

(Dimensions following DIN 1850)

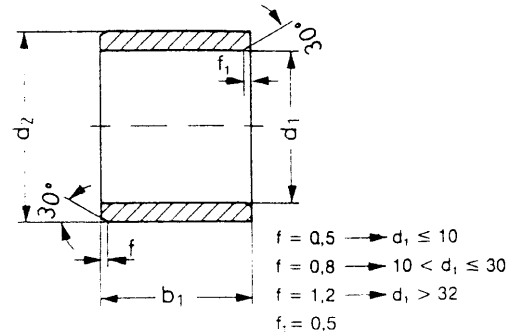
Recommended tolerances for installation
Housing bore H7
Shaft h9

Construction of order number:

MSM - 0 1 0 3 - 0 2

		d1	d2	b1	(in mm)			
		Metric dimension						
		Type						
		Material						

Type S



Order No.	d1 ¹⁾	d2	b1 ²⁾	Order No.	d1 ¹⁾	d2	b1 ²⁾
MSM-0103-02	1 +0,020 +0,080	3	2	MSM-0814-06	8 +0,040 +0,130	14	6
MSM-0104-02	1,5 +0,020 +0,080	4	2	MSM-0814-10	8 +0,040 +0,130	14	10
MSM-0205-02	2 +0,020 +0,080	5	2	MSM-0912-14	9 +0,040 +0,130	12	14
MSM-0205-03	2 +0,020 +0,080	5	3	MSM-1014-06	10 +0,040 +0,130	14	6
MSM-0206-03	2,5 +0,020 +0,080	6	3	MSM-1014-08	10 +0,040 +0,130	14	8
MSM-0305-03	3 +0,020 +0,080	5	3	MSM-1014-10	10 +0,040 +0,130	14	10
MSM-0305-04	3 +0,020 +0,080	5	4	MSM-1014-16	10 +0,040 +0,130	14	16
MSM-0306-03	3 +0,020 +0,080	6	3	MSM-1016-06	10 +0,040 +0,130	16	6
MSM-0306-04	3 +0,020 +0,080	6	4	MSM-1016-10	10 +0,040 +0,130	16	10
MSM-0407-03	4 +0,030 +0,105	7	3	MSM-1016-16	10 +0,040 +0,130	16	16
MSM-0407-04	4 +0,030 +0,105	7	4	MSM-1016-50	10 +0,040 +0,130	16	50
MSM-0407-06	4 +0,030 +0,105	7	6	MSM-1214-20	12 +0,050 +0,160	14	20
MSM-0408-06	4 +0,030 +0,105	8	6	MSM-1216-15	12 +0,050 +0,160	16	15
MSM-0508-04	5 +0,030 +0,105	8	4	MSM-1216-20	12 +0,050 +0,160	16	20
MSM-0508-05	5 +0,030 +0,105	8	5	MSM-1218-08	12 +0,050 +0,160	18	8
MSM-0508-08	5 +0,030 +0,105	8	8	MSM-1218-10	12 +0,050 +0,160	18	10
MSM-0509-05	5 +0,030 +0,105	9	5	MSM-1218-15	12 +0,050 +0,160	18	15
MSM-0509-08	5 +0,030 +0,105	9	8	MSM-1218-20	12 +0,050 +0,160	18	20
MSM-0608-10	6 +0,030 +0,105	8	10	MSM-1416-10	14 +0,050 +0,160	16	10
MSM-0609-06	6 +0,030 +0,105	9	6	MSM-1416-15	14 +0,050 +0,160	16	15
MSM-0610-04	6 +0,030 +0,105	10	4	MSM-1416-20	14 +0,050 +0,160	16	20
MSM-0610-06	6 +0,030 +0,105	10	6	MSM-1420-10	14 +0,050 +0,160	20	10
MSM-0610-10	6 +0,030 +0,105	10	10	MSM-1420-15	14 +0,050 +0,160	20	15
MSM-0612-06	6 +0,030 +0,105	12	6	MSM-1420-20	14 +0,050 +0,160	20	20
MSM-0612-10	6 +0,030 +0,105	12	10	MSM-1517-10	15 +0,050 +0,160	17	10
MSM-0710-05	7 +0,040 +0,130	10	5	MSM-1517-15	15 +0,050 +0,160	17	15
MSM-0710-08	7 +0,040 +0,130	10	8	MSM-1521-10	15 +0,050 +0,160	21	10
MSM-0810-06	8 +0,040 +0,130	10	6	MSM-1521-15	15 +0,050 +0,160	21	15
MSM-0810-08	8 +0,040 +0,130	10	8	MSM-1521-20	15 +0,050 +0,160	21	20
MSM-0810-10	8 +0,040 +0,130	10	10	MSM-1618-12	16 +0,050 +0,160	18	12
MSM-0811-08	8 +0,040 +0,130	11	8	MSM-1618-20	16 +0,050 +0,160	18	20
MSM-0811-12	8 +0,040 +0,130	11	12	MSM-1620-20	16 +0,050 +0,160	20	20
MSM-0812-06	8 +0,040 +0,130	12	6	MSM-1620-25	16 +0,050 +0,160	20	25
MSM-0812-08	8 +0,040 +0,130	12	8	MSM-1622-12	16 +0,050 +0,160	22	12
MSM-0812-10	8 +0,040 +0,130	12	10	MSM-1622-15	16 +0,050 +0,160	22	15
MSM-0812-12	8 +0,040 +0,130	12	12	MSM-1622-16	16 +0,050 +0,160	22	16

