

Low-cost material for high quantities – iglidur® GLW



Applications with static loads

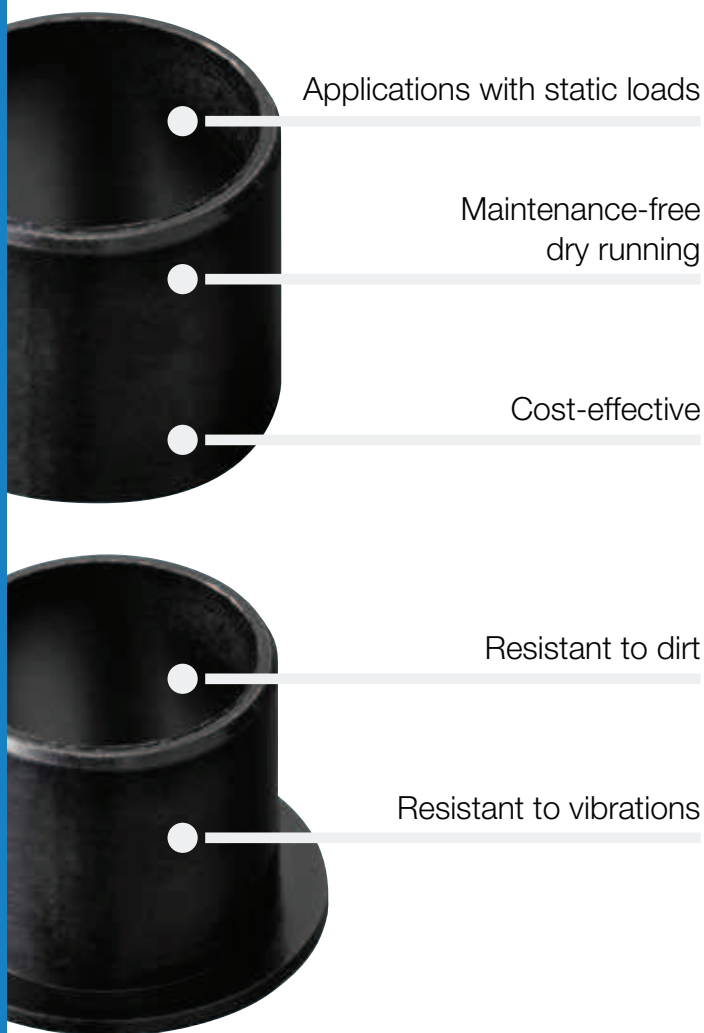
Maintenance-free dry running

Cost-effective

Resistant to dirt

Resistant to vibrations

Low-cost material for high quantities. Low cost material for medium loads. iglidur® GLW plain bearings are preferred in applications with static load, where only occasional movement takes place.



When to use it?

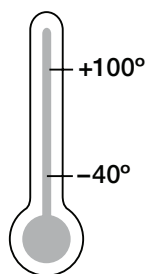
- When you need an economical universal bearing for mass production
- For high, primarily static loads
- For low to medium speeds



When not to use it?

- When mechanical reaming of the wall surface is necessary
▶ iglidur® M250, page 127
- For primarily dynamic loads
▶ iglidur® G, page 81
- When the highest wear resistance is necessary
▶ iglidur® W300, page 151
- When temperatures continuously exceed +130 °C
▶ iglidur K, page 215
- For underwater applications
▶ iglidur H370, page 375

Temperature



Product range

on request



Material properties table			
General properties	Unit	iglidur [®] GLW	Testing method
Density	g/cm ³	1.36	
Colour		black	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	1.3	DIN 53495
Max. water absorption	% weight	5.5	
Coefficient of sliding friction, dynamic against steel	μ	0.1–0.24	
pv value, max. (dry)	MPa · m/s	0.3	
Mechanical properties			
Modulus of elasticity	MPa	7,700	DIN 53457
Tensile strength at +20 °C	MPa	235	DIN 53452
Compressive strength	MPa	74	
Max. recommended surface pressure (+20 °C)	MPa	80	
Shore D hardness		78	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+100	
Max. short term application temperature	°C	+160	
Min. application temperature	°C	−40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	K ^{−1} · 10 ^{−5}	17	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 ¹¹	DIN IEC 93
Surface resistance	Ω	> 10 ¹¹	DIN 53482

