

SLIDE
BEARINGS
TYPE M
IN MECHANICAL
ENGINEERING



SLIDE BEARINGS TYPE M IN MECHANICAL ENGINEERING

AZ Hollink slide bearings type M were developed for various applications. All bearings of this design have similar characteristics: low weight yet sturdy and robust housing, low friction losses and low operating temperatures due to short running surfaces. Edge loading caused by installation inaccuracies are being eliminated by the tilting motion of the shells and their almost universal frictionless self-alignment.

DESIGN AND FUNCTION

Short running surfaces

The arrangement of the fixed oil ring in the centre of the bearing results in a very favourable ratio of shaft diameter to length of shell, thus ensuring an efficient lubrication.

TILTING MOTION OF THE SHELL

In rigidly **seated shells** (fig. 1) or in bearings with running surfaces integral with the housing, even the slightest inaccuracy of installation will lead to edge loading breaking through of the oil film, increased friction losses, undue wear and overheating.

Spherically seated shells facilitate installation. Edge loading, however, cannot quite be eliminated because of the friction between shell and housing which makes self-alignment more difficult and requires a higher momentum of force for alignment under load. Therefore, this type of shell is generally used with bearings operating under heavy and heaviest conditions (e.g. type RENK „I“ bearings).

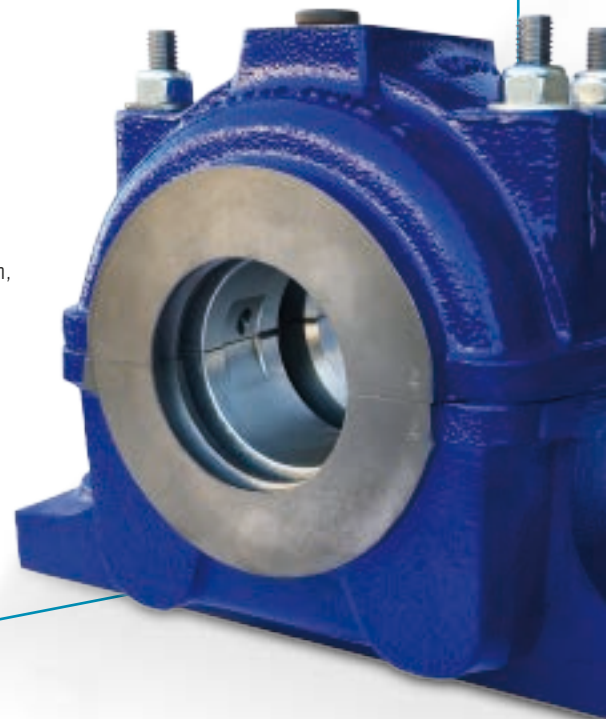
Tilting shells which have proved (in many thousands of bearings) to give full satisfaction, eliminate these disadvantages to give an almost frictionless self-alignment under load. The tilting shell rolls around its supporting point to follow any angular movement of the shaft. A slightly undulated spring (in halves) of flat rectangular cross section, engages in two circumferential grooves one on the back of the shell, the other in the bearing housing. This spring holds the shell elastically in its central position (fig. 2). At an inclined position of the shaft (fig. 3) the shell tilts about point P, flattening out the undulation of the spring which, owing to its small lateral rigidity, offers only minimal resistance, even to the lightest axial pressures. The almost frictionless losses at the working faces and trouble free operation, even with a displacement of the shaft during service.

LUBRICATION

The proven fixed oil ring ensures an efficient and even oil supply: An oil scraper arranged at the highest point deflects the oil and returns a

considerable amount over the outer surface of the bearing shell in opposite direction to shaft rotation into the oil pocket near h_{min} (fig. 4).

The oil is picked up by the shaft and in some cases the quantity taken up here is so big that excess oil overflows the oil pocket near h_{max} and falls back into the oil sump. This means additional cooling of the sliding surfaces.



