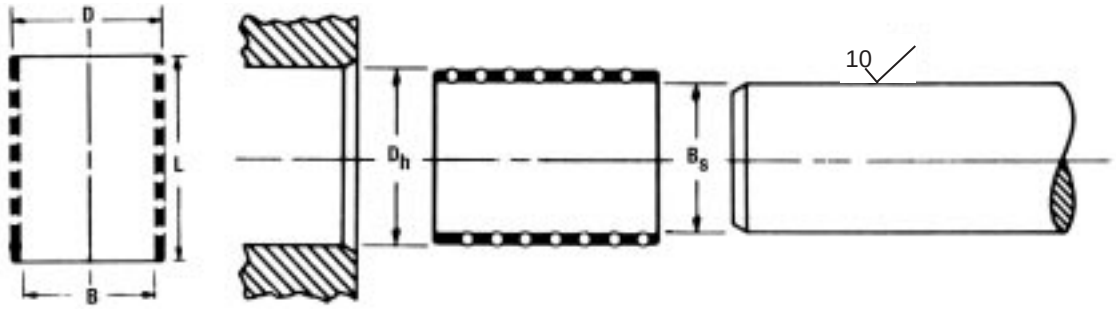
Bearing Life
The “basic capacity” shown is the load at which 90% of the bearings will complete or exceed one million revolutions, when tested under identical conditions, before the first perceptible sign of fatigue appears. It is generally accepted that the life expectancy is always a function of the load and this is inversely proportional to the cube of the basic capacity for bearings. Thus, the operation of a bearing at one half its rated basic capacity will increase to eight million revolutions, and at one quarter of its rated load, to sixty-four million revolutions.

Static Capacity
This is defined as that static radial load which corresponds to the combined permanent deformation of ball and sleeve at the most heavily stressed contact of .0001 of the ball diameter.

Type MCR Ball Retaining Cages

In applications where the design requires only a ball cage assembly, the MCR cages are recommended. Standard materials are brass and aluminium. Balls are manufactured from 535 A99 steel.
Shaft and housing should be hardened to at least 60 HRC and ground to at least 0.25µm. It is therefore important that the dimensions for the shaft (B_S) and for the housing (D_h) be followed so the function of the entire bearing will be equal to that of the standard Rotolin Bearings.

Special Retaining Cages
We are equipped to meet your requirements for special retainer cages in any size, any material, any configuration. Please call or write to us if you have a requirement which our standard cages do not fulfill.
If a shaft or housing is required please contact us to discuss your needs.



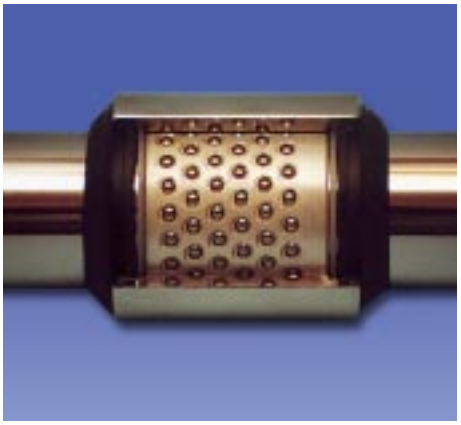
DIMENSIONS AND SPECIFICATIONS *(Dimensions in inches)*

Bearing Ref	B		D		L	Shaft Dia. Bs		Housing Dh		Preload Interference Fit ‡ Min	Preload Interference Fit ‡ Max	Static Capacity lbf
ΔMCR 500-687	.500	+.012 -.015	.687	+.010 -.015	.468	.5000	+.0000 -.0002	.6875	+.0003 -.0005	.0001	.0005	230
ΔMCR 625-812	.625	+.012 -.015	.812	+.010 -.015	.656	.6250	+.0000 -.0002	.8125	+.0003 -.0005	.0001	.0005	352
MCR 750-937	.750	+.012 -.015	.937	+.010 -.015	.843	.7500	+.0000 -.0002	.9375	+.0003 -.0005	.0001	.0005	440
MCR 875-1125	.875	+.022 -.025	1.125	+.020 -.025	1.031	.8750	+.0000 -.0002	1.1250	+.0003 -.0005	.0001	.0005	562
MCR 1000-1250	1.000	+.022 -.025	1.250	+.020 -.025	1.281	1.0000	+.0000 -.0002	1.2500	+.0003 -.0005	.0001	.0005	688
MCR 1125-1375	1.125	+.022 -.025	1.375	+.020 -.025	1.531	1.1250	+.0000 -.0002	1.3750	+.0003 -.0005	.0001	.0005	814
MCR 1250-1500	1.250	+.022 -.025	1.500	+.020 -.025	1.781	1.2500	+.0000 -.0002	1.5000	+.0003 -.0005	.0001	.0005	967
MCR 1500-1750	1.500	+.022 -.025	1.750	+.020 -.025	2.000	1.5000	+.0000 -.0002	1.7500	+.0003 -.0005	.0001	.0005	1147
MCR 1750-2125	1.750	+.032 -.035	2.125	+.030 -.035	2.375	1.7500	+.0000 -.0002	2.1250	+.0003 -.0005	.0001	.0005	2185
MCR 2000-2375	2.000	+.032 -.035	2.375	+.030 -.035	2.687	2.0000	+.0000 -.0002	2.3750	+.0003 -.0005	.0001	.0005	2490

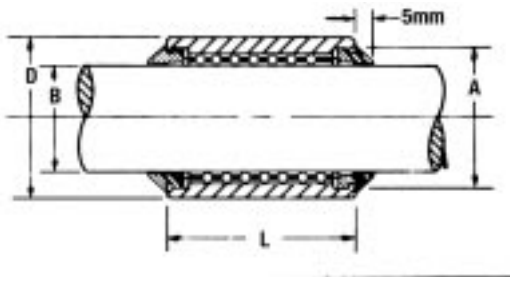
‡ Between Shaft, Balls and Outer Sleeve I.D.
Δ Available in brass only

Type MR

PRELOADED GENERAL PURPOSE BEARINGS FOR ROTARY MOTION ONLY



Rotolin "MR" Series ball bearings are designed and manufactured for those applications where purely radial loads must be supported in a PRELOADED condition. They are ideally adapted to those applications where the necessary clearance in needle and roller bearings is not desirable. "MR" type bearings are fitted with nitrile rubber wiper seals. The retainer is held between two flat retaining rings which also back up the seals.



DIMENSIONS AND SPECIFICATIONS

METRIC RANGE *(Dimensions in mm)*

Bearing Ref Δ	B Shaft Dia	D Bearing O.D.	$L^{+.00}_{-.13}$
MR 16 - 28	16	28	29.00
MR 20 - 32	20	32	34.00
MR 25 - 39	25	39	38.00
MR 32 - 46	32	46	49.00
MR 40 - 55	40	55	57.00
MR 50 - 70	50	70	72.00

INCH RANGE *(Dimensions in inches)*

Bearing Ref Δ	B Shaft Dia	D Bearing O.D.	$L^{+.000}_{-.005}$
MR 500 - 875	.5000	.8750	.937
MR 625 - 1000	.6250	1.0000	1.125
MR 750 - 1250	.7500	1.2500	1.312
MR 875 - 1500	.8750	1.5000	1.500
MR 1000 - 1625	1.0000	1.6250	1.750
MR 1125 - 1750	1.1250	1.7500	2.000
MR 1250 - 1875	1.2500	1.8750	2.250
MR 1500 - 2125	1.5000	2.1250	2.500
MR 1750 - 2625	1.7500	2.6250	2.875
MR 2000 - 2875	2.0000	2.8750	3.187

Δ Bearing reference indicates bearing type, shaft diameter, outside diameter.

