

## iglidur® Specialists | For Long Service Life



**iglidur® J260**

**ideal for plastic shafts**

Standard range from stock ► from page 221



**iglidur® J3**

**runs up to three times longer than iglidur® J**

Standard range from stock ► from page 231



**iglidur® J350**

**high temperatures, versatile**

Standard range from stock ► from page 241



**iglidur® L250**

**for high speeds**

Standard range from stock ► from page 251



**iglidur® R**

**low-cost**

Standard range from stock ► from page 261



**iglidur® D**

**low-cost material with silicone**

On request ► from page 271



**iglidur® J200**





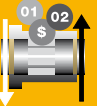

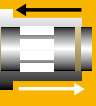












**specially for aluminum shafts**

On request ► from page 279

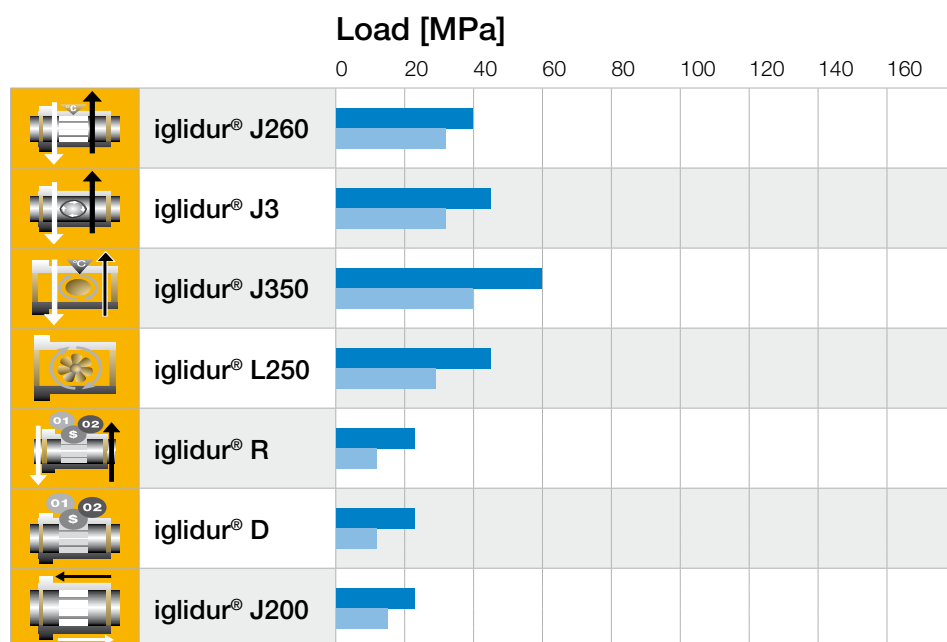
# iglidur® Specialists | Selection According to Main Criteria

iglidur®  
polymer  
bearings

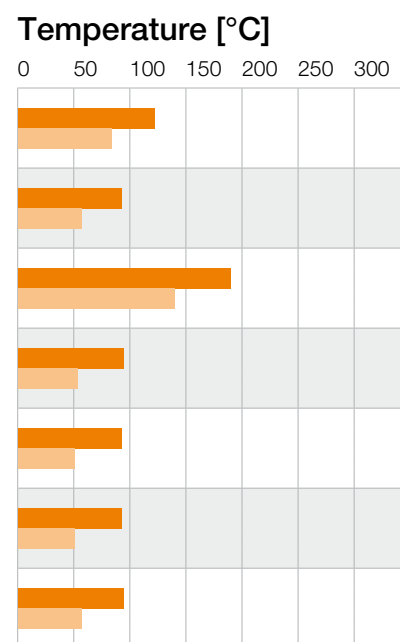
iglidur®  
Specialists –  
For Long  
Service Life

							
	iglidur® J260	iglidur® J3	iglidur® J350	iglidur® L250	iglidur® R	iglidur® D	iglidur® J200
 Long life dry running	●	●	●	●	●		●
 For high loads			●				
 For high temperatures			●				
 Low friction/high speed	●	●	●	●	●	●	●
 Dirt resistant							●
 Chemicals resistant			●				
 Low water absorption	●	●	●		●	●	●
 Food-suitable							
 Vibration-dampening							
 Edge pressure		●	●	●	●	●	●
 For under water use							
 Cost-effective		●			●	●	
from page	221	231	241	251	261	271	279

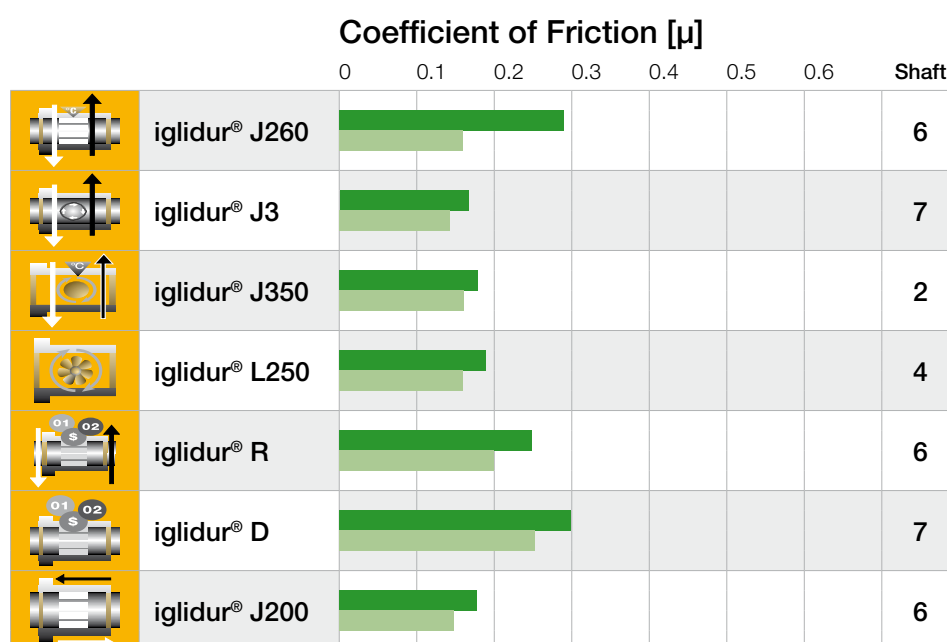
# iglidur® Specialists | Selection According to Main Criteria



Maximum permissible radial load of iglidur® bearings at  
■ +20°C  
■ +80°C



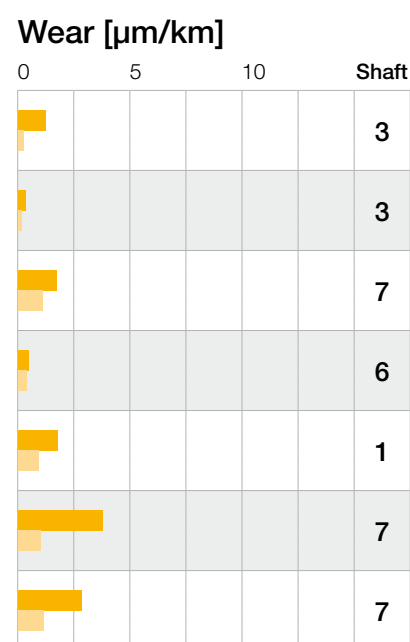
Important temperature limits of iglidur® bearings  
■ Maximum permissible application temperature, continuous  
■ Temperature where bearings need to be secured against radial or axial movement in the housing



Coefficients of friction of iglidur® bearings sliding against steel,  
 $p = 1 \text{ MPa}$ ,  $v = 0.3 \text{ m/s}$   
■ Average coefficient of all the seven sliding combinations tested  
■ Coefficient of friction of best combination

Shaft material:

- |                           |                      |
|---------------------------|----------------------|
| 1 = Cf53                  | 5 = HR carbon steel  |
| 2 = Cf53, hard chromed    | 6 = 304 SS           |
| 3 = Aluminum, hc          | 7 = High grade steel |
| 4 = Automatic screw steel |                      |



Wear of iglidur® bearings sliding against steel,  $p = 1 \text{ MPa}$   
■ Average wear of all the seven sliding combinations tested  
■ Wear of best combination

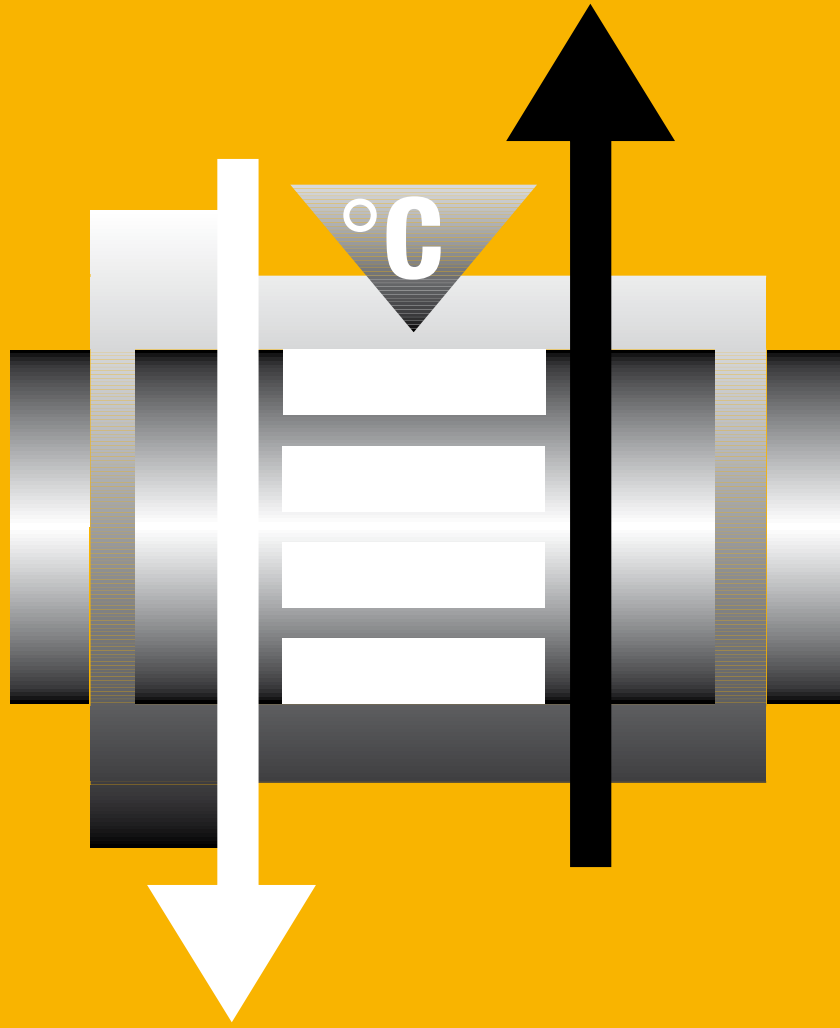
Material properties table								
General properties	Unit	iglidur® J260	iglidur® J3	iglidur® J350	iglidur® L250	iglidur® R	iglidur® D	iglidur® J200
Density	g/cm³	1.35	1.42	1.44	1.50	1.39	1.40	1.72
Colour		yellow	yellow	yellow	beige	dark red	green	dark grey
Max. moisture absorption at +23 °C/50 % r.h.	% weight	0.2	0.3	0.3	0.7	0.2	0.3	0.2
Max. water absorption	% weight	0.4	1.3	1.6	3.9	1.1	1.1	0.7
Coefficient of sliding friction, dynamic against steel	μ	0.06–0.20	0.06–0.20	0.10–0.20	0.08–0.19	0.09–0.25	0.08–0.26	0.11–0.17
pv value, max. (dry)	MPa · m/s	0.35	0.50	0.45	0.40	0.27	0.27	0.30
Mechanical properties								
Modulus of elasticity	MPa	2,200	2,700	2,000	1,950	1,950	2,000	2,800
Tensile strength at +20 °C	MPa	60	70	55	67	70	72	58
Compressive strength	MPa	50	60	60	47	68	70	43
Max. recommended surface pressure (+20 °C)	MPa	40	45	60	45	23	23	23
Shore D hardness		77	73	80	68	77	78	70
Physical and thermal properties								
Max. long term application temperature	°C	+120	+90	+180	+90	+90	+90	+90
Max. short term application temperature	°C	+140	+120	+220	+180	+110	+110	+120
Min. application temperature	°C	–100	–50	–100	–40	–50	–50	–50
Thermal conductivity	W/m · K	0.24	0.25	0.24	0.24	0.25	0.25	0.24
Coefficient of thermal expansion (at +23 °C)	K⁻¹ · 10⁻⁵	13	13	7	10	11	11	8
Electrical properties								
Specific volume resistance	Ωcm	> 10¹²	> 10¹²	> 10¹³	> 10¹⁰	> 10¹²	> 10¹⁴	> 10⁸
Surface resistance	Ω	> 10¹⁰	> 10¹²	> 10¹⁰	> 10¹¹	> 10¹²	> 10¹⁴	> 10⁸

Material resistance (at +20 °C)							
Chemical resistance	iglidur® J260	iglidur® J3	iglidur® J350	iglidur® L250	iglidur® R	iglidur® D	iglidur® J200
Alcohol	+ to 0	+	+	+ to 0	+	+	+
Hydrocarbons	+	+	+ to 0	+	+	+	+
Greases, oils without additives	0 to –	+	+	+	+	+	+
Fuels	–	+	+	+	+	+	+
Diluted acids	–	0 to –	+	0 to –	0 to –	0 to –	0 to –
Strong acids	–	–	+ to 0	–	–	–	–
Diluted alkalines	+ to 0	+	+	+	+	+	+
Strong alkalines	+ to 0	+ to 0	+	0	+ to 0	+ to 0	+ to 0
Radiation resistance [Gy] to	3 · 10²	1 · 10⁴	2 · 10²	3 · 10⁴	3 · 10²	3 · 10²	3 · 10²

+ resistant 0 conditionally resistant – not resistant

# My Sketches





## Ideal for plastic shafts – iglidur® J260



Standard range from stock

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Lubrication- and maintenance-free

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Very good c.o.f. for low or medium loads

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Good liquid media resistance

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Slightly higher temperature rating than iglidur® J

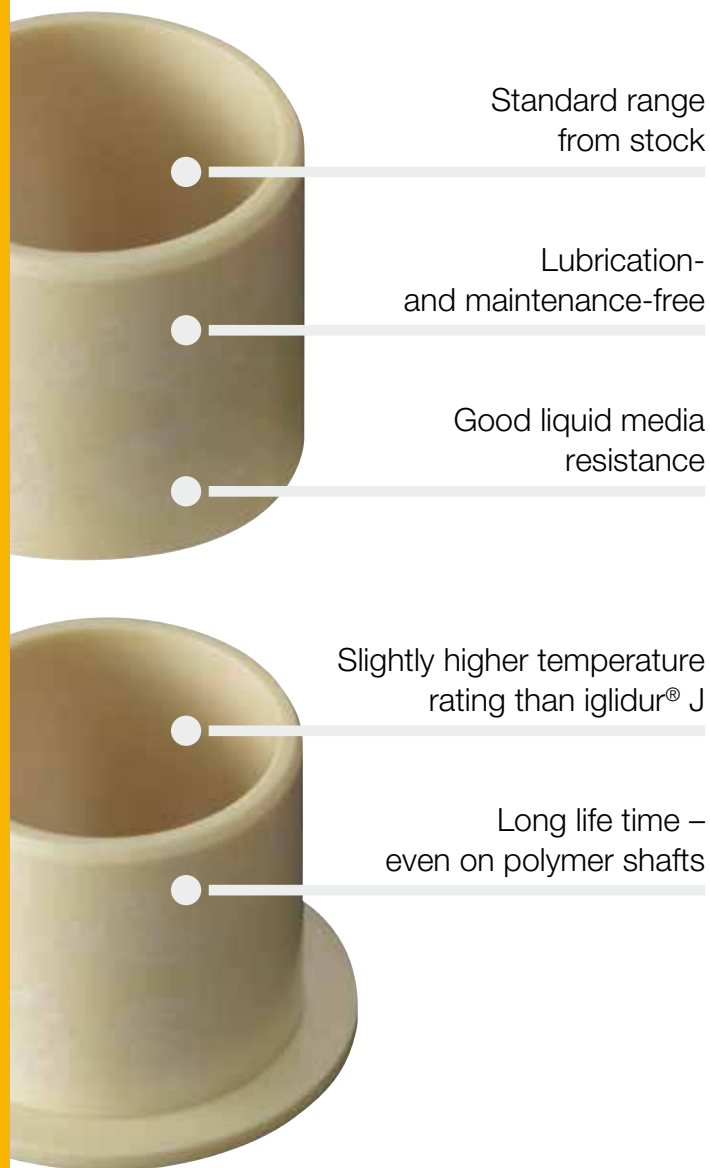
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Long life time – even on polymer shafts and other special cases

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# iglidur® J260

**Ideal for plastic shafts.** iglidur® J260 is a perfect material for long service life and best coefficient of friction with special operating conditions – first of all in contact with plastic shafts!



## When to use it?

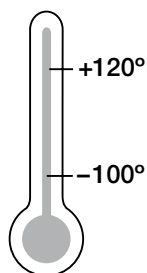
- When polymer shafts are used
- When the temperature rating of iglidur® J is not sufficient
- If bearings with low friction is required
- If good wear resistance is required at medium loads
- If good liquid media resistance is required



## When not to use?

- When high pressures occur  
▶ iglidur® Z, page 311
- When short term temperatures occur that are greater +120°C  
▶ iglidur® J350, page 241
- When a low-cost bearing for occasional movements is necessary  
▶ iglidur® J, page 93

## Temperature



## Product range

2 types  
Ø 6–20 mm  
more dimensions  
on request



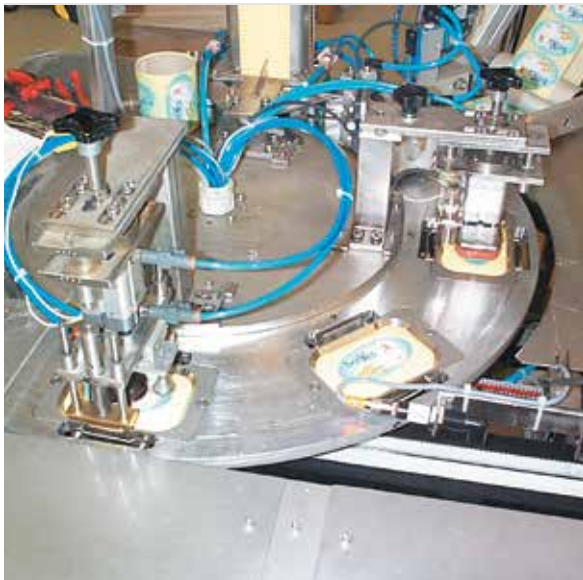


## Typical sectors of industry and application areas

- Automation ● Machine design
- Test engineering and quality assurance
- Robotics ● Eletronics industry etc.

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

► [www.igus.co.uk/iglidur-applications](http://www.igus.co.uk/iglidur-applications)



► [www.igus.co.uk/packaging-machines](http://www.igus.co.uk/packaging-machines)



► [www.igus.co.uk/printing-machines](http://www.igus.co.uk/printing-machines)



► [www.igus.co.uk/steering-systems](http://www.igus.co.uk/steering-systems)



### Material properties table

General properties	Unit	iglidur® J260	Testing method
Density	g/cm <sup>3</sup>	1.35	
Colour		yellow	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	0.2	DIN 53495
Max. water absorption	% weight	0.4	
Coefficient of sliding friction, dynamic against steel	μ	0.06–0.20	
pv value, max. (dry)	MPa · m/s	0.35	
Mechanical properties			
Modulus of elasticity	MPa	2,200	DIN 53457
Tensile strength at +20 °C	MPa	60	DIN 53452
Compressive strength	MPa	50	
Max. recommended surface pressure (+20 °C)	MPa	40	
Shore D hardness		77	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+120	
Max. short term application temperature	°C	+140	
Min. application temperature	°C	–100	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	K <sup>–1</sup> · 10 <sup>–5</sup>	13	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 <sup>12</sup>	DIN IEC 93
Surface resistance	Ω	> 10 <sup>10</sup>	DIN 53482

Table 01: Material properties table

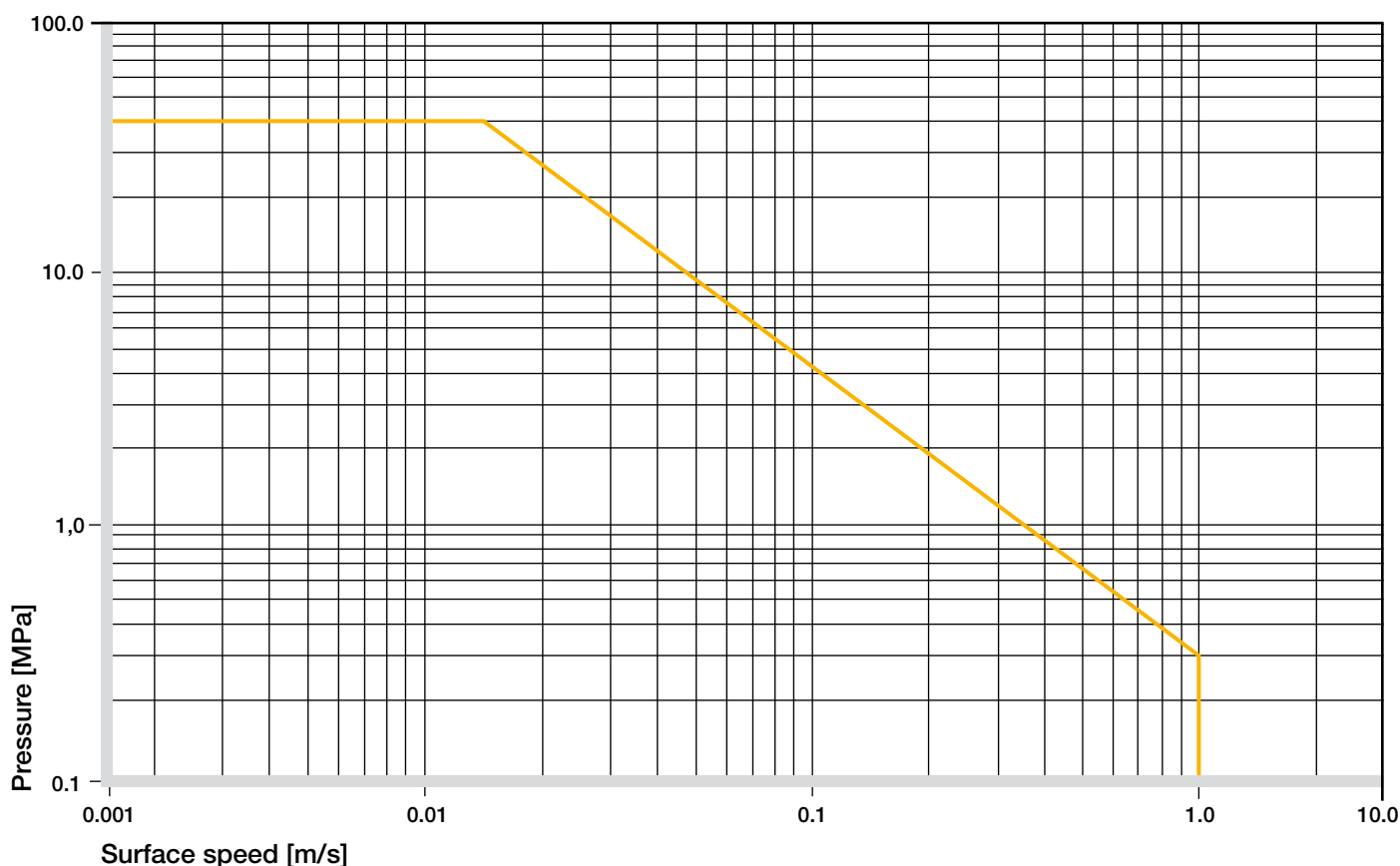
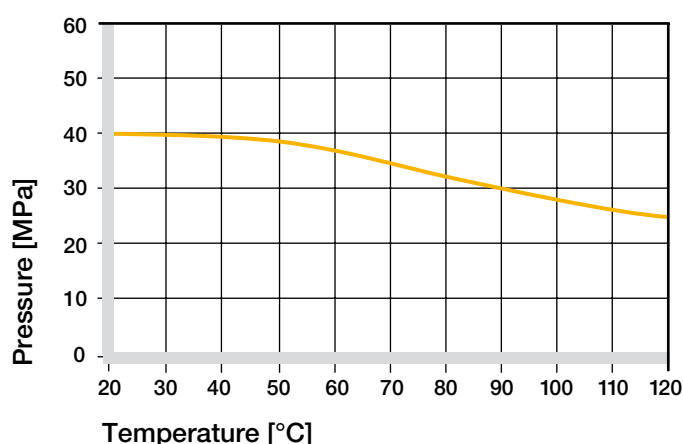


Diagram 01: Permissible pv values for iglidur® J260 with a wall thickness of 1 mm dry running against a steel shaft at +20 °C, mounted in a steel housing

Similar to the classic, iglidur® J, iglidur® J260 is an endurance runner with outstanding wear behavior, but provides increased reserves at its long-term application temperature of 120 °C.

## Mechanical Properties

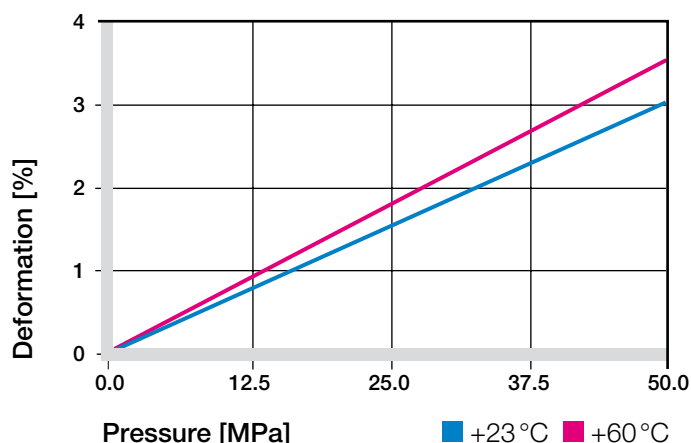
With increasing temperatures, the compressive strength of iglidur® J260 plain bearings decreases. The Diagram 02 shows this inverse relationship. However, at the longterm maximum temperature of +120 °C the permissible surface pressure is 24 MPa. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.



**Diagram 02: Recommended maximum surface pressure as a function of temperature (40 MPa at +20 °C)**

Diagram 03 shows the elastic deformation of iglidur® J260 at radial loads. At the maximum recommended surface pressure of 40 MPa at room temperature the deformation is less than 2,5 %. A possible deformation could be, among others, dependant on the duty cycle of the load.

## ► Surface Pressure, page 47



**Diagram 03: Deformation under pressure and temperature**

## Permissible Surface Speeds

iglidur® J260 has been developed for low to medium surface speeds.

The maximum values shown in table 02 can only be achieved at low pressures. At the given speeds, friction can cause a temperature increase to maximum permissible levels. In practice, though, this temperature level is rarely reached, due to varying application conditions.

