iglidur® L250

For high speed. Plain bearings for high speed rotation applications, especially for fan- and motors.

Recommended for rotating applications

Very low coefficients of friction

Excellent wear resistance

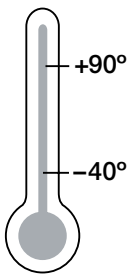
When to use it?

- For rotating applications at high speed
- If highest service life is required
- Low load applications
- If low noise level is required
- For very low coefficients of friction

When not to use it?

- When high pressure loads occur
  ▶ **iglidur® Q, page 461**
  ▶ **iglidur® W300, page 131**
- When sustained temperatures above +90 °C is a condition
  ▶ **iglidur® V400, page 279**
- When low moisture absorption is required
  ▶ **iglidur® H1, page 337**
  ▶ **iglidur® J, page 89**

Temperature



Product range

2 styles
Ø 6–20 mm
more dimensions
on request

iglidur® L250 | Application Examples

Typical sectors of industry and application areas

● Automotive ● Electronics industry
● Mechatronics ● Optical industry
● Test engineering and quality assurance etc.

Improve technology and reduce costs – 310 exciting examples for iglidur® plain bearings online

▶ www.igus.eu/eu/iglidur-applications

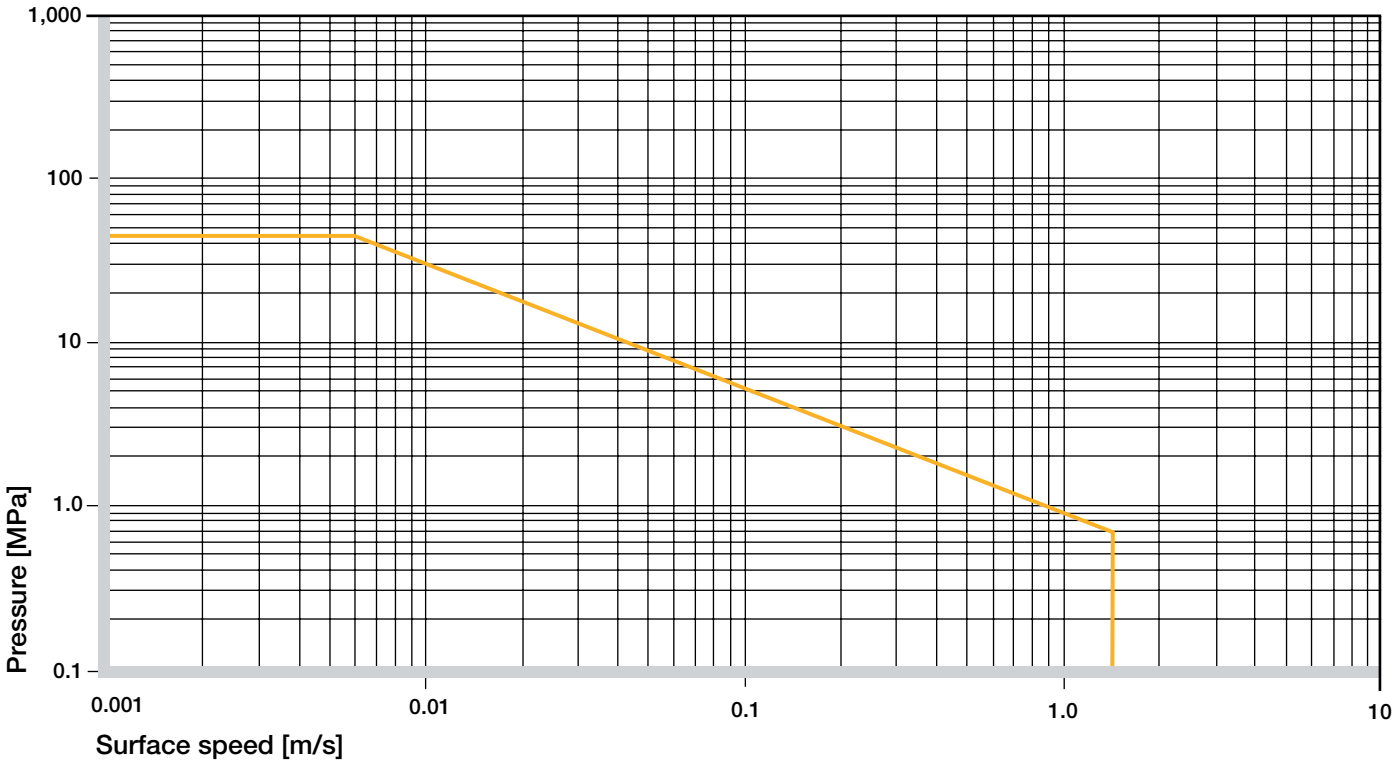
▶ www.igus.eu/light-aircraft

iglidur® L250 | Technical Data

Material data			