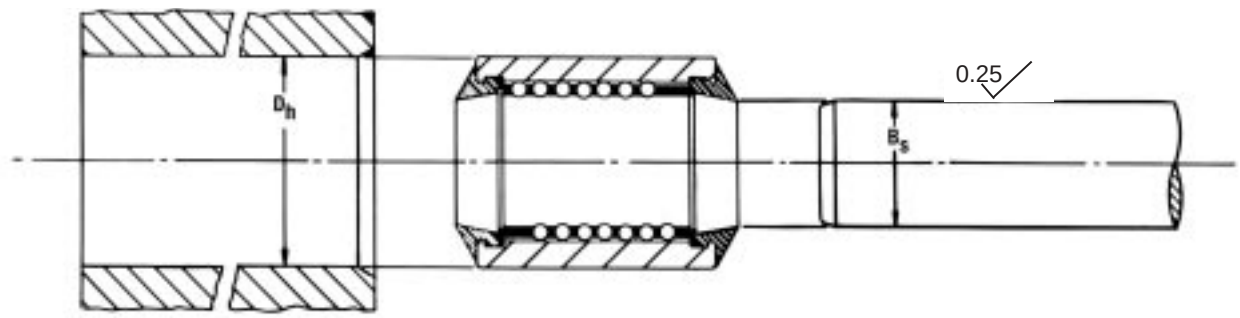
‡ Between Shaft, Balls and Outer Sleeve I.D.

Larger, heavy duty and special types are available.
Call or write outlining your performance requirements using the form on page 21

*CAUTION: Excessive press fits may affect preload. If in doubt please contact us for alternative mounting methods

Type MR

Series “MR” bearings supporting pure radial loads must be used with an interference fit between the balls and the shaft. In such applications, the shaft must be made to the dimensions and tolerances given below. The outer races and balls are of 535 A99 steel. Shafts should be hardened to at least 60 HRC and ground to at least 0.25μm.



SHAFT AND HOUSING TOLERANCES AND RESULTING FITS

Seal O.D. A	Housing Dh*		Shaft Bs		Preload Interference Fit ‡ Min	Preload Interference Fit ‡ Max	Eccentricity O.D. to Bore	Maximum R.P.M.	Basic Capacity KN	Static Capacity KN
25.40	28.00	+.007 -.005	16.00	+.000 -.005	.002	.012	.007	13,000	1.50	1.34
29.36	32.00	+.010 -.005	20.00	+.000 -.005	.002	.012	.010	12,000	1.94	1.91
36.50	39.00	+.013 -.005	25.00	+.000 -.005	.002	.012	.010	10,000	2.45	2.24
42.85	46.00	+.013 -.005	32.00	+.000 -.005	.002	.012	.010	8,000	3.63	4.18
51.81	55.00	+.013 -.005	40.00	+.000 -.005	.002	.012	.010	7,000	4.41	5.37
63.50	70.00	+.013 -.005	50.00	+.000 -.005	.002	.012	.010	5,000	6.91	9.34

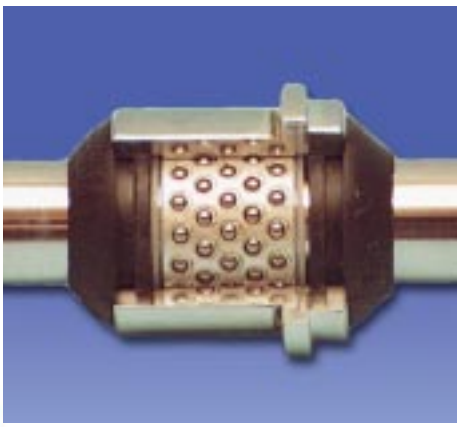
Seal O.D. A	Housing Dh*		Shaft Bs		Preload Interference Fit ‡ Min	Preload Interference Fit ‡ Max	Eccentricity O.D. to Bore	Maximum R.P.M.	Basic Capacity lbf	Static Capacity lbf
.875	.8750	+.0003 -.0002	.5000	+.0000 -.0002	.0001	.0005	.0003	14,000	230	158
1.000	1.0000	+.0003 -.0002	.6250	+.0000 -.0002	.0001	.0005	.0003	13,000	352	302
1.125	1.2500	+.0004 -.0002	.7500	+.0000 -.0002	.0001	.0005	.0004	12,000	440	430
1.312	1.5000	+.0004 -.0002	.8750	+.0000 -.0002	.0001	.0005	.0004	11,000	562	503
1.437	1.6250	+.0004 -.0002	1.0000	+.0000 -.0002	.0001	.0005	.0004	10,000	688	692
1.562	1.7500	+.0004 -.0002	1.1250	+.0000 -.0002	.0001	.0005	.0004	9,000	814	907
1.687	1.8750	+.0005 -.0002	1.2500	+.0000 -.0002	.0001	.0005	.0004	8,000	967	1195
1.937	2.1250	+.0005 -.0002	1.5000	+.0000 -.0002	.0001	.0005	.0004	7,000	1147	1612
2.312	2.6250	+.0005 -.0002	1.7500	+.0000 -.0002	.0001	.0005	.0004	6,000	2185	2978
2.562	2.8750	+.0005 -.0002	2.0000	+.0000 -.0002	.0001	.0005	.0004	5,000	2490	3733

Lubrication and Temperature Requirements

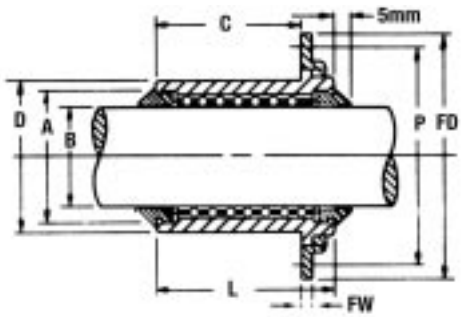
All bearings are supplied in rust preventative oil and should be cleaned and lubricated before use. Good quality medium oils and light ball bearing greases have the advantage of greater surface cohesion. High grade light oil will allow a higher operating speed and greater sensitivity to

Type MRF

FLANGED PRELOADED GENERAL PURPOSE BEARINGS FOR ROTARY MOTION ONLY



Rotolin "MRF" Series ball bearings are designed and manufactured for those applications where purely radial loads must be supported in a PRELOADED condition. They are ideally adapted to those applications where the necessary clearance in needle and roller bearings is not acceptable. "MRF" type bearings are fitted with nitrile rubber wiper seals. The retainer is held between two flat retaining rings which also back up the seals.



DIMENSIONS AND SPECIFICATIONS

METRIC RANGE *(Dimensions in mm)*

Bearing Ref Δ	B Shaft Dia	D Bearing O.D.	$L^{+.00}_{-.13}$	C	Seal O.D. A	FW
MRF 16 - 28	16	28	29.00	21	25.4	1.63
MRF 20 - 32	20	32	34.00	24	29.36	1.63
MRF 25 - 39	25	39	38.00	26	36.50	1.63
MRF 32 - 46	32	46	49.00	37	42.85	2.03
MRF 40 - 55	40	55	57.00	43	51.01	2.03
MRF 50 - 70	50	70	72.00	58	63.50	2.03

INCH RANGE *(Dimensions in inches)*

Bearing Ref Δ	B Shaft Dia	D Bearing O.D.	$L^{+.000}_{-.005}$	C	Seal O.D. A	FW
MRF 500 - 875	.5000	.8750	.937	.718	.875	.048
MRF 625 - 1000	.6250	1.0000	1.125	.812	1.000	.064
MRF 750 - 1250	.7500	1.2500	1.312	.937	1.125	.064
MRF 875 - 1500	.8750	1.5000	1.500	1.062	1.312	.064
MRF 1000 - 1625	1.0000	1.6250	1.750	1.312	1.437	.064
MRF 1125 - 1750	1.1250	1.7500	2.000	1.562	1.562	.064
MRF 1250 - 1875	1.2500	1.8750	2.250	1.812	1.687	.064
MRF 1500 - 2125	1.5000	2.1250	2.500	1.937	1.937	.080
MRF 1750 - 2625	1.7500	2.6250	2.875	2.312	2.312	.080
MRF 2000 - 2875	2.0000	2.8750	3.187	2.625	2.562	.080

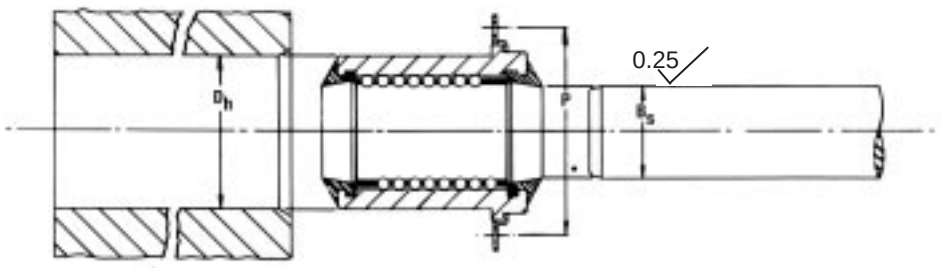
Δ Bearing reference indicates bearing type, shaft diameter, outside diameter.