## ► Surface Speed, page 49

m/s	Rotating	Oscillating	Linear
Continuous	1	0.7	3
Short term	2	1.4	4

**Table 02: Maximum running speed**

## Temperatures

iglidur® J260 plain bearings can be used at temperatures from -100 °C up to +120 °C. The short term maximum temperature is +140 °C. The temperature in an application also has an effect on the bearing wear. With increasing temperatures, the wear increases and this effect is significant when temperatures rise over +80 °C.

## ► Application Temperatures, page 50

iglidur® J260	Application temperature
Minimum	-100 °C
Max. long term	+120 °C
Max. short term	+140 °C
Add. securing is required from	+80 °C

**Table 03: Temperature limits**

## Friction and Wear

Similar to wear resistance, the coefficient of friction  $\mu$  also changes with the load. The coefficient of friction decreases with increasing loads, whereas an increase in surface speed causes an increase of the coefficient of friction.

► Coefficients of Friction and Surfaces, **page 52**

► Wear Resistance, **page 53**

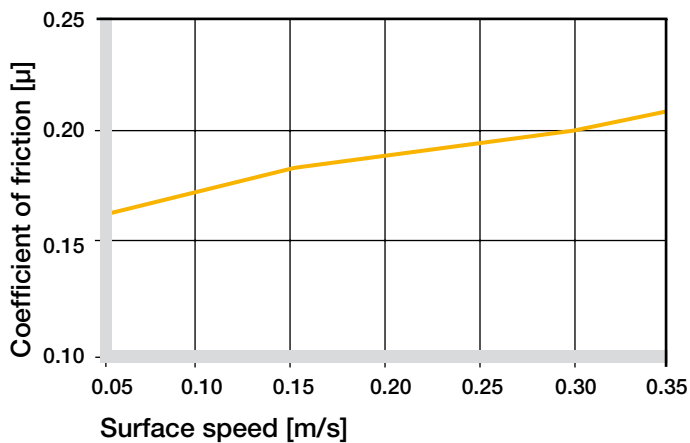


Diagram 04: Coefficient of friction as a function of the running speed,  $p = 0.75 \text{ MPa}$

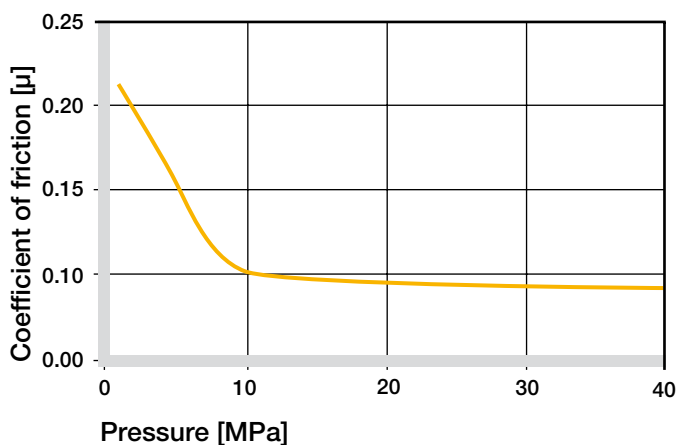


Diagram 05: Coefficient of friction as a function of the pressure,  $v = 0.01 \text{ m/s}$

## Shaft Materials

The friction and wear are also dependent, to a large degree, on the shaft material. Shafts that are too smooth, increase both the coefficient of friction and the wear of the bearing. For iglidur® J260 a ground surface with an average roughness  $R_a = 0.8 \text{ μm}$  is recommended (Diagram 06). Diagrams 07 to 09 shows results of testing different shaft materials with plain bearings made of iglidur® J260. In Diagram 07 it shows that iglidur® J260 can be combined with various shaft materials. The hard anodized aluminum shafts came out best at low loads, but iglidur® J260 bearings show good service life even on simple Cf53, stainless steel and hard-chromed shafts. In this connection it is important to note that with increasing loads, the recommended hardness of the shaft increases. The “soft” shafts tend to wear more easily and thus increase the wear of the overall system, if the loads exceed 2 MPa. Diagram 08 shows that with increasing load the wear on hard-chromed shafts and V2A shafts rises less strongly than on Cf53 and St37 shafts. The comparison of rotation and oscillating in Diagram 09 makes it very clear where iglidur® J260 bearings are best used, especially in rotary operations.

► Shaft Materials, **page 55**

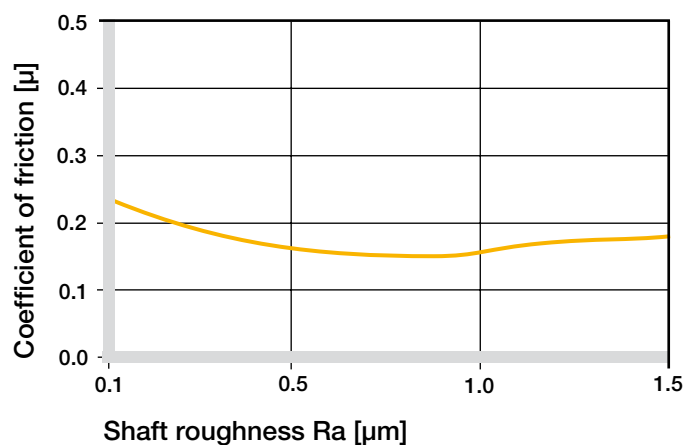


Diagram 06: Coefficient of friction as function of the shaft surface (Cf53 hardened and ground steel)

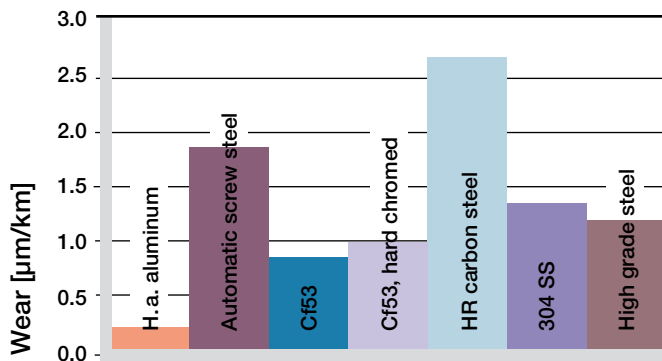


Diagram 07: Wear, rotating with different shaft materials, pressure  $p = 1$  MPa,  $v = 0.3$  m/s

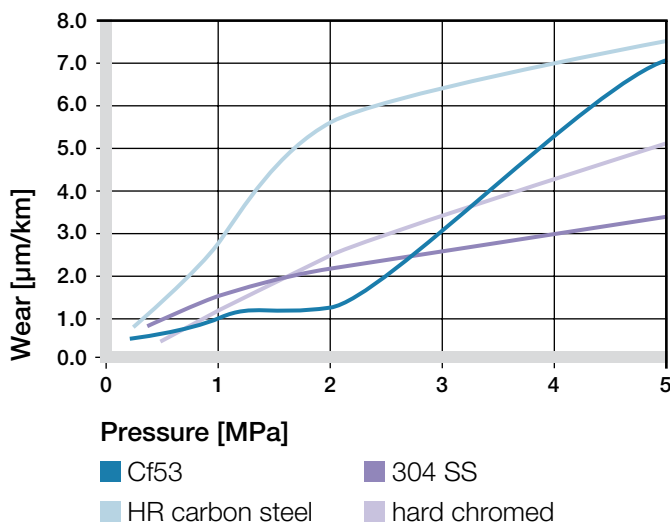


Diagram 08: Wear with different shaft materials in rotational operation, as a function of the pressure

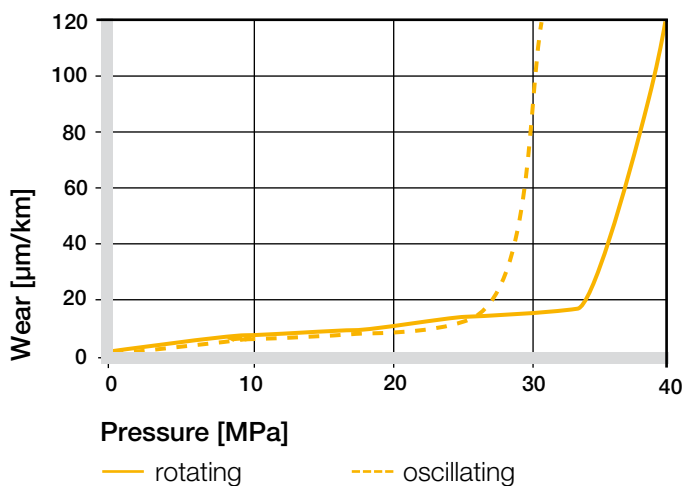


Diagram 09: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the pressure

iglidur® J260	Dry	Greases	Oil	Water
C.o.f. $\mu$	0.06–0.20	0.09	0.04	0.04

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

## Additional Properties

### Chemical Resistance

iglidur® J260 plain bearings are resistant to diluted alkalis, hydrocarbons and alcohols. The very low moisture absorption also permits use in wet or damp environments.

► Chemical Table, [page 1118](#)

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

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

Table 05: Chemical resistance

### Radiation Resistance

Resistant to radiation up to an intensity of  $3 \cdot 10^2$  Gy.

### UV Resistance

Partially resistant against UV rays.

### Vacuum

In a vacuum, any moisture absorbed in the material would be outgassed. For this reason only dehumidified iglidur® J260 bearings are suitable for vacuum.

## Electrical Properties

iglidur® J260 plain bearings are electrically insulating.

Volume resistance	$> 10^{12} \Omega \text{cm}$
Surface resistance	$> 10^{10} \Omega$

## Moisture Absorption

The moisture absorption of iglidur® J260 plain bearings is approximately 0.2 % in standard atmosphere. The saturation limit submerged in water is 0.4 %. These values are so low that design changes due to absorption can be ignored in most cases.

### Maximum moisture absorption

At +23 °C/50 % r.h.	0.2 % weight
Max. water absorption	0.4 % weight

Table 06: Moisture absorption

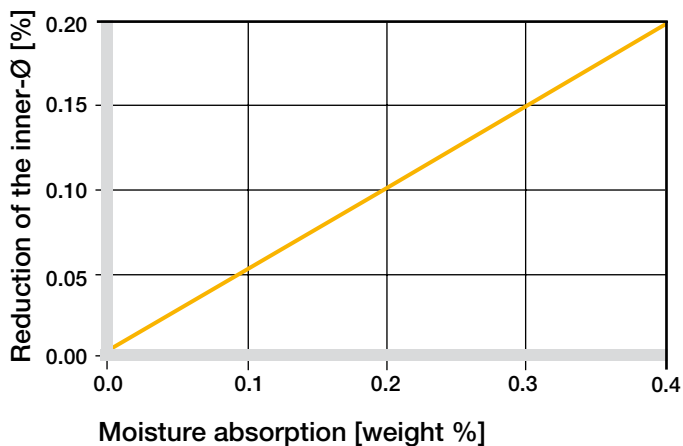


Diagram 10: Effect of moisture absorption on plain bearings

## Installation Tolerances

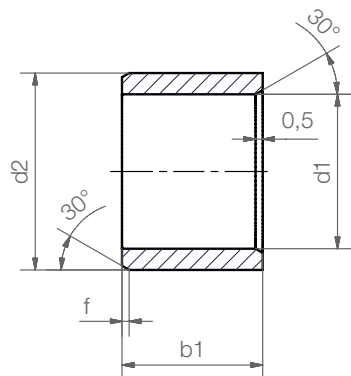
iglidur® J260 plain bearings are standard bearings for shafts with h-tolerance (recommended minimum h9). The bearings are designed for pressfit into a housing machined to a H7 tolerance. After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table). In relation to the installation tolerance, the inner diameter changes with the absorption of humidity.

► Testing Methods, page 59

Diameter d1 [mm]	Shaft h9 [mm]	iglidur® J260 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

## Sleeve bearing



### Order key

**J260SM-0608-06**



Length b1  
Outer diameter d2  
Inner diameter d1  
Metric  
Type (Form S)  
Material iglidur® J260

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
J260SM-0608-06	6.0	+0.020 +0.068	8.0	6.0
J260SM-0810-06	8.0	+0.025 +0.083	10.0	6.0
J260SM-0810-10	8.0	+0.025 +0.083	10.0	10.0
J260SM-1012-10	10.0	+0.025 +0.083	12.0	10.0
J260SM-1214-12	12.0	+0.032 +0.102	14.0	12.0
J260SM-1214-15	12.0	+0.032 +0.102	14.0	15.0
J260SM-1618-15	16.0	+0.032 +0.102	18.0	15.0
J260SM-1820-12	18.0	+0.032 +0.102	20.0	12.0
J260SM-2023-20	20.0	+0.040 +0.124	23.0	20.0

\* after pressfit. Testing methods ► page 59

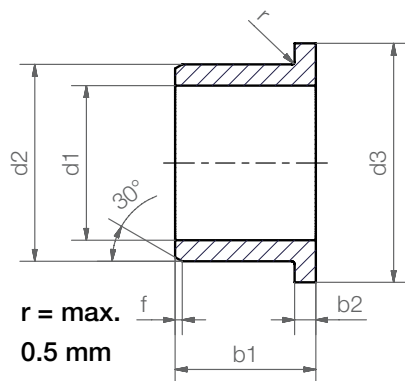


**delivery** from stock  
**time**



**prices** price list online  
[www.igus.co.uk/en/j260](http://www.igus.co.uk/en/j260)

## Flange bearing



### Order key

**J260FM-0608-06**



Length b1  
Outer diameter d2  
Inner diameter d1  
Metric  
Type (Form F)  
Material iglidur® J260

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 d13	b1 h13	b2 -0.14
J260FM-0608-06	6.0	+0.020 +0.068	8.0	12.0	6.0	1.0
J260FM-0810-10	8.0	+0.025 +0.083	10.0	15.0	10.0	1.0
J260FM-1012-10	10.0	+0.025 +0.083	12.0	18.0	10.0	1.0
J260FM-1214-12	12.0	+0.032 +0.102	14.0	20.0	12.0	1.0
J260FM-1618-17	16.0	+0.032 +0.102	18.0	24.0	17.0	1.0
J260FM-2023-21	20.0	+0.040 +0.124	23.0	30.0	21.5	1.5

\* after pressfit. Testing methods ► page 59



### Don't find your size?

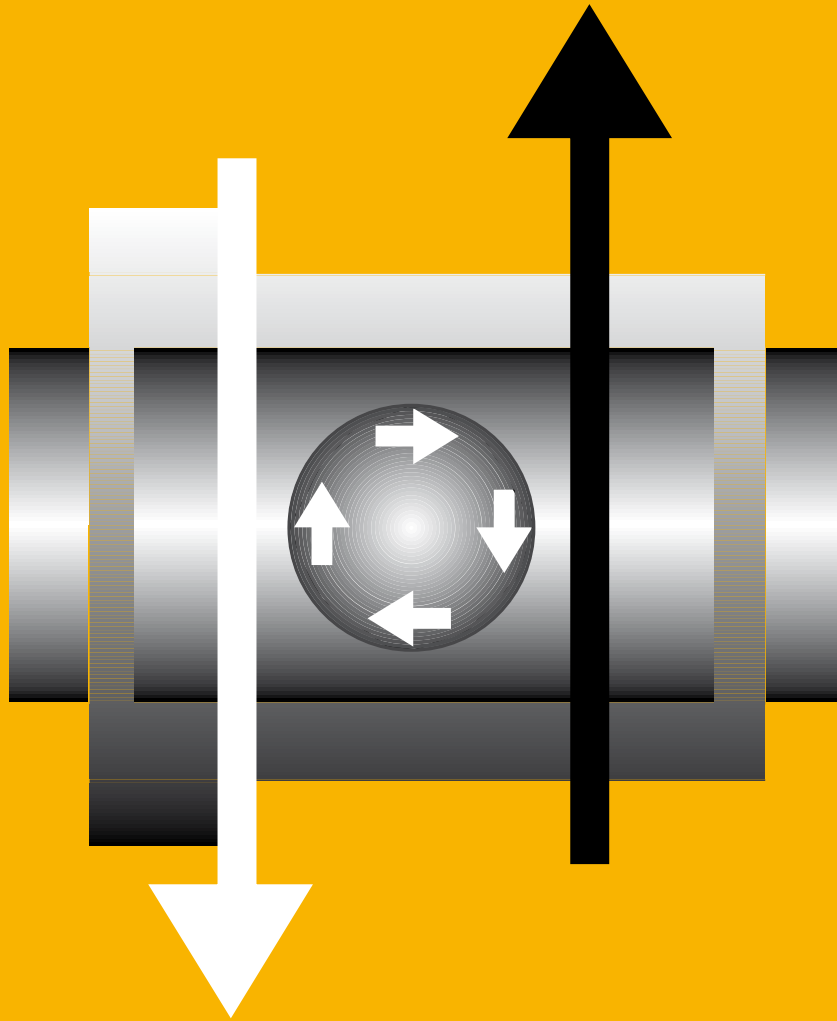
Do you need another length, other dimensions or tolerances? You need a particular design or alternative for your application? Please call us. igus® listens to your needs and provides you a solution in a very short time.



**delivery** from stock  
**time**



**prices** price list online  
[www.igus.co.uk/en/j260](http://www.igus.co.uk/en/j260)



**Runs up to three times longer than  
iglidur® J – iglidur® J3**



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Standard range from stock

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Lubrication- and maintenance-free

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Low coefficients of friction

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Good liquid media resistance

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Low moisture absorption

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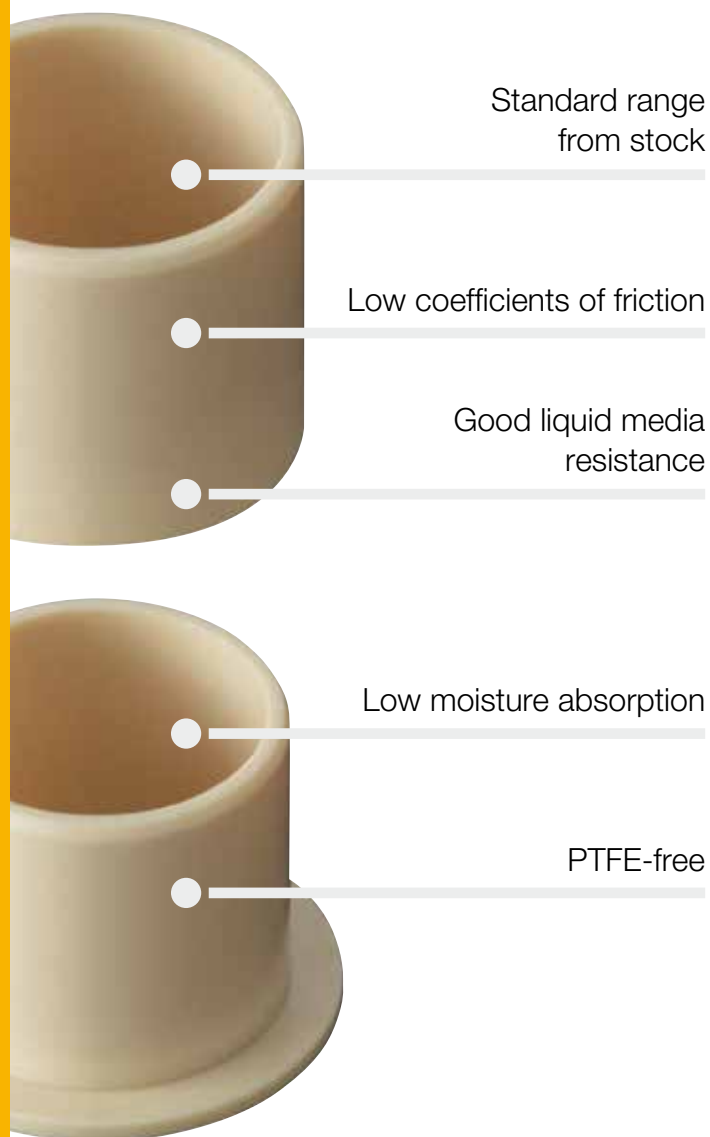
PTFE-free

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# iglidur® J3

**Runs up to three times longer than iglidur® J.** iglidur® J3 is the new material with improved wear resistance at low to medium loads and high speed. The lifetime is up to three times longer than iglidur® J – the previous iglidur® champion.



## When to use it?

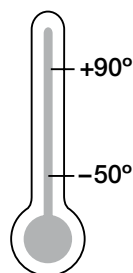
- If wear resistance (rotating or oscillating) of iglidur® J should be optimized
- If a really low coefficient of friction in dry run is necessary
- If high wear resistance at low temperatures is required
- If low moisture absorption is requested
- If good liquid media resistance is required



## When not to use it?

- If you need a wear-resistant bearing for linear motion
  - ▶ iglidur® J, page 93
- If permanent temperatures exceed +90 °C
  - ▶ iglidur® J260, page 221
- If radial surface pressure is higher than 35 MPa
  - ▶ iglidur® W300, page 135

## Temperature



## Product range

2 types  
Ø 2–40 mm  
more dimensions  
on request



# iglidur® J3 | Application Examples



## Typical sectors of industry and application areas

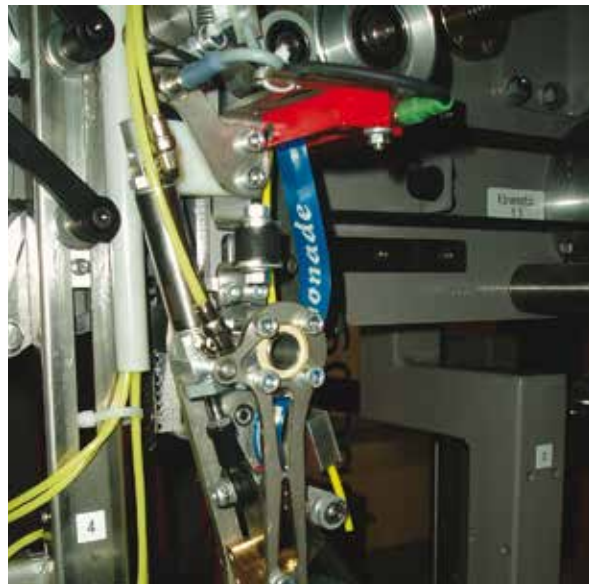
- Automation ● Printing industry
- Beverage technology ● Glass industry
- Aerospace engineering etc.

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

► [www.igus.co.uk/iglidur-applications](http://www.igus.co.uk/iglidur-applications)



► [www.igus.co.uk/flap-bearings](http://www.igus.co.uk/flap-bearings)



► [www.igus.co.uk/carrier-handle](http://www.igus.co.uk/carrier-handle)

### Material properties table

General properties	Unit	iglidur® J3	Testing method
Density	g/cm <sup>3</sup>	1.42	
Colour		yellow	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	0.3	DIN 53495
Max. water absorption	% weight	1.3	
Coefficient of sliding friction, dynamic against steel	μ	0.06–0.20	
pv value, max. (dry)	MPa · m/s	0.5	
Mechanical properties			
Modulus of elasticity	MPa	2,700	DIN 53457
Tensile strength at +20 °C	MPa	70	DIN 53452
Compressive strength	MPa	60	
Max. recommended surface pressure (+20 °C)	MPa	45	
Shore D hardness		73	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+90	
Max. short term application temperature	°C	+120	
Min. application temperature	°C	–50	
Thermal conductivity	W/m · K	0.25	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	K <sup>-1</sup> · 10 <sup>-5</sup>	13	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 <sup>12</sup>	DIN IEC 93
Surface resistance	Ω	> 10 <sup>12</sup>	DIN 53482

Table 01: Material properties table

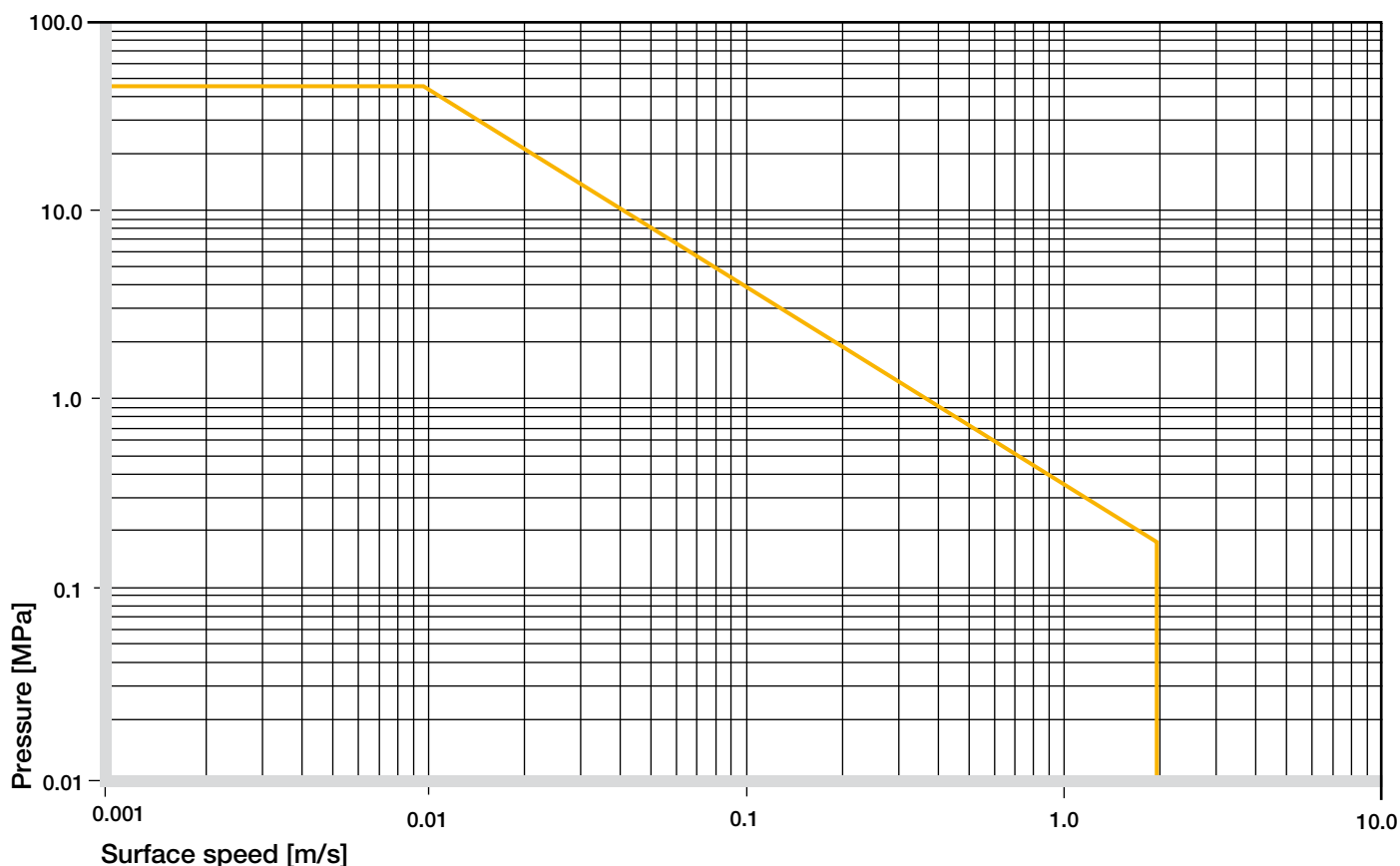
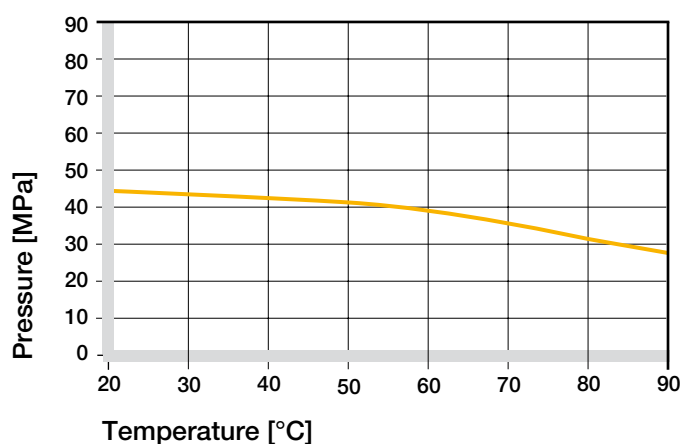


Diagram 01: Permissible pv values for iglidur® J3 with a wall thickness of 1 mm dry running against a steel shaft at +20 °C, mounted in a steel housing

With respect to its general mechanical and thermal specifications, iglidur® J3 is directly comparable to our classic, iglidur® J.