Table 01: Material properties table

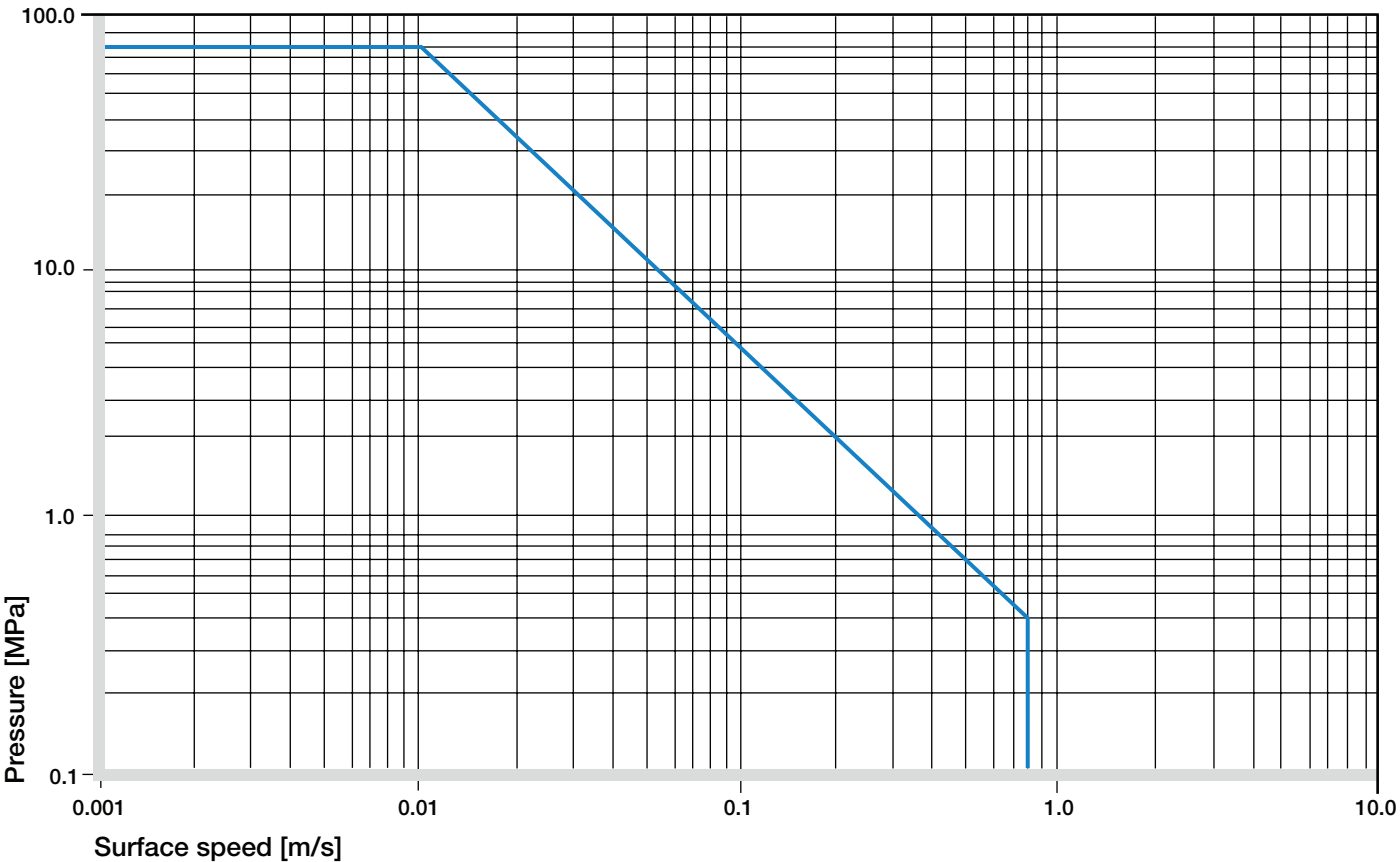


Diagram 01: Permissible pv values for iglidur[®] GLW with a wall thickness of 1 mm dry running against a steel shaft at +20 °C, mounted in a steel housing

With plain bearings made of iglidur® GLW we can offer our customers an alternative to iglidur® G for mass production applications. Featuring similar mechanical designed as iglidur® G, iglidur® GLW plain bearings are primarily recommended for static loads. With regard to these applications, in which the dynamic properties of iglidur® G to a large extent are unimportant, iglidur® GLW presents a very cost-effective alternative.