‡ Between Shaft, Balls and Outer Sleeve I.D.

Larger, heavy duty and special types are available.
Call or write outlining your performance requirements using the form on page 21.

Type MRF

Series “MRF” bearings supporting pure radial loads must be used with an interference fit between the balls and the shaft. In such applications, the shaft must be made to the dimensions and tolerances given below. The outer races and balls are of 535 A99 steel. Shafts should be hardened to at least 60 HRC and ground to at least 0.25μm.



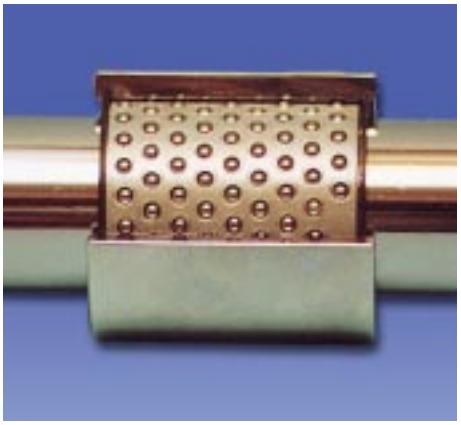
SHAFT AND HOUSING TOLERANCES AND RESULTING FITS

FD	Housing Dh*	Shaft Bs	Preload Interference Fit ‡ Min	Max	P	Size Cap Screw	Eccentricity O.D. to Bore	Maximum R.P.M.	Basic Capacity KN	Static Capacity KN
55.56	28.00 +.007 -.005	16.00 +.000 -.005	.002	.012	46	5mm 3-OFF	.007	13,000	1.57	1.34
60.32	32.00 +.010 -.005	20.00 +.000 -.005	.002	.012	51	5mm 3-OFF	.010	12,000	1.94	1.91
64.30	39.00 +.013 -.005	25.00 +.000 -.005	.002	.012	55	5mm 3-OFF	.010	10,000	2.45	2.24
73.02	46.00 +.013 -.005	32.00 +.000 -.005	.002	.012	64	5mm 3-OFF	.010	8,000	3.63	4.18
87.31	55.00 +.013 -.005	40.00 +.000 -.005	.002	.012	75	5mm 3-OFF	.010	7,000	4.41	5.37
104.00	70.00 +.013 -.005	50.00 +.000 -.005	.002	.012	95	5mm 4-OFF	.010	5,000	6.91	9.34

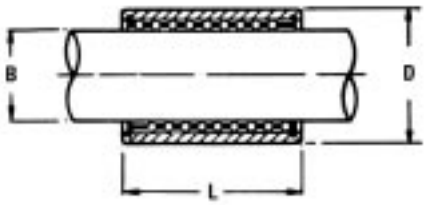
FD	Housing Dh*	Shaft Bs	Preload Interference Fit ‡ Min	Max	P	Size Cap Screw	Eccentricity O.D. to Bore	Maximum R.P.M.	Basic Capacity lbf	Static Capacity lbf
1.812	.875 +.0003 -.0002	.5000 +.0000 -.0002	.0001	.0005	1.500	3 BA 3-OFF	.0003	14,000	230	158
2.187	1.0000 +.0003 -.0002	.6250 +.0000 -.0002	.0001	.0005	1.812	2 BA 3-OFF	.0003	13,000	352	302
2.375	1.2500 +.0004 -.0002	.7500 +.0000 -.0002	.0001	.0005	2.000	2 BA 3-OFF	.0004	12,000	440	430
2.531	1.5000 +.0004 -.0002	.8750 +.0000 -.0002	.0001	.0005	2.187	2 BA 3-OFF	.0004	11,000	562	503
2.687	1.6250 +.0004 -.0002	1.0000 +.0000 -.0002	.0001	.0005	2.312	2 BA 3-OFF	.0004	10,000	688	692
2.875	1.7500 +.0004 -.0002	1.1250 +.0000 -.0002	.0001	.0005	2.531	2 BA 3-OFF	.0004	9,000	814	907
3.000	1.8750 +.0005 -.0002	1.2500 +.0000 -.0002	.0001	.0005	2.656	2 BA 3-OFF	.0004	8,000	967	1195
3.437	2.1250 +.0005 -.0002	1.5000 +.0000 -.0002	.0001	.0005	2.968	2 BA 3-OFF	.0004	7,000	1147	1612
3.937	2.6250 +.0005 -.0002	1.7500 +.0000 -.0002	.0001	.0005	3.468	2 BA 4-OFF	.0004	6,000	2185	2978
4.093	2.8750 +.0005 -.0002	2.0000 +.0000 -.0002	.0001	.0005	3.178	2 BA 4-OFF	.0004	5,000	2490	3733

Type MS

SLIDING AND ROTARY MOTION BALL BUSHES



Rotolin sliding ball bushes are designed to allow unrestricted length of linear travel and consequently, are not suitable for preloading. They are capable of both sliding and rotary motions and provide a sensitive fit, superior to any plain bushings. Sliding ball bushes are eminently satisfactory for a wide variety of purposes not requiring preloading, and particularly suitable for light loading and vertical applications. Being virtually friction-free in operation, they permit high speed performance with freedom from lubrication troubles or risk of seizure.



DIMENSIONS AND SPECIFICATIONS

METRIC RANGE *(Dimensions in mm)*

Bearing Ref Δ	B Shaft Dia	D Bearing O.D.	$L^{+.00}_{-.13}$
MS 16 - 28	16	28	22.00
MS 20 - 32	20	32	26.00
MS 25 - 39	25	39	32.00
MS 32 - 46	32	46	42.00
MS 40 - 55	40	55	50.00
MS 50 - 70	50	70	64.00

INCH RANGE *(Dimensions in inches)*

Bearing Ref Δ	B Shaft Dia	D Bearing O.D.	$L^{+.000}_{-.005}$
MS 500 - 875	0.5000	0.8750	0.625
MS 625 - 1000	0.6250	1.0000	0.812
MS 750 - 1250	0.7500	1.2500	1.000
MS 875 - 1500	0.8750	1.5000	1.250
MS 1000 - 1625	1.0000	1.6250	1.500
MS 1125 - 1750	1.1250	1.7500	1.750
MS 1250 - 1875	1.2500	1.8750	2.000
MS 1500 - 2125	1.5000	2.1250	2.250
MS 1750 - 2625	1.7500	2.6250	2.625
MS 2000 - 2875	2.0000	2.8750	3.000

Δ Bearing reference indicates bearing type, shaft diameter, outside diameter.

‡ Between Shaft, Balls and Outer Sleeve I.D.

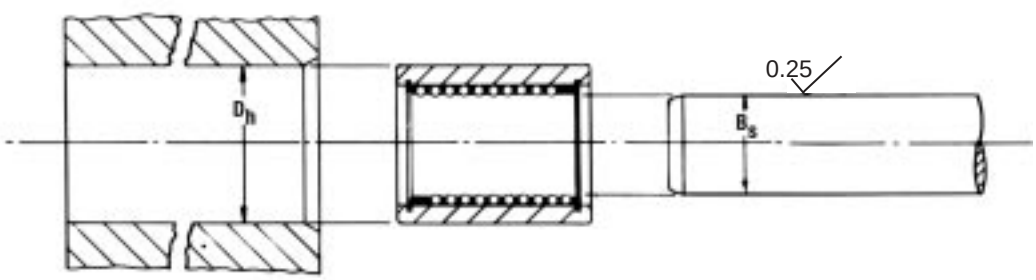
Larger, heavy duty and special types are available.
Call or write outlining your performance requirements using the form on page 21.