General properties	**Unit**	**iglidur® L250**	**Testing method**
Density	**g/cm³**	1.50	
Colour		beige	
Max. moisture absorption at +23 °C/50 % r.h.	**% weight**	0.7	DIN 53495
Max. moisture absorption	**% weight**	3.9	
Coefficient of sliding friction, dynamic against steel	**µ**	0.08–0.19	
pv value, max. (dry)	**MPa · m/s**	0.4	
Mechanical properties			
Modulus of elasticity	**MPa**	1,950	DIN 53457
Tensile strength at +20 °C	**MPa**	67	DIN 53452
Compressive strength	**MPa**	47	
Max. recommended surface pressure (+20 °C)	**MPa**	45	
Shore D hardness		68	DIN 53505
Physical and thermal properties			
Max. long term application temperature	**°C**	+90	
Max. short term application temperature	**°C**	+180	
Max. ambient temperature. short term[1)]	**°C**	+200	
Min. application temperature	**°C**	–40	
Thermal conductivity	**W/m · K**	0.24	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	**$K^{-1} \cdot 10^{-5}$**	10	DIN 53752
Electrical properties			
Specific volume resistance	**Ωcm**	$> 10^{10}$	DIN IEC 93
Surface resistance	**Ω**	$> 10^{11}$	DIN 53482

[1)] Without additional load; no sliding movement; relaxation possible

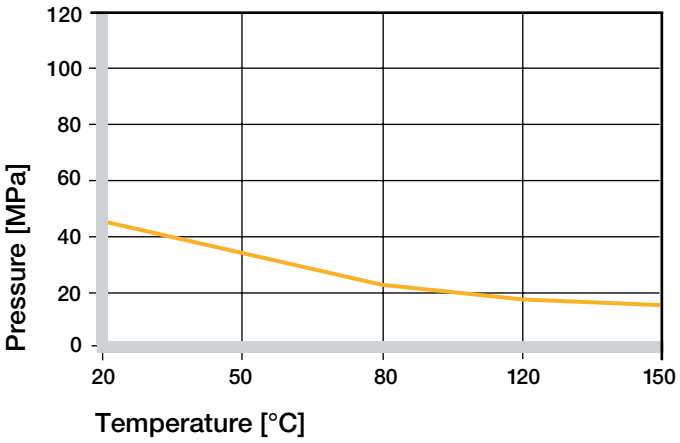
Table 01: Material data



Graph 01: Permissible pv values for iglidur® L250 with a wall thickness of 1 mm dry running against a steel shaft at +20 °C, mounted in a steel housing