Mechanical Properties

With increasing temperatures, the compressive strength of iglidur® GLW plain bearings decreases. The Diagram 02 shows this inverse relationship. However, at the longterm maximum temperature of +100° C the permissible surface pressure is almost 30 MPa. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

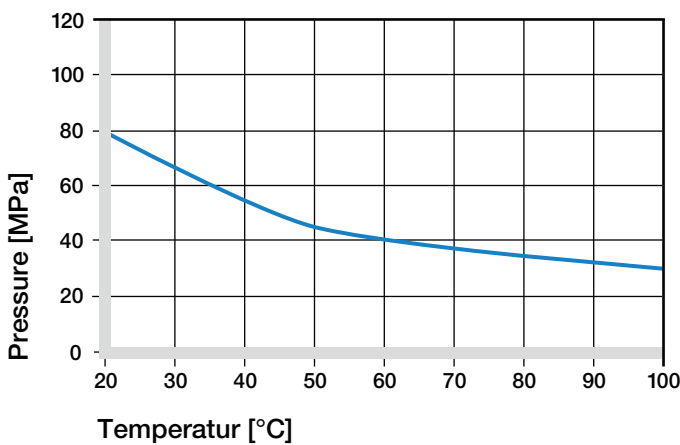


Diagram 02: Recommended maximum surface pressure as a function of temperature (80 MPa at +20 °C)

Diagram 03 shows the elastic deformation of iglidur® GLW at radial loads. At the recommended maximum surface pressure of 70 MPa at room temperature, the deformation is less than 3 %. At this load the plastic deformation is minimal. However, it is also dependent on the duty cycle of the application.

► Surface Pressure, page 63

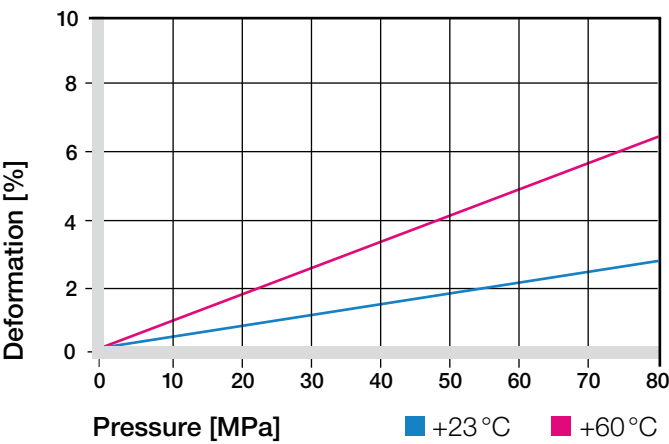


Diagram 03: Deformation under pressure and temperature

Permissible Surface Speeds

iglidur® GLW was developed for low to average surface speeds. In constant operation, a maximum speed of 0.8 m/s (rotating) or 2.5 m/s (linear) is permitted. Please note that the maximum values shown in table 02 are only possible at the lowest pressures. In practice, these values are rarely reached, due to the increasing temperatures approach ing or exceeding the maximum permitted value.

► Surface Speed, page 65

m/s	Rotating	Oscillating	Linear
Continuous	0.8	0.6	2.5
Short term	1	0.7	3

Table 02: Maximum running speed

Temperatures

To a large extent, the surrounding temperatures affect the properties of plain bearings. Diagram 02 shows the inverse relationship. With increasing temperatures in the bearing system, the wear also increases.

► Application Temperatures, page 66

iglidur® GLW	Application temperature
Minimum	−40 °C
Max. long term	+100 °C
Max. short term	+160 °C
Add. securing is required from	+80 °C

Table 03: Temperature limits

Friction and Wear

Similar to wear resistance, the coefficient of friction μ also changes with increasing load. It is striking that the coefficient of friction μ decreases with increasing pressure. This relationship explains the excellent suitability of iglidur® GLW plain bearings with regard to high loads.