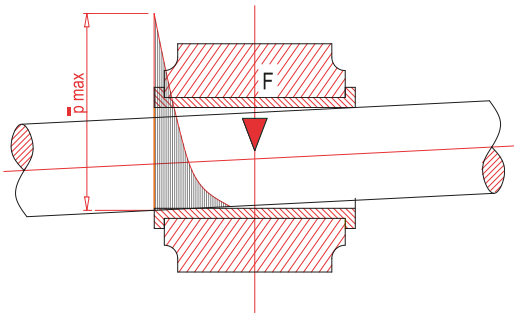


fig. 1 Parallel seated shell

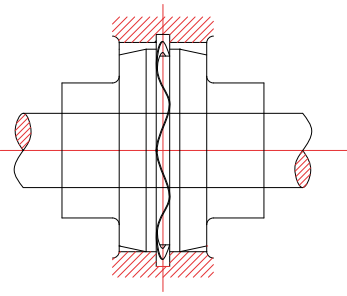


fig. 2 Undulated spring

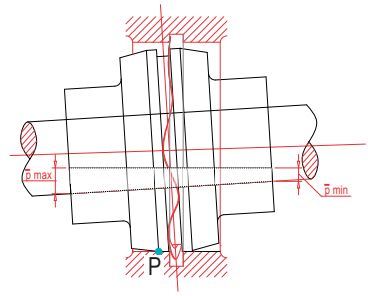


fig. 3 Undulated spring under load

TECHNICAL DETAILS MM AND MS BEARINGS

Bearing housing: Cast iron; in halves, split lines and base with ground finish. Four joint studs with locking nuts and dowel pins for effective absorption of horizontal and axial loads. Large oil sump, oil drain and oil level plug; from sizes MS 7/MM 8 upward with oil level sight hole on the longitudinal side of the bearing. Cylindrical end bores of housing; from sizes MS 7/MM 8 upward with groove for taking up a felt packing ring (extra price).

For specific requirements, special seals can be installed or attached.

Bearing shell: Cast iron; in halves, located by dowel pins. Central fixed oil ring and discharge holes. Oil deflection by loose oil scraper of steel guided in a milled slot in the upper shell. Oil flow via the top shell oil pockets through oil inlet grooves in the assembly joint. Whitmetal lining closely bonded to the backing material. Superfinished running surfaces. Identical shells for

locating and non-locating bearing. The tilting motion of the shell is ensured by narrow supporting rails and the adjoining chamfered edges of the oil ring shroud. Frictionless self-adjustability by means of the undulated spring halves which engage in the annular grooves of both shell and housing. Upper half of undulated spring with stop pin retaining the bearing shell; lower shell removable without dismantling of the shaft.

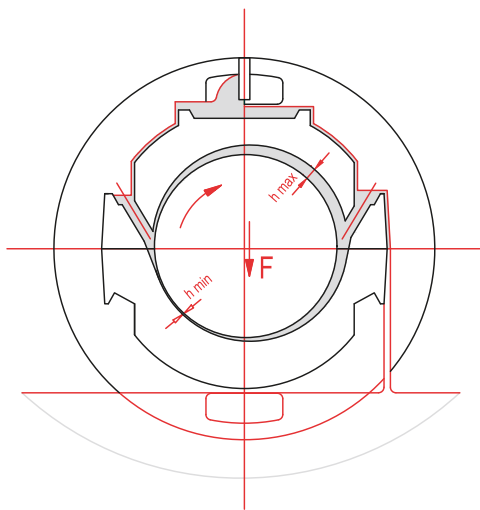
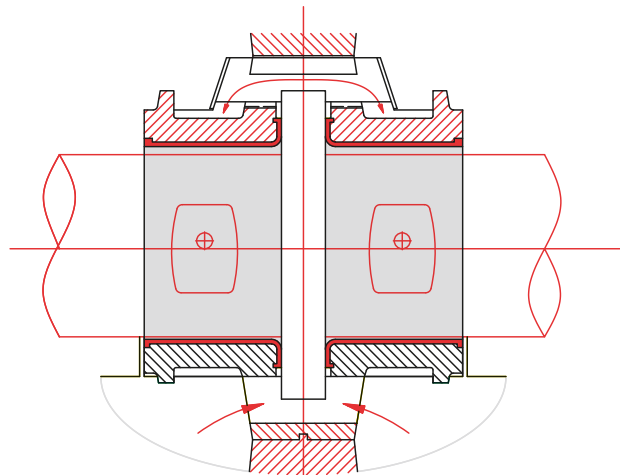
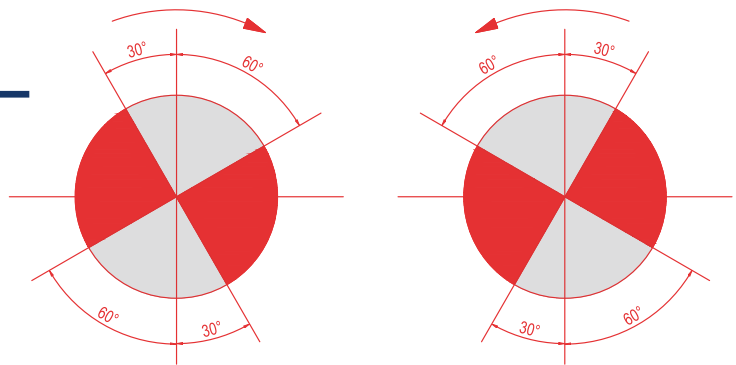