*CAUTION: Excessive press fits may affect preload. If in doubt please contact us for alternative mounting methods

ENGINEERING DATA

Type MS

Series “MS” bearings must be used with a clearance fit between the balls and the shaft. The housing and shaft tolerances stated must therefore be strictly adhered to in order to prevent excessive closing in of the bearing sleeve on assembly. The outer race and balls are of 535 A99 steel. Shafts should be hardened to at least 60 HRC and ground to at least 0.25μm.



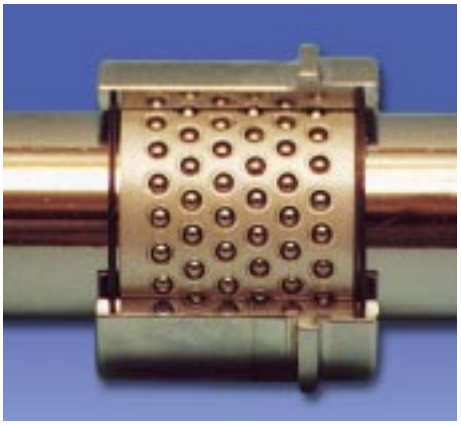
SHAFT AND HOUSING TOLERANCES AND RESULTING FITS

Housing Dh*		Shaft Bs		Clearance Fit ‡ Min	Clearance Fit ‡ Max	Static Capacity KN
28.00	+.007 -.005	16.00	+.000 -.005	.002	.012	1.34
32.00	+.010 -.005	20.00	+.000 -.005	.005	.015	1.91
39.00	+.013 -.005	25.00	+.000 -.005	.005	.015	2.24
46.00	+.013 -.005	32.00	+.000 -.005	.008	.018	4.18
55.00	+.013 -.005	40.00	+.000 -.005	.008	.018	5.37
70.00	+.013 -.005	50.00	+.000 -.005	.008	.018	9.34

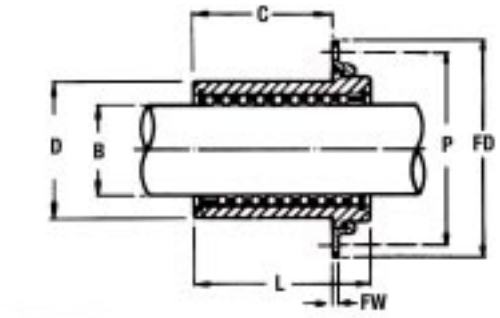
Housing Dh*		Shaft Bs		Clearance Fit ‡ Min	Clearance Fit ‡ Max	Static Capacity lbf
0.8750	+.0003 -.0002	0.5000	+.0000 -.0002	.0001	.0005	158
1.0000	+.0003 -.0002	0.6250	+.0000 -.0002	.0001	.0005	302
1.2500	+.0004 -.0002	0.7500	+.0000 -.0002	.0002	.0006	430
1.5000	+.0004 -.0002	0.8750	+.0000 -.0002	.0002	.0006	503
1.6250	+.0004 -.0002	1.0000	+.0000 -.0002	.0002	.0006	692
1.7500	+.0004 -.0002	1.1250	+.0000 -.0002	.0002	.0006	907
1.8750	+.0005 -.0002	1.2500	+.0000 -.0002	.0003	.0007	1195
2.1250	+.0005 -.0002	1.5000	+.0000 -.0002	.0003	.0007	1612
2.6250	+.0005 -.0002	1.7500	+.0000 -.0002	.0003	.0007	2978
2.8750	+.0005 -.0002	2.0000	+.0000 -.0002	.0003	.0007	3733

Type MSF

SLIDING AND ROTARY MOTION BALL BUSHES



Flanged types of Rotolin sliding ball bushes are made a “push fit” into bored holes of correct diameter. This avoids any possible closing-in of the outer sleeve which could result in preloading and impair the ultra-smooth working action, it also serves to facilitate installation in their operating stations. These ball bushes are capable of providing first class, sliding fit on precision shafts without restriction on the length of travel, they are extensively employed for their adaptability, reliabity and general efficiency in service.



DIMENSIONS AND SPECIFICATIONS

METRIC RANGE *(Dimensions in mm)*

Bearing Ref Δ	B Shaft Dia	D Bearing O.D.	$L^{+.000}_{-.13}$	C	FW	FD
MSF 16 - 28	16	28	22.00	14	1.63	56
MSF 20 - 32	20	32	26.00	16	1.63	60
MSF 25 - 39	25	39	32.00	20	1.63	64
MSF 32 - 46	32	46	42.00	30	2.03	73
MSF 40 - 55	40	55	50.00	36	2.03	87
MSF 50 - 70	50	70	64.00	50	2.03	104

INCH RANGE *(Dimensions in inches)*

Bearing Ref Δ	B Shaft Dia	D Bearing O.D.	$L^{+.000}_{-.005}$	C	FW	FD
MSF 500 - 875	0.5000	0.8750	0.625	0.406	.048	1.812
MSF 625 - 1000	0.6250	1.0000	0.812	0.500	.064	2.187
MSF 750 - 1250	0.7500	1.2500	1.000	0.625	.064	2.375
MSF 875 - 1500	0.8750	1.5000	1.250	0.812	.064	2.531
MSF 1000 - 1625	1.0000	1.6250	1.500	1.062	.064	2.687
MSF 1125 - 1750	1.1250	1.7500	1.750	1.312	.064	2.875
MSF 1250 - 1875	1.2500	1.8750	2.000	1.562	.080	3.000
MSF 1500 - 2125	1.5000	2.1250	2.250	1.687	.080	3.437
MSF 1750 - 2625	1.7500	2.6250	2.625	2.062	.080	3.937
MSF 2000 - 2875	2.0000	2.8750	3.000	2.437	.080	4.093

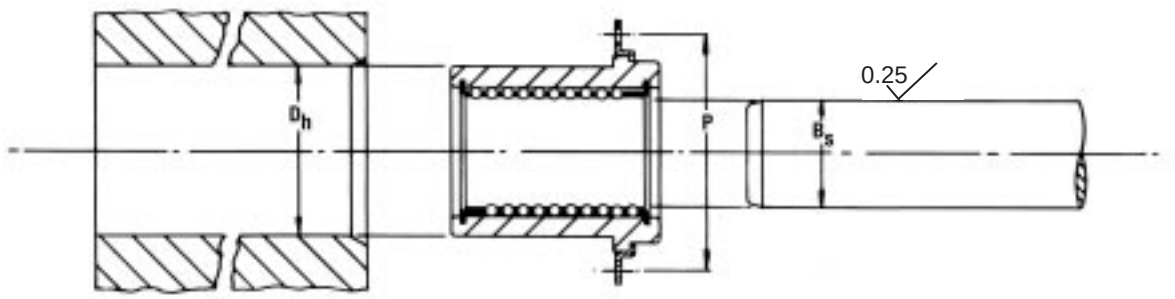
Δ Bearing reference indicates bearing type, shaft diameter, outside diameter.

‡ Between Shaft, Balls and Outer Sleeve I.D.

Larger, heavy duty and special types are available.
Call or write outlining your performance requirements using the

Type MSF

Series “MSF” bearings must be used with a clearance fit between the balls and the shaft. The housing and shaft tolerances stated must therefore be strictly adhered to in order to prevent excessive closing in of the bearing sleeve on assembly. The outer race and balls are of 535 A99 steel. Shafts should be hardened to at least 60 HRC and ground to at least 0.25μm.