- Coefficients of Friction and Surfaces, **page 68**
- Wear Resistance, **page 69**

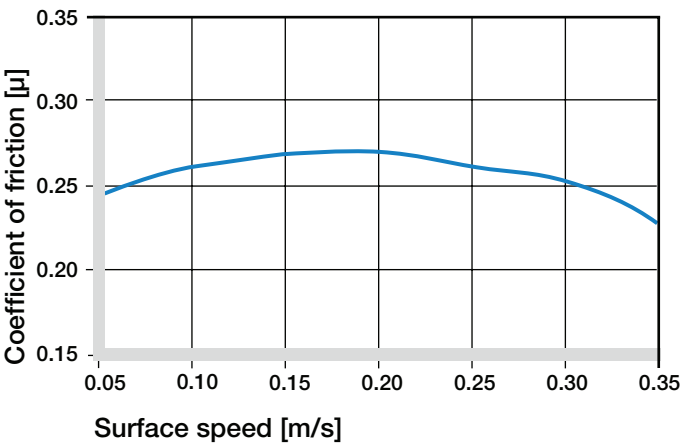


Diagram 04: Coefficient of friction as a function of the running speed, $p = 0.75 \text{ MPa}$

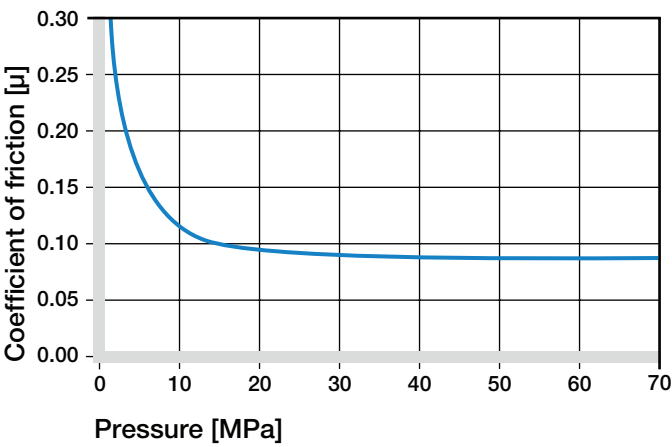


Diagram 05: Coefficient of friction as a function of the pressure, $v = 0.01 \text{ m/s}$

Shaft Materials

To a large extent, friction and wear depend on the shaft material. Shafts that are too smooth increase both the coefficient of friction and the wear of the bearing. A ground surface with an average roughness R_a between 0.1 and 0.2 μm is the most suitable (Diagram 06). The following diagrams show an extract of the results of tests with different shaft materials carried out with iglidur® GLW plain bearings. If the shaft material you plan on using is not shown in these test results, please contact us.

- Shaft Materials, **page 71**

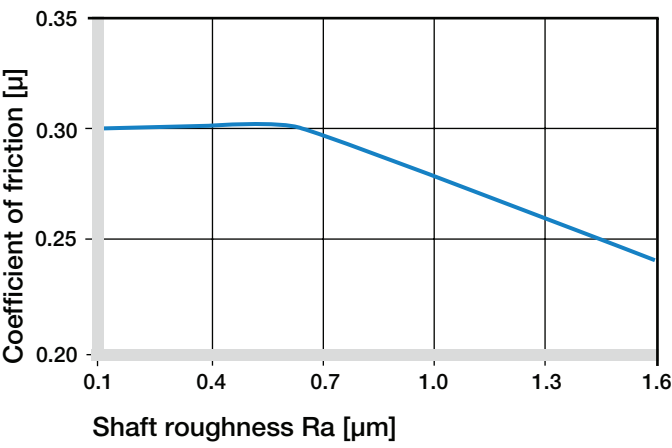


Diagram 06: Coefficient of friction as function of the shaft surface (Cf53 hardened and ground steel)

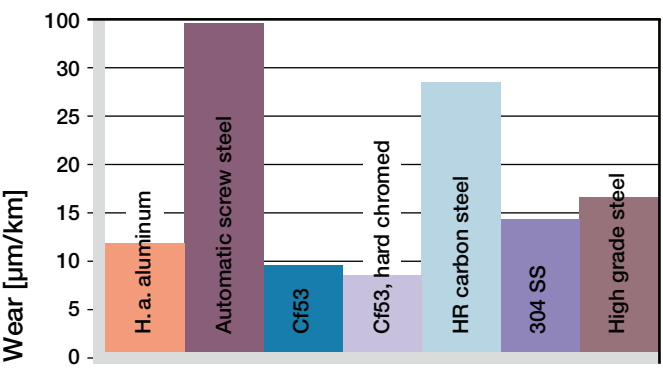


Diagram 07: Wear, rotating with different shaft materials, pressure, $p = 1 \text{ MPa}$, $v = 0.3 \text{ m/s}$

iglidur® GLW	Dry	Greases	Oil	Water
C.o.f. μ	0.10–0.24	0.09	0.04	0.04

Table 04: Coefficient of friction against steel ($R_a = 1 \text{ μm}$, 50 HRC)

Additional Properties

Chemical Resistance

iglidur® GLW plain bearings have a good resistance to chemicals. They are resistant to most lubricants.
iglidur® GLW is not attacked by most organic and inorganic acids.