(Dimensions following DIN 1850)

Recommended tolerances for installation
Housing bore H7
Shaft h9

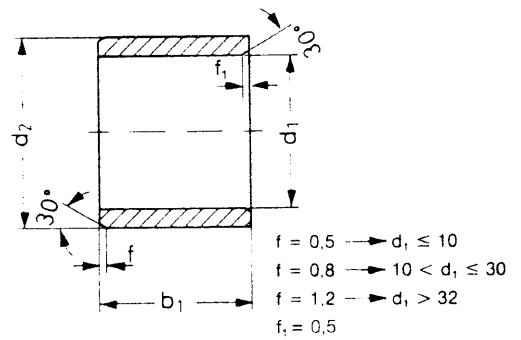
Construction of order number:

MSM-0608-08

Material | Type | Metric dimension

d1 d2 b1 (in mm)

Type S



Order No.	d1 ¹⁾	d2	b1 ²⁾	Order No.	d1 ¹⁾	d2	b1 ²⁾
MSM-1622-20	16 +0,050 +0,160	22	20	MSM-2836-30	28 +0,065 +0,195	36	30
MSM-1622-25	16 +0,050 +0,160	22	25	MSM-2836-40	28 +0,065 +0,195	36	40
MSM-1824-12	18 +0,050 +0,160	24	12	MSM-3038-20	30 +0,065 +0,195	38	20
MSM-1824-20	18 +0,050 +0,160	24	20	MSM-3038-30	30 +0,065 +0,195	38	30
MSM-1824-30	18 +0,050 +0,160	24	30	MSM-3038-40	30 +0,065 +0,195	38	40
MSM-2023-15	20 +0,065 +0,195	23	15	MSM-3240-20	32 +0,080 +0,240	40	20
MSM-2023-20	20 +0,065 +0,195	23	20	MSM-3240-30	32 +0,080 +0,240	40	30
MSM-2025-20	20 +0,065 +0,195	25	20	MSM-3240-40	32 +0,080 +0,240	40	40
MSM-2025-30	20 +0,065 +0,195	25	30				
MSM-2026-15	20 +0,065 +0,195	26	15				
MSM-2026-20	20 +0,065 +0,195	26	20				
MSM-2026-30	20 +0,065 +0,195	26	30				
MSM-2226-15	22 +0,065 +0,195	26	15				
MSM-2228-10	22 +0,065 +0,195	28	10				
MSM-2228-15	22 +0,065 +0,195	28	15				
MSM-2228-20	22 +0,065 +0,195	28	20				
MSM-2228-30	22 +0,065 +0,195	28	30				
MSM-2430-15	24 +0,065 +0,195	30	15				
MSM-2430-20	24 +0,065 +0,195	30	20				
MSM-2430-30	24 +0,065 +0,195	30	30				
MSM-2528-12	25 +0,065 +0,195	28	12				
MSM-2528-20	25 +0,065 +0,195	28	20				
MSM-2530-20	25 +0,065 +0,195	30	20				
MSM-2530-30	25 +0,065 +0,195	30	30				
MSM-2530-40	25 +0,065 +0,195	30	40				
MSM-2532-20	25 +0,065 +0,195	32	20				
MSM-2532-30	25 +0,065 +0,195	32	30				
MSM-2532-40	25 +0,065 +0,195	32	40				
MSM-2630-20	26 +0,065 +0,195	30	20				
MSM-2632-30	26 +0,065 +0,195	32	30				
MSM-2734-20	27 +0,065 +0,195	34	20				
MSM-2734-30	27 +0,065 +0,195	34	30				
MSM-2734-40	27 +0,065 +0,195	34	40				
MSM-2833-20	28 +0,065 +0,195	33	20				
MSM-2836-20	28 +0,065 +0,195	36	20				