Mechanical Properties

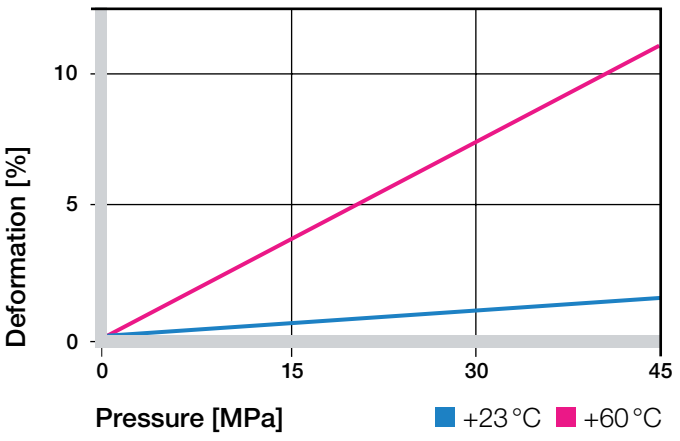
The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this. With increasing temperatures, the compressive strength of iglidur® L250 plain bearings decreases. The Graph 02 shows this inverse relationship. However, at the longterm maximum temperature of +90° C the permissible surface pressure is almost 20 MPa.



Graph 02: Recommended maximum surface pressure as a function of temperature (45 MPa at +20 °C)

iglidur® L250 is a bearing material for high rotary speeds and low coefficients of friction. The iglidur® L250 material can feature these advantages particularly with low loads. Applications which feature these advantages are fans, small motors, fast-running sensors or the magnet technology.

▶ Surface Pressure, **page 43**



Graph 03: Deformation under pressure and temperature

Permissible Surface Speeds

iglidur® L250 has been developed especially for high surface speeds with low loads. Besides the physical limit, which is preset by the heating of the bearing, the coefficients of wear also act limitingly if rapidly high glide paths emerge at high peripheral speeds and the permitted wear limit is thus reached earlier. The great advantages of the iglidur® L250 bearings are seen right here. The wear rate is very low, thus making the material an ideal solution for extreme glide paths. The maximum speeds can be gathered from Table 02.

▶ Surface Speed, **page 45**

m/s	Rotating	Oscillating	Linear
Continuous	1	0.7	2
Short term	1.5	1.1	3

Table 02: Maximum running speed

Temperatures

The iglidur® L250 bearings can be used in temperatures up to 180 °C for the short-term. Note that a mechanical securing of the bearing is recommended from temperatures of 55 °C. Higher temperatures can also cause the bearing to lose its press-fit seating and move in the bore.

▶ Application Temperatures, **page 46**

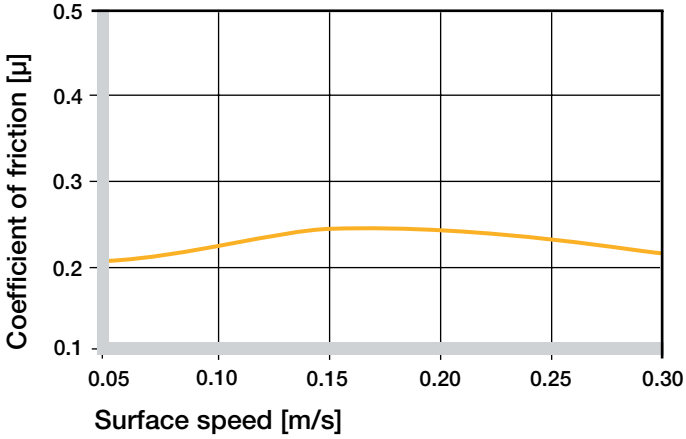
iglidur® L250	Application temperature
Minimum	–40 °C
Max. long term	+90 °C
Max. short term	+180 °C
Add. securing is required from	+55 °C