## Mechanical Properties

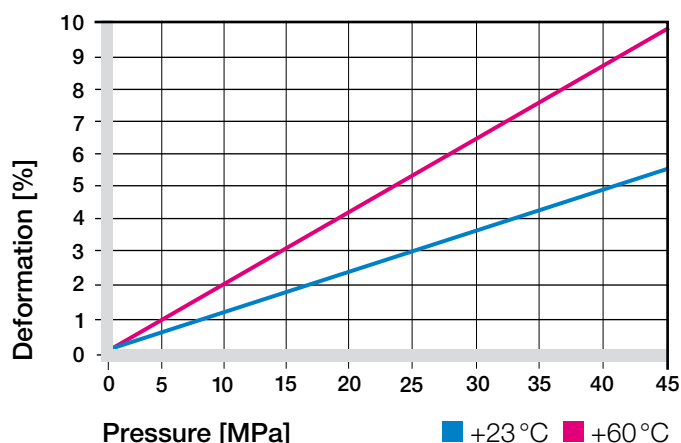
With increasing temperatures, the compressive strength of iglidur® J3 plain bearings decreases. The Diagram 02 shows this inverse relationship. However, at the longterm maximum temperature of +90°C the permissible surface pressure is almost 30 MPa. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.



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

Diagram 03 shows the elastic deformation of iglidur® J3 at radial loads. At the maximum recommended surface pressure of 45 MPa at room temperature, the deformation is less than 6 %. A possible deformation could be, among others, dependent on the duty cycle of the load.

## ► Surface Pressure, page 47



**Diagram 03: Deformation under pressure and temperature**

## Permissible Surface Speeds

iglidur® J3 has been developed for medium to high surface speeds. The maximum values shown in table 02 can only be achieved at low pressures. At the given speeds, friction can cause a temperature increase to maximum permissible levels. In practice, though, this temperature level is rarely reached, due to varying application conditions.

## ► Surface Speed, page 49

m/s	Rotating	Oscillating	Linear
Continuous	1.5	1.1	8
Short term	3	2.1	10

**Table 02: Maximum running speed**

## Temperatures

iglidur® J3 plain bearings can be used at temperatures from –50 °C up to +90 °C. The short term maximum temperature is +120 °C. The temperature in an application also has an effect on the bearing wear. With increasing temperatures, the wear increases and this effect is significant when temperatures rise over +90 °C.

## ► Application Temperatures, page 50

iglidur® J3	Application temperature
Minimum	–50 °C
Max. long term	+90 °C
Max. short term	+120 °C
Add. securing is required from	+60 °C

**Table 03: Temperature limits**

## Friction and Wear

Similar to wear resistance, the coefficient of friction  $\mu$  also changes with the load. The coefficient of friction decreases with increasing loads, as it shows a clear minimum at surface speeds up to 0.15 m/s (s. Diagram. 04 and 05).

► Coefficients of Friction and Surfaces, **page 52**

► Wear Resistance, **page 53**

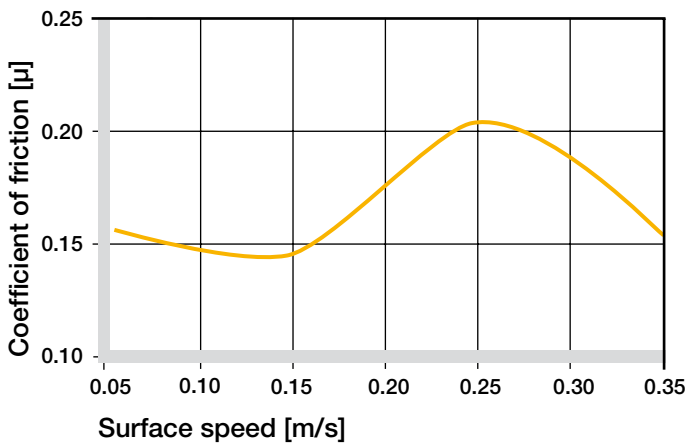


Diagram 04: Coefficient of friction as a function of the running speed,  $p = 0.75 \text{ MPa}$

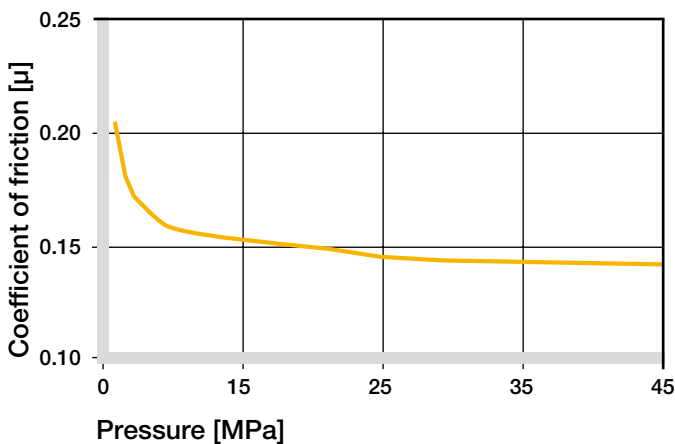


Diagram 05: Coefficient of friction as a function of the pressure,  $v = 0.01 \text{ m/s}$

## Shaft Materials

The friction and wear are also dependent, to a large degree, on the shaft material. Shafts that are too smooth, increase both the coefficient of friction and the wear of the bearing. For iglidur® J3 a ground surface with an average roughness  $R_a = 0.1\text{--}0.3 \text{ μm}$  is recommended. (s. Diagram 06). Diagrams 07 to 09 shows results of testing different shaft materials with plain bearings made of iglidur® J3. In Diagram 07 it shows that iglidur® J3 can be combined with various shaft materials. At low pressures, hard anodized aluminum shafts, X90 stainless steel and Cf53 steel shafts proved to be the best. But even in combination with other shaft materials, except for free cutting steel, iglidur® J3 bearings achieve excellent wear values. Diagram 08 shows that the difference between shaft materials increase with increasing loads. Hard chromed or 304 SS-shafts are best at pressures from 2 MPa in rotation movement. Diagram 09 shows rotating and oscillating tests in comparison. With higher load, the wear increases more for rotating than for oscillating movements.

► Shaft Materials, **page 55**

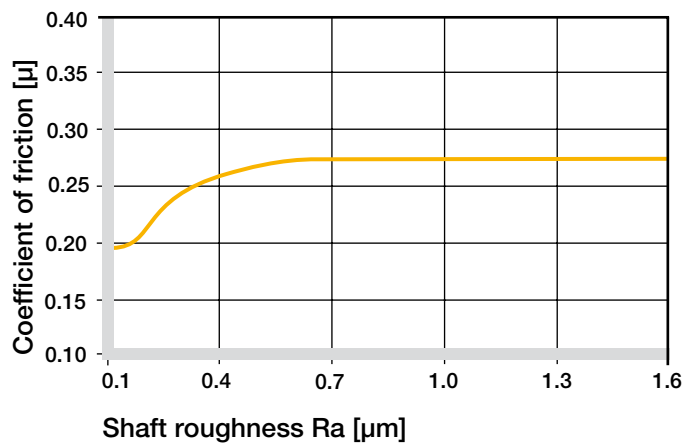


Diagram 06: Coefficient of friction as function of the shaft surface (Cf53 hardened and ground steel)

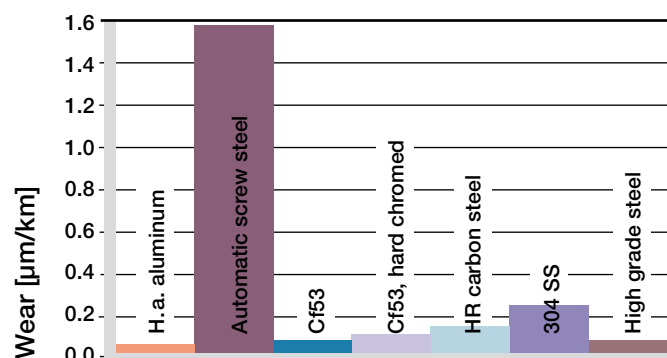


Diagram 07: Wear, rotating with different shaft materials, pressure  $p = 1$  MPa,  $v = 0.3$  m/s

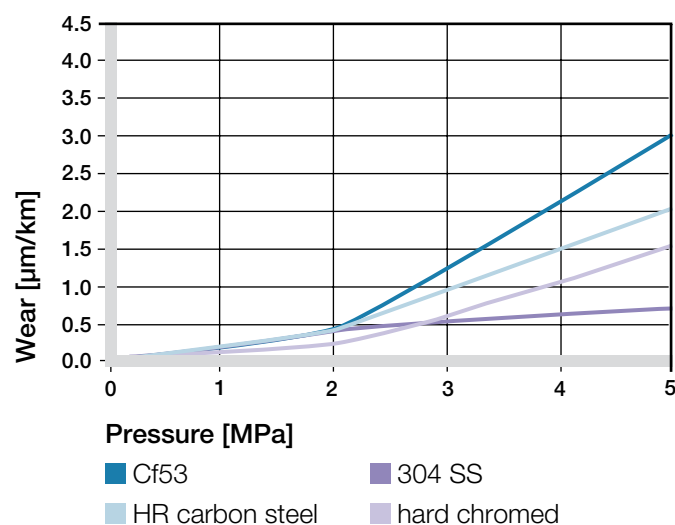


Diagram 08: Wear with different shaft materials in rotational operation, as a function of the pressure

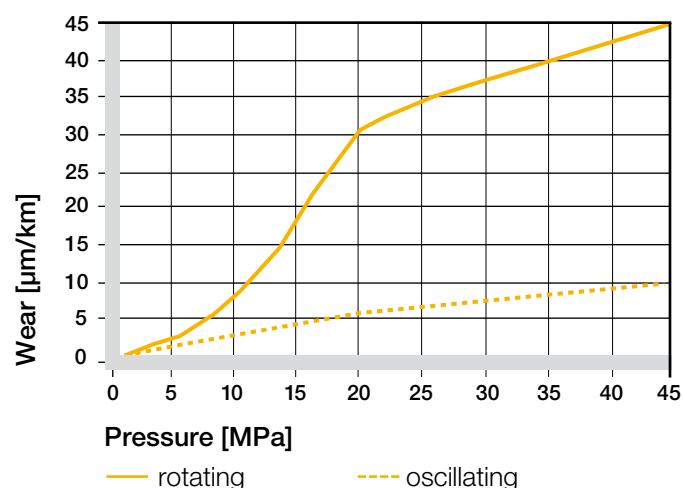


Diagram 09: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the pressure

iglidur® J3	Dry	Greases	Oil	Water
C.o.f. $\mu$	0.06–0.20	0.09	0.04	0.04

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

## Additional Properties

### Chemical Resistance

iglidur® J3 bearings are resistant to diluted alkalis and very weak acids as well as to fuels and all kinds of lubricants. The low humidity absorption allows them to be used in wet or humid environments. iglidur® J3 bearings are also resistant to conventional detergents used in the food industry.

► Chemical Table, page 1118

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

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

Table 05: Chemical resistance

### Radiation Resistance

Resistant to radiation up to an intensity of  $1 \cdot 10^4$  Gy.

### UV Resistance

iglidur® J3 plain bearings become discoloured under UV radiation. However, hardness, compressive strength and the wear resistance of the material do not change.

### Vacuum

In vacuum applications, any absorbed moisture content is degassed. For this reason only dehumidified iglidur® J3 bearings are suitable for use in a vacuum.



## Electrical Properties

iglidur® J3 plain bearings are electrically insulating.

Volume resistance  $> 10^{12} \Omega \text{cm}$

Surface resistance  $> 10^{12} \Omega$

## Moisture Absorption

The moisture absorption of iglidur® J3 plain bearings is approximately 0.3 % in the standard atmosphere. The saturation limit submerged in water is 1.3 %. These values are so low that design changes due to absorption are only necessary in extreme cases.

### Maximum moisture absorption

At +23 °C/50 % r.h. 0.3 % weight

Max. water absorption 1.3 % weight

Table 06: Moisture absorption

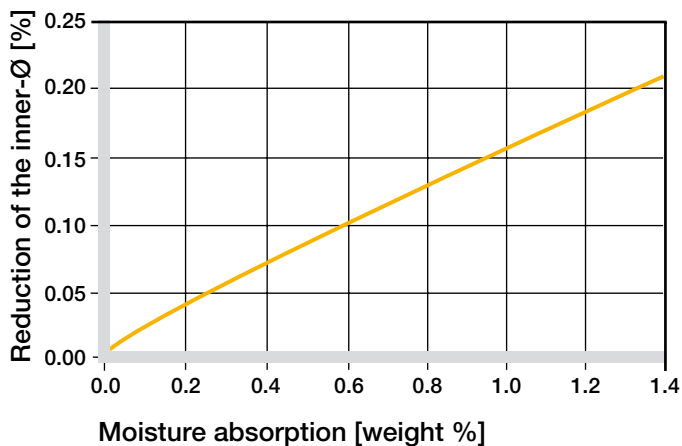


Diagram 10: Effect of moisture absorption on plain bearings

## Installation Tolerances

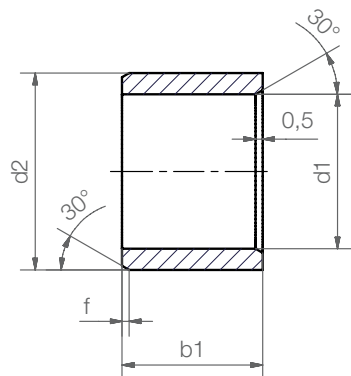
iglidur® J3 plain bearings are standard bearings for shafts with h-tolerance (recommended minimum h9). The bearings are designed for pressfit into a housing machined to a H7 tolerance. After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table). In relation to the installation tolerance, the inner diameter changes with the absorption of humidity.

► Testing Methods, page 59

Diameter d1 [mm]	Shaft h9 [mm]	iglidur® J3 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

## Sleeve bearing



### Order key

**J3SM-0304-05**



Length b1  
Outer diameter d2  
Inner diameter d1  
Metric  
Type (Form S)  
Material iglidur® J3

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
J3SM-0304-05	3.0	+0.014 +0.054	4.5	5.0
J3SM-0507-05	5.0	+0.020 +0.068	7.0	5.0
J3SM-0608-06	6.0	+0.020 +0.068	8.0	6.0
J3SM-0810-10	8.0	+0.025 +0.083	10.0	10.0
J3SM-1012-10	10.0	+0.025 +0.083	12.0	10.0
J3SM-1214-15	12.0	+0.032 +0.102	14.0	15.0
J3SM-1618-15	16.0	+0.032 +0.102	18.0	15.0
J3SM-2023-20	20.0	+0.040 +0.124	23.0	20.0
J3SM-2528-30	25.0	+0.040 +0.124	28.0	30.0
J3SM-3034-30	30.0	+0.040 +0.124	34.0	30.0
J3SM-3539-40	35.0	+0.050 +0.150	39.0	40.0
J3SM-4044-40	40.0	+0.050 +0.150	44.0	40.0

\* after pressfit. Testing methods ► page 59



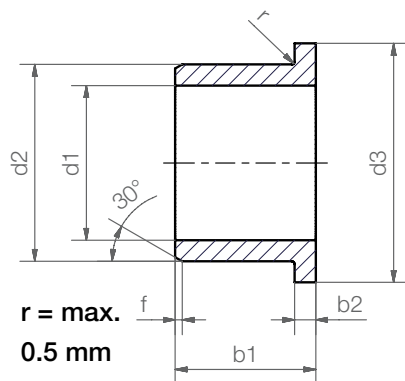
**delivery** from stock  
**time**



**prices** price list online  
[www.igus.co.uk/en/j3](http://www.igus.co.uk/en/j3)



## Flange bearing



### Order key

**J3FM-0304-05**


Length b1  
Outer diameter d2  
Inner diameter d1  
Metric  
Type (Form F)  
Material iglidur® J3

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 d13	b1 h13	b2 -0.14
J3FM-0203505-05	2.0	+0.014 +0.054	3.5	5.0	5.0	0.75
J3FM-0304-05	3.0	+0.014 +0.054	4.5	7.5	5.0	0.75
J3FM-0507-05	5.0	+0.020 +0.068	7.0	11.0	5.0	1.0
J3FM-0608-06	6.0	+0.020 +0.068	8.0	12.0	6.0	1.0
J3FM-0810-10	8.0	+0.025 +0.083	10.0	15.0	10.0	1.0
J3FM-1012-10	10.0	+0.025 +0.083	12.0	18.0	10.0	1.0
J3FM-1214-12	12.0	+0.032 +0.102	14.0	20.0	12.0	1.0
J3FM-1618-17	16.0	+0.032 +0.102	18.0	24.0	17.0	1.0
J3FM-2023-21	20.0	+0.040 +0.124	23.0	30.0	21.5	1.5
J3FM-2528-21	25.0	+0.040 +0.124	28.0	35.0	21.5	1.5
J3FM-3034-26	30.0	+0.040 +0.124	34.0	42.0	26.0	2.0
J3FM-3539-26	35.0	+0.050 +0.150	39.0	47.0	26.0	2.0
J3FM-4044-40	40.0	+0.050 +0.150	44.0	52.0	40.0	2.0

\* after pressfit. Testing methods ► page 59



### Don't find your size?

Do you need another length, other dimensions or tolerances? You need a particular design or alternative for your application? Please call us. igus® listens to your needs and provides you a solution in a very short time.



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More than 300 dimensions are now available. Search online for your required bearing.

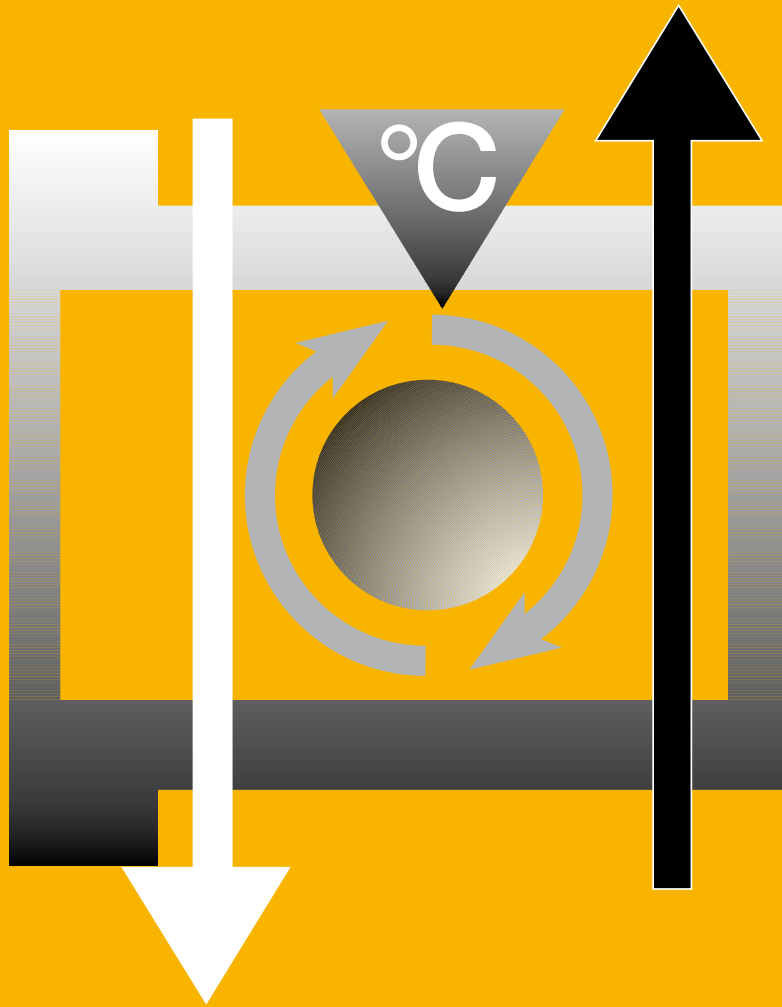
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**time**



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[www.igus.co.uk/en/j3](http://www.igus.co.uk/en/j3)



## High temperatures, versatile – iglidur® J350



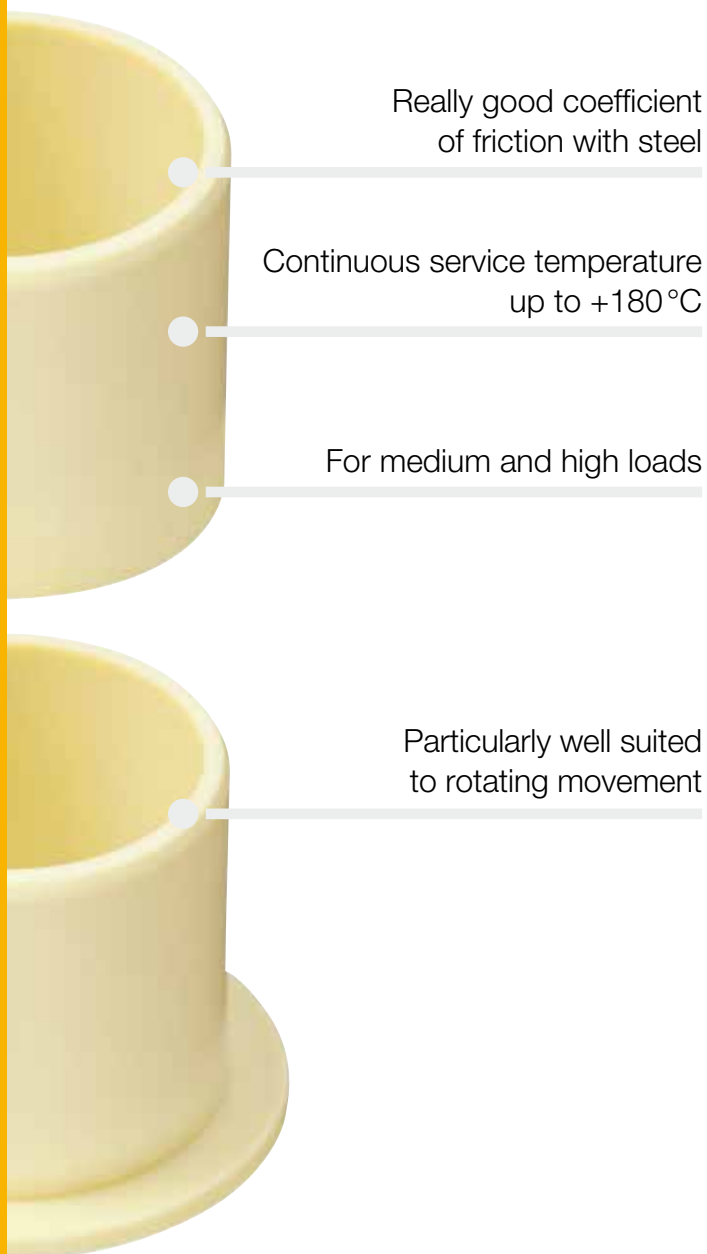
Excellent coefficient of friction against steel

Continuous service temperature up to +180°C

For medium and high loads

Particularly well suited to rotating movement

**High temperatures, versatile.** An outstanding bearing for rotating applications – and for a wide range of different shaft materials: With iglidur® J350 bearings, the lifetime can often be increased for applications between 1 and 50 MPa. In addition, the high temperature resistance makes it a very versatile material.