¹⁾ Tolerance for d1 after being press-fitted in housing H7

²⁾ Tolerance h13 for b1

iglidur M250

Thick and Robust

iglidur M250 self-lubricating bearings are ideally suited for harsh environments. Impact resistance and vibration dampening, wear resistance and the ability to absorb dirt ingress represent the primary advantages of this bearing type.

iglidur M250 is based on a thermoplastic alloy, modified for general load resistance and low wear. A mix of solid lubricants provides the self-lubricating effect during dry operation as well as a high crystalline level on the surface, thus increasing wear resistance substantially. (Illustration 5.1)

iglidur M250 is primarily used in the manufacture of agricultural, sports and leisure equipment, gardening tools, mountings for the construction industry, with furniture, boat manufacture, medical technology, machinery manufacture as well as packaging and textile machines.

Special Characteristics of iglidur M250

- Excellent vibration dampening characteristics, 250 times better than steel
- Impact resistant
- Excellent abrasion resistance
- Thick walls to withstand harsh environment
- Ability to withstand dirt ingress
- Maintenance-free dry operation due to solid lubricants
- Quiet operation
- Suited for slowly rotating, oscillating and all linear motion
- Possibility of retrofitting other bearing types
- Cost effective

p · v Values

iglidur M250 bearings are designed for low to average loads during continuous operation. Illustration 5.3 depicts the maximum permissible p · v values for dry operation. During dry operation, iglidur M250 has a load capacity of up to $0.3 \text{ N/mm}^2 \times \text{m/s}$. Values up to $2 \text{ N/mm}^2 \times \text{m/s}$ can be achieved with permanent lubrication using grease, oil or water.

While iglidur M250 does not stand up well to high rotational speed during dry operation, this material features extremely high levels of wear resistance during slow rotating, oscillating and axial motion. Table 5.1 lists the surface speeds for various types of operation.

Compressive Strength

iglidur M250 has a load capacity of approx. 12 N/mm^2 at operating temperatures up to $115 \text{ }^\circ\text{C}$. Temperatures up to $200 \text{ }^\circ\text{C}$ are possible for short duration. (Illustration 5.4)

iglidur M250 flanged bushings are capable of the same axial pressure through the bearing flange.

5.2

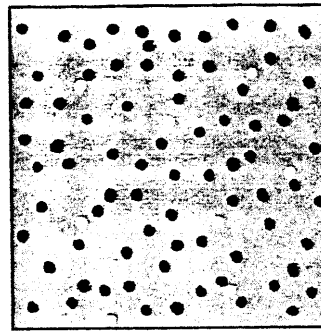


Illustration 5.1
Structure of iglidur M250
Impact resistant thermo-
plastic alloy + solid
lubricants



Illustration 5.2
iglidur M250 – Thick and Robust
Impact resistance and vibration dampening, wear resistance and the ability to withstand dirt ingress are among the best qualities of this bearing.