fig. 4 Lubrication by fixed oil ring



TECHNICAL INFORMATION



The load table represents maximum values. In order to obtain the admissible loads at different operating conditions, the following indications have to be considered:

1. Load and load direction

- 1.1 Downward load to bottom half-shell (within the white field): the tabulated F_u values are applicable.
- 1.2 Load directed towards the assembly joint (within the black field): 40% of the tabulated F_u values are admissible.
- 1.3 Upward load to upper half-shell (within the grey field): the tabulated F_o values are applicable, or the values F_u if inferior to F_o .
- 1.4 In axial direction: The admissible thrust loads on the locating bearing are 3% of the tabulated F_u values. A higher load can be admitted for a short time, e.g. when a mechanical friction clutch is operated.

2. Operating conditions

The admissible loads to para 1 are valid for:

- 2.1 rotating shafts
- 2.2 regular service
- 2.3 ambient and shaft temperature 15 to 25°C
- 2.4 erection on bed plate

They are NOT valid for:

- 2.5 reversing duty
- 2.6 irregular service with shockloads
- 2.7 erection on brackets, trestle or steel construction. In these cases only 60% of the tabulated F_u values are permitted unless lower values to 1.2 or 1.3 are to be considered.

3. Bores and appropriate shafts

- 3.1 All M bearings are manufactured with a bore tolerance D 9 to ISO.
- 3.2 The admissible journal loads according to para 1 are valid for ground shafts with a tolerance h 6 to h 8, C.L.A. = 0,5 µm.

4. Lubrication

- 4.1 Any good quality mineral oil is suitable.
- 4.2 The viscosity depends on the R.P.M. and loading. The load table shows the required viscosities.

5. Admissible bearing temperature

- 5.1 To prevent premature oxidation of lubricant, the maximum oil film temperature of 80°C should not be exceeded.
- 5.2 Regulations of Classification Bureaux or directions for special requirements have to be considered.

6. Loads at speeds not contained in the tables

- 6.1 Lower speeds can be admitted in some cases, with use of special oil conveying devices (oil scoopers). Please enquire.
- 6.2 Higher speeds can be admitted, if the bearings are connected to an external oil circulation system dissipating the heat. Please enquire.

7. Installation and maintenance

When using M-type bearings, please observe our 'Instructions for installation, maintenance and operation'.

1	Type	M
2	Series	<div> <div>M</div> <div>S</div> </div> <div> medium series heavy series </div>
3	Heat dissipation	<div> <div>N</div> <div>Z</div> </div> <div> natural cooling lubrication by oil circulation with external oil cooling </div>
4	Thrust surface	<div> <div>L</div> <div>F</div> </div> <div> non-locating or guide bearing locating bearing </div>