## When to use it?

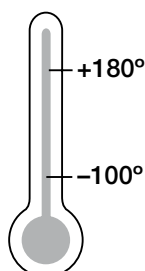
- If a high wear-resistant bearing for rotating movement at medium and high loads is required
- If an economic bearing is required for use at high temperatures.
- If pressfit up to +150 °C is necessary
- If high wear resistance is required at high loads
- If the bearing is exposed to shock loading



## When not to use it?

- If permanent temperatures exceed +180 °C  
▶ iglidur® X, page 157
- If low friction is required  
▶ iglidur® J, page 93
- When a cost-effective bearing with a low friction is needed  
▶ iglidur® D, page 271  
▶ iglidur® R, page 261
- With high rotational speeds  
▶ iglidur® J, page 93

## Temperature



## Product range

2 styles  
Ø 6–30 mm  
more dimensions  
on request



## Material properties table

General properties	Unit	iglidur® J350	Testing method
Density	g/cm <sup>3</sup>	1.44	
Colour		yellow	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	0.3	DIN 53495
Max. water absorption	% weight	1.6	
Coefficient of sliding friction, dynamic against steel	μ	0.1–0.2	
pv value, max. (dry)	MPa · m/s	0.45	
Mechanical properties			
Modulus of elasticity	MPa	2,000	DIN 53457
Tensile strength at +20 °C	MPa	55	DIN 53452
Compressive strength	MPa	60	
Max. recommended surface pressure (+20 °C)	MPa	60	
Shore D hardness		80	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+180	
Max. short term application temperature	°C	+220	
Min. application temperature	°C	–100	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	K <sup>–1</sup> · 10 <sup>–5</sup>	7	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 <sup>13</sup>	DIN IEC 93
Surface resistance	Ω	> 10 <sup>10</sup>	DIN 53482

Table 01: Material properties table

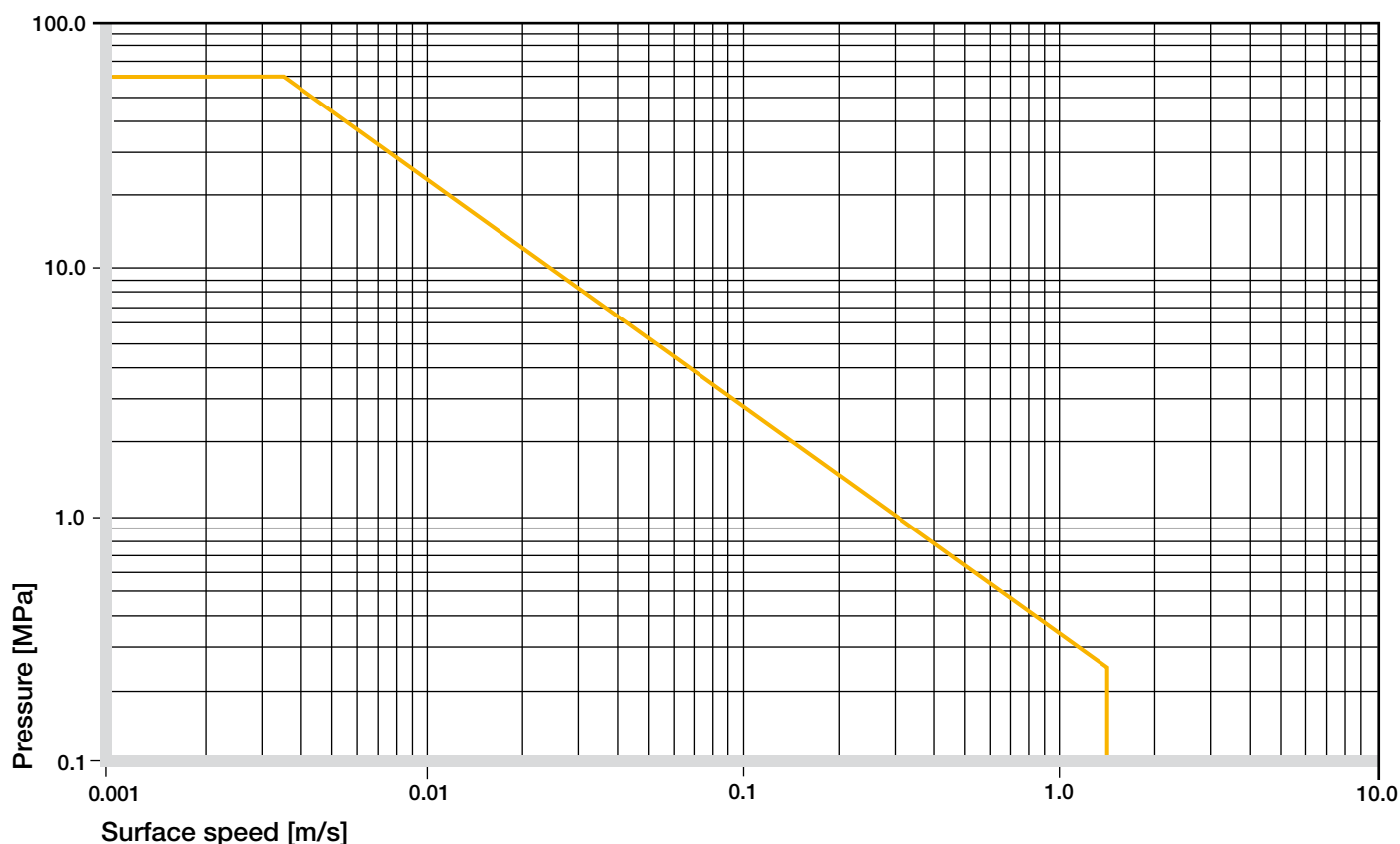
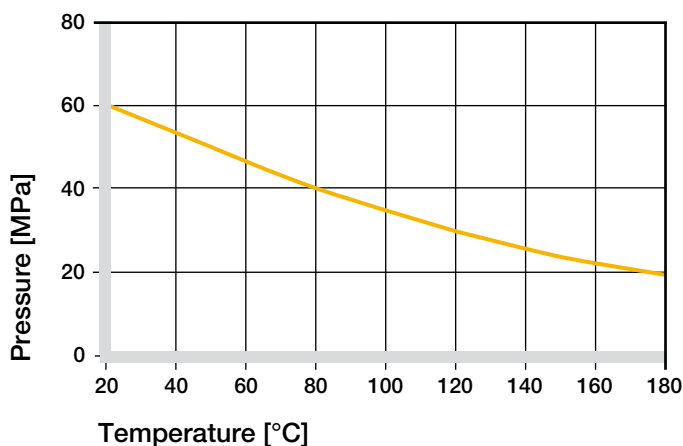


Diagram 01: Permissible pv values for iglidur® J350 with a wall thickness of 1 mm dry running against a steel shaft at +20 °C, mounted in a steel housing

iglidur® J350 blends universally good wear resistance, flexibility and temperature resistance into a very versatile iglidur® material with a broad application spectrum.

## Mechanical Properties

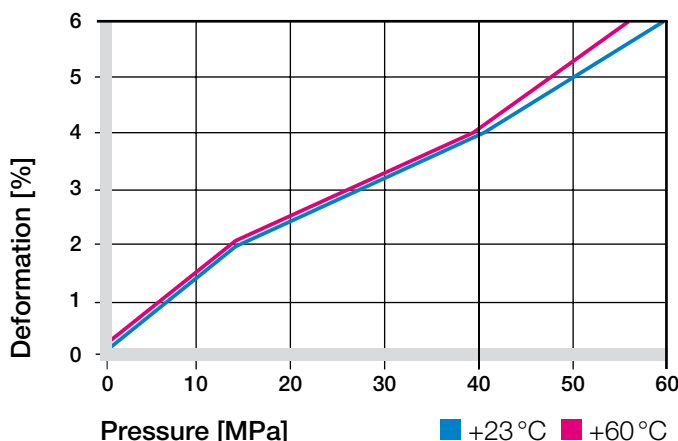
With increasing temperatures, the compressive strength of iglidur® J350 plain bearings decreases. The Diagram 02 shows this inverse relationship. However, at the longterm maximum temperature of +180°C the permissible surface pressure is 20 MPa. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.



**Diagram 02: Recommended maximum surface pressure as a function of temperature (60 MPa at +20 °C)**

iglidur® J350 bearings are adequate for medium and high loads. Diagram 03 shows the elastic deformation under different temperatures. It shows the material behaviour submitted to a short term load. The surrounding temperatures are only noticeable at 60 MPa.

## ► Surface Pressure, page 47



**Diagram 03: Deformation under pressure and temperature**

## Permissible Surface Speeds

iglidur® J350 has been developed for low and medium speeds in rotating and oscillating use. The wear rate is much better with rotating movement.

iglidur® J350 plain bearings can also be used for linear motion.

## ► Surface Speed, page 49

m/s	Rotating	Oscillating	Linear
Continuous	1.3	1	4
Short term	3	2,3	8

**Table 02: Maximum running speed**

## Temperatures

The temperature resistance of iglidur® J250 allows universal applications in many different industries. The short term maximum temperature is +220 °C. At temperatures above +150 °C the bearing should be mechanically fixed in the bore. Higher temperatures may result in a loss of the pressfit of the plain bearings, potentially allowing the bearing to drift within the housing bore.

The wear-rate of iglidur® J350 bearings changes very little at high temperatures. In some cases, the wear even decreases at +100 °C. Generally, the wear figures between +20 °C and +150 °C are very similar.

The iglidur® J350 is a highly wear-resistant bearing material, which can also be used at higher temperatures. The combination of excellent tribological and thermal properties fills a gap in the group of long life materials.

## ► Application Temperatures, page 50

iglidur® J350	Application temperature
Minimum	– 100 °C
Max. long term	+ 180 °C
Max. short term	+ 220 °C
Add. securing is required from	+ 140 °C

**Table 03: Temperature limits**

## Friction and Wear

The coefficient of friction of iglidur® J350 in dry operation on a steel shaft is very good. It is even lower at high speed, which makes the material very suitable for permanently dry-running application at high rotation speed, as can be seen in diagram 04.

iglidur® J350 bearings are clearly superior to other bearing materials in rotating applications over 2 MPa. The lifetime of iglidur® J350 can be several times higher.

- Coefficients of Friction and Surfaces, **page 52**
- Wear Resistance, **page 53**

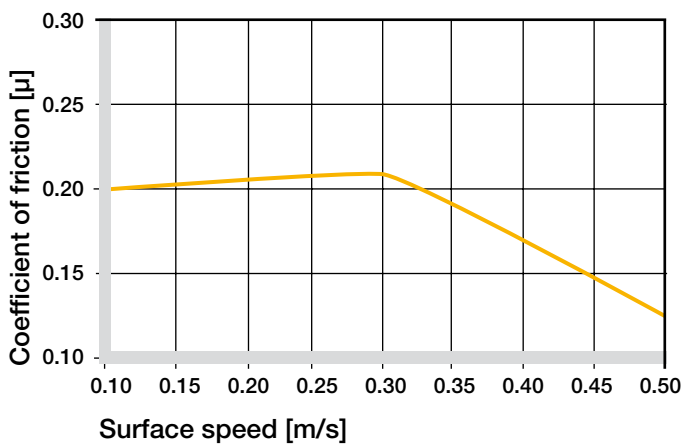


Diagram 04: Coefficient of friction as a function of the running speed,  $p = 1 \text{ MPa}$

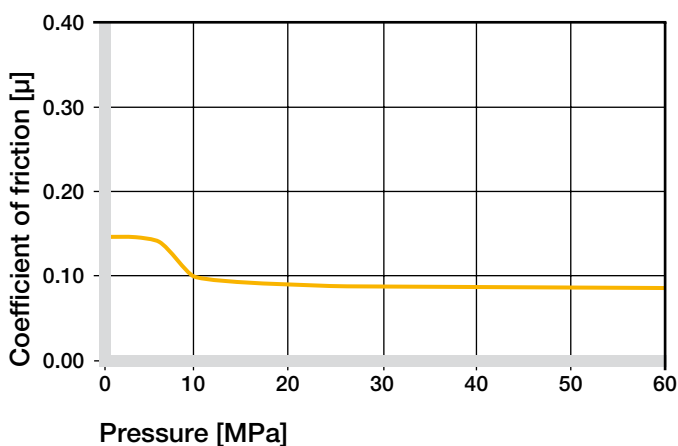


Diagram 05: Coefficient of friction as a function of the pressure,  $v = 0.01 \text{ m/s}$

## Shaft Materials

Diagram 06 and 07 shows results of testing different shaft materials with plain bearings made of iglidur® J350.

iglidur® J350 plain bearings can be combined with various shaft materials.

One shaft – bearing combination stands out when looking at the wear results of the test: iglidur® J350 with soft stainless steel (V2A). Not many bearing materials are suitable for use with this rather difficult soft stainless steel material (V2A) and achieve good wear results. Also, iglidur® J350 shows good properties with hard-anodized aluminum shafts.

If the shaft material you plan on using is not shown in these test results, please contact us.

- Shaft Materials, **page 55**

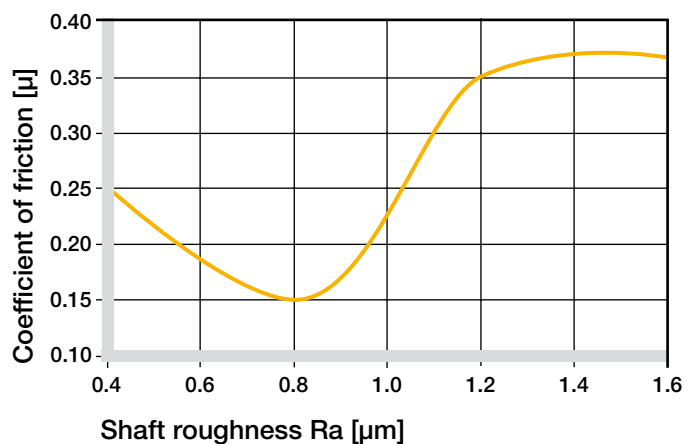


Diagram 06: Coefficient of friction as function of the shaft surface (Cf53 hardened and ground steel)

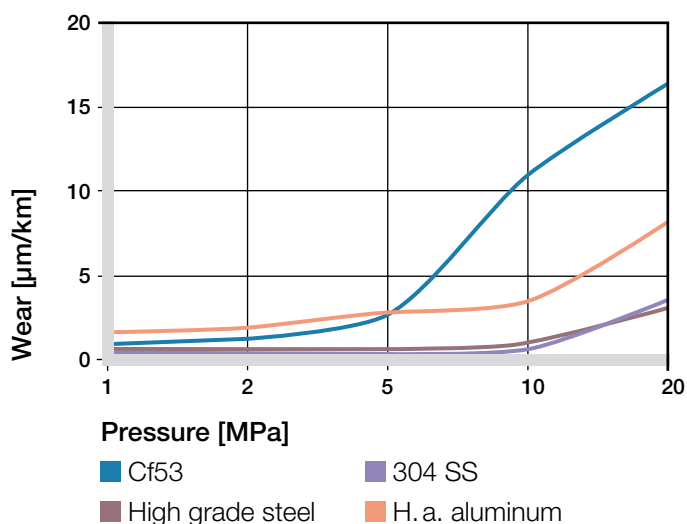


Diagram 07: Wear with different shaft materials in rotational operation, as a function of the pressure

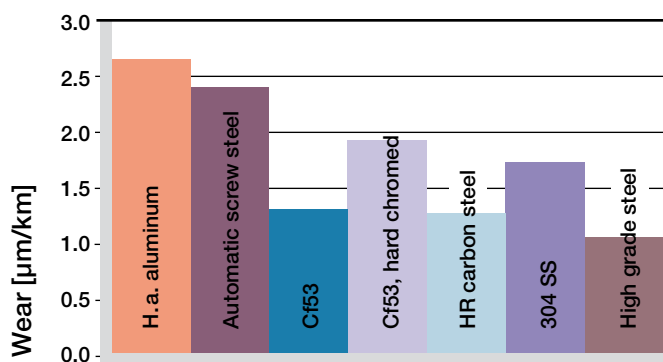


Diagram 08: Wear, rotating with different shaft materials,  $p = 1 \text{ MPa}$ ,  $v = 0.3 \text{ m/s}$

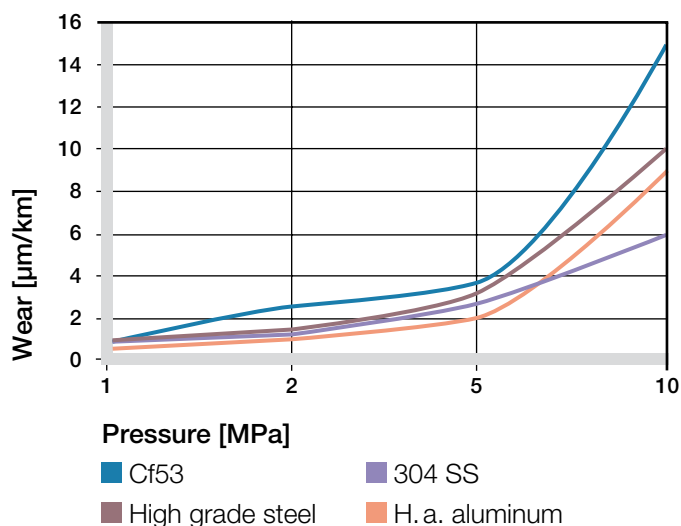


Diagram 09: Wear with oscillating movement of different shaft materials according to applied load

iglidur® J350	Dry	Greases	Oil	Water
C.o.f. $\mu$	0.1–0.2	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® J350 plain bearings are resistant to diluted alkalines and acids, alcohols, cleaning agents and lubricants.

iglidur® J350 will be attacked by esters, ketones, chlorinated hydrocarbons, and other solvents, please refer to the chemical resistance chart at the back of this catalogue.

► Chemical Table, **page 1118**

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

**+** resistant **0** conditionally resistant **–** not resistant

All data given at room temperature  $[+20 \text{ °C}]$

Table 05: Chemical resistance

### Radiation Resistance

Plain bearings made from iglidur® J350 are resistant to radiation up to an intensity of  $2 \cdot 10^2 \text{ Gy}$ .

### UV Resistance

iglidur® J350 plain bearings are conditionally resistant to UV radiation.

### Vacuum

iglidur® J260 plain bearings outgas in a vacuum. Use in a vacuum environment is only possible with dehumidified bearings.

### Electrical Properties

iglidur® J350 plain bearings are electrically insulating.

Volume resistance	$> 10^{13} \text{ Ωcm}$
Surface resistance	$> 10^{10} \text{ Ω}$

Moisture Absorption

The humidity absorption of iglidur® J350 is low and can be ignored when using standard-bearings. Even when saturated with water, iglidur® J350 does not absorb more than 1.6 % of water (by weight).

Maximum moisture absorption	
At +23 °C/50 % r.h.	0.3 % weight
Max. water absorption	1.6 % weight

Table 06: Moisture absorption

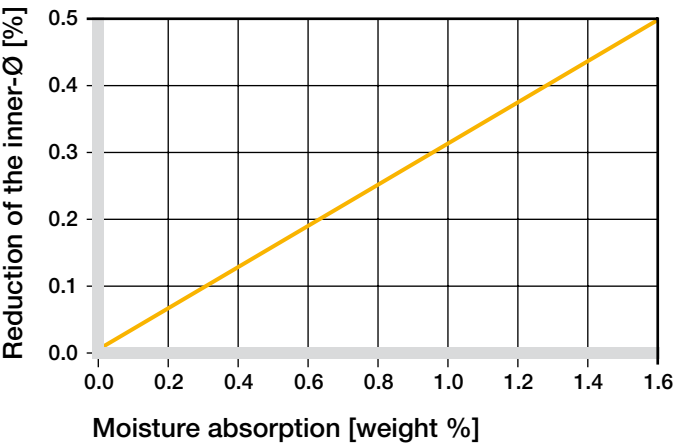


Diagram 10: Effect of moisture absorption on plain bearings

Installation Tolerances

iglidur® J350 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 F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

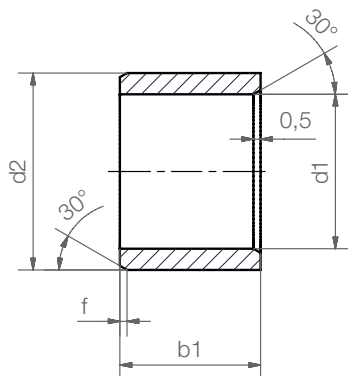
► Testing Methods, page 59

Diameter d1 [mm]	Shaft h9 [mm]	iglidur® J350 F10 [mm]	Housing H7 [mm]
up to 3	0–0.025	+0.006 +0.046	0 +0.010
> 3 to 6	0–0.030	+0.010 +0.058	0 +0.012
> 6 to 10	0–0.036	+0.013 +0.071	0 +0.015
> 10 to 18	0–0.043	+0.016 +0.086	0 +0.018
> 18 to 30	0–0.052	+0.020 +0.104	0 +0.021
> 30 to 50	0–0.062	+0.025 +0.125	0 +0.025
> 50 to 80	0–0.074	+0.030 +0.150	0 +0.030

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



## Sleeve bearing



Order key

**J350SM-0608-06**



Length b1

Outer diameter d2

Inner diameter d1

Metric

Type (Form S)

Material iglidur® J350

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
J350SM-0608-06	6.0	+0.010 +0.058	8.0	6.0
J350SM-0810-10	8.0	+0.013 +0.071	10.0	10.0
J350SM-1012-10	10.0	+0.013 +0.071	12.0	10.0
J350SM-1214-12	12.0	+0.016 +0.086	14.0	12.0
J350SM-1618-15	16.0	+0.016 +0.086	18.0	15.0
J350SM-2023-20	20.0	+0.020 +0.104	23.0	20.0

\* after pressfit. Testing methods ► page 59

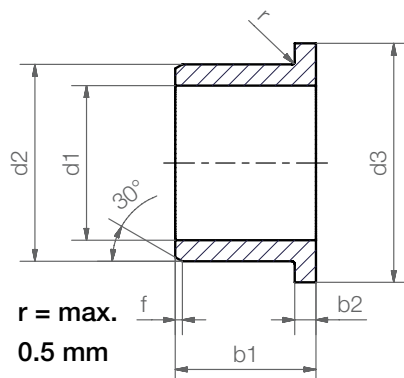


**delivery** from stock  
**time**



**prices** price list online  
[www.igus.co.uk/en/j350](http://www.igus.co.uk/en/j350)

## Flange bearing



Order key

**J350FM-0608-06**



Length b1  
Outer diameter d2  
Inner diameter d1  
Metric  
Type (Form F)  
Material iglidur® J350

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 d13	b1 h13	b2 -0.14
J350FM-0608-06	6.0	+0.010 +0.058	8.0	12.0	6.0	1.0
J350FM-0810-10	8.0	+0.013 +0.071	10.0	15.0	10.0	1.0
J350FM-1012-07	10.0	+0.013 +0.071	12.0	18.0	7.0	1.0
J350FM-1012-10	10.0	+0.013 +0.071	12.0	18.0	10.0	1.0
J350FM-1214-12	12.0	+0.016 +0.086	14.0	20.0	12.0	1.0
J350FM-1618-17	16.0	+0.016 +0.086	18.0	24.0	17.0	1.0
J350FM-2023-21	20.0	+0.020 +0.104	23.0	30.0	21.5	1.5
J350FM-3034-37	30.0	+0.020 +0.104	34.0	42.0	37.0	2.0

\* after pressfit. Testing methods ► page 59



### Don't find your size?

Do you need another length, other dimensions or tolerances? You need a particular design or alternative for your application? Please call us. igus® listens to your needs and provides you a solution in a very short time.

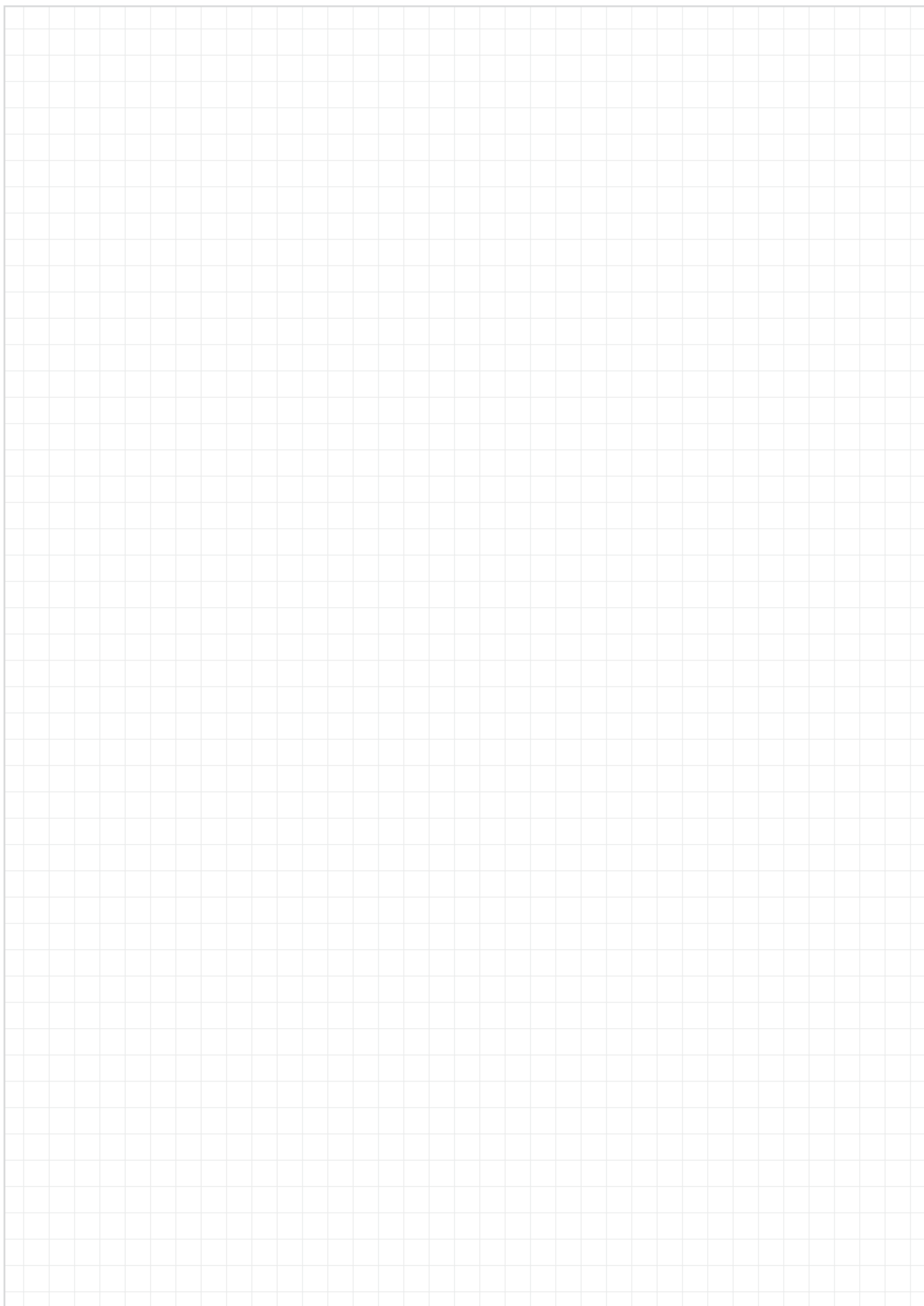


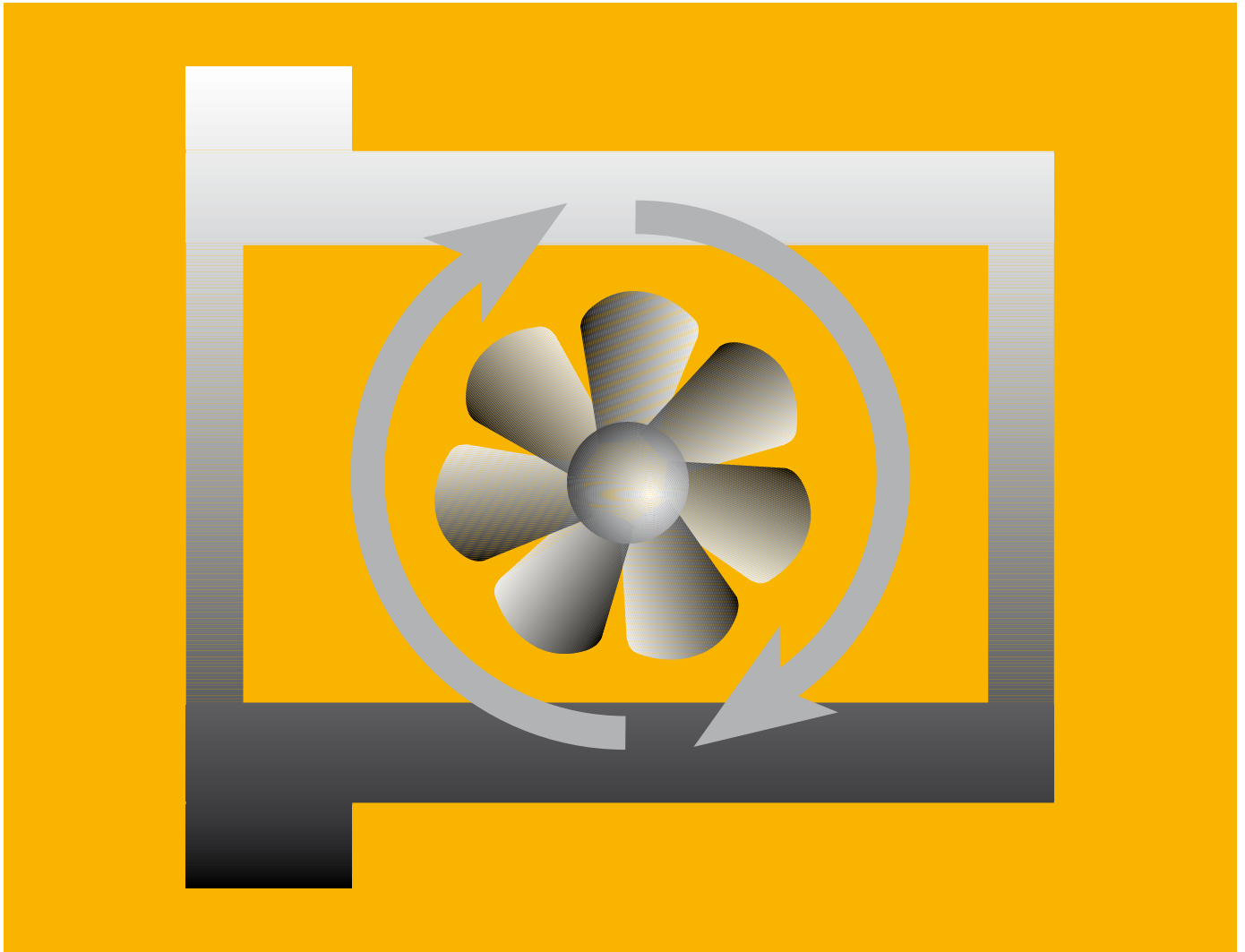
**delivery** from stock  
**time**



**prices** price list online  
[www.igus.co.uk/en/j350](http://www.igus.co.uk/en/j350)

# My Sketches





## For high speeds – iglidur® L250



Standard range from stock

Recommended for rotating applications

Very low coefficients of friction

Excellent wear resistance

# iglidur® L250

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



## When to use it?

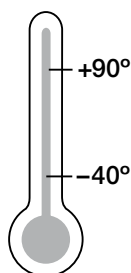
- For rotating applications at high speed
- If highest service life is required
- Low load applications
- If low noise level is required
- For very low coefficients of friction