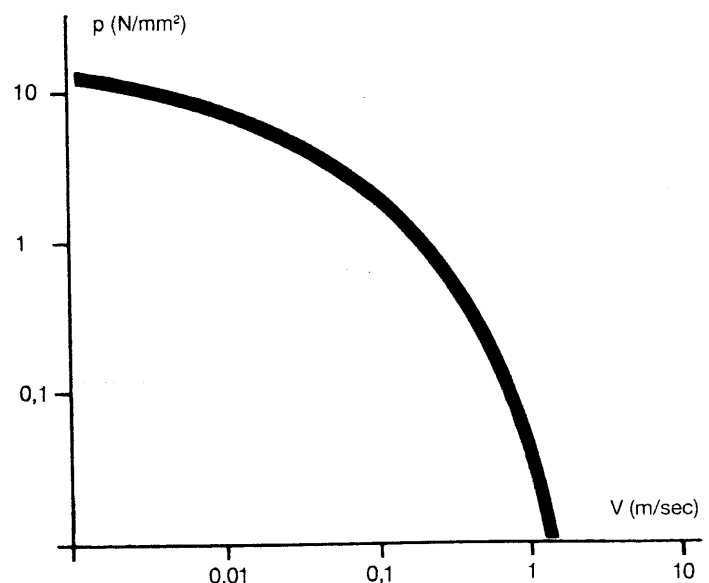


Illustration 5.3
Permissible p · v values for iglidur M250 in dry operation
with steel

Table 5.1
Maximum surface speed for iglidur M250 during dry operation

in m/s	Rotating	Oscillating	Linear
Continuous	1	1	3
Short duration	2	2	5

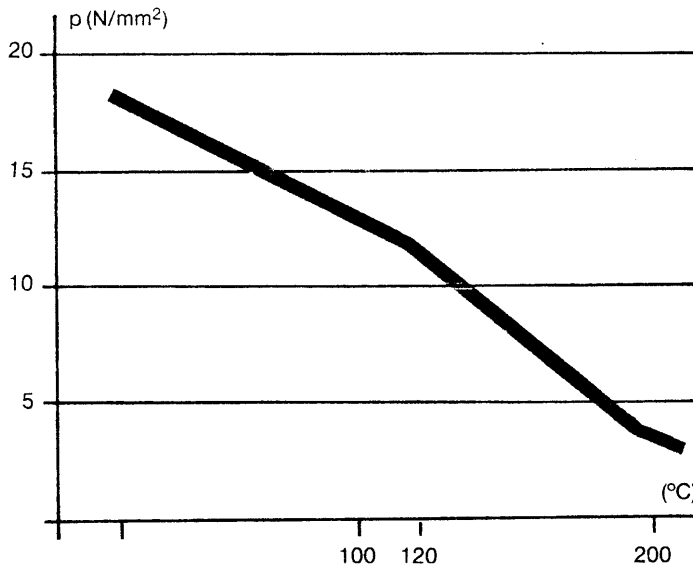


Illustration 5.4
Permissible static unit pressure as a function of operating temperature °C for iglidur M250