Example

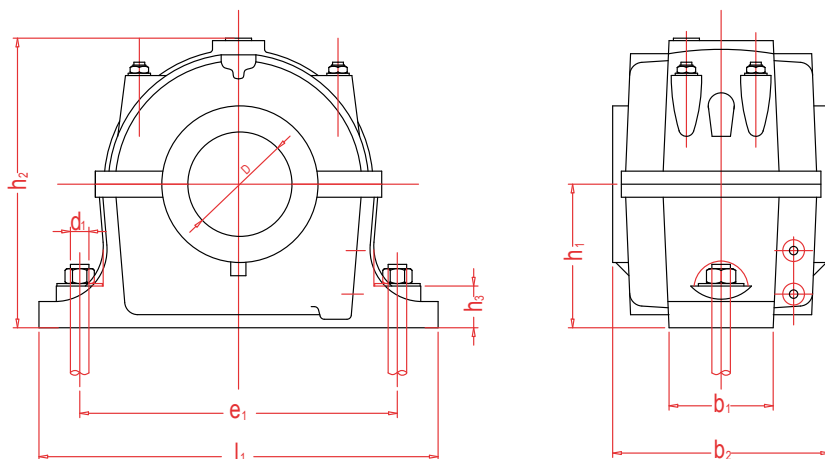
for quoting a complete bearing

1 2 3 4
M M N L 8 - 80

Slide bearing type M, medium series, with natural cooling, non-locating or guide bearing, size 8, shaft diameter 80 mm.

DIMENSIONS OF BEARINGS

MMNF, MMNL, MSNF, MSNL



MMNF and MMNL Bearings - DIN 118, type of construction G										Dimensions in mm	
Size	Shaft Ø D	b ₁	b ₂	d ₁	e ₁	h ₁	h ₂	h ₃	l ₁	Oil Capacity litres a.b.	Weight incl. oil ring [kg]
4	40	52	110	M12	150	65	140	25	200	0,18	6,5
5	50	60	125	M12	170	75	160	25	220	0,2	8,5
6	60	70	140	M16	200	90	190	30	260	0,3	14
7	70	80	160	M16	230	100	210	30	290	0,45	19
8	80	90	180	M20	260	110	230	35	330	0,65	26
9	90	100	200	M20	290	125	260	35	370	1,0	35
11	100 110	110	220	M24	320	140	290	50	410	1,5	50
14	125 140	130	250	M24	370	165	340	50	470	2,0	75
18	160 180	160	300	M30	450	200	410	70	560	3,5	125

MSNF and MSNL Bearings - DIN 118, type of construction K*										Dimensions in mm	
Size	Shaft Ø D	b ₁	b ₂	d ₁	e ₁	h ₁	h ₂	h ₃	l ₁	Oil Capacity litres a.b.	Weight incl. oil ring [kg]
4	40	60	125	M12	170	75	160	25	220	0,2	8,5
5	50	70	140	M16	200	90	190	30	260	0,3	14,5
6	60	80	160	M16	230	100	210	30	290	0,45	20
7	70	90	180	M20	260	110	230	35	330	0,65	27
8	80	100	200	M20	290	125	260	35	370	1,0	36,5
9	90	110	220	M24	320	140	290	50	410	1,5	52
11	100 110	130	250	M24	370	165	340	50	470	2,0	78
14	125 140	160	300	M30	450	200	410	70	560	3,5	133

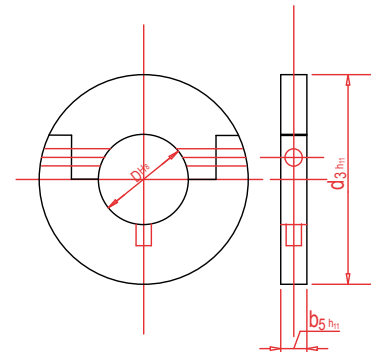
* Not for new bearings, but for spare parts only

DIMENSIONS

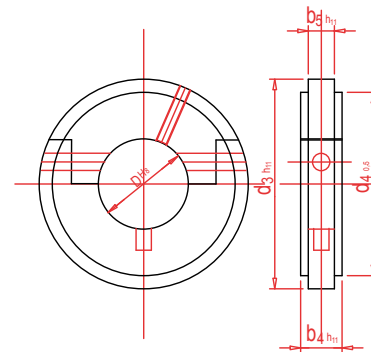
OF OIL RINGS, ADJUSTABLE COLLARS, SHOULDERS, SHAFT COLLARS

for slide bearings MMNF and MMNL							Dimensions in mm
Size	Shaft Ø D	b_4	b_5	d_3	d_4	r_1	
4	40	14,2	14	80	70	—	
5	50	14,2	14	90	80	—	
6	60	16,3	16	105	95	—	
7	70	16,3	16	115	105	—	
8	80	20,6	20	130	120	5	
9	90	20,6	20	150	138	5	
11	100	20,6	20	170	158	5	
14	125	25,8	25	200	185	5	
18	160	25,8	25	245	230	5	

