

FER-MAS®

Solid, turned, ground and hardened steel plain bearing | Requires maintenance

Bearing properties

FER-MAS® is a steel sliding bearing without integrated sliding material. Good lubrication is required! Suitable for highest loads, resistant, long service life.

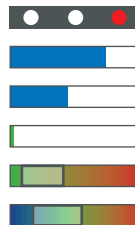
Material properties

Carrier material 100Cr6 hardened and ground
alternatively 20MnV6



Material properties

Maintenance	Requires maintenance
spec. static load capacity	≤ 250 N/mm ²
spec. dynamic load capacity	≤ 150 N/mm ²
Sliding speed	≤ 0,6 m/s
Friction value	0,05 to 0,25
Temperature strain	- 100 to + 250 °C
Max. Pv - value	1,2 N/mm ² x m/s
Hardness	58 – 62 HRC



Tolerance specifications

Housing bore-ø	H7
Shaft tolerance	f7 to h6

Shaft material

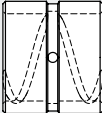
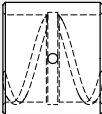
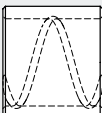
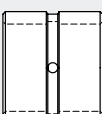
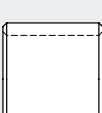
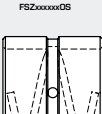

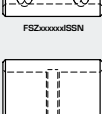
Hardened steel (C45 recommended)

Mounting instructions

Housing bore	Installation chamfer, approx. 1,5 mm x 15 to 45°
Shaft	Installation chamfer, 5 mm x 15°, edges rounded.
Fitting mandrel	For assembly, we suggest to use an adequate fitting mandrel. Grease lubrication of the outer surface may be necessary when mounting.



FER-MAS® groove systems:

- 
AIS
 Outside inside lubrication
FSZxxxxxAIS
- 
IS
 Inside lubrication
FSZxxxxxIS
- 
ISS
 Internal lubrication spiral groove
FSZxxxxxISS
- 
AIRS
 Outside inside radial lubrication
FSZxxxxxAIRS
- 
OS
 Without lubrication
 (Attention, only groove name.
 Maintenance is still required).
FSZxxxxxOS
- 
AISN
 Outside inside lubrication
 Non leaking
FSZxxxxxAISN
- 
ISSN
 Internal lubrication spiral groove
 Non leaking
FSZxxxxxISSN
- 
IRS
 Internal radial lubrication
FSZxxxxxIRS

FER-MAS® is available in AIS, IS and OS as standard product. Individual adaptations can be taken into account during production.

Information on sliding bearings

Sliding bearings are the most commonly used bearings in mechanical engineering. In the following, we would like to inform you about various properties of sliding bearings to give you the best possible insight. Our extensive range of bearings offers products for every need.

Advantages of sliding bearings

Due to the largely completely different application properties of sliding bearings, even the most difficult requirements can usually be optimally fulfilled. Some sliding bearings are relatively insensitive to impacts, vibrations and shocks due to the material and the damping properties of the bearing surface.

Sliding bearings run predominantly quietly, are robust, usually also very impervious to dirt and only rarely require additional seals.

Bushings are also available in split versions, which serve their requisite purpose in certain constructions.

Disadvantages of sliding bearings

With some types of sliding bearings, a higher starting torque is inevitable. Non-maintenance-free sliding bearings always require adequate maintenance and lubrication.

The efficiency of sliding bearings can generally be assumed to be somewhat lower than that of rolling bearings.

PV value

The PV value has a significant influence on the service life. It is the product of specific bearing load (p) and speed (v). The service life decreases as the PV value increases.

Friction

The friction value depends on the following factors:

- Selection of the material pairing
- Roughness of the counter surfaces
- Specific bearing load
- Sliding speed
- Bearing temperature
- Type of lubrication

Preferred use

For bearing arrangements with low speeds, for pivoting or axial movements, for shock loads and dirt loads. Also for bearing arrangements with all-purpose requirements, in agricultural machinery, construction machinery, vehicle construction, etc.

Mechanical engineering sliding bearings are also used in applications that require a simple design and a low price.