Table 03: Temperature limits

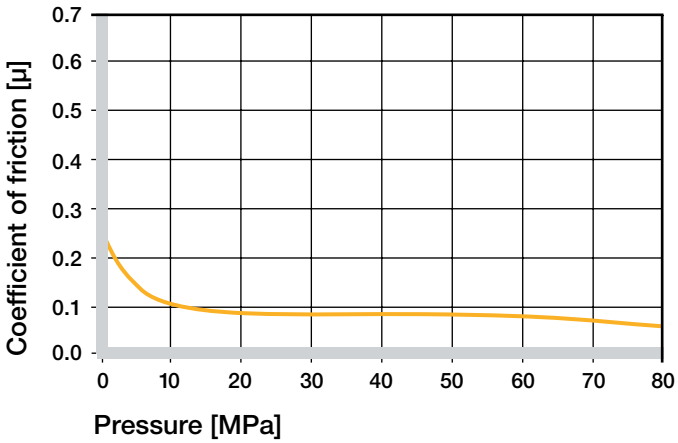
Friction and Wear

Low coefficients of friction form an essential reason for the excellent features of the iglidur® L250 bearings. In the best pairing (with V2A shafts), friction coefficients of 0.14 are already reached with low loads. Coefficients of friction under 0.1 was measured already below 10 MPa. To utilize the excellent coefficients of wear in the application, loads over 5 MPa should be avoided according to shaft material.

▶ Coefficients of Friction and Surfaces, **page 48**
▶ Wear Resistance, **page 49**



Graph 04: Coefficient of friction as a function of the running speed, p = 0.75 MPa

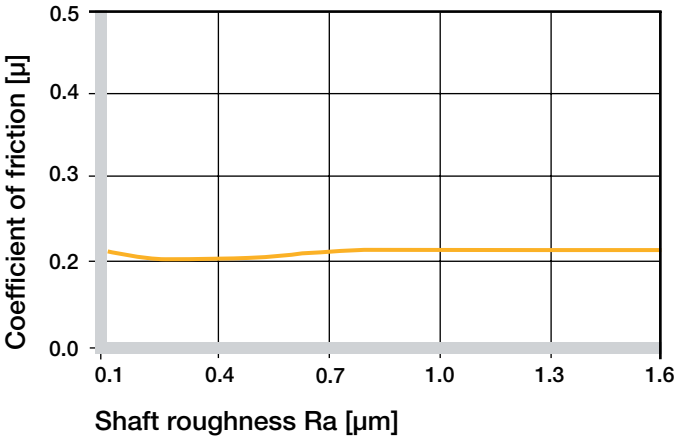


Graph 05: Coefficient of friction as a function of the pressure, v = 0.01 m/s

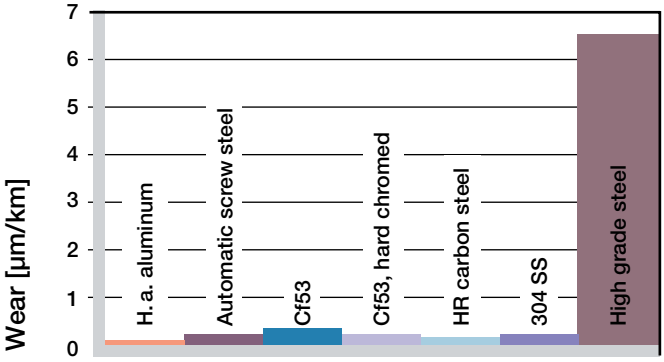
Shaft Materials

As seen in Graph 07, many shafts are recommendable for low loads and low rotations. The good coefficients of friction are additionally retained over a wide range of recommendable surface finishes for shafts (see Graph 06 for it). For loads greater than 1 MPa, particular attention should be paid to the shaft material used.