## When not to use it?

- When high pressure loads occur
  - ▶ iglidur® Q, page 485
  - ▶ iglidur® W300, page 135
- When sustained temperatures above +90 °C is a condition
  - ▶ iglidur® V400, page 301
- When low moisture absorption is required
  - ▶ iglidur® H1, page 349
  - ▶ iglidur® J, page 93

## Temperature



## Product range

2 styles  
Ø 6–20 mm  
more dimensions  
on request





## 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.co.uk/iglidur-applications](http://www.igus.co.uk/iglidur-applications)



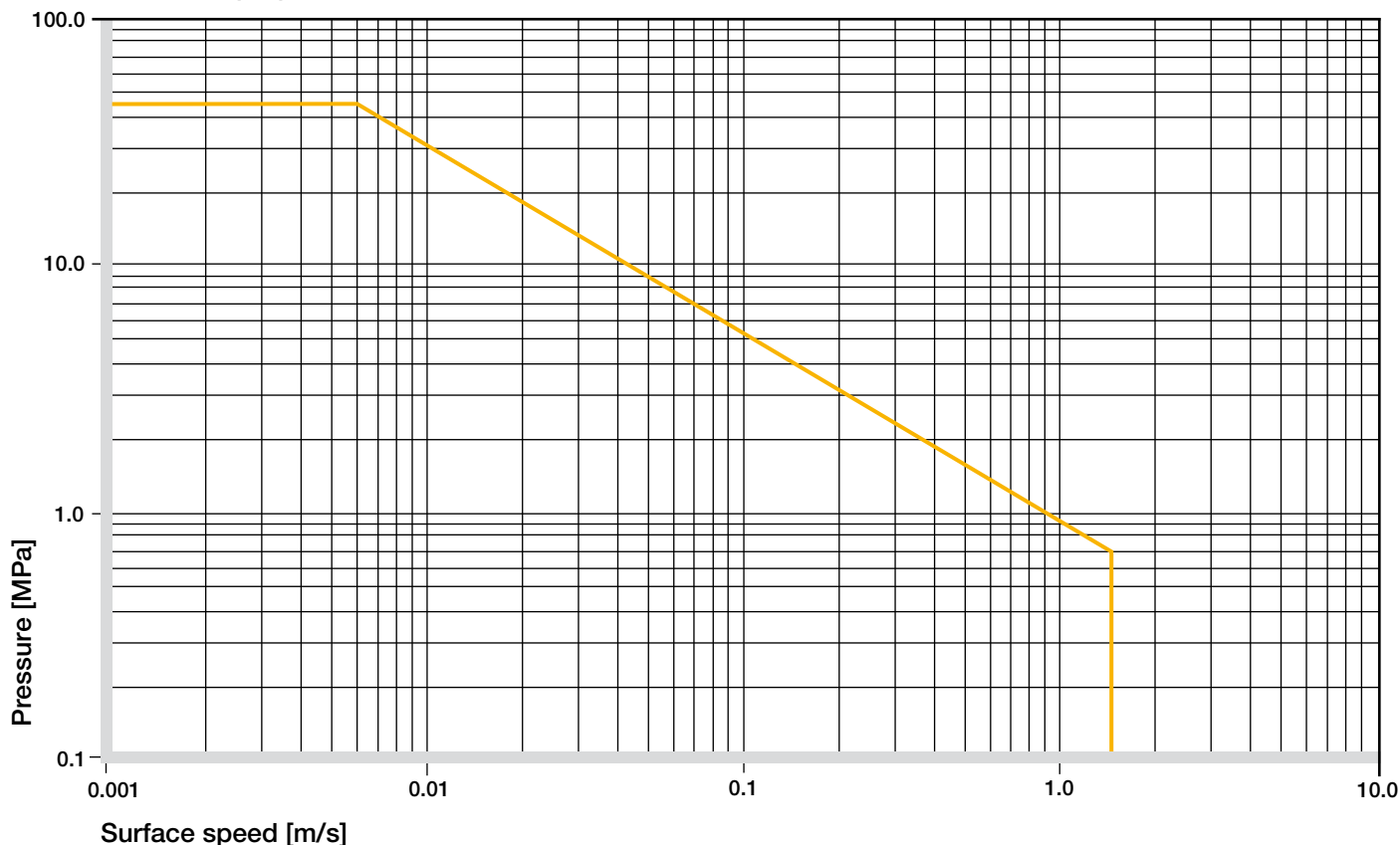
► [www.igus.co.uk/light-aircraft](http://www.igus.co.uk/light-aircraft)

### Material properties table

General properties	Unit	iglidur® L250	Testing method
Density	g/cm <sup>3</sup>	1.50	
Colour		beige	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	0.7	DIN 53495
Max. water 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 <sup>1)</sup>	°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 <sup>-1</sup> · 10 <sup>-5</sup>	10	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 <sup>10</sup>	DIN IEC 93
Surface resistance	Ω	> 10 <sup>11</sup>	DIN 53482

<sup>1)</sup> Without additional load; no sliding movement; relaxation possible

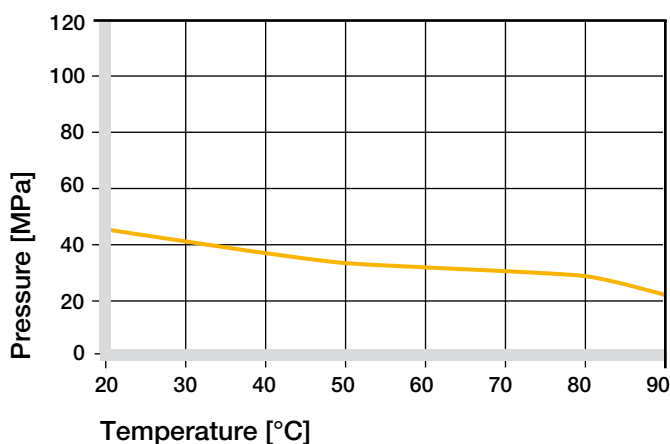
Table 01: Material properties table



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.

## Mechanical Properties

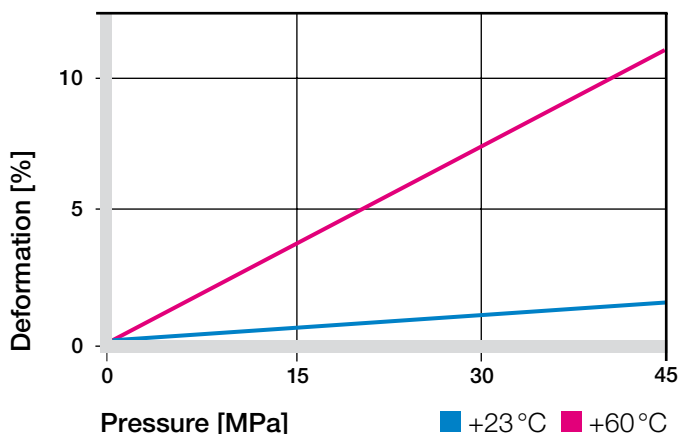
With increasing temperatures, the compressive strength of iglidur® L250 plain bearings decreases. The Diagram 02 shows this inverse relationship. However, at the longterm maximum temperature of +90 °C the permissible surface pressure is almost 20 MPa. The recommended maximum surface pressure is a mechanical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



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

Applications which feature these advantages are fans, small motors, fast-running sensors or the magnet technology.

### ► Surface Pressure, page 47



**Diagram 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 49

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 50

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 52**

► Wear Resistance, **page 53**

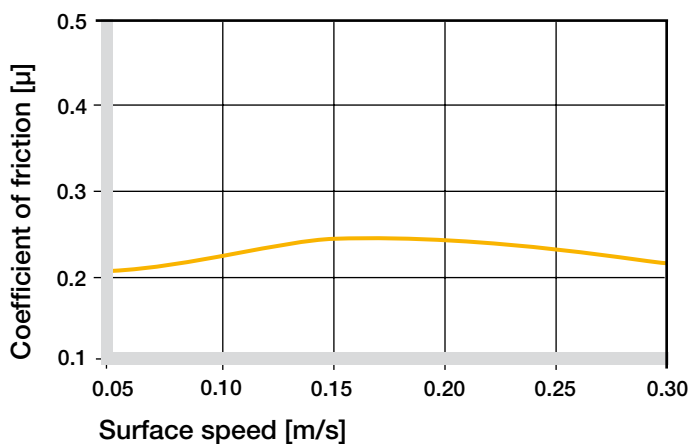


Diagram 04: Coefficient of friction as a function of the running speed,  $p = 0.75 \text{ MPa}$

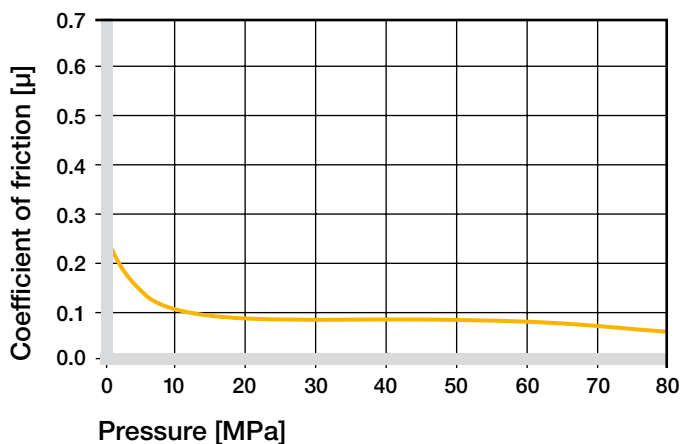


Diagram 05: Coefficient of friction as a function of the pressure,  $v = 0.01 \text{ m/s}$

## Shaft Materials

As seen in Diagram 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 shaft surfaces finish. For loads higher than 1 MPa, particular attention should be paid to the shaft material used.

► Shaft Materials, **page 55**

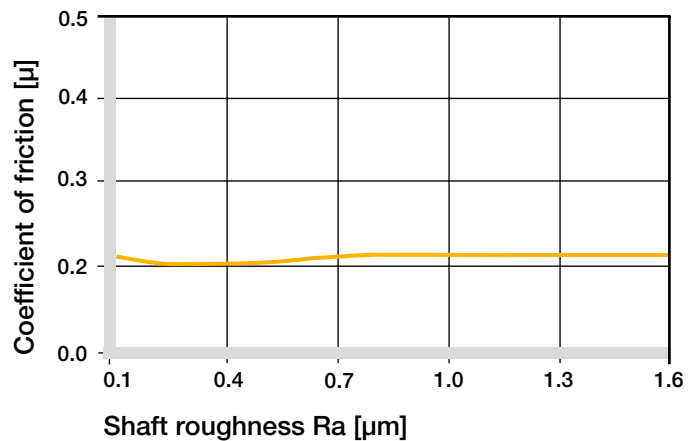


Diagram 06: Coefficient of friction as function of the shaft surface (Cf53 hardened and ground steel)

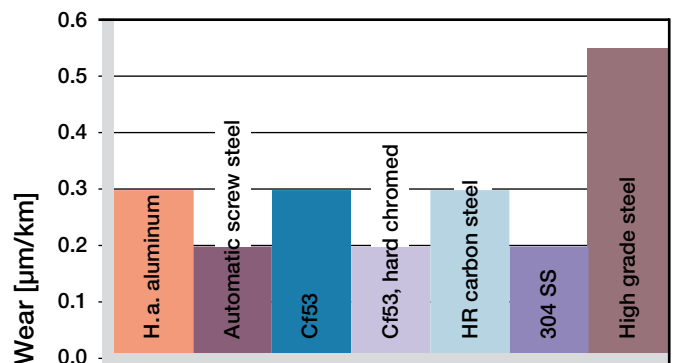
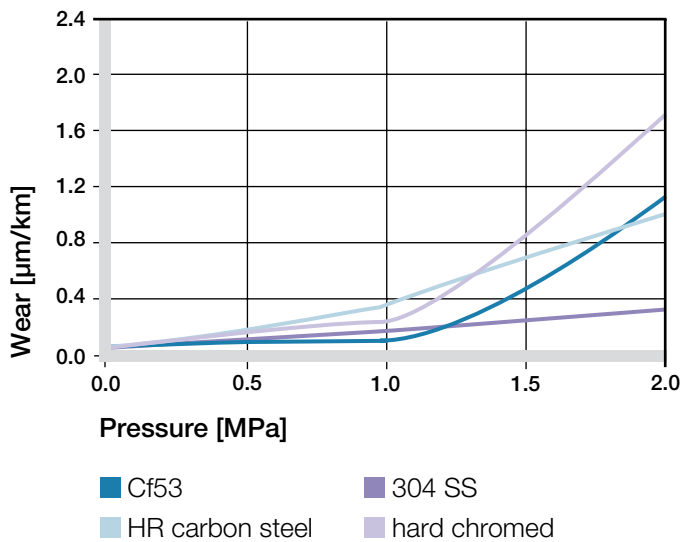
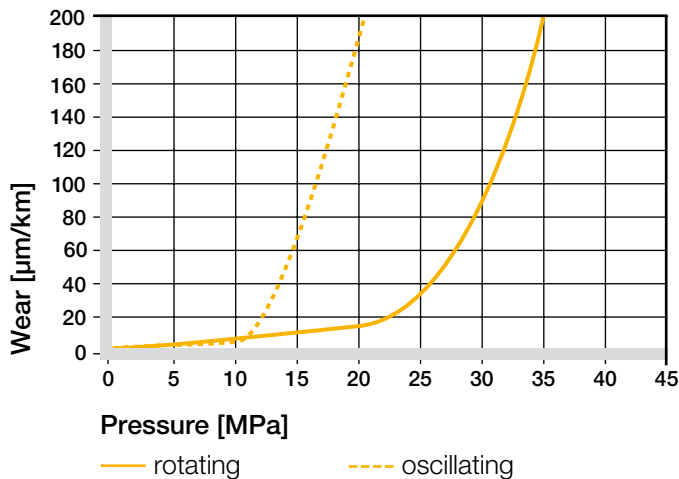


Diagram 07: Wear, rotating with different shaft materials, pressure  $p = 1 \text{ MPa}$ ,  $v = 0.3 \text{ m/s}$



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



**Diagram 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. $\mu$	0.08–0.19	0.09	0.04	0.04

**Table 04: Coefficient of friction against steel ( $R_a = 1 \mu\text{m}$ , 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 1118**

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 [ $+20^\circ\text{C}$ ]

**Table 05: Chemical resistance**

### Radiation Resistance

Plain bearings of iglidur® L250 are resistant to radiation up to a radiation intensity of  $3 \cdot 10^4 \text{ Gy}$ . 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	$> 10^{10} \Omega\text{cm}$
Surface resistance	$> 10^{11} \Omega$

## 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. water absorption 3.9 % weight

Table 06: Moisture absorption

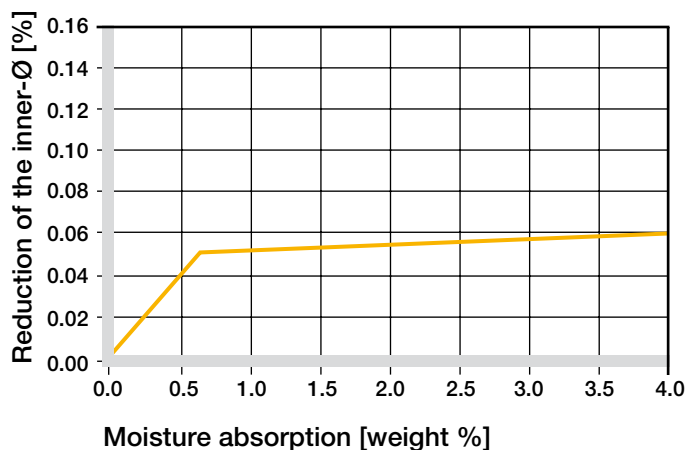


Diagram 10: Effect of moisture absorption on plain bearings

## Installation Tolerances

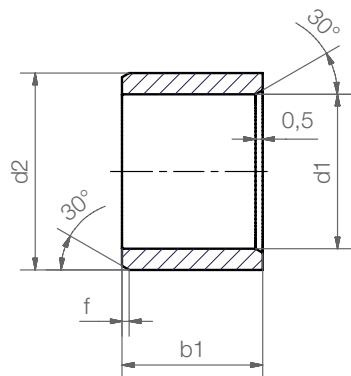
iglidur® L250 plain bearings are standard bearings for shafts with h-tolerance (recommended minimum h9). The bearings are designed for pressfit into a housing machined to a H7 tolerance. After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

► Testing Methods, page 59

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

## 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 59

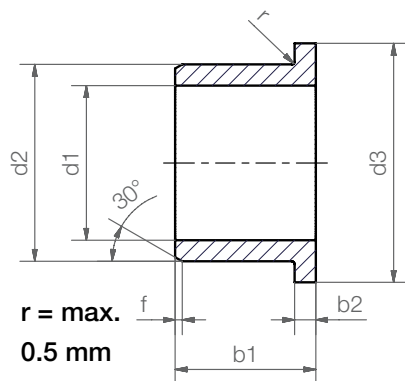


delivery from stock  
time



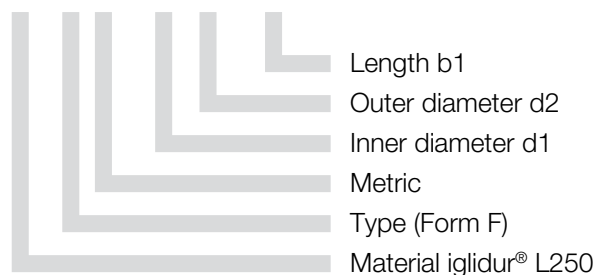
prices price list online  
[www.igus.co.uk/en/l250](http://www.igus.co.uk/en/l250)

## Flange bearing



Order key

**L250FM-0608-06**



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 d13	b1 h13	b2 -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 59



### Don't find your size?

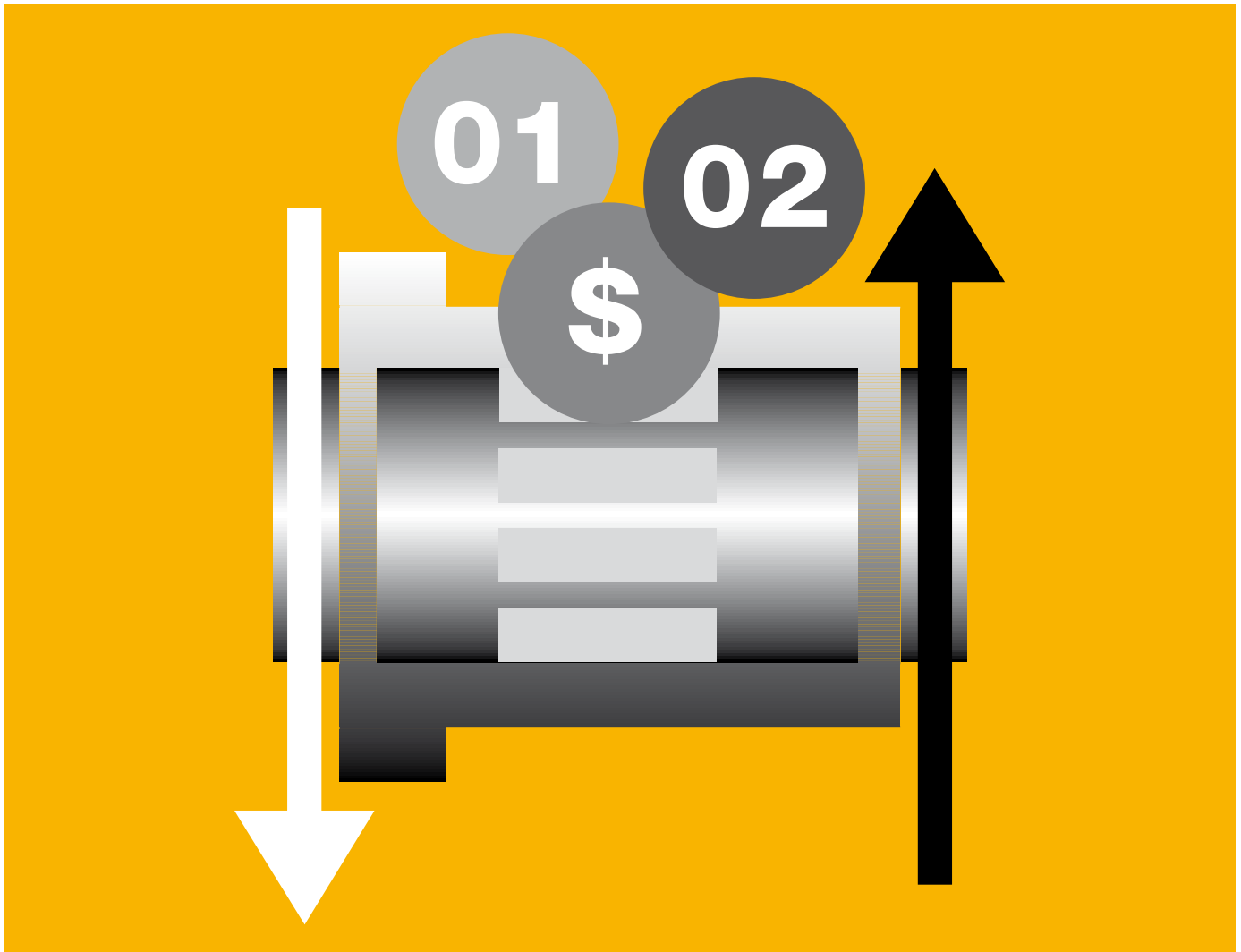
Do you need another length, other dimensions or tolerances? You need a particular design or alternative for your application? Please call us. igus® listens to your needs and provides you a solution in a very short time.



**delivery** from stock  
**time**



**prices** price list online  
[www.igus.co.uk/en/l250](http://www.igus.co.uk/en/l250)



## Low-cost – iglidur® R



Standard range from stock

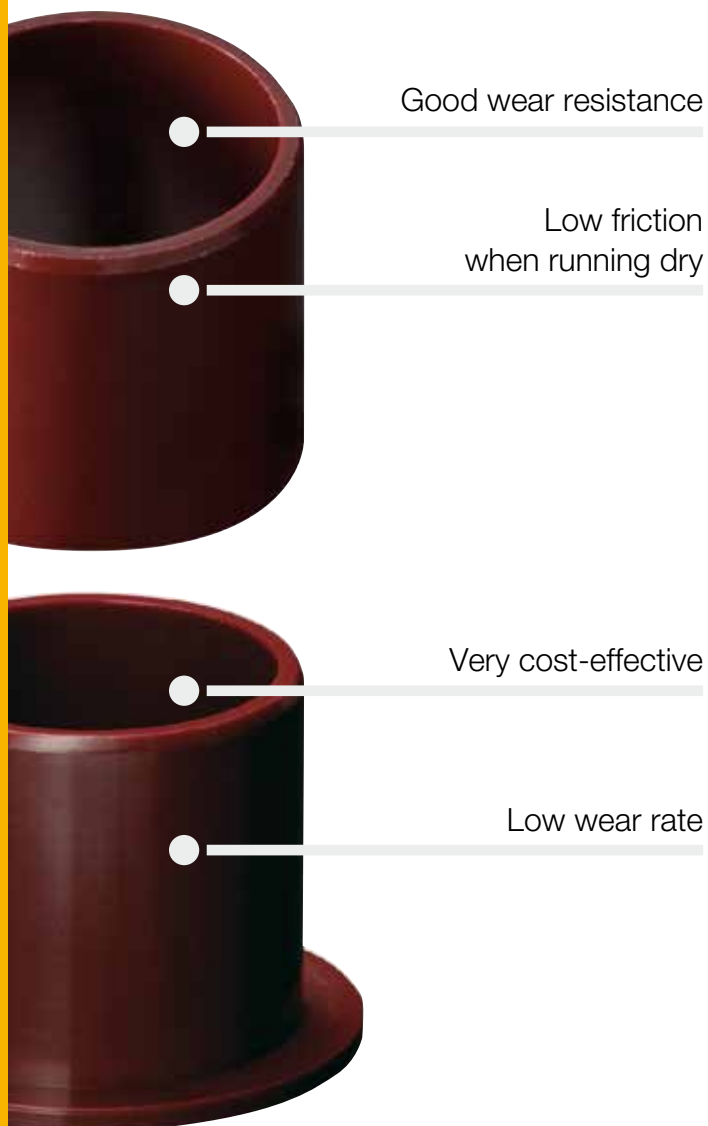
Good wear resistance

Low friction when running dry

Very cost-effective

Low wear rate

**Low-cost.** Low-cost-material with low coefficients of friction and good wear resistance at low to medium loads.



## When to use it?

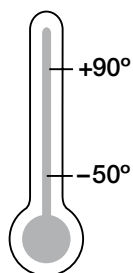
- If high wear resistance at low load is required
- If you are looking for a very cost-effective bearing
- If low friction at dry operation is required
- If edge loads occur
- If you are looking for low water absorption
- If PTFE and silicone are prohibited in the application



## When not to use it?

- If high pressure occurs
  - ▶ iglidur® G, page 65
- If permanent temperatures exceed +90 °C
  - ▶ iglidur® G, page 65
  - ▶ iglidur® P, page 179
- If best wear resistance is required
  - ▶ iglidur® J, page 93

## Temperature



## Product range

2 types  
Ø 2–35 mm  
more dimensions  
on request

# iglidur® R | Application Examples



## Typical sectors of industry and application areas

- Sports and leisure ● Model making
- Automotive ● Mechatronics
- Camera technology etc.