The sliding bearings are also suitable for bearing arrangements at high or low temperatures and with special corrosion resistance. They are also used for bearing arrangements in long-term applications that require a long service life and where wear-free running is required, usually in the area of liquid friction. These include water and steam turbines, generators, centrifugal pumps, heavy ship shaft bearings and the like.

Service life factors:

- Specific bearing load
- Sliding speed
- PV value
- Material and surface roughness of the sliding partners
- Load zone allocation
- Duty cycle
- Temperature
- Lubrication
- Operating conditions (e.g. dirt)

etc.

Delivery condition of the sliding bearings

Our sliding bearings (as well as brass bushings or sliding bearing bushings) are mainly delivered in a ready-to-install condition. As to a few types of bearings, specifications suitable for post-machining are possible. Please do not hesitate to ask us!

Proper storage of sliding bearings

Bronze, stainless steel and plastic sliding bearings are corrosion-resistant and do not require any special storage. Steel sliding bearings should be stored in dry rooms with low humidity. It is recommended to remove these bearings from their packaging only immediately before installation.

What you should consider when choosing a plain bearing

It is particularly important to note that the material and lubricant must be matched to each other. It is important that the material has good emergency running properties, high wear resistance and high thermal conductivity. The lubricant must coat the friction surface well.

Mounting of sliding bearings

In the case of wrapped sliding bearing bushes, slight deviations in the round shape as well as an open butt joint due to the manufacturing process cannot be prevented. These differences have been anchored in the applicable standards.

The circumference of these bearing bushes is dimensioned so that they are round and have a sufficient press fit after installation in a housing bore.

The press-fitting of sliding bearings should always be carried out with an fitting mandrel. For rolled plain bearing bushes with a diameter larger than 50 mm, it is recommended to additionally use a mounting ring (see supplementary sheet).

For easier installation of bearing bushes, a chamfer of 15° - 30° is required on the housing.

For flanged bushings, an additional chamfer of 1.0 x 45° (for larger bushings 1.5 to 2 x 45°) should be provided so that the flange rests completely and flat on the housing surface.

To ensure proper assembly of the bolt, the shaft ends must also be chamfered or rounded. Sharp edges can damage the sliding surface during assembly and reduce the function of the sliding bearing.

The tolerances of the inner diameter stated in the respective data sheets, in assembled condition, can only be guaranteed if the assembly has been carried out correctly and a locating hole has been made in the middle of the required tolerance field.

Gluing of bearing bushes and more

Bushings, thrust washers, strips and special parts made of metal or plastic can be secured not only by screwing or pinning but also by gluing.

Plastic bushings in particular are very often additionally secured by gluing them into the housing. This is often used when plastic bushings are exposed to high temperature fluctuations.



Lubrication (oil lubrication, grease lubrication, dry lubricant)

Oil lubrication

This type is preferable for high rotational speeds and loads, but also applicable for low rotation speeds. The type of lubricating oil depends on the particular application of the sliding bearing. Additives of molybdenum disulphide or graphite can improve the lubrication properties by increasing the adhesion and smoothing the sliding surfaces.

Grease lubrication

Grease lubrication of sliding bearings is mainly used for low speeds, oscillating movements and shock loads or when floating friction cannot be achieved.

Only high-quality plain bearing greases should be used for grease lubrication.

Lubricants with a solid additive of more than 2 % are not recommended, as these can cause premature wear. Under no circumstances should greases containing molybdenum sulphide be used to lubricate plastic sliding bearings. (e.g. Molicote grease)

Dry lubricant

Solid bronze bearing bushes with solid lubricant inserts in the sliding surface can also be used maintenance-free. All-plastic sliding bearings can increasingly be provided for demanding dry bearings and are often a better solution than bronze or steel sliding bearings. The application limits of these plastic sliding bearings are usually set by the specific thermal conductivity and thermal expansion.

However, specially developed plastics are also available for these applications. Dry lubricants such as molybdenum disulphide (MoS₂) or graphite are used at high temperatures or for emergency running and one-time lubrication.

Running-in process of sliding bearings

During the running-in process, the lubricant or parts of the dry sliding layer are transferred to the mating surface. This fills and compensates for the surface roughness in the running surface. This results in a sliding pairing that has a very low friction coefficient. Only after this process can a positive sliding behaviour with low operating values develop.