► Chemical Table, page 1258

Medium	Resistance
Alcohol	+ to 0
Hydrocarbons	+
Greases, oils without additives	+
Fuels	+
Diluted acids	0 to –
Strong acids	–
Diluted alkalines	+
Strong alkalines	0

+ resistant 0 conditionally resistant – not resistant
All data given at room temperature [+20 °C]

Table 05: Chemical resistance

Radiation Resistance

Plain bearings made of iglidur® GLW are resistant to radiation up to an intensity of $3 \cdot 10^2$ Gy.

UV Resistance

iglidur® GLW plain bearings are permanently resistant to UV radiation.

Vacuum

In a vacuum environment iglidur® GLW plain bearings release gases. Use in a vacuum should be tested beforehand.

Electrical Properties

iglidur® GLW plain bearings are electrically insulating.	
Volume resistance	$> 10^{11} \Omega\text{cm}$
Surface resistance	$> 10^{11} \Omega$
10	

Moisture Absorption

The moisture absorption of iglidur® GLW plain bearings is approximately 1.3 % in standard atmosphere. The saturation limit in water is 5.5 %. This must be taken into account with regard to the respective operating conditions.

Maximum moisture absorption	
At +23 °C/50 % r.h.	1.3 % weight
Max. water absorption	5.5 % weight

Table 06: Moisture absorption

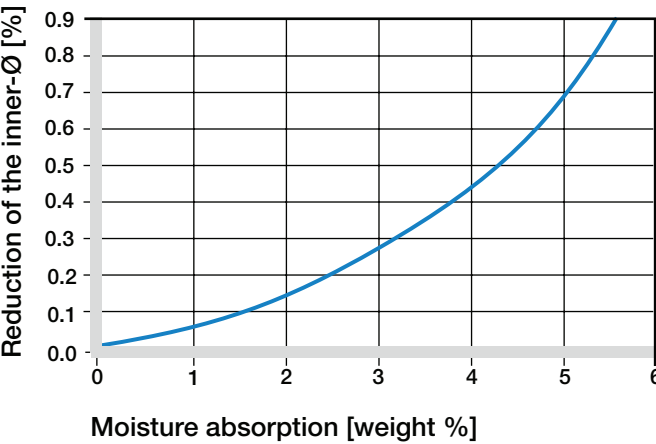


Diagram 08: Effect of moisture absorption on plain bearings

Installation Tolerances

iglidur[®] GLW plain bearings are standard bearings for shafts with h-tolerance (recommended minimum h9). The bearings are designed for pressfit into a housing machined to a H7 tolerance. After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

► Testing Methods, page 75

Diameter d1 [mm]	Shaft h9 [mm]	iglidur [®] GLW E10 [mm]	Housing H7 [mm]
up to 3	0–0.025	+0.014 +0.054	0 +0.010
> 3 to 6	0–0.030	+0.020 +0.068	0 +0.012
> 6 to 10	0–0.036	+0.025 +0.083	0 +0.015
> 10 to 18	0–0.043	+0.032 +0.102	0 +0.018
> 18 to 30	0–0.052	+0.040 +0.124	0 +0.021
> 30 to 50	0–0.062	+0.050 +0.150	0 +0.025
> 50 to 80	0–0.074	+0.060 +0.180	0 +0.030
> 80 to 120	0–0.087	+0.072 +0.212	0 +0.035
> 120 to 180	0–0.100	+0.085 +0.245	0 +0.040

Table 07: Important tolerances for plain bearings according to ISO 3547-1 after pressfit

Product Range

iglidur[®] GLW plain bearings are made to special order. For high volume applications, please request iglidur[®] GLW plain bearings as an alternative to iglidur[®] G.