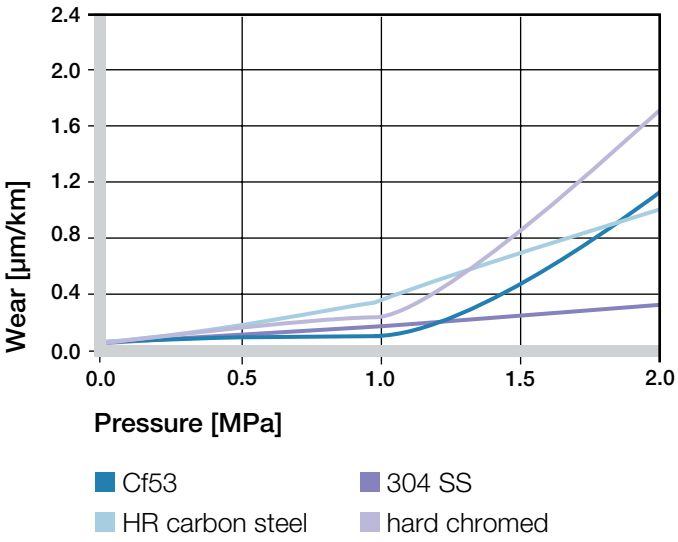
▶ Shaft Materials, **page 51**



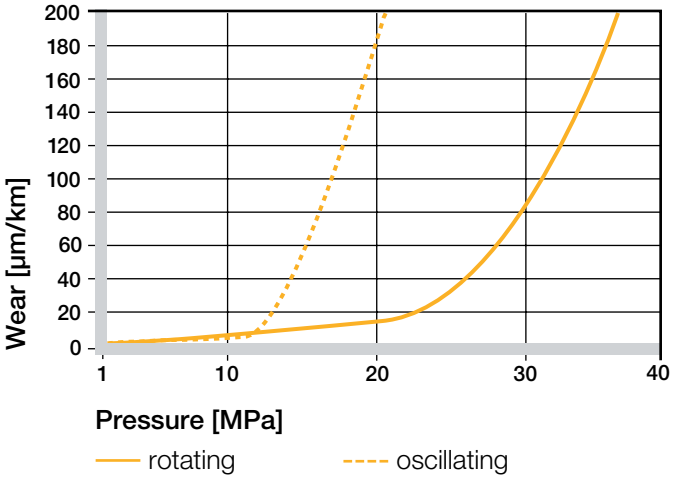
Graph 06: Coefficient of friction as function of the shaft surface (Cf53 hardened and ground steel)



Graph 07: Wear, rotating with different shaft materials, pressure p = 0.75 MPa, v = 0.5 m/s



Graph 08: Wear with different shaft materials in rotational operation, as a function of the pressure



Graph 09: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the pressure

iglidur® L250	Dry	Greases	Oil	Water
C. o. f. µ	0.08–0.19	0.09	0.04	0.04

Table 04: Coefficient of friction against steel (Ra = 1 µm, 50 HRC)

Additional Properties

Chemical Resistance

iglidur® L250 plain bearings are resistant to diluted alkalines and very weak acids, as well as to solvents and all types of lubricants.

▶ Chemical Table, **page 974**

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 of iglidur® L250 are resistant to radiation up to a radiation intensity of $3 \cdot 10^4$ Gy. Higher radiation affects the material and may result in a significant decrease in mechanical properties.

UV Resistance

When subjected to UV radiation, iglidur® L250 plain bearings change colour. The hardness, compression strength, and wear resistance of the material, however, are not affected.

Vacuum

When used in a vacuum, the existing humidity may out gas. Therefore, only dehumidified bearings of iglidur® L250 are suitable for a vacuum application.

Electrical Properties

iglidur® L250 plain bearings are electrically insulating.

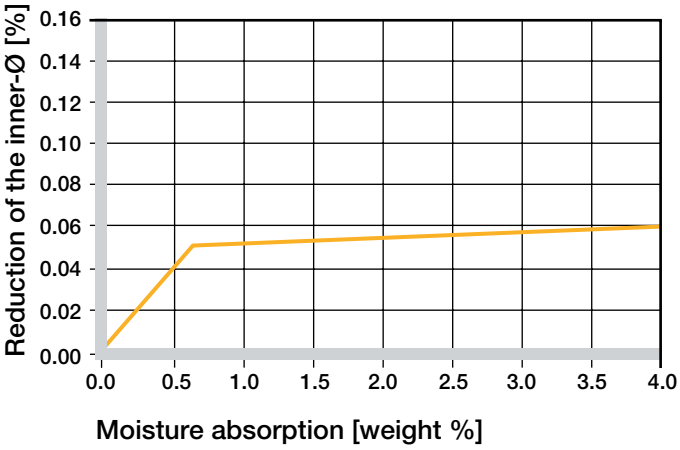
Volume resistance	$> 10^{10}$ Ωcm
Surface resistance	$> 10^{11}$ Ω

Moisture Absorption

With regard to applications where the smallest bearing clearances are concerned, please take the moisture absorption into consideration.