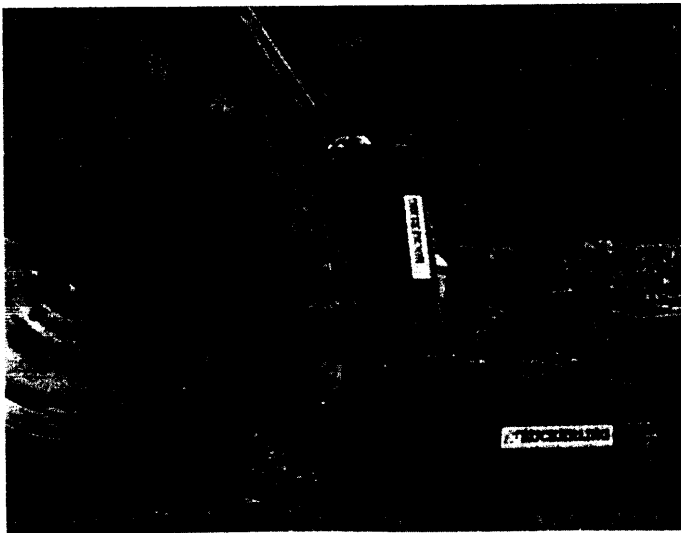


Illustration 5.5
Application: Agricultural Machines
In drilling and sowing machines the plain bearings are exposed to **extreme contamination, weather and shocks**. The fact that the plain bearing runs under dry operation ensures that the dirt does not enter the bearing location.

Coefficients of Friction

During dry operation with hardened steel, the friction value of iglidur M250 varies between 0.18 and 0.30. The lower friction values can be achieved during lower speeds.

The friction value will decrease to 0.04 with permanent water or oil lubrication. (Table 5.2)

Table 5.2
Coefficients of friction for iglidur M250 with steel

	Dry	Grease	Oil	Water
igidur M250	0,18–0,30	0,09	0,04	0,04
Steel shaft: Hardness 50 HRC, Hrms = 1 µm				

The "start-up" capability during dry operation is excellent for iglidur M250. Dynamic and static friction values are almost identical.

During the start-up phase, friction values will be higher than average until the microscopic abrasion has embedded into the shaft surface. Initial, one-time installation lubrication ensures quiet operation of the bearings from the start.

Operating Temperatures

igidur M250 will reach maximum performance during operating temperatures up to 80 °C. The recommended temperature for continuous operation is 115 °C. During cold temperature operation, iglidur M250 maintains its load capacity to -40 °C. (Table 5.3)

Table 5.3
Operating temperatures for iglidur M250

Wear limit °C	Continuous operation °C	Short duration °C
80	115	200

Vibration Dampening Properties

The mechanical loss factor for iglidur M250 which is applied in measuring vibration dampening properties, is 250 times higher than for steel. As a result, the bearing operates quietly and vibratory noise is reduced to a minimum.

Service Life

iglidur M250 is characterized by a high wear resistance. iglidur M250 is particularly superior to lubricated bearings in heavy duty operation.

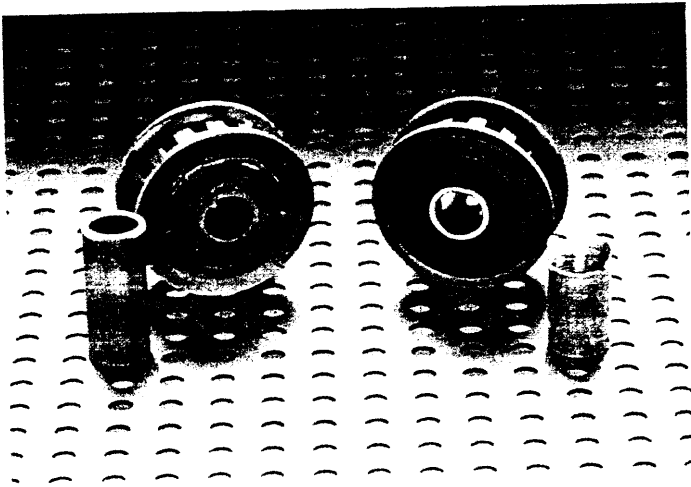


Illustration 5.6
iglidur M250 compared with a metallic bearing in a mail sorting machine.