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

► [www.igus.co.uk/iglidur-applications](http://www.igus.co.uk/iglidur-applications)



► [www.igus.co.uk/rickshaw](http://www.igus.co.uk/rickshaw)



► [www.igus.co.uk/office-chair](http://www.igus.co.uk/office-chair)



### Material properties table

General properties	Unit	iglidur® R	Testing method
Density	g/cm <sup>3</sup>	1.39	
Colour		dark red	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	0.2	DIN 53495
Max. water absorption	% weight	1.1	
Coefficient of sliding friction, dynamic against steel	μ	0.09–0.25	
pv value, max. (dry)	MPa · m/s	0.27	
Mechanical properties			
Modulus of elasticity	MPa	1,950	DIN 53457
Tensile strength at +20 °C	MPa	70	DIN 53452
Compressive strength	MPa	68	
Max. recommended surface pressure (+20 °C)	MPa	23	
Shore D hardness		77	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+90	
Max. short term application temperature	°C	+110	
Min. application temperature	°C	–50	
Thermal conductivity	W/m · K	0.25	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	K <sup>-1</sup> · 10 <sup>-5</sup>	11	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 <sup>12</sup>	DIN IEC 93
Surface resistance	Ω	> 10 <sup>12</sup>	DIN 53482

Table 01: Material properties table

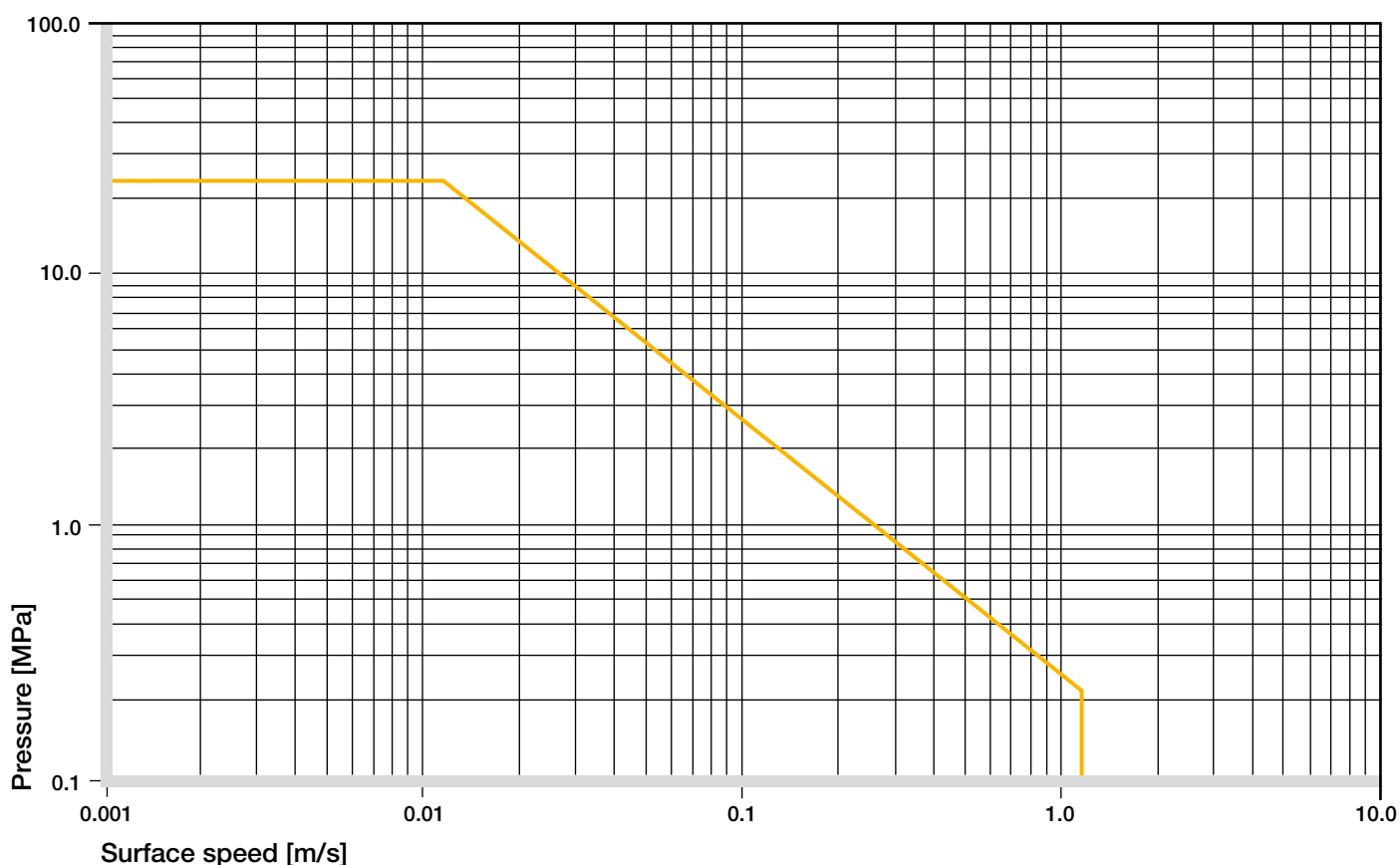
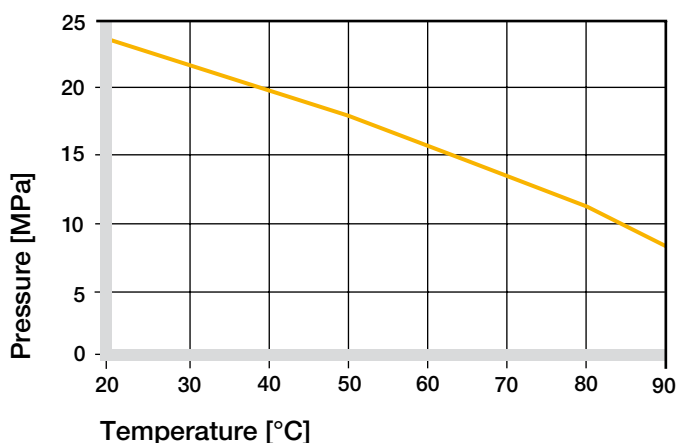


Diagram 01: Permissible pv values for iglidur® R with a wall thickness of 1 mm dry running against a steel shaft at +20 °C, mounted in a steel housing

The development of the iglidur® R as a bearing material focused on high performance and very low cost. Especially in the dry operation low coefficients of friction and wear were to be achieved. Bearings made of iglidur® R are selectively supported by a combination of solid lubricants. The PTFE- and silicon-free material achieves extremely low coefficients of friction in dry operation and runs largely free of stick-slip effects.

## Mechanical Properties

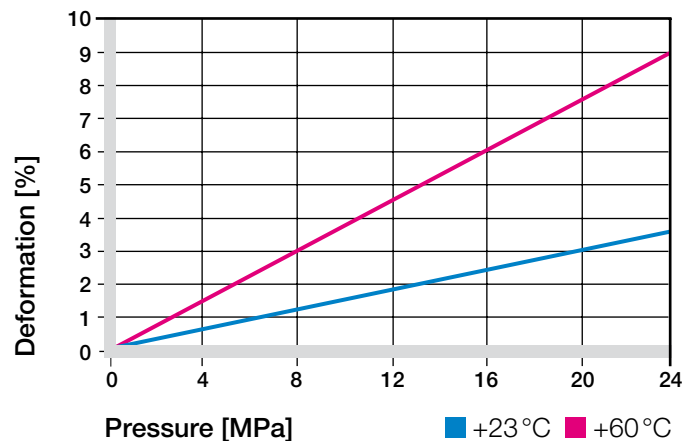
With increasing temperatures, the compressive strength of iglidur® R plain bearings decreases. The Diagram 02 shows this inverse relationship. However, at the longterm maximum temperature of +90 °C the permissible surface pressure is around 11 MPa. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.



**Diagram 02: Recommended maximum surface pressure as a function of temperature (23 MPa at +20 °C)**

iglidur® R plain bearings in the first place were developed for low to average radial loads – Diagram 03 shows the elastic deformation of iglidur® R at radial loads. At the maximum permissible load of 23 MPa, the deformation is approximately 4 %. Plastic deformation is not detectable up to this value. However, it is also dependent on the service time.

► Surface Pressure, [page 47](#)



**Diagram 03: Deformation under pressure and temperature**

## Permissible Surface Speeds

iglidur® R bearings are suitable for high surface speeds. Speeds of up to 10 m/s are permitted in linear motions! Here too the specified maximum values can be achieved only with minimum pressure loads. The specified values show the speed at which due to friction an increase in temperature up to the long-term permitted value can occur.

► Surface Speed, [page 49](#)

m/s	Rotating	Oscillating	Linear
Continuous	0.8	0.6	3.5
Short term	1.2	1	5

**Table 02: Maximum running speed**

## Temperatures

The short term maximum temperature is +110 °C, the long term maximum temperature is +90 °C. With increasing temperatures, the compressive strength of iglidur® R bearings decreases. Diagram 02 clarifies this relationship. The ambient temperature in the application also has an impact on the wear of the bearing, an increase in temperature will result in an increase in wear.

► Application Temperatures, [page 50](#)

iglidur® R	Application temperature
minimum	-50 °C
Max. long term	+90 °C
Max. short term	+110 °C
Add. securing is required	+50 °C

**Table 03: Temperature limits**

## Friction and Wear

The coefficient of friction decreases like the wear resistance with increasing load. In contrast, a higher surface speed has less impact on the coefficient of friction of an iglidur® R bearing. iglidur® R is suitable for applications in which high pv values are given mainly through the high surface speed and not as much through the surface pressure. The coefficient of friction of iglidur® R plain bearings depends greatly on the shaft roughness.

► Coefficients of Friction and Surfaces, **page 52**

► Wear Resistance, **page 53**

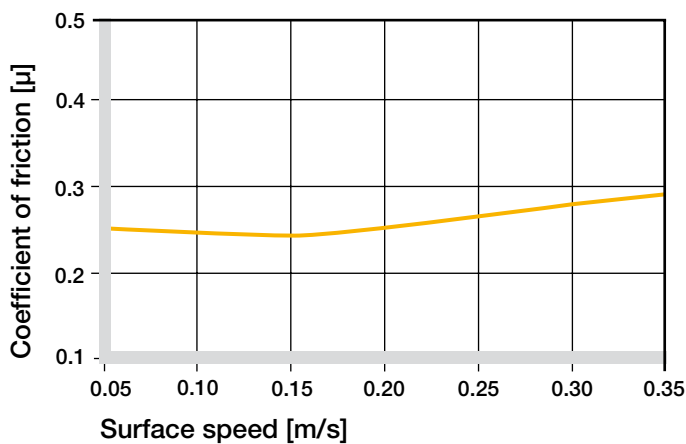


Diagram 04: Coefficient of friction as a function of the running speed,  $p = 0.75 \text{ MPa}$

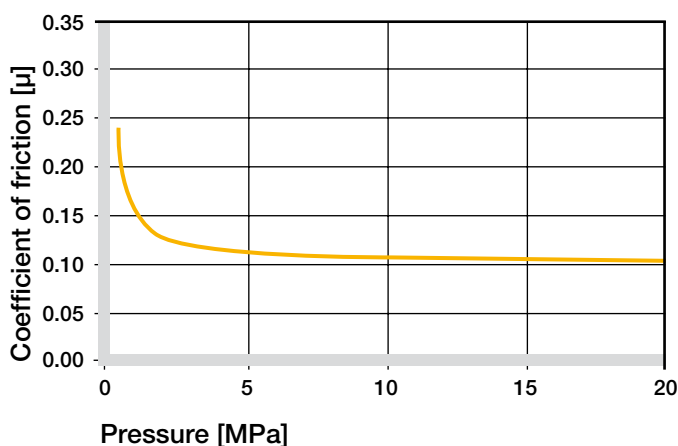


Diagram 05: Coefficient of friction as a function of the pressure,  $v = 0.01 \text{ m/s}$

## Shaft Materials

Diagram 06 to 09 display a summary of the results of tests with different shaft materials conducted with bearings made of iglidur® R. At 0.3 m/s and 1 MPa, the X90 and Cf53 shafts are the best materials.

With increasing loads the iglidur® R bearings feature the best wear behavior with Cf53 and V2A shafts. In oscillating applications, the hard chromed shaft proves to be the ideal material.

If the shaft material you plan on using is not shown in these test results, please contact us.

► Shaft Materials, **page 55**

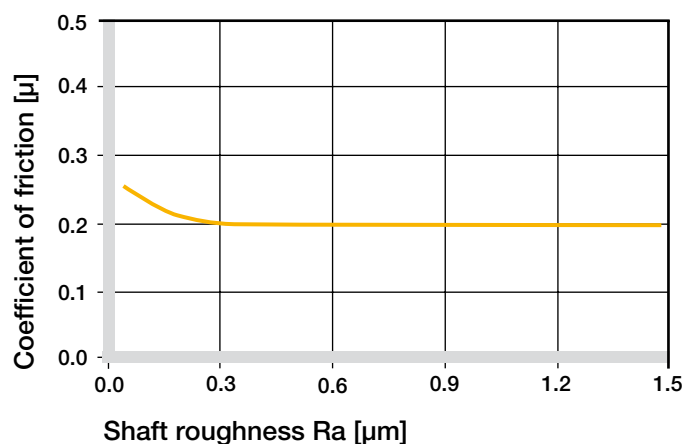


Diagram 06: Coefficient of friction as function of the shaft surface (Cf53 hardened and ground steel)

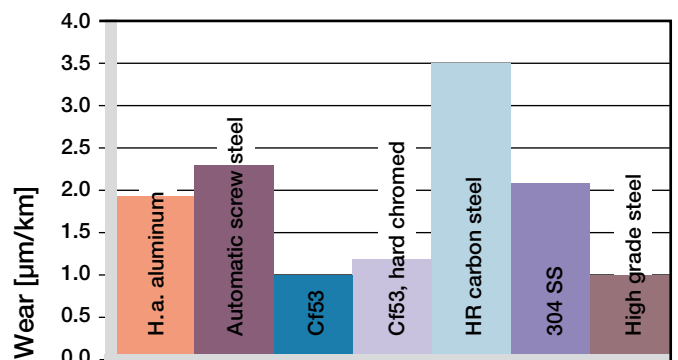


Diagram 07: Wear, rotating with different shaft materials, pressure  $p = 1 \text{ MPa}$ ,  $v = 0.3 \text{ m/s}$

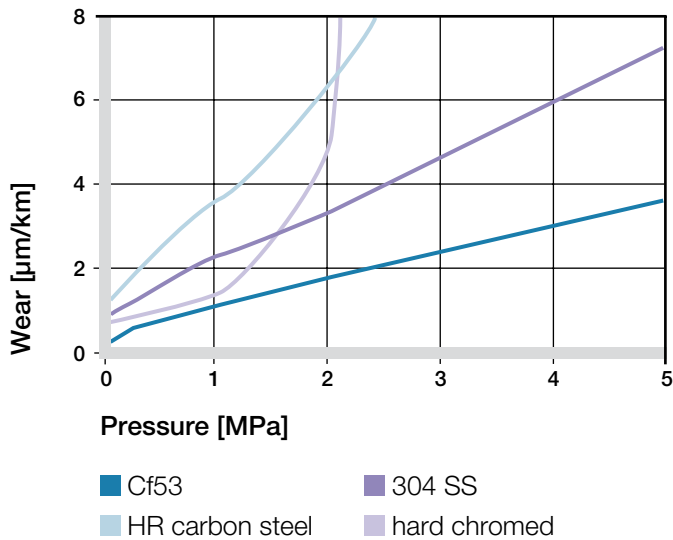


Diagram 08: Wear with different shaft materials in rotational operation, as a function of the pressure

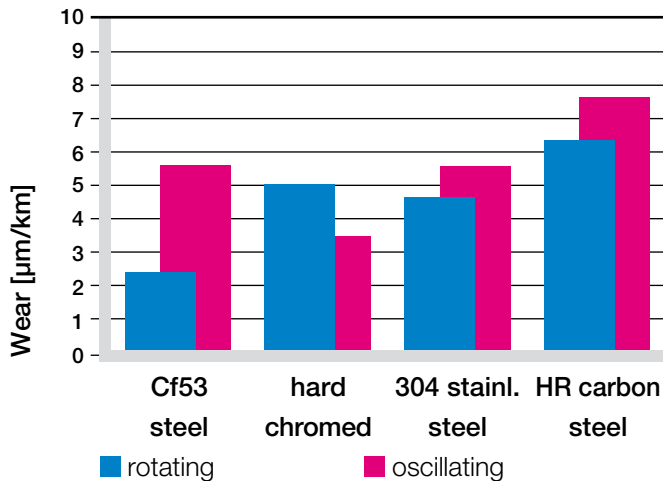


Diagram 09: Wear for rotating and oscillating applications with different shaft materials,  $p = 2 \text{ MPa}$

iglidur® R	Dry	Greases	Oil	Water
C. o. f. $\mu$	0.09–0.25	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® R bearings can be used in various environmental conditions and in contact with numerous chemicals. Table 05 gives an overview of the chemical resistance of iglidur® R bearings at room temperature.

► Chemical Table, **page 1118**

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

**+ resistant 0 conditionally resistant – not resistant**

All data given at room temperature [ $+20 \text{ °C}$ ]

Table 05: Chemical resistance

### Radiation Resistance

Plain bearings made from iglidur® R are resistant to radiation up to an intensity of  $3 \cdot 10^2 \text{ Gy}$ .

### UV Resistance

iglidur® R plain bearings are resistant to UV radiation, but the tribological properties are reduced by permanent exposure.

### Vacuum

In a vacuum environment, iglidur® R plain bearings release gases. It is only possible to use iglidur® R in vacuum to a limited extent.

### Electrical Properties

iglidur® R plain bearings are electrically insulating.

Volume resistance	$> 10^{12} \text{ Ωcm}$
Surface resistance	$> 10^{12} \text{ Ω}$

### Moisture Absorption

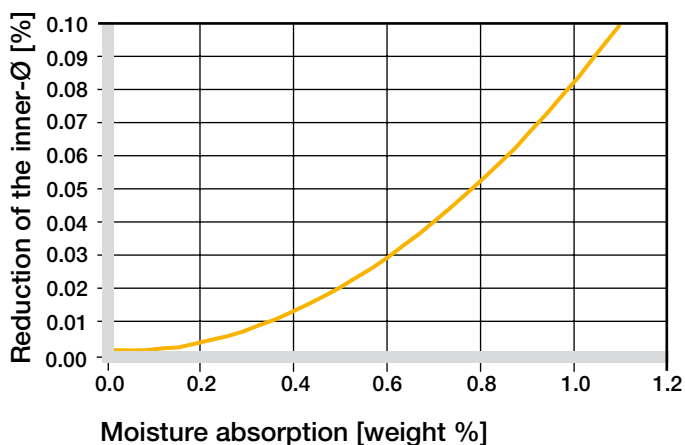
The moisture absorption of iglidur® R plain bearings is approximately 0.2 % in the standard atmosphere. The saturation limit submerged in water is 1.1 %. This must be taken into account along with other environmental influences.

#### Maximum moisture absorption

At +23 °C/50 % r.h. 0.2 % weight

Max. water absorption 1.1 % weight

**Table 06: Moisture absorption**



**Diagram 10: Effect of moisture absorption on plain bearings**

### Installation Tolerances

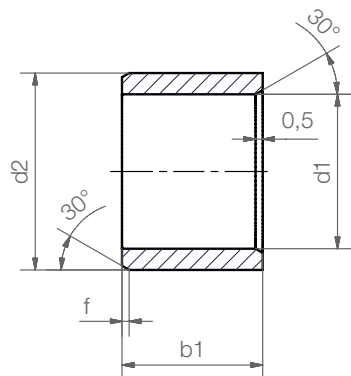
iglidur® R plain bearings are standard bearings for shafts with h-tolerance (recommended minimum h9). The bearings are designed for pressfit into a housing machined to a H7 tolerance. After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the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

► Testing Methods, **page 59**

Diameter d1 [mm]	Shaft h9 [mm]	iglidur® R 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**

## Sleeve bearing



### Order key

**RSM-0203-07**



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

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
RSM-0203-07	2.0	+0.014 +0.054	3.6	7.0
RSM-0405-04	4.0	+0.020 +0.068	5.5	4.0
RSM-0507-05	5.0	+0.020 +0.068	7.0	5.0
RSM-0608-06	6.0	+0.020 +0.068	8.0	6.0
RSM-0810-10	8.0	+0.025 +0.083	10.0	10.0
RSM-1012-05	10.0	+0.025 +0.083	12.0	5.0
RSM-1012-10	10.0	+0.025 +0.083	12.0	10.0
RSM-1012-15	10.0	+0.025 +0.083	12.0	15.0
RSM-1214-12	12.0	+0.032 +0.102	14.0	12.0
RSM-1416-15	14.0	+0.032 +0.102	16.0	15.0
RSM-1517-15	15.0	+0.032 +0.102	17.0	15.0
RSM-1618-15	16.0	+0.032 +0.102	18.0	15.0
RSM-1820-25	18.0	+0.032 +0.102	20.0	25.0
RSM-2023-15	20.0	+0.040 +0.124	23.0	15.0
RSM-2023-20	20.0	+0.040 +0.124	23.0	20.0
RSM-2528-25	25.0	+0.040 +0.124	28.0	25.0
RSM-2832-12	28.0	+0.040 +0.124	32.0	12.0
RSM-3034-25	30.0	+0.040 +0.124	34.0	25.0
RSM-3034-30	30.0	+0.040 +0.124	34.0	30.0
RSM-3539-30	35.0	+0.050 +0.150	39.0	30.0

\* after pressfit. Testing methods ► page 59

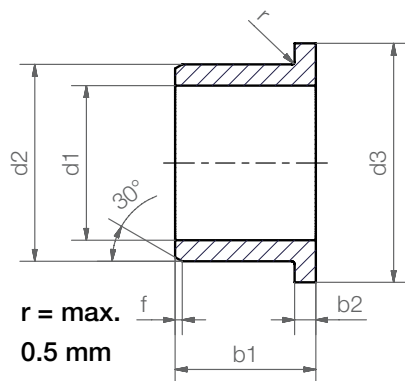


**delivery** from stock  
**time**



**prices** price list online  
[www.igus.co.uk/en/r](http://www.igus.co.uk/en/r)

## Flange bearing



$r = \max.$   
0.5 mm



### Order key

**RFM-0608-06**



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

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 h13	b2
RFM-0405-04	4.0	+0.020 +0.068	5.5	9.5	4.0	0.75
RFM-0507-05	5.0	+0.020 +0.068	7.0	11.0	5.0	1.0
RFM-0608-06	6.0	+0.020 +0.068	8.0	12.0	6.0	1.0
RFM-0810-05	8.0	+0.025 +0.083	10.0	15.0	5.0	1.0
RFM-0810-10	8.0	+0.025 +0.083	10.0	15.0	10.0	1.0
RFM-1012-10	10.0	+0.025 +0.083	12.0	18.0	10.0	1.0
RFM-1012-18	10.0	+0.025 +0.083	12.0	18.0	18.0	1.0
RFM-1214-10	12.0	+0.032 +0.102	14.0	20.0	10.0	1.0
RFM-1214-12	12.0	+0.032 +0.102	14.0	20.0	12.0	1.0
RFM-1416-17	14.0	+0.032 +0.102	16.0	22.0	17.0	1.0
RFM-1517-17	15.0	+0.032 +0.102	17.0	23.0	17.0	1.0
RFM-1618-17	16.0	+0.032 +0.102	18.0	24.0	17.0	1.0
RFM-1820-17	18.0	+0.032 +0.102	20.0	26.0	17.0	1.0
RFM-2023-21	20.0	+0.040 +0.124	23.0	30.0	21.5	1.5
RFM-222529-045	22.0	+0.040 +0.124	25.0	29.0	4.5	1.5
RFM-2528-21	25.0	+0.040 +0.124	28.0	35.0	21.5	1.5

\* after pressfit. Testing methods ► page 59



### Don't find your size?

Do you need another length, other dimensions or tolerances? You need a particular design or alternative for your application? Please call us. igus® listens to your needs and provides you a solution in a very short time.



### Even more dimensions from stock

More than 300 dimensions are now available. Search online for your required bearing.