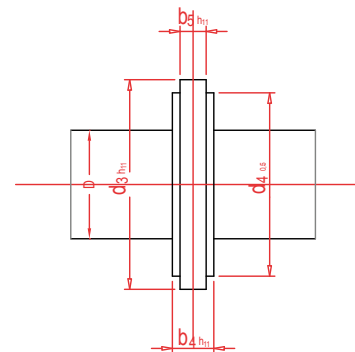
for slide bearings MSNF and MSNL							Dimensions in mm
Size	Shaft Ø D	b_4	b_5	d_3	d_4	r_1	
4	40	14,2	14	85	75	—	
5	50	16,3	16	100	90	—	
6	60	16,3	16	110	100	—	
7	70	20,6	20	125	115	5	
8	80	20,6	20	135	123	5	
9	90	20,6	20	160	148	5	
11	100	25,8	25	180	165	5	
14	125	25,8	25	220	205	5	



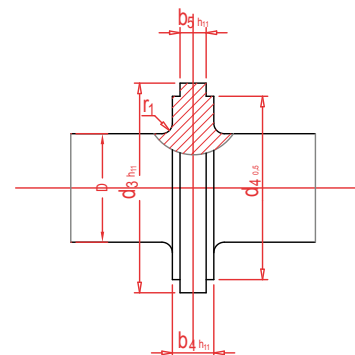
with oil ring in halves, non-locating bearing



with adjustable collar in halves, locating bearing



with shrunk-on collar, guide or locating bearing














with integral shaft collar, guide or locating bearing

LOAD TABLE

Load Table													
speed in [R.P.M.]	Bore D = 40 mm		Bore D = 50 mm		Bore D = 60 mm		Bore D = 70 mm		Bore D = 80 mm		Bore D = 90 mm		recommended lubricants in ISO_VG viscosity grades
	MMN	MSN	MMN	MSN	MMN	MSN	MMN	MSN	MMN	MSN	MMN	MSN	
	Admissible load F _u in [N]												
8													VG 150
10													
12,5													
16													
20													
25									20800	23000	28500	31500	
31,5					11300	13500	18000	21000	24000	26500	29500	34000	
40			8300	9800	13500	16200	18500	21000	24000	26500	29500	34000	
50	5800	6700	9600	11200	13500	16200	18500	21000	24000	26500	29500	34000	VG 100
63	6700	7600	9600	11200	13500	16200	18500	21000	24000	26500	29500	34000	
80	6700	7600	9600	11200	13500	16200	18500	21000	24000	26500	29500	34000	
100	6700	7600	9600	11200	13500	16200	18500	21000	24000	26500	29500	34000	
125	6700	7600	9600	11200	13500	16200	18500	21000	24000	26500	29500	34000	VG 68
160	6700	7600	9600	11200	13500	16200	18500	21000	24000	26500	29500	34000	
200	6700	7600	9600	11200	13500	16200	18500	21000	24000	26500	29500	34000	
250	6700	7600	9600	11200	13500	16200	18500	21000	24000	26500	29500	34000	
315	6700	7600	9600	11200	13500	16200	18500	21000	24000	26500	29500	34000	
400	6700	7600	9600	11200	13500	16200	18500	21000	24000	26500	29500	34000	
500	6700	7600	9600	11200	13500	16200	18500	21000	24000	26500	29500	34000	
560	6700	7600	9600	11200	13500	16200	18500	21000	24000	26500	29000	34000	
630	6700	7600	9600	11200	13500	16200	18500	21000	23500	26500	28200	34000	
710	6700	7600	9600	11200	13500	16200	18500	21000	23000	26500	26000	34000	
800	6700	7600	9600	11200	13500	16200	18300	21000	21000	26500	23000	30500	
900	6700	7600	9600	11200	13500	16200	16500	21000	18400	23600	20500	27500	
1000	6700	7600	9400	11200	12200	16200	15200	20000	16800	22500	18300	24800	
1120	6700	7600	9200	11200	11200	15600	13200	18000	14800	19500	16400	22000	
1250	6600	7600	8600	11200	10000	14500	12000	16000	13200	17500	14400	21000	
1400	6500	7600	7800	10700	8700	13000	10700	14000	11600	15800	12000	17000	
1600	5900	7600	6750	9700	7800	10000	9200	12500	9400	13000	10000	14000	VG 32
1800	5300	7000	5900	8200	7000	9700	7500	10500	8000	11000	8400		
2000	4800	6700	5200	7500	5800	8800	6600	9100	7000				
2240	4300	5900	4700	6600	5000	7500	5500						
2500	3800	5100	4000	5600	4300								
2800	3250	4500	3400										
3150	2750												
same as F _u	Admissible load F _o in [N]												
	3350	3800	4800	5600	6750	8100	9250	10500	12000	13250	14750	17000	