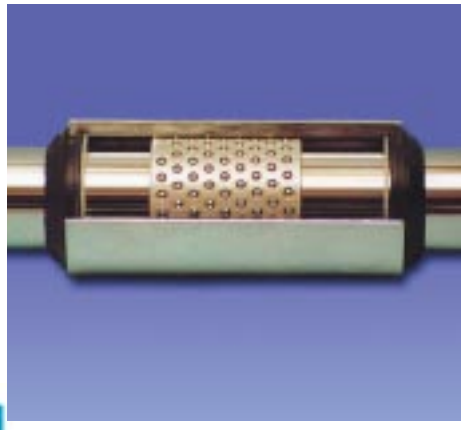
SHAFT AND HOUSING TOLERANCES AND RESULTING FITS

Housing Dh*	Shaft Bs	Clearance Fit ‡ Min	Clearance Fit ‡ Max	P	Size Cap Screw	Static Capacity KN
28.00 +.007 -.005	16.00 +.000 -.005	.002	.012	46	5mm 3-OFF	1.34
32.00 +.010 -.005	20.00 +.000 -.005	.002	.012	51	5mm 3-OFF	1.91
39.00 +.013 -.005	25.00 +.000 -.005	.002	.012	55	5mm 3-OFF	2.24
46.00 +.013 -.005	32.00 +.000 -.005	.002	.012	64	5mm 3-OFF	4.18
55.00 +.013 -.005	40.00 +.000 -.005	.002	.012	75	5mm 3-OFF	5.38
70.00 +.013 -.005	50.00 +.000 -.005	.002	.012	95	5mm 4-OFF	9.34

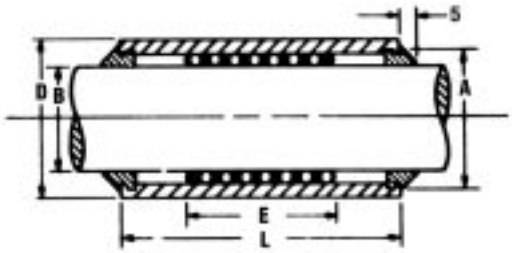
Housing Dh*	Shaft Bs	Clearance Fit ‡ Min	Clearance Fit ‡ Max	P	Size Cap Screw	Static Capacity lbf
0.8750 +.0003 -.0002	0.5000 +.0000 -.0002	.0001	.0005	1.500	3BA 3-OFF	158
1.0000 +.0003 -.0002	0.6250 +.0000 -.0002	.0001	.0005	1.812	2BA 3-OFF	302
1.2500 +.0004 -.0002	0.7500 +.0000 -.0002	.0001	.0005	2.000	2BA 3-OFF	430
1.5000 +.0004 -.0002	0.8750 +.0000 -.0002	.0001	.0005	2.187	2BA 3-OFF	503
1.6250 +.0004 -.0002	1.0000 +.0000 -.0002	.0001	.0005	2.312	2BA 3-OFF	692
1.7500 +.0004 -.0002	1.1250 +.0000 -.0002	.0001	.0005	2.531	2BA 3-OFF	907
1.8750 +.0005 -.0002	1.2500 +.0000 -.0002	.0001	.0005	2.656	2BA 3-OFF	1195
2.1250 +.0005 -.0002	1.5000 +.0000 -.0002	.0001	.0005	2.968	2BA 3-OFF	1612
2.6250 +.0005 -.0002	1.7500 +.0000 -.0002	.0001	.0005	3.468	2BA 4-OFF	2978
2.8750 +.0005 -.0002	2.0000 +.0000 -.0002	.0001	.0005	3.718	2BA 4-OFF	3733

Type ML

PRELOADED GENERAL PURPOSE BEARINGS
SUPPORTING COMBINATION LINEAR AND ROTARY MOTION



Rotolin “ML” Series ball bearings support rotary and linear relative shaft motions simultaneously and separately. Shaft rigidity and anti-friction freedom is maintained at all times because all the balls are under an intentional preload. All “ML” Series bearings have low-friction moulded nitrile rubber wiper seals.



DIMENSIONS AND SPECIFICATIONS

METRIC RANGE *(Dimensions in mm)*

Bearing Ref Δ	B Shaft Dia	D Bearing O.D.	E	$L^{+.00}_{-.13}$	Total Linear Travel
ML 16 - 28 - 25	16	28	16	45.00	25
ML 16 - 28 - 50				55.00	50
ML 20 - 32 - 25	20	32	21	50.00	25
ML 20 - 32 - 50				60.00	50
ML 25 - 39 - 25	25	39	25	55.00	25
ML 25 - 39 - 50				65.00	50
ML 25 - 39 - 75				80.00	75
ML 25 - 39 - 100				95.00	100
ML 32 - 46 - 25	32	46	36	65.00	25
ML 32 - 46 - 50				75.00	50
ML 32 - 46 - 75				90.00	75
ML 32 - 46 - 100				105.00	100
ML 32 - 46 - 150				125.00	150
ML 40 - 55 - 25	40	55	43	70.00	25
ML 40 - 55 - 50				85.00	50
ML 40 - 55 - 75				95.00	75
ML 40 - 55 - 100				110.00	100
ML 40 - 55 - 150				135.00	150
ML 50 - 70 - 25	50	70	58.5	85.00	25
ML 50 - 70 - 50				100.00	50
ML 50 - 70 - 75				110.00	75
ML 50 - 70 - 100				125.00	100
ML 50 - 70 - 150				150.00	150

Δ Bearing reference indicates bearing type, shaft diameter, outside diameter.

Larger, heavy duty and special types are available.
Call or write outlining your performance requirements using the form on page 21

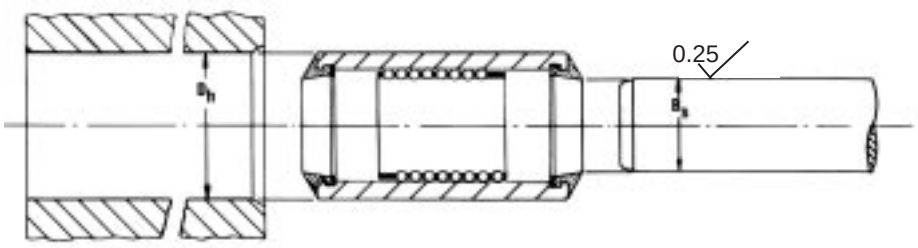
‡ Between Shaft, Balls and Outer Sleeve I.D.

*CAUTION: Excessive press fits may affect preload. If in doubt please contact us for alternative mounting methods

ENGINEERING DATA

Type ML

All Rotolin Series “ML” bearings must be mounted and used with a shaft that produces an interference between the balls and the shaft. This PRELOADS the balls. Shafts should be hardened to at least 60 HRC and be ground to a finish of at least 0.25µm. Assembly of the shaft will require some sliding of the ball cage to locate it in its proper operating position. Balls and outer race are made from carbon chrome bearing steel of 535 A99. Housing and shaft tolerances listed on these two pages will produce the required fit of the housing and interference of the shaft.



SHAFT AND HOUSING TOLERANCES AND RESULTING FITS

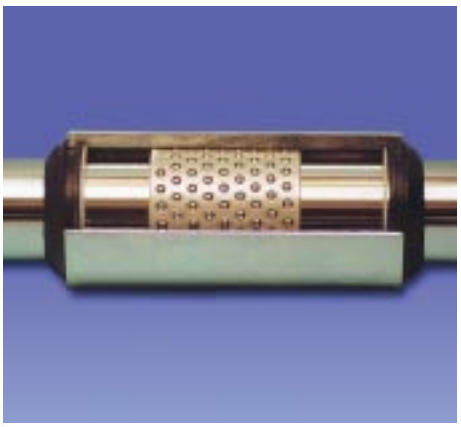
Seal O.D. A	Housing Dh*		Shaft Bs		Preload Interference Fit ‡ Min	Preload Interference Fit ‡ Max	Eccentricity O.D. to Bore	Maximum R.P.M.	Basic Capacity KN	Static Capacity KN
25.5	28.00	+.007 -.005	16.00	+.000 -.005	.002	.012	.007	13,000	1.57	1.34
29.5	32.00	+.010 -.005	20.00	+.000 -.005	.002	.012	.010	12,000	1.94	1.91
36.5	39.00	+.013 -.005	25.00	+.000 -.005	.002	.012	.010	10,000	2.45	2.24
43	46.00	+.013 -.005	32.00	+.000 -.005	.002	.012	.010	8,000	3.63	4.18
52	55.00	+.013 -.005	40.00	+.000 -.005	.002	.012	.010	7,000	4.41	5.37
63.5	70.00	+.013 -.005	50.00	+.000 -.005	.002	.012	.010	5,000	6.91	9.34

Lubrication and Temperature Requirements

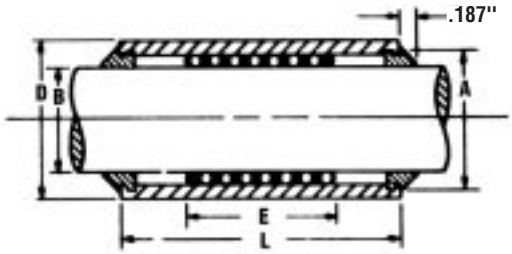
All bearings are supplied in rust preventative oil and should be cleaned and lubricated before use. Good quality medium oils and light ball bearing greases have the advantage of greater surface cohesion. High grade light oil will allow a higher operating speed and greater sensitivity to movement. Working temperatures under maximum load conditions should not exceed 120ºC

Type ML

PRELOADED GENERAL PURPOSE BEARINGS
SUPPORTING COMBINATION LINEAR AND ROTARY MOTION



Rotolin "ML" Series ball bearings support rotary and linear relative shaft motions simultaneously and separately. Shaft rigidity and anti-friction freedom is maintained at all times because all the balls are under an intentional preload. All "ML" Series bearings have low-friction moulded nitrile rubber wiper seals.