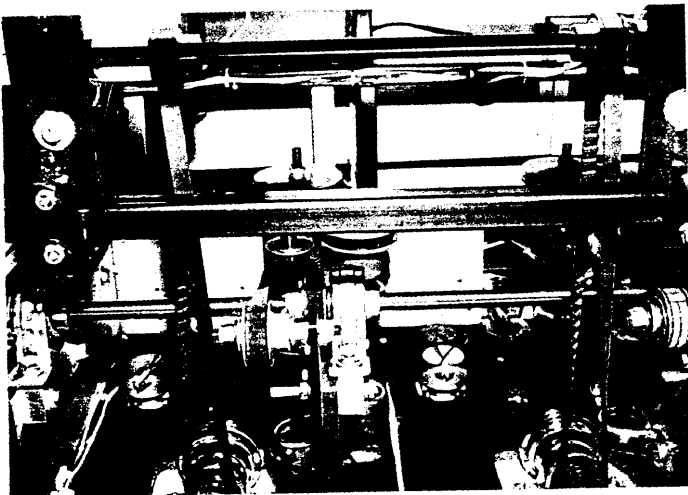


Illustration 5.7
Application: Mail Sorting Machine
Paper dust which is very aggressive resulted in a rapid failure of sintered bearings. The bearings had to be cleaned and relubricated every four weeks. In spite of this, most of them only reached a service life of 2 months. iglidur M250 plain bearings work maintenance-free for longer than 1.5 years.

Electrical Properties

iglidur M250 offers electrically isolating properties. The specific resistance is $10^{12} \Omega \text{ cm}$.

Radiation Resistance

- Restrictions apply if iglidur M250 is to be used under the influence of radiation. Gamma rays in excess of 10 MRad are capable of damaging the material, effecting a 50% reduction in performance.

Vacuum

iglidur M250 can only be used in a vacuum to a limited degree. Gasses are emitted.

Weather Resistance

iglidur M250 is resistant to UV radiation. It is highly resistant to aging, and is the preferred choice for outdoor applications.

Chemical Resistance

iglidur M250 is resistant to cleaning materials, benzene, oil, grease, alkaline solutions and several acid solutions of weak concentration. Please refer to the list of resistance values on page 1.22 for further details.

Shaft Materials

iglidur M250 shows best results in conjunction with hardened steel shafts 50 HRC, with an average surface finish of $H_{rms} = 1.5$ to $3 \mu\text{m}$ concerning friction values and wear.

Softer shaft materials may result in high levels of wear to the shaft itself. However, softer materials can be used in many applications with lower load requirements. When choosing the shaft material, please contact us if something other than the recommended "hardened steel" has to be used.

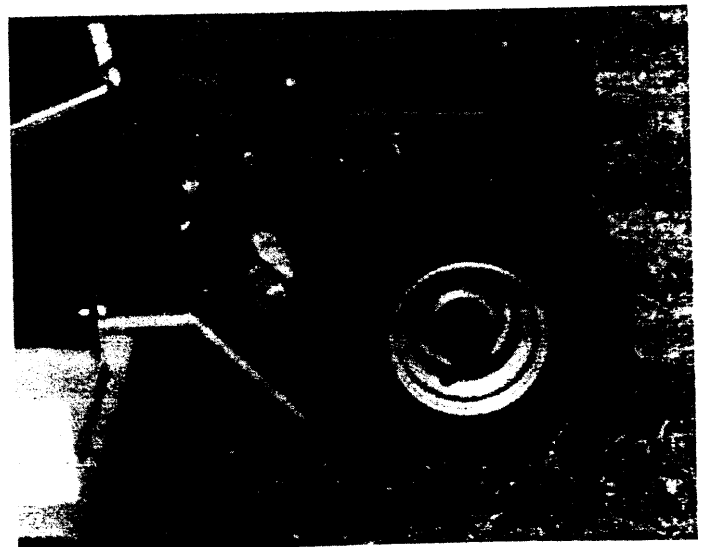


Illustration 5.8
Application: Wheel Bearing
Vibration dampening under average loads as well as **corrosion resistance** are the technical advantages of iglidur M250 plain bearings for the wheel bearings of lawn mowers. Rustproof shafts and less accurate shafts can be matched well with iglidur M250.

Fitting Practice

The tolerance fields are shown in table 5.4. iglidur M250 requires relatively high bearing tolerances for optimum performance (refer to DIN 1850/16). The tolerances ensure performance reliability during temperature deviations and water absorption, i.e. 1.5% in the case of iglidur M250.