Load Table											recommended lubricants in ISO-VG viscosity grades	
speed in [R.P.M.]	Bore D = 100 mm		Bore D = 110 mm		Bore D = 125 mm		Bore D = 140 mm		Bore D = 140 mm	Bore D = 180 mm		
	MMN	MSN	MMN	MSN	MMN	MSN	MMN	MSN	MMN	MMN		
	Admissible load F _u in [N]											
8											VG 150	
10												
12,5									75000	91000		
16					45500	59000	52000	70000	86000	95000		
20	32500	36500	40000	41000	52500	68000	58500	75000	86000	95000		
25	37500	42000	41500	46000	52500	68000	58500	75000	86000	95000		
31,5	37500	42000	41500	46000	52500	68000	58500	75000	86000	95000	VG 100	
40	37500	42000	41500	46000	52500	68000	58500	75000	86000	95000		
50	37500	42000	41500	46000	52500	68000	58500	75000	86000	95000		
63	37500	42000	41500	46000	52500	68000	58500	75000	86000	95000		
80	37500	42000	41500	46000	52500	68000	58500	75000	86000	95000		
100	37500	42000	41500	46000	52500	68000	58500	75000	86000	95000	VG 68	
125	37500	42000	41500	46000	52500	68000	58500	75000	86000	95000		
160	37500	42000	41500	46000	52500	68000	58500	75000	86000	95000		
200	37500	42000	41500	46000	52500	68000	58500	75000	86000	95000		
250	37500	42000	41500	46000	52500	68000	58500	75000	86000	95000		
315	37500	42000	41500	46000	52500	68000	58500	75000	86000	95000		
400	37500	42000	41500	46000	52500	68000	58500	75000	86000	91000		
500	37000	42000	40000	46000	52500	68000	57000	75000	72000	85000		
560	36500	42000	37500	46000	51000	68000	52000	70000	66000	63000		
630	32500	42000	33000	46000	44000	62500	45000	63000	57500	56500		
710	29000	42000	29500	43000	40200	56500	41000	58000	52000	47000		
800	26500	39000	26500	38500	35000	50000	35500	50000	42000	39000	VG 32	
900	23200	34000	23000	35000	31500	44000	29500	44000	36000	33000		
1000	20600	31000	20500	31000	26300	40000	23500	40000	31000	28000		
1120	18200	28000	17300	28000	22800	36000	21800	36000	26500			
1250	15700	24500	15000	24500	19500		16800					
1400	13200	22500	12500	20000	16600		18600					
1600	12000											
1800												
2000												
2240												
2500												
2800												
3150												
same as F _u	Admissible load F _o in [N]											same as F _u
	18750	21000	20750	23000	26250	34000	29250	37500	43000	47500		

PRODUCTS

Overview		
 <p>Stud</p>	 <p>Feltrings</p>	 <p>Oil scraper</p>
 <p>Undulated spring</p>	 <p>Lock nuts and loosen rings</p>	 <p>Oil sight glass</p>
 <p>Oil ring</p>	 <p>End plug</p>	 <p>G-Key</p>
 <p>Coil springs and whasers</p>	 <p>Bearing shell</p>	 <p>Bearing housing</p>



A.Z. Hollink B.V.

Laan van de Ram 49
7324 BW Apeldoorn
The Netherlands

T +31 (0) 881 200 380
E info@azhollink.eu
W www.azhollink.eu

Images may differ from reality. All content (logo, text, data, graphics, and images) may not be reproduced, copied, transmitted or manipulated without the prior written permission of the AZ Hollink Group. All content (text, diagrams and pictures) is subject to alteration. We accept no liability.

AZHollink
transmissions

WWW.AZHOLLINK.EU