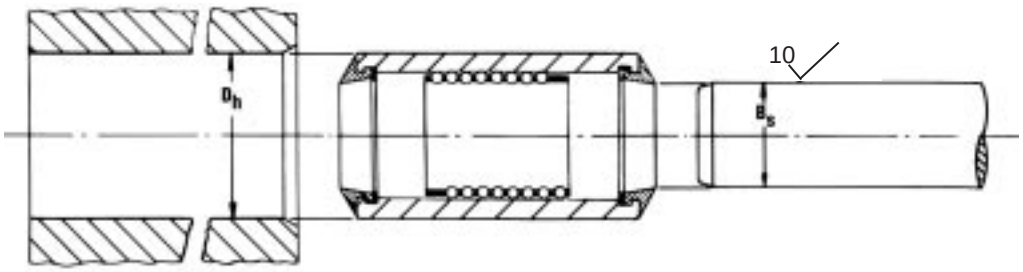
DIMENSIONS AND SPECIFICATIONS

INCH RANGE *(Dimensions in inches)*

Bearing Ref Δ	B Shaft Dia	D Bearing O.D.	E	$L^{+.000}_{-.005}$	Total Linear Travel
ML 500 - 875 - 1	.5000	.8750	.500	1.625	1.000
ML 500 - 875 - 2				2.125	2.000
ML 625 - 1000 - 1	.6250	1.0000	.656	1.875	1.000
ML 625 - 1000 - 2				2.375	2.000
ML 750 - 1250 - 1	.7500	1.2500	.843	2.000	1.000
ML 750 - 1250 - 2				2.500	2.000
ML 875 - 1500 - 1	.8750	1.5000	1.031	2.250	1.000
ML 875 - 1500 - 2				2.750	2.000
ML 1000 - 1625 - 1	1.0000	1.6250	1.281	2.500	1.000
ML 1000 - 1625 - 2				3.000	2.000
ML 1000 - 1625 - 3				3.500	3.000
ML 1000 - 1625 - 4				4.000	4.000
ML 1125 - 1750 - 1	1.1250	1.7500	1.531	2.750	1.000
ML 1125 - 1750 - 2				3.250	2.000
ML 1125 - 1750 - 3				3.750	3.000
ML 1125 - 1750 - 4				4.250	4.000
ML 1250 - 1875 - 1	1.2500	1.8750	1.781	3.000	1.000
ML 1250 - 1875 - 2				3.500	2.000
ML 1250 - 1875 - 3				4.000	3.000
ML 1250 - 1875 - 4				4.500	4.000
ML 1250 - 1875 - 6				5.500	6.000
ML 1500 - 2125 - 1	1.5000	2.1250	2.000	3.250	1.000
ML 1500 - 2125 - 2				3.750	2.000
ML 1500 - 2125 - 3				4.250	3.000
ML 1500 - 2125 - 4				4.750	4.000
ML 1500 - 2125 - 6				5.750	6.000
ML 1750 - 2625 - 1	1.7500	2.6250	2.375	3.625	1.000
ML 1750 - 2625 - 2				4.125	2.000
ML 1750 - 2625 - 3				4.625	3.000
ML 1750 - 2625 - 4				5.125	4.000
ML 1750 - 2625 - 6				6.125	6.000
ML 2000 - 2875 - 1	2.0000	2.8750	2.687	4.000	1.000
ML 2000 - 2875 - 2				4.500	2.000
ML 2000 - 2875 - 3				5.000	3.000
ML 2000 - 2875 - 4				5.500	4.000
ML 2000 - 2875 - 6				6.500	6.000

Type ML

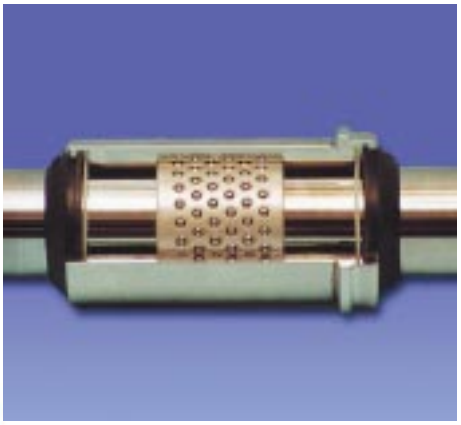
All Rotolin Series “ML” bearings must be mounted and used with a shaft that produces an interference between the balls and the shaft. This PRELOADS the balls. Shafts should be hardened to at least 60 HRC and be ground to a finish of at least 10 micro inches. Assembly of the shaft will require some sliding of the ball cage to locate it in its proper operating position. Balls and outer race are made from carbon chrome bearing steel of 535 A99. Housing and shaft tolerances listed on these two pages will produce the required fit of the housing and interference of the shaft.



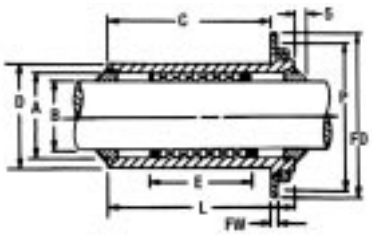
SHAFT AND HOUSING TOLERANCES AND RESULTING FITS

Seal O.D. A	Housing Dh*		Shaft Bs		Preload Interference Fit ‡ Min	Max	Eccentricity O.D. to Bore	Maximum R.P.M.	Basic Capacity lbf	Static Capacity lbf
.875	.8750	+.0003 -.0002	.5000	+.0000 -.0002	.0001	.0005	.0003	14,000	230	158
1.000	1.0000	+.0003 -.0002	.6250	+.0000 -.0002	.0001	.0005	.0003	13,000	352	302
1.125	1.2500	+.0004 -.0002	.7500	+.0000 -.0002	.0001	.0005	.0004	12,000	440	430
1.312	1.5000	+.0004 -.0002	.8750	+.0000 -.0002	.0001	.0005	.0004	11,000	562	503
1.437	1.6250	+.0004 -.0002	1.0000	+.0000 -.0002	.0001	.0005	.0004	10,000	688	692
1.562	1.7500	+.0004 -.0002	1.1250	+.0000 -.0002	.0001	.0005	.0004	9,000	814	907
1.687	1.8750	+.0005 -.0002	1.2500	+.0000 -.0002	.0001	.0005	.0004	8,000	967	1195
1.937	2.1250	+.0005 -.0002	1.5000	+.0000 -.0002	.0001	.0005	.0004	7,000	1147	1612
2.312	2.6250	+.0005 -.0002	1.7500	+.0000 -.0002	.0001	.0005	.0004	6,000	2185	2978
2.562	2.8750	+.0005 -.0002	2.0000	+.0000 -.0002	.0001	.0005	.0004	5,000	2490	3733

Type MLF FLANGED PRELOADED GENERAL PURPOSE BEARINGS SUPPORTING COMBINATION LINEAR AND ROTARY MOTION



Rotolin "MLF" Series ball bearings support rotary and linear relative shaft motions simultaneously and separately. Shaft rigidity and anti-friction freedom is maintained at all times because all the balls are under an intentional preload. All "MLF" Series bearings have low-friction moulded nitrile rubber wiper seals. Type "MLF" bearings are furnished with a flange on the O.D. and a locking ring. On **Special** order the flange can be located at any point along the O.D.