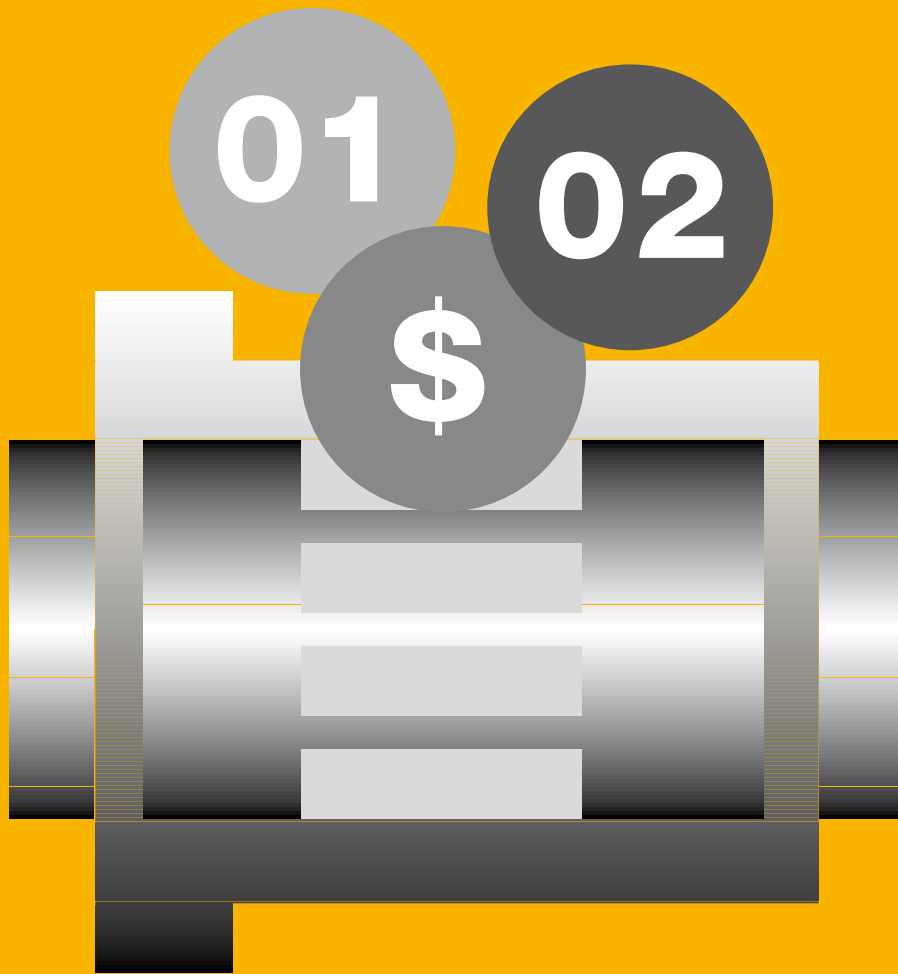
► [www.igus.co.uk/iglidur-specialbearings](http://www.igus.co.uk/iglidur-specialbearings)



**delivery** from stock  
**time**



**prices** price list online  
[www.igus.co.uk/en/r](http://www.igus.co.uk/en/r)



## Low-cost material with silicone – iglidur® D



Low coefficients of friction at high speeds

For low loads

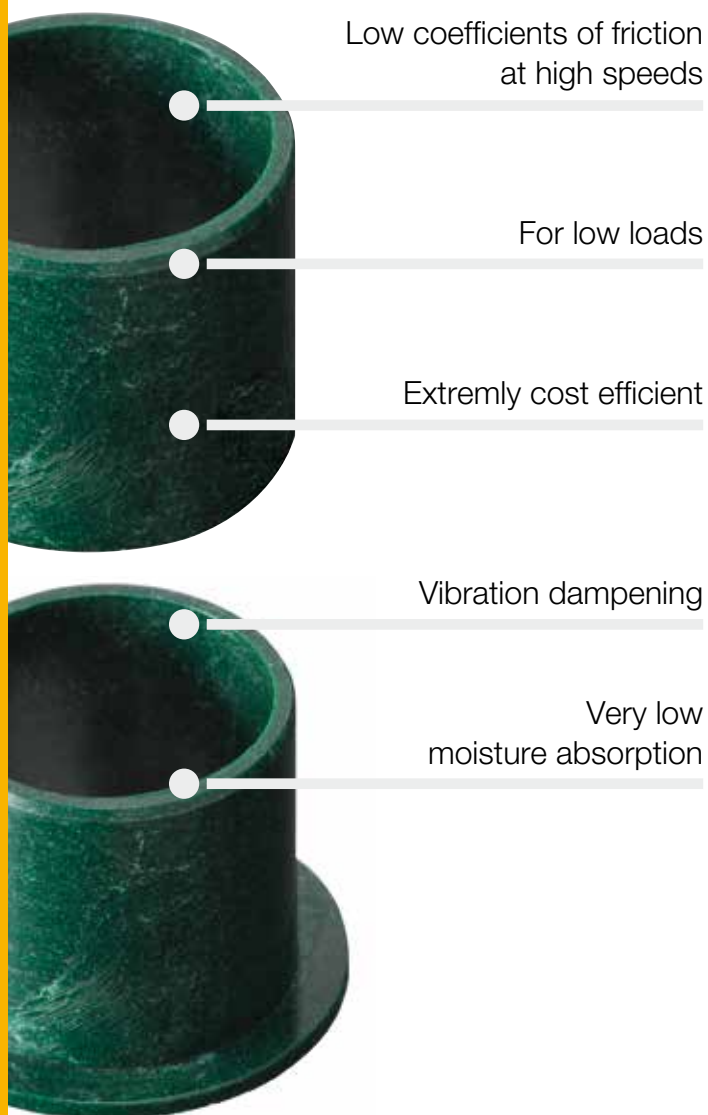
Extremely cost-effective

Vibration dampening

Very low moisture absorption



**Low-cost material with silicone.** Low-cost-material with low coefficients of friction and good wear resistance at low loads.



## When to use it?

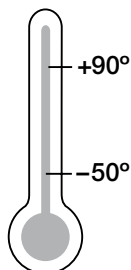
- When very low coefficients of friction are needed
- For high speeds
- For low load
- When a very low-priced bearing is required



## When not to use it?

- When high pressure loads occur  
▶ iglidur® G, page 65
- When the part should be free of silicon  
▶ iglidur® J, page 93  
▶ iglidur® R, page 261
- When constant temperatures of more than +90 °C occur  
▶ iglidur® G, page 65  
▶ iglidur® P, page 179

## Temperature



## Product range

on request

## Material properties table

General properties	Unit	iglidur® D	Testing method
Density	g/cm <sup>3</sup>	1.40	
Colour		green	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	0.3	DIN 53495
Max. water absorption	% weight	1.1	
Coefficient of sliding friction, dynamic against steel	μ	0.08–0.26	
pv value, max. (dry)	MPa · m/s	0.27	
Mechanical properties			
Modulus of elasticity	MPa	2,000	DIN 53457
Tensile strength at +20 °C	MPa	72	DIN 53452
Compressive strength	MPa	70	
Max. recommended surface pressure (+20 °C)	MPa	23	
Shore D hardness		78	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+90	
Max. short term application temperature	°C	+110	
Min. application temperature	°C	–50	
Thermal conductivity	W/m · K	0.25	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	K <sup>-1</sup> · 10 <sup>-5</sup>	11	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 <sup>14</sup>	DIN IEC 93
Surface resistance	Ω	> 10 <sup>14</sup>	DIN 53482

Table 01: Material properties table

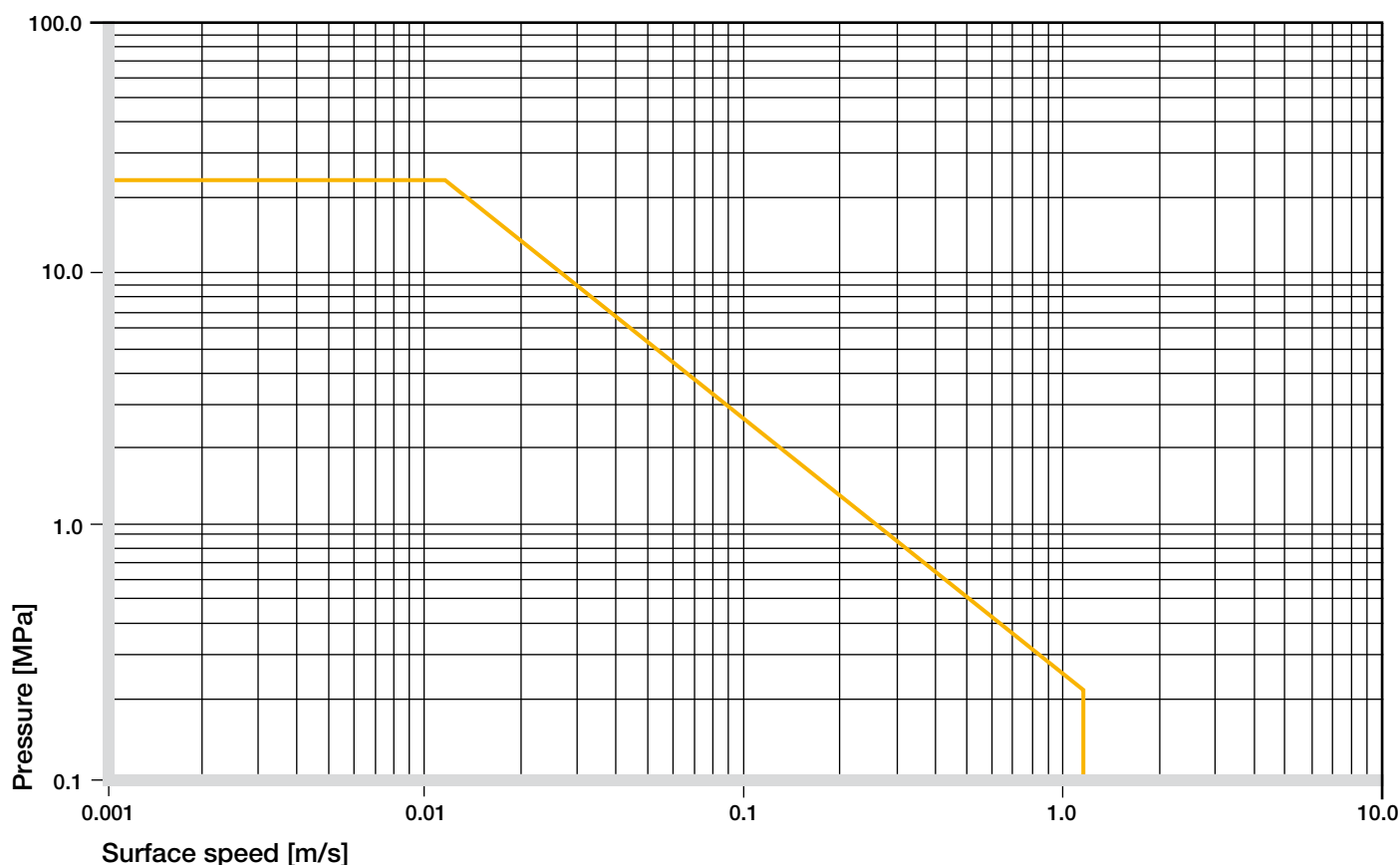
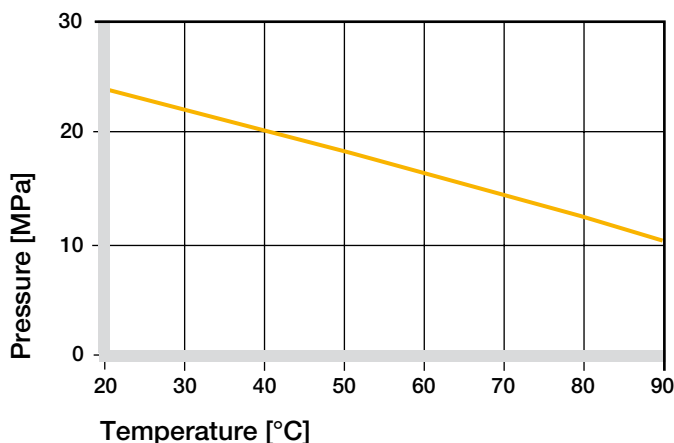


Diagram 01: Permissible pv values for iglidur® D with a wall thickness of 1 mm dry running against a steel shaft at +20 °C, mounted in a steel housing

During the development process of iglidur® D as a bearing material, high performance and a very low price were the top requirements. In particular, low coefficients of friction were needed at high speeds in the dry run. Plain bearings made of iglidur® D are supported by a combination of solid lubricants. This material containing silicone achieves excellently low friction values in dry operation and runs with virtually no stick-slip.

## Mechanical Properties

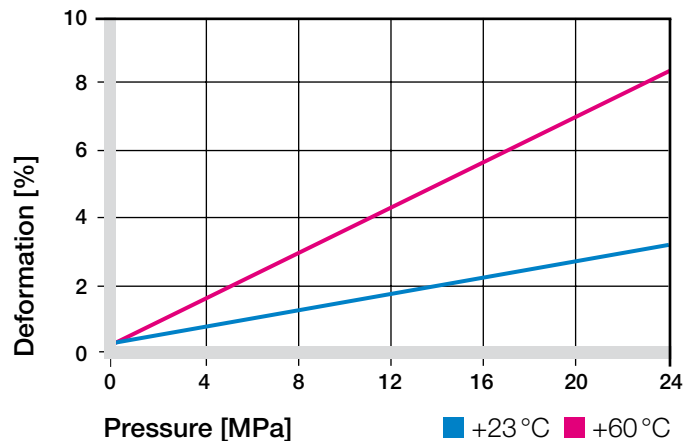
With increasing temperatures, the compressive strength of iglidur® D plain bearings decreases. The Diagram 02 shows this inverse relationship. However, at the longterm maximum temperature of +90 °C the permissible surface pressure is almost +100 MPa. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.



**Diagram 02: Recommended maximum surface pressure as a function of temperature (23 MPa at +20 °C)**

iglidur® D bearings were specially developed for low radial loads. Diagram 03 shows the elastic deformation of iglidur® D during radial loading. At the recommended maximum surface pressure of 23 MPa the deformation is less than 3 %. Plastic deformation is not detectable up to this value. However, it is also dependent on the service time.

► Surface Pressure, [page 47](#)



**Diagram 03: Deformation under pressure and temperature**

## Permissible Surface Speeds

iglidur® D bearings are suitable for high surface speeds. Speeds of up to 10 m/s are permitted in linear motions! Here too the specified maximum values can be achieved only with minimum pressure loads. The specified values show the speed at which due to friction an increase in temperature up to the long-term permitted value can occur.

► Surface Speed, [page 49](#)

m/s	Rotating	Oscillating	Linear
Continuous	1.5	1.1	8
Short term	3	2.1	10

**Table 02: Maximum running speed**

## Temperatures

The short-term permitted maximum temperature is +110 °C, and the long-term application temperature is +90 °C. With increasing temperatures, the compressive strength of iglidur® D bearings decreases. Diagram 02 clarifies this relationship.

The ambient application temperature has a direct impact on bearing wear, an increase in temperature results in an increase in wear.

► Application Temperatures, [page 50](#)

iglidur® D	Application temperature
Minimum	-50 °C
Max. long term	+90 °C
Max. short term	+110 °C
Add. securing is required from	+50 °C

**Table 03: Temperature limits**

## Friction and Wear

The coefficient of friction decreases like the wear resistance with increasing load. In contrast, a higher surface speed rarely affects the coefficient of friction of an iglidur® D bearing. iglidur® D is suitable for applications in which high pv values are achieved mainly through the high surface speed and not as much through the surface pressure.

The coefficient of friction of the iglidur D bearings is highly dependant on the shaft surface finish. In the Ra range between 0.4 and 0.6 µm, the coefficient of friction attains the optimum value. With values below and above this range, the friction of the bearing system rapidly rises.

► Coefficients of Friction and Surfaces, **page 52**

► Wear Resistance, **page 53**

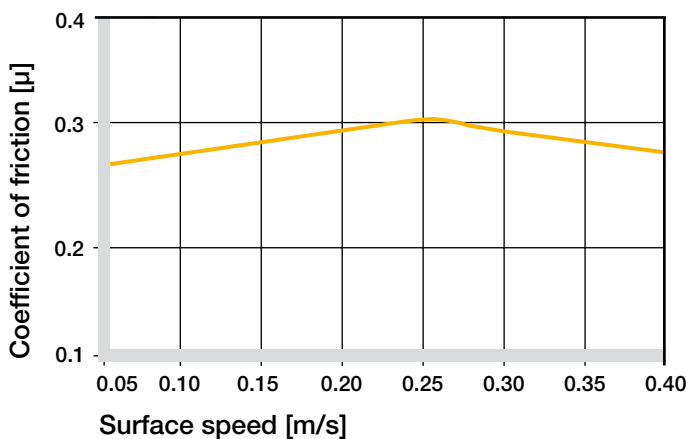


Diagram 04: Coefficient of friction as a function of the running speed,  $p = 0.75 \text{ MPa}$

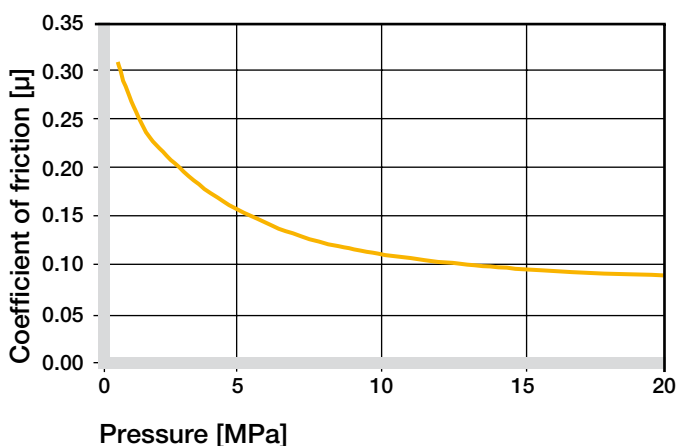


Diagram 05: Coefficient of friction as a function of the pressure,  $v = 0.01 \text{ m/s}$

## Shaft Materials

Diagram 06 to 09 display a summary of the results of tests with different shaft materials conducted with bearings made of iglidur® D.

Please contact us if you would like to use a shaft material not included in this list.

► Shaft Materials, **page 55**

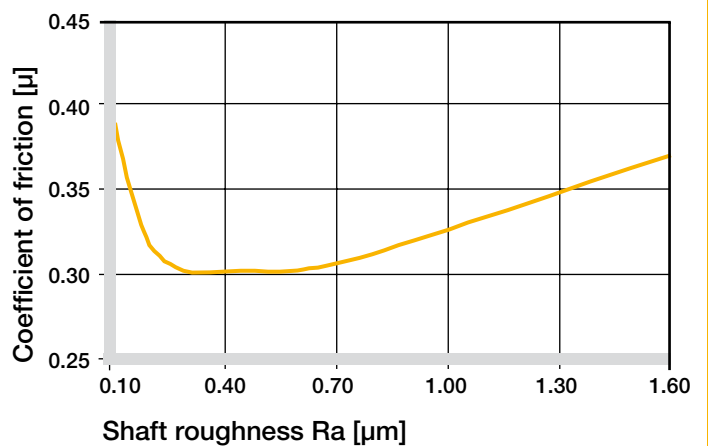


Diagram 06: Coefficient of friction as function of the shaft surface (Cf53 hardened and ground steel)

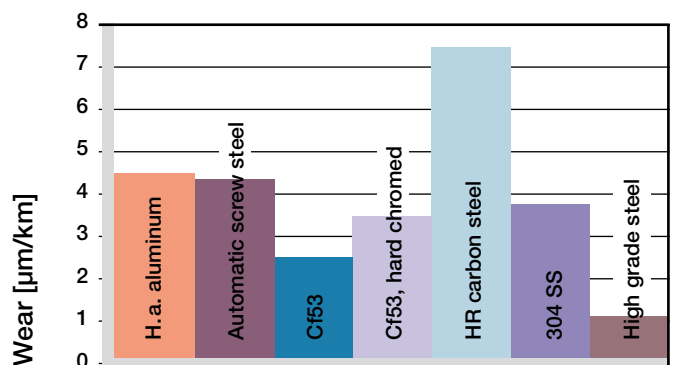


Diagram 07: Wear, rotating with different shaft materials, pressure  $p = 1 \text{ MPa}$ ,  $v = 0.3 \text{ m/s}$

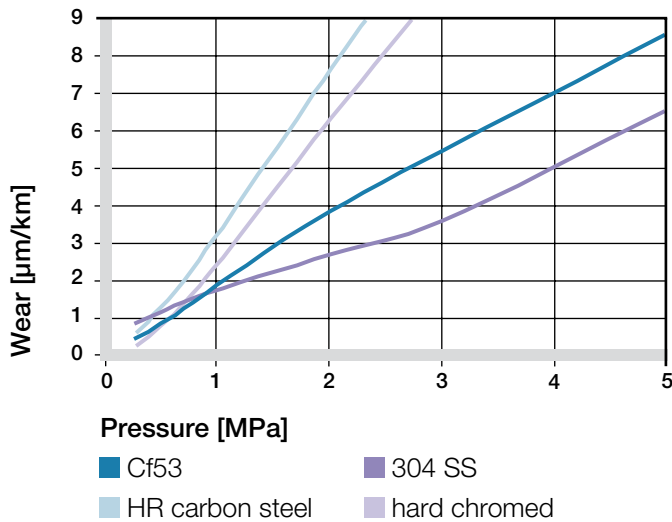


Diagram 08: Wear with different shaft materials in rotational operation, as a function of the pressure

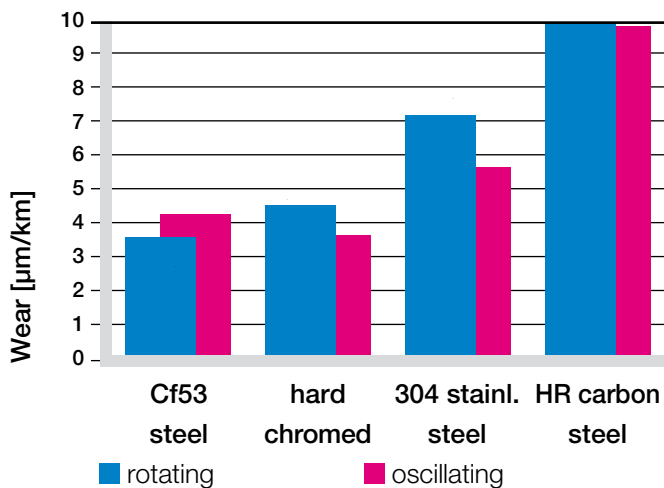


Diagram 09: Wear for rotating and oscillating applications with different shaft materials, p = 2 MPa

iglidur® D	Dry	Greases	Oil	Water
C.o.f. $\mu$	0.08–0.26	0.09	0.04	0.04

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

## Additional Properties

### Chemical Resistance

iglidur® D plain bearings are resistant to very weak acids, diluted alkaline, fuels and all types of lubricants.

► Chemical Table, page 1118

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

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

Table 05: Chemical resistance

### Radiation Resistance

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

### UV Resistance

iglidur® D plain bearings are resistant to UV radiation, but the tribological properties are reduced by permanent exposure.

### Vacuum

In a vacuum environment, iglidur® D plain bearings release gases. It is only possible to use in a vacuum to a limited extent.

### Electrical Properties

iglidur® D plain bearings are electrically insulating.

Volume resistance	$> 10^{14} \Omega\text{cm}$
Surface resistance	$> 10^{14} \Omega$

Moisture Absorption

The moisture absorption of iglidur® D plain bearings is approximately 0.3 % in standard atmosphere. The saturation limit in water is 1.1 %. This low moisture absorption allows for design in wet environments.

Maximum moisture absorption	
At +23 °C/50 % r.h.	0.3 % weight
Max. water absorption	1.1 % weight

Table 06: Moisture absorption

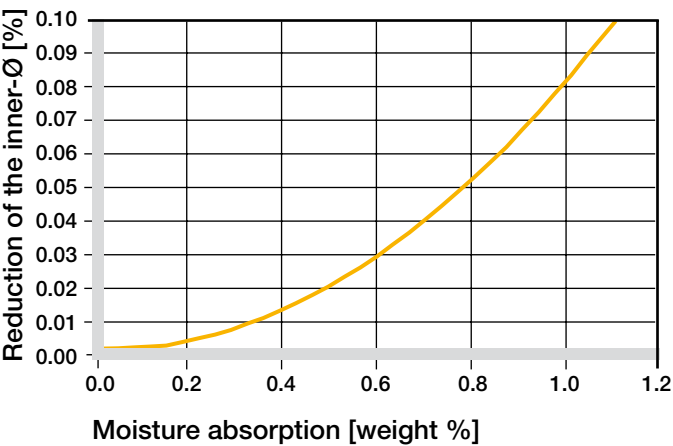


Diagram 10: Effect of moisture absorption on plain bearings

Installation Tolerances

iglidur® D 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 59

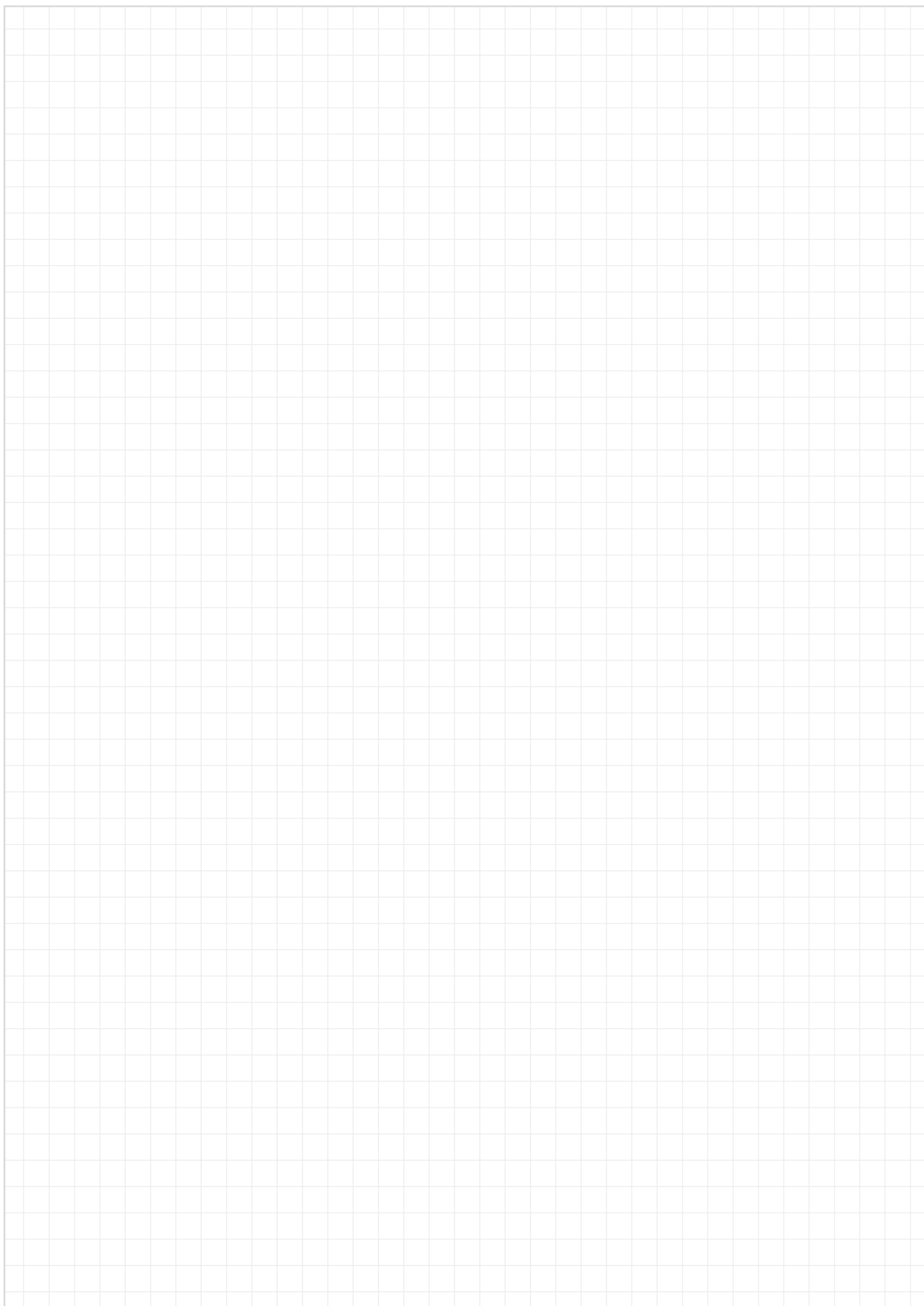
Diameter d1 [mm]	Shaft h9 [mm]	iglidur® D E10 [mm]	Housing H7 [mm]
up to 3	0–0.025	+0.014 +0.054	0 +0.010
> 3 to 6	0–0.030	+0.020 +0.068	0 +0.012
> 6 to 10	0–0.036	+0.025 +0.083	0 +0.015
> 10 to 18	0–0.043	+0.032 +0.102	0 +0.018
> 18 to 30	0–0.052	+0.040 +0.124	0 +0.021
> 30 to 50	0–0.062	+0.050 +0.150	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

