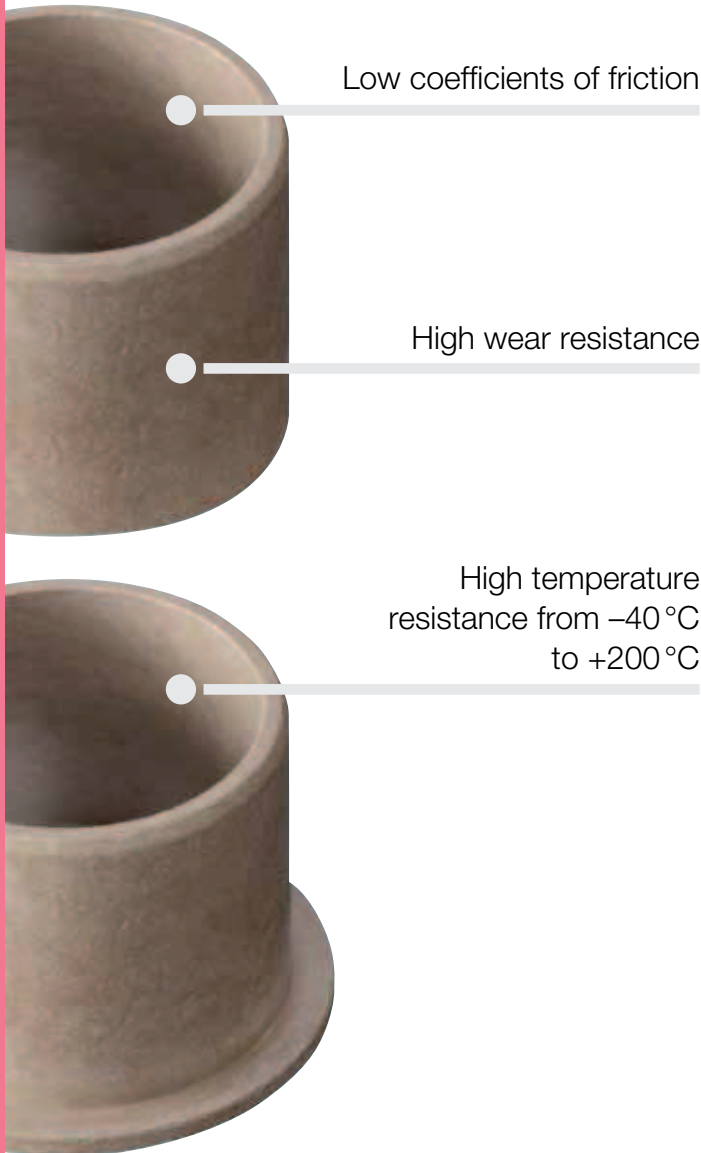


# iglidur® H4

**The automotive under bonnet standard.** Very cost-efficient high-temperature material with good dry-operation properties and “engine compartment resistance”.



### When to use it?

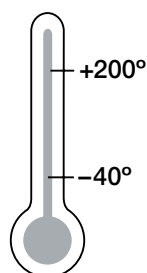
- Application with fuels, oils etc.
- When high wear resistance is required
- For low coefficients of friction
- For high temperature resistance from  $-40^{\circ}\text{C}$  to  $+200^{\circ}\text{C}$
- For high chemical resistance



### When not to use it?

- For underwater use
  - ▶ **iglidur® H370, page 347**
- When a cost-effective universal bearing is required
  - ▶ **iglidur® G, page 61**
- When you need a temperature- and media-resistant bearing for static applications.
  - ▶ **iglidur® H2, page 359**

### Temperature



### Product range

2 types  
 $\varnothing$  6–40 mm  
 more dimensions  
 on request



# iglidur® H4 | Application Examples



## Typical sectors of industry and application areas

- Automotive ● Automation
- Packaging etc.

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

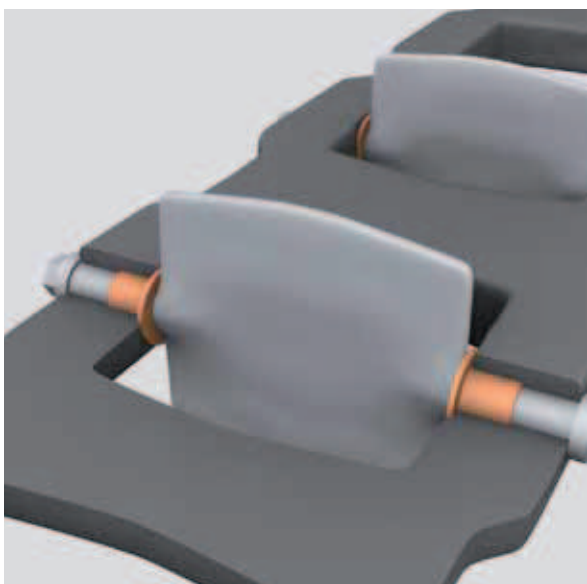
► [www.igus.eu/eu/iglidur-applications](http://www.igus.eu/eu/iglidur-applications)



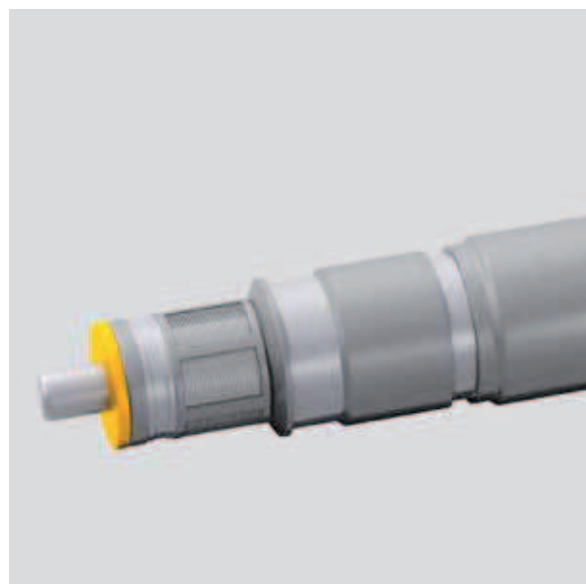
► [www.igus.eu/gear-actuator](http://www.igus.eu/gear-actuator)



► [www.igus.eu/throttle-valves](http://www.igus.eu/throttle-valves)



► [www.igus.eu/intake-systems](http://www.igus.eu/intake-systems)