DIMENSIONS AND SPECIFICATIONS

METRIC RANGE *(Dimensions in mm)*

Bearing Ref Δ	B Shaft Dia	D Bearing O.D.	E	$L^{+.00}_{-.13}$	Total Linear Travel	FD	C	FW
MLF 16 - 28 - 25	16	28	16	45.00	25	55.56	37	1.63
MLF 16 - 28 - 50				55.00	50		47	
MLF 20 - 32 - 25	20	32	21	50.00	25	60.32	40	1.63
MLF 20 - 32 - 50				60.00	50		50	
MLF 25 - 39 - 25	25	39	25	55.00	25	64.30	43	1.63
MLF 25 - 39 - 50				65.00	50		53	
MLF 25 - 39 - 75				80.00	75		68	
MLF 25 - 39 - 100				95.00	100		83	
MLF 32 -46 - 25	32	46	36	65.00	25	73.02	53	2.03
MLF 32 - 46 - 50				75.00	50		63	
MLF 32 - 46 - 75				90.00	75		78	
MLF 32 - 46 - 100				105.00	100		93	
MLF 32 - 46 - 150				125.00	150		113	
MLF 40 - 55 - 25	40	55	43	70.00	25	87.31	55	2.03
MLF 40 - 55 - 50				85.00	50		70	
MLF 40 - 55 - 75				95.00	75		80	
MLF 40 - 55 - 100				110.00	100		95	
MLF 40 - 55 - 150				135.00	150		120	
MLF 50 - 70 - 25	50	70	58.5	85.00	25	104.00	70	2.03
MLF 50 - 70 - 50				100.00	50		85	
MLF 50 - 70 - 75				110.00	75		95	
MLF 50 - 70 - 100				125.00	100		110	
MLF 50 - 70 - 150				150.00	150		135	

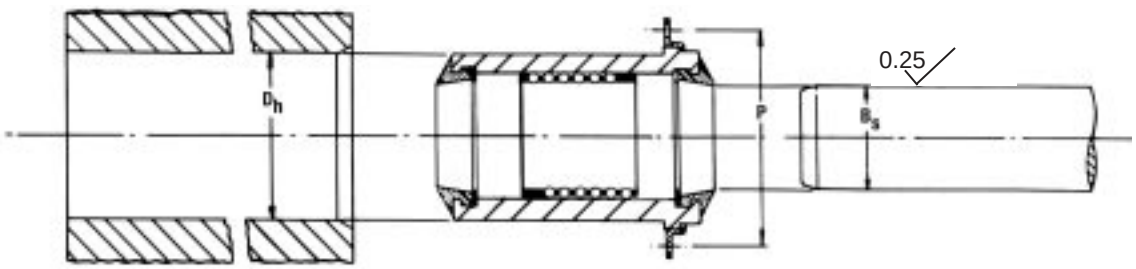
Δ Bearing reference indicates bearing type, shaft diameter, outside diameter.

‡ Between Shaft, Balls and Outer Sleeve I.D.

Larger, heavy duty and special types are available.
Call or write outlining your performance requirements using the form on page 21.

Type MLF

All Rotolin Series “MLF” bearings must be mounted and used with a shaft that produces an interference between the balls and the shaft. This PRELOADS the balls. Shafts should be hardened to at least 60 HRC and be ground to a finish of at least 0.25µm. Assembly of the shaft will require some sliding of the ball cage to locate it in its proper operating position. Balls and outer race are made from carbon chrome bearing steel of 535 A99. Housing and shaft tolerances listed on these two pages will produce the required fit of the housing and interference of the shaft. These flanged bearings are designed to be a “push fit” into housing ratings of the correct nominal diameter, secured by a locking ring.

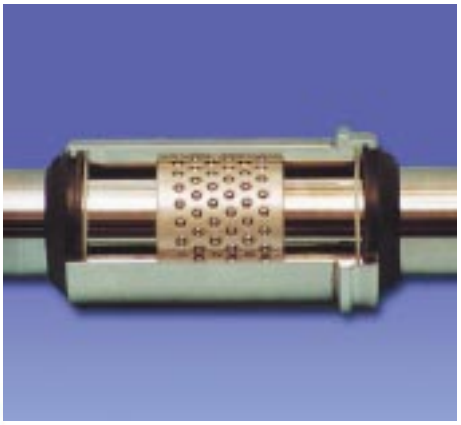


SHAFT AND HOUSING TOLERANCES AND RESULTING FITS

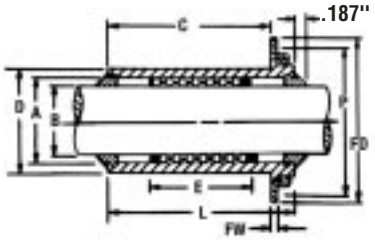
Seal O.D. A	Housing Dh*	Shaft Bs	Preload Interference Fit ‡ Min	Preload Interference Fit ‡ Max	P	Size Cap Screw	Eccentricity O.D. to Bore	Maximum R.P.M.	Basic Capacity KN	Static Capacity KN
25.4	28.00 +.007 -.005	16.00 +.000 -.005	.002	.012	46	5mm 3-OFF	.007	13,000	1.57	1.34
29.36	32.00 +.010 -.005	20.00 +.000 -.005	.002	.012	51	5mm 3-OFF	.010	12,000	1.94	1.91
36.50	39.00 +.013 -.005	25.00 +.000 -.005	.002	.012	55	5mm 3-OFF	.010	10,000	2.45	2.24
42.85	46.00 +.013 -.005	32.00 +.000 -.005	.002	.012	64	5mm 3-OFF	.010	8,000	3.63	4.18
51.81	55.00 +.013 -.005	40.00 +.000 -.005	.002	.012	75	5mm 3-OFF	.010	7,000	4.41	5.37
63.50	70.00 +.013 -.005	50.00 +.000 -.005	.002	.012	95	5mm 4-OFF	.010	5,000	6.91	9.34

NOTE: Use Nomogram on page 31 for all load life calculations.

Type MLF FLANGED PRELOADED GENERAL PURPOSE BEARINGS SUPPORTING COMBINATION LINEAR AND ROTARY MOTION



Rotolin "MLF" Series ball bearings support rotary and linear relative shaft motions simultaneously and separately. Shaft rigidity and anti-friction freedom is maintained at all times because all the balls are under an intentional preload. All "MLF" Series bearings have low-friction moulded nitrile rubber wiper seals. Type "MLF" bearings are furnished with a flange on the O.D. and a locking ring. On **Special** order the flange can be located at any point along the O.D.