Maximum moisture absorption	
At +23 °C/50 % r.h.	0.7 % weight
Max. moisture absorption	3.9 % weight

Table 06: Moisture absorption



Graph 10: Effect of moisture absorption on plain bearings

Installation Tolerances

iglidur® L250 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, the inner diameter adjusts to meet the specified tolerances.

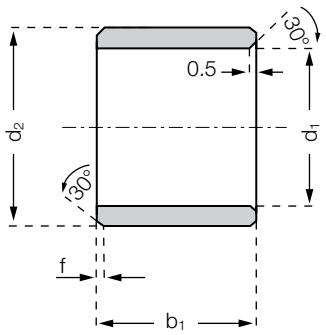
▶ Testing Methods, **page 55**

Diameter d1 [mm]	Shaft h9 [mm]	iglidur® L250 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

iglidur® L250 | Product Range

Sleeve bearing



Order key

L250SM-0608-06

- Length b1
- Outer diameter d2
- Inner diameter d1
- Metric
- Type (Form S)
- Material iglidur® L250

Dimensions according to ISO 3547-1 and special dimensions

Chamfer in relation to the d1

d1 [mm]:	Ø 1–6	Ø 6–12	Ø 12–30	Ø > 30
f [mm]:	0.3	0.5	0.8	1.2

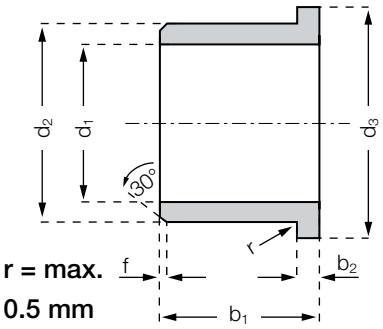
Dimensions [mm]

Part number	d1	d1-Tolerance*	d2	b1 h13
L250SM-0608-06	6.0	+0.020 +0.068	8.0	6.0
L250SM-0810-10	8.0	+0.025 +0.083	10.0	10.0
L250SM-1012-10	10.0	+0.025 +0.083	12.0	10.0
L250SM-1214-12	12.0	+0.032 +0.102	14.0	12.0
L250SM-1618-15	16.0	+0.032 +0.102	18.0	15.0
L250SM-2023-20	20.0	+0.040 +0.124	23.0	20.0

* after pressfit. Testing methods ▶ page 55

iglidur® L250 | Product Range

Flange bearing



r = max. 0.5 mm

Order key

L250FM-0608-06

- Length b1
- Outer diameter d2
- Inner diameter d1
- Metric
- Type (Form F)
- Material iglidur® L250

Dimensions according to ISO 3547-1 and special dimensions

Chamfer in relation to the d1

d1 [mm]:	Ø 1–6	Ø 6–12	Ø 12–30	Ø > 30
f [mm]:	0.3	0.5	0.8	1.2

Dimensions [mm]

Part number	d1	d1-Tolerance*	d2	d3	b1	b2
				d13	h13	-0.14
L250FM-0608-06	6.0	+0.020 +0.068	8.0	12.0	6.0	1.0
L250FM-0810-10	8.0	+0.025 +0.083	10.0	15.0	10.0	1.0
L250FM-1012-10	10.0	+0.025 +0.083	12.0	18.0	10.0	1.0
L250FM-1214-12	12.0	+0.032 +0.102	14.0	20.0	12.0	1.0
L250FM-1618-17	16.0	+0.032 +0.102	18.0	24.0	17.0	1.0
L250FM-2023-21	20.0	+0.040 +0.124	23.0	30.0	21.5	1.5

* after pressfit. Testing methods ▶ page 55

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