The excellent dampening characteristics balance the effect of bearing tolerances. While such tolerances would not be acceptable for metallic bearings, they actually enhance some of the most significant advantages of iglidur M250 bearings, namely wear resistance and zero maintenance requirements.

igidur M250 bearing bushings are very suitable for being mechanically reworked by boring or turning if the application requires this. Processing of the bearing face with pressure application should be carried out in the press-fitted condition if possible.

Table 5.4
Installation dimensions of iglidur M250 standard plain bearings

Tolerance fields for iglidur M250

Diameter d1	Shaft (h9)	igidur M250 (D 11) ¹⁾
from 1 mm	0	+ 80
to 3 mm	- 25 μm	+ 20 μm
over 3 mm	0	+ 105
to 6 mm	- 30 μm	+ 30 μm
over 6 mm	0	+ 130
to 10 mm	- 36 μm	+ 40 μm
over 10 mm	0	+ 160
to 18 mm	- 43 μm	+ 50 μm
over 18 mm	0	+ 195
to 30 mm	- 52 μm	+ 65 μm
over 30 mm	0	+ 240
to 50 mm	- 62 μm	+ 80 μm

¹⁾ After being press-fitted into housing bore H7

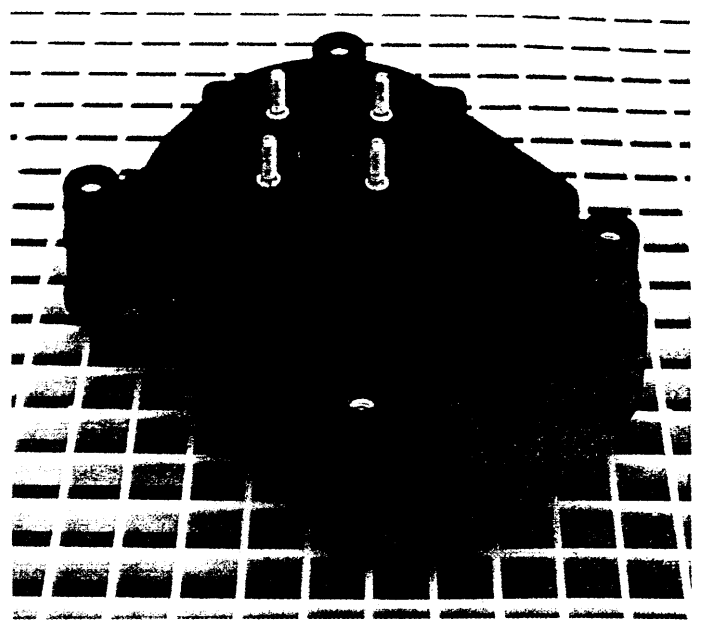


Illustration 5.9

Application: Waste Water Pump

The plain bearings are moved with an **eccentric oscillating lateral load with 400 rpm**. The waste water is polluted with suspended particles and chemicals. Sintered bronze bearings and rolled and coated plain bearings failed early. iglidur M250 plain bearings reach a service life of at least five years.

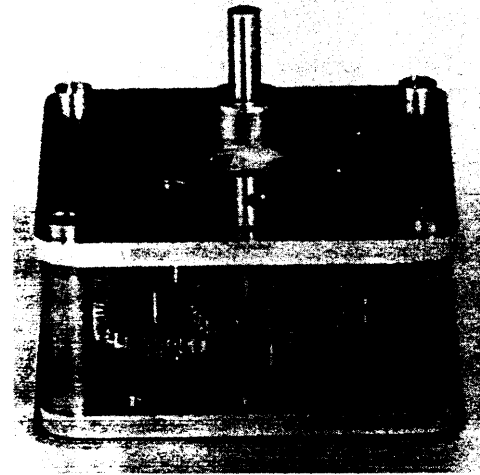


Illustration 5.10

Application: Precision Gears

The special requirements in this gear are the **very different surface speeds**. In the event of low speeds no stick slip may occur. Nevertheless, high speeds of up to 5,300 rpm have to be mastered.