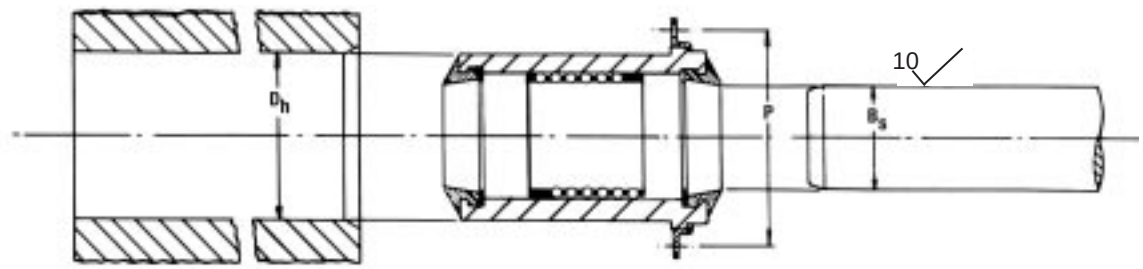
DIMENSIONS AND SPECIFICATIONS

INCH RANGE *(Dimensions in inches)*

Bearing Ref Δ	B Shaft Dia	D Bearing O.D.	E	$L^{+.000}_{-.005}$	Total Linear Travel	FD	C	FW
MLF 500 - 875 - 1	.5000	.8750	.500	1.625	1.000	1.812	1.406	.048
MLF 500 - 875 - 2				2.125	2.000		1.906	
MLF 625 - 1000 - 1	.6250	1.0000	.656	1.875	1.000	2.187	1.562	.064
MLF 625 - 1000 - 2				2.375	2.000		2.062	
MLF 750 - 1250 - 1	.7500	1.2500	.843	2.000	1.000	2.375	1.625	.064
MLF 750 - 1250 - 2				2.500	2.000		2.125	
MLF 875 - 1500 - 1	.8750	1.5000	1.031	2.250	1.000	2.531	1.812	.064
MLF 875 - 1500 - 2				2.750	2.000		2.312	
MLF 1000 - 1625 - 1	1.0000	1.6250	1.281	2.500	1.000	2.687	2.062	.064
MLF 1000 - 1625 - 2				3.000	2.000		2.562	
MLF 1000 - 1625 - 3				3.500	3.000		3.062	
MLF 1000 - 1625 - 4				4.000	4.000		3.562	
MLF 1125 - 1750 - 1	1.1250	1.7500	1.531	2.750	1.000	2.875	2.312	.064
MLF 1125 - 1750 - 2				3.250	2.000		2.812	
MLF 1125 - 1750 - 3				3.750	3.000		3.312	
MLF 1125 - 1750 - 4				4.250	4.000		3.812	
MLF 1250 - 1875 - 1	1.2500	1.8750	1.781	3.000	1.000	3.000	2.562	.064
MLF 1250 - 1875 - 2				3.500	2.000		3.062	
MLF 1250 - 1875 - 3				4.000	3.000		3.562	
MLF 1250 - 1875 - 4				4.500	4.000		4.062	
MLF 1250 - 1875 - 6				5.500	6.000		5.062	
MLF 1500 - 2125 - 1	1.5000	2.1250	2.000	3.250	1.000	3.437	2.687	.080
MLF 1500 - 2125 - 2				3.750	2.000		3.187	
MLF 1500 - 2125 - 3				4.250	3.000		3.687	
MLF 1500 - 2125 - 4				4.750	4.000		4.187	
MLF 1500 - 2125 - 6				5.750	6.000		5.187	
MLF 1750 - 2625 - 1	1.7500	2.6250	2.375	3.625	1.000	3.937	3.062	.080
MLF 1750 - 2625 - 2				4.125	2.000		3.562	
MLF 1750 - 2625 - 3				4.625	3.000		4.062	
MLF 1750 - 2625 - 4				5.125	4.000		4.562	
MLF 1750 - 2625 - 6				6.125	6.000		5.562	
MLF 2000 - 2875 - 1	2.0000	2.8750	2.687	4.000	1.000	4.093	3.437	.080
MLF 2000 - 2875 - 2				4.500	2.000		3.937	
MLF 2000 - 2875 - 3				5.000	3.000		4.437	
MLF 2000 - 2875 - 4				5.500	4.000		4.937	
MLF 2000 - 2875 - 6				6.500	6.000		5.937	

Type MLF

All Rotolin Series “MLF” bearings must be mounted and used with a shaft that produces an interference between the balls and the shaft. This PRELOADS the balls. Shafts should be hardened to at least 60 HRC and be ground to a finish of at least 10 micro inches. Assembly of the shaft will require some sliding of the ball cage to locate it in its proper operating position. Balls and outer race are made from carbon chrome bearing steel of 535 A99. Housing and shaft tolerances listed on these two pages will produce the required fit of the housing and interference of the shaft. These flanged bearings are designed to be a “push fit” into housing ratings of the correct nominal diameter, secured by a locking ring.



SHAFT AND HOUSING TOLERANCES AND RESULTING FITS

Seal O.D. A	Housing Dh*		Shaft Bs		Preload Interference Fit ‡ Min	Max	P	Size Cap Screw	Eccentricity O.D. to Bore	Maximum R.P.M.	Basic Capacity lbf	Static Capacity lbf
.875	.8750	+.0003 -.0002	.5000	+.0000 -.0002	.0001	.0005	1.500	3 BA 3-OFF	.0003	14,000	230	158
1.000	1.0000	+.0003 -.0002	.6250	+.0000 -.0002	.0001	.0005	1.812	2 BA 3-OFF	.0003	13,000	352	302
1.125	1.2500	+.0004 -.0002	.7500	+.0000 -.0002	.0001	.0005	2.000	2 BA 3-OFF	.0004	12,000	440	430
1.312	1.5000	+.0004 -.0002	.8750	+.0000 -.0002	.0001	.0005	2.187	2 BA 3-OFF	.0004	11,000	562	503
1.437	1.6250	+.0004 -.0002	1.0000	+.0000 -.0002	.0001	.0005	2.312	2 BA 3-OFF	.0004	10,000	688	692
1.562	1.7500	+.0004 -.0002	1.1250	+.0000 -.0002	.0001	.0005	2.531	2 BA 3-OFF	.0004	9,000	814	907
1.687	1.8750	+.0005 -.0002	1.2500	+.0000 -.0002	.0001	.0005	2.656	2 BA 3-OFF	.0004	8,000	967	1195
1.937	2.1250	+.0005 -.0002	1.5000	+.0000 -.0002	.0001	.0005	2.968	2 BA 3-OFF	.0004	7,000	1147	1612
2.312	2.6250	+.0005 -.0002	1.7500	+.0000 -.0002	.0001	.0005	3.468	2 BA 4-OFF	.0004	6,000	2185	2978
2.562	2.8750	+.0005 -.0002	2.0000	+.0000 -.0002	.0001	.0005	3.7182	2 BA 4-OFF	.0004	5,000	2490	3733

Precision Guide Shafts

The metric range of Rotolin precision guide shafts have been introduced in response to popular demand. Basically, they represent the sizes of various shafts which were formerly most frequently produced to customers' requirements as "specials". Guide shafts have the advantage of lower costs by virtue of economical large scale specialised production methods and most sizes are normally available for immediate delivery from stock.

It is not always obvious that shafts are an integral part of linear bearing assemblies and for maximum performance, their excellence should match the quality and precision of the bearings. The balls impose searching conditions of service, particularly for preloaded bearings, and any minor variations in shaft diameter, case depth or surface hardness and finish has a critical influence on working efficiency which can result in tracking or indentations under severe operating conditions.

Rotolin guide shafts are made from high grade carbon steel and induction hardened to produce a hard uniform deep case, minimum 60 HRC, free from surface defects or minute cracks They are ground to precision tolerances, straight within 0.025/300mm and parallel with a fine micro finish to ensure a smooth working action and provide the correct preload for the corresponding diameter bearings.

Non-Standard Shafts

It is part of our service to undertake the manufacture of spindles and shafts up to 1828mm long to customers' special requirements. Non-standard sizes and special variations of guide shafts are made to order with prompt delivery.

Cutting Service

Standard guide shafts can be cut to customers' individual requirements subject to a service charge.

METRIC RANGE

Reference	Diameter +.000mm -.005mm	Length ± 2mm	Min. Depth of case mm
SS 12-250	12	250	1.5
SS 12-500		500	
SS 16-300	16	300	1.5
SS 16-600		400	
SS 20-400	20	600	1.5
SS 20-750		750	
SS 25-500	25	500	2.0
SS 25-1000		1000	
SS 32-650	32	650	2.0
SS 32-1250		1250	
SS 40-750	40	750	2.0
SS 40-1500		1500	
SS 50-750	50	750	2.5
SS 50-1500		1500	

INCH RANGE

Reference	Diameter +.0000" -.0002"	Length ± .060"	Min. Depth of case ins
SS 500-10	.5000	10	.060
SS 500-20		20	
SS 625-12	.6250	12	.060
SS 625-25		25	
SS 750-15	.7500	15	.060
SS 750-30		30	
SS 875-15	0.8750	15	.060
SS 875-30		30	
SS 1000-20	1.0000	20	.080
SS 1000-40		40	
SS 1125-25	1.1250	25	.080
SS 1125-50		50	
SS 1250-25	1.2500	25	.080
SS 1250-50		50	
SS 1500-30	1.5000	30	.080
SS 1500-60		60	
SS 1750-30	1.7500	30	.100
SS 1750-60		60	
SS 2000-30	2.0000	30	.100
SS 2000-60		60	