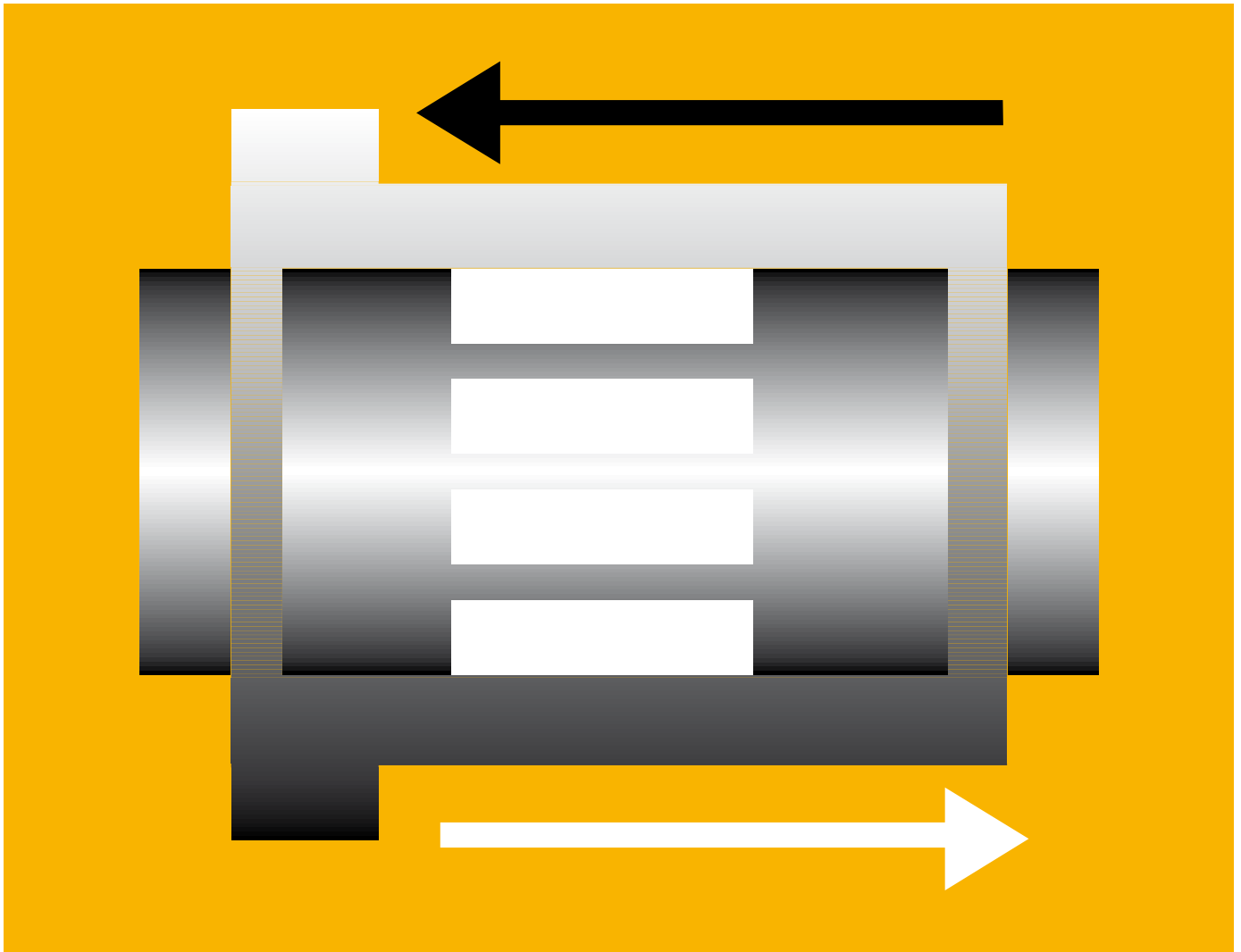
Table 07: Important tolerances for plain bearings according to ISO 3547-1 after pressfit

Product Range

iglidur® D plain bearings are manufactured to special order.

# My Sketches





## Specially for aluminum shafts – iglidur® J200



Very long service life with hard anodized  
aluminium

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Low coefficients of friction

---

Low wear

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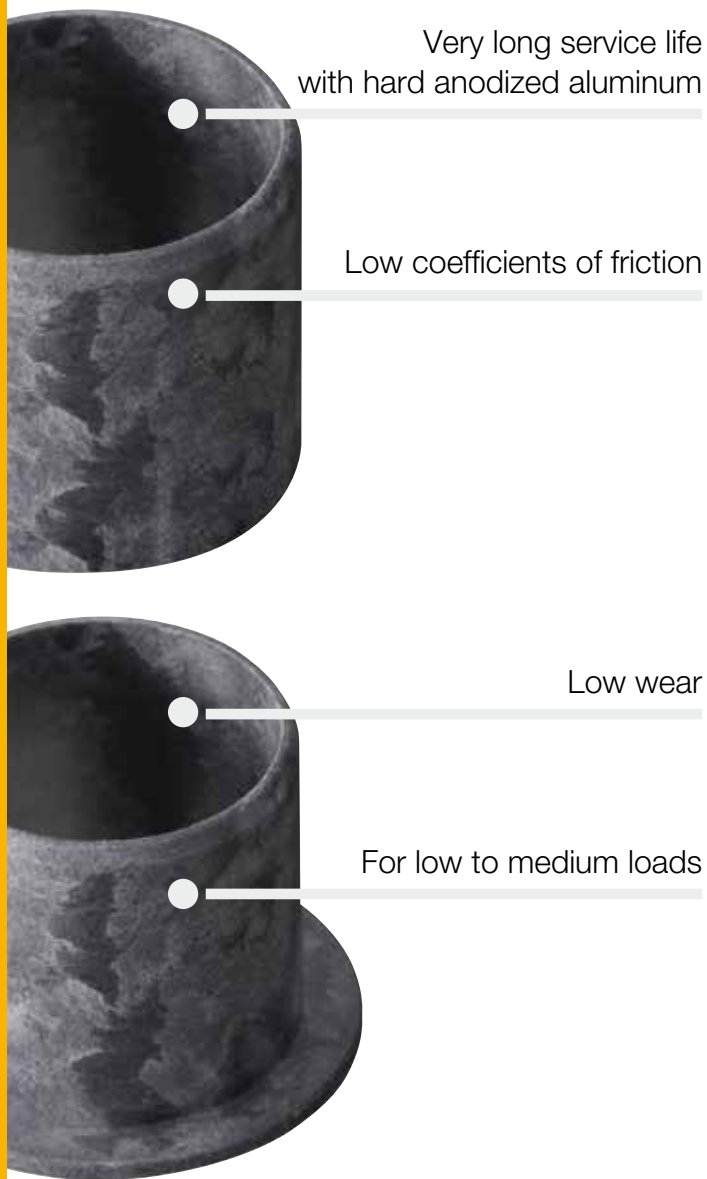
For low to medium loads

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# iglidur® J200

**Specially for aluminum shafts.** The specialist for low friction-values and minimal wear with hard anodized aluminum shaft.



## When to use it?

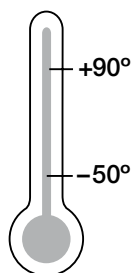
- For applications with anodized aluminum shafts
- When lowest coefficients of friction are required
- If long service life with low wear is required



## When not to use it?

- For steel shafts
  - ▶ iglidur® J, page 93
  - ▶ iglidur® W300, page 135
- When temperatures are continuously higher than +90 °C
  - ▶ iglidur® V400, page 301
- When a cost-effective universal bearing is required
  - ▶ iglidur® G, page 65
  - ▶ iglidur® P, page 179

## Temperature



## Product range

on request



## Material properties table

General properties	Unit	iglidur® J200	Testing method
Density	g/cm <sup>3</sup>	1.72	
Colour		dark grey	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	0.2	DIN 53495
Max. water absorption	% weight	0.7	
Coefficient of sliding friction, dynamic against steel	μ	0.11–0.17	
pv value, max. (dry)	MPa · m/s	0.30	
Mechanical properties			
Modulus of elasticity	MPa	2,800	DIN 53457
Tensile strength at +20 °C	MPa	58	DIN 53452
Compressive strength	MPa	43	
Max. recommended surface pressure (+20 °C)	MPa	23	
Shore D hardness		70	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+90	
Max. short term application temperature	°C	+120	
Maximum ambient temperature, short term	°C	+140	
Min. application temperature	°C	–50	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	K <sup>-1</sup> · 10 <sup>-5</sup>	8	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 <sup>8</sup>	DIN IEC 93
Surface resistance	Ω	> 10 <sup>8</sup>	DIN 53482

<sup>1)</sup> Without additional load; no sliding movement; relaxation possible

Table 01: Material properties table

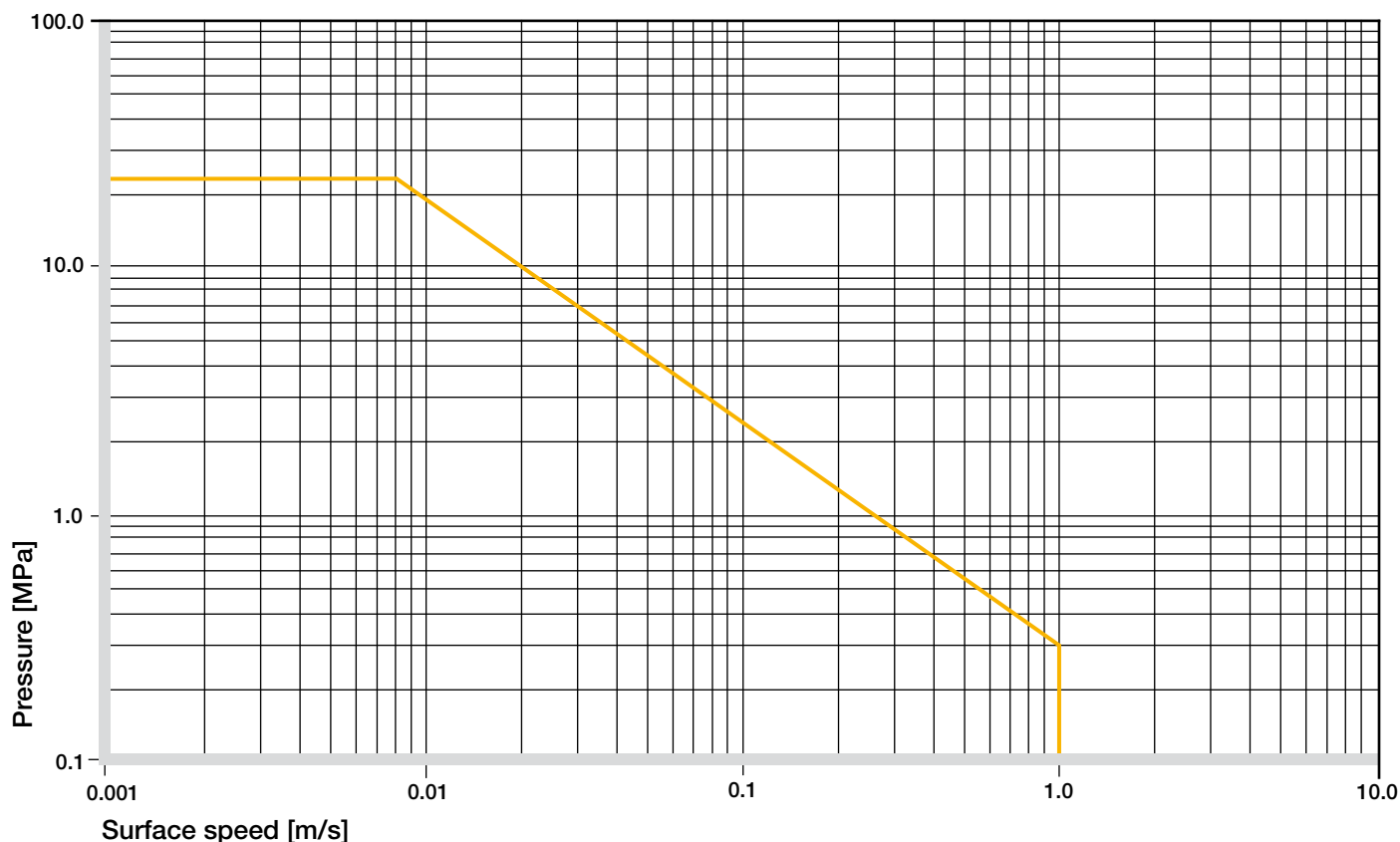
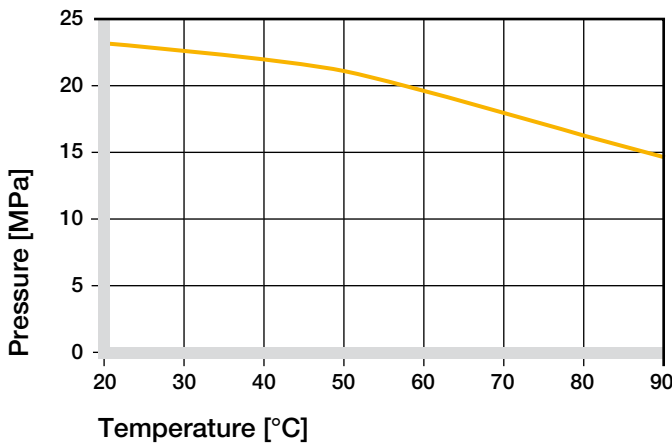


Diagram 01: Permissible pv values for iglidur® J200 with a wall thickness of 1 mm dry running against a steel shaft at +20 °C, mounted in a steel housing

iglidur® J200 is the result of the development of extremely low friction plain bearing materials. When using plain bearings in linear motion, friction can be critical. Many materials can give low coefficients of friction under high loads, but iglidur® J200 can give excellent friction values even at low loads.

## Mechanical Properties

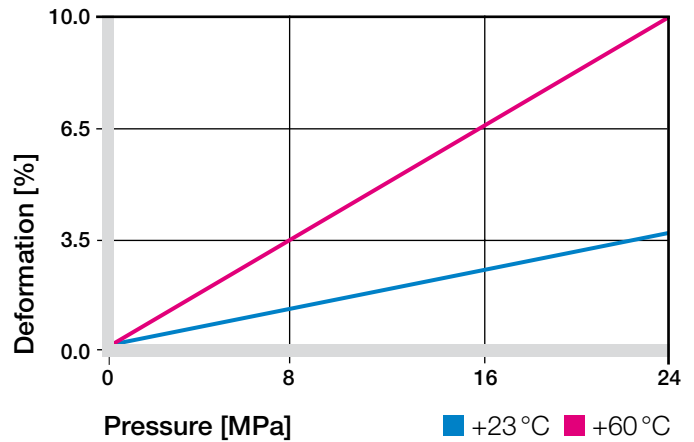
With increasing temperatures, the compressive strength of iglidur® J200 plain bearings decreases. The Diagram 02 shows this inverse relationship. However, at the longterm maximum temperature of +90°C the permissible surface pressure is almost 15 MPa. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.



**Diagram 02: Recommended maximum surface pressure of a function of temperature (23 MPa at +20 °C)**

Diagram 03 shows the deformation of the material at room temperature to the recommended maximum limit. At the recommended maximum surface pressure of 23 MPa the deformation is less than 3,5 %. A plastic deformation up to this value can be ignored, but it depends on the duration of the applied force.

► Surface Pressure, [page 47](#)



**Diagram 03: Deformation under pressure and temperature**

## Permissible Surface Speeds

iglidur® J200 attains high surface speeds through its excellent coefficients of friction. Continuous rotary speeds of 1 m/s are possible. The permitted speeds are clearly higher yet in linear movements or in short-term operation. Speeds of over 15 m/s were successfully tested in linear movements.

► Surface Speed, [page 49](#)

m/s	Rotating	Oscillating	Linear
Continuous	1	0.7	10
Short term	1.5	1.1	15

**Table 02: Maximum running speed**

## Temperatures

The bearings made of iglidur® J200 were not developed for high temperatures. The maximum permitted temperature of +120°C should not be exceeded. Thereby the ambient temperature generated by friction has to be added. From +60°C onward, the bearing should be mechanically fastened, so that the danger of bushings creeping out of the bores is avoided. The wear resistance also declines disproportionately from +70°C.

► Application Temperatures, [page 50](#)

iglidur® J200	Application temperature
Minimum	-50 °C
Max. long term	+90 °C
Max. short term	+120 °C
Add. securing is required from	+60 °C

**Table 03: Temperature limits**

## Friction and Wear

iglidur® J200 presents the lowest coefficients of friction of all iglidur® materials. The average coefficient of friction of all measurements, even with different shaft materials, is  $0.11 \mu$ . The use of hard anodized aluminum as a shaft material is also of importance.

The comparison to the other iglidur® materials reveals that iglidur® J200 plain bearings are more suitable for lower loads. The influence of sliding speed and load on the wear is small. The change of the coefficient of friction at high loads is in the normal range (diagram. 04 and 05). The optimum shaft roughness is between  $0.2$  and  $0.4 \mu\text{m Ra}$ . The influence of the shaft material on the wear is significant. Even at low loads, we recommend to have a closer look into the wear database.

► Coefficients of Friction and Surfaces, **page 52**

► Wear Resistance, **page 53**

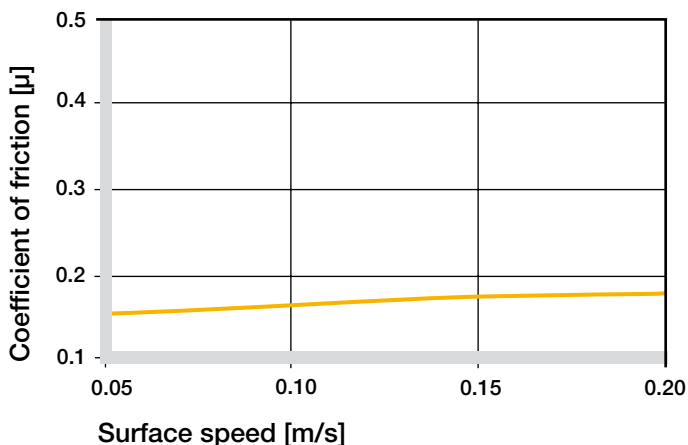


Diagram 04: Coefficient of friction as a function of the running speed,  $p = 0.75 \text{ MPa}$

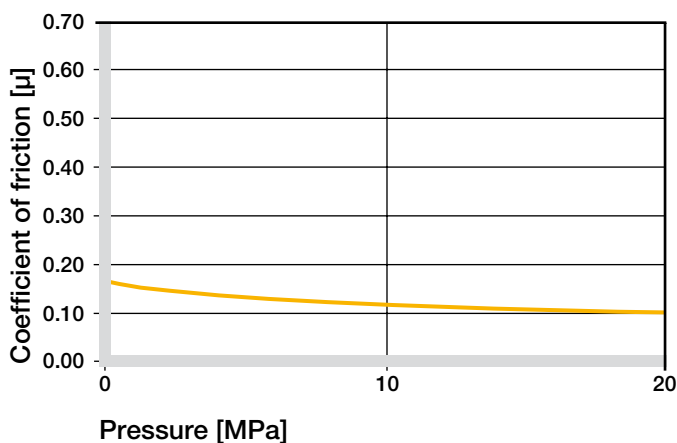


Diagram 05: Coefficient of friction as a function of the pressure,  $v = 0.01 \text{ m/s}$

## Shaft Materials

The shaft material used has a great impact on the wear resistance. In fact, all shaft materials (smooth or hardened) are suitable for use with iglidur® J200, but the best results are achieved with hard anodized aluminum. In particular when used in linear motion, this running surface has proven its value.

► Shaft Materials, **page 55**

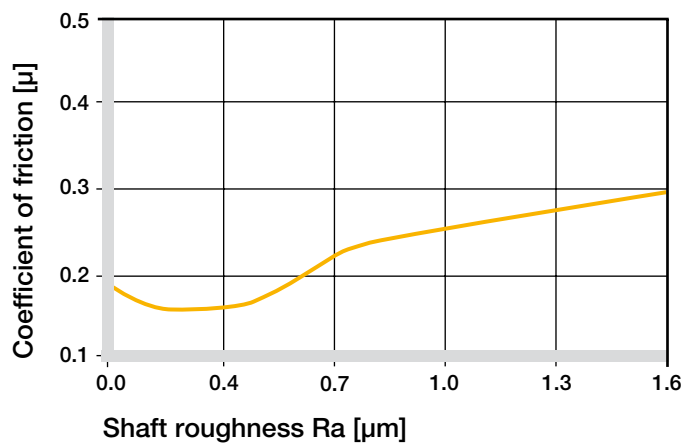


Diagram 06: Coefficient of friction as function of the shaft surface (Cf53 hardened and ground steel)

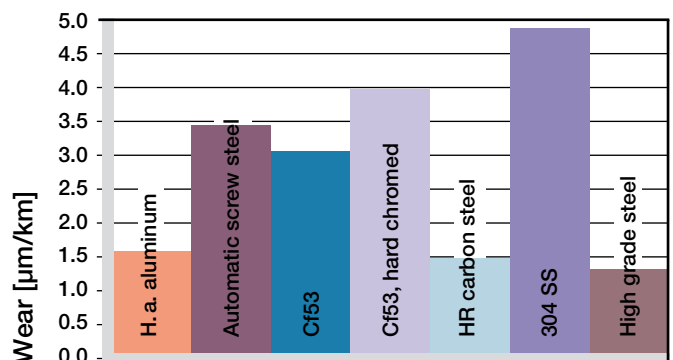


Diagram 07: Wear, rotating with different shaft materials, pressure  $p = 1 \text{ MPa}$ ,  $v = 0.3 \text{ m/s}$

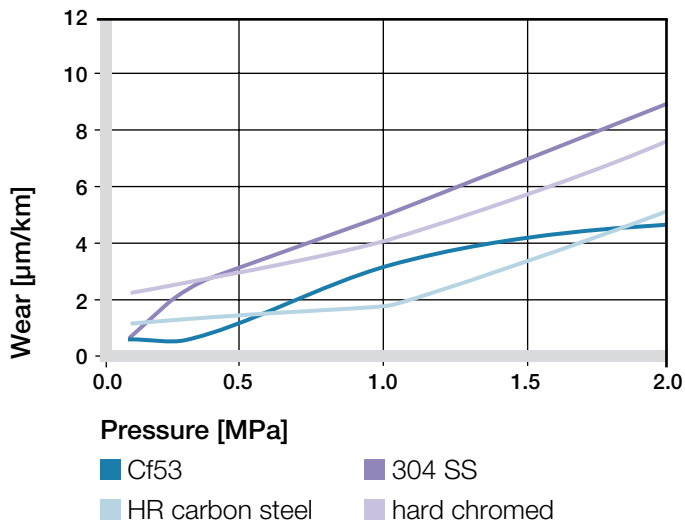


Diagram 08: Wear with different shaft materials in rotational operation, as a function of the pressure

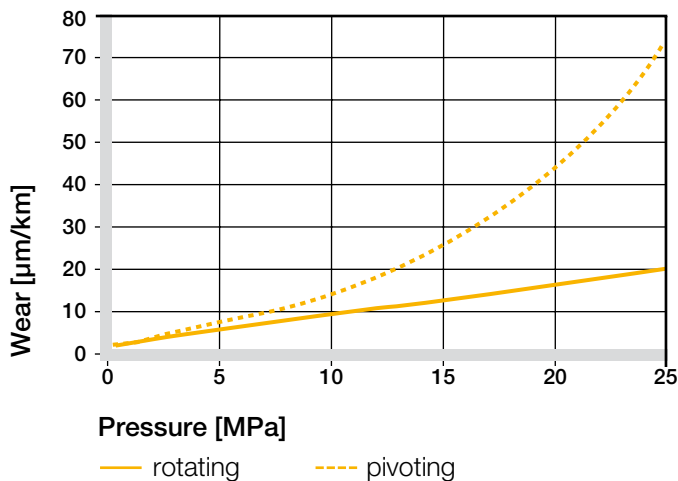


Diagram 09: Wear for pivoting and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the pressure

iglidur® J200	Dry	Greases	Oil	Water
C.o.f. $\mu$	0.11–0.17	0.09	0.04	0.04

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

## Additional Properties

### Chemical Resistance

iglidur® J200 plain bearings are resistant to diluted alkalines, as well as to solvents and all types of lubricants.

► Chemical Table, **page 1118**

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

**+ resistant 0 conditionally resistant – not resistant**  
All data given at room temperature [ $+20^\circ\text{C}$ ]

Table 05: Chemical resistance

### Radiation Resistance

Plain bearings made of iglidur® J200 are radiation resistant up to a radiation intensity of  $3 \cdot 10^2 \text{ Gy}$ .

### UV Resistance

iglidur® J200 plain bearings are very resistant to the impact of UV radiation.

### Vacuum

Use in a vacuum is only possible to a limited extent. Also, only dehumidified bearings made from iglidur® J200 should be tested in a vacuum.

### Electrical Properties

iglidur® J200 plain bearings are electrically insulating.

Volume resistance	$> 10^8 \Omega\text{cm}$
Surface resistance	$> 10^8 \Omega$

## Moisture Absorption

The moisture absorption of iglidur® J200 plain bearings in standard atmosphere is approximately 0.2 %. The saturation limit in water is 0.7 %. Due to these low values considering expansion by moisture absorption is only required in extreme cases.

### Maximum moisture absorption

At +23 °C/50 % r.h.	0.2 % weight
Max. water absorption	0.7 % weight

Table 06: Moisture absorption

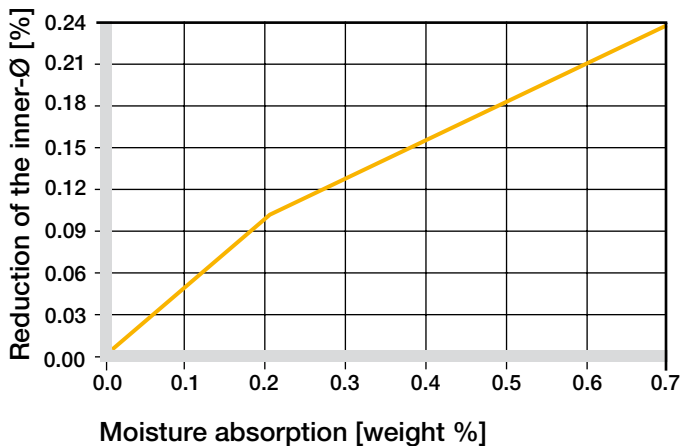


Diagram 10: Effect of moisture absorption on plain bearings

## Installation Tolerances

iglidur® J200 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 59

Diameter d1 [mm]	Shaft h9 [mm]	iglidur® J200 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

At present, iglidur® J200 plain bearings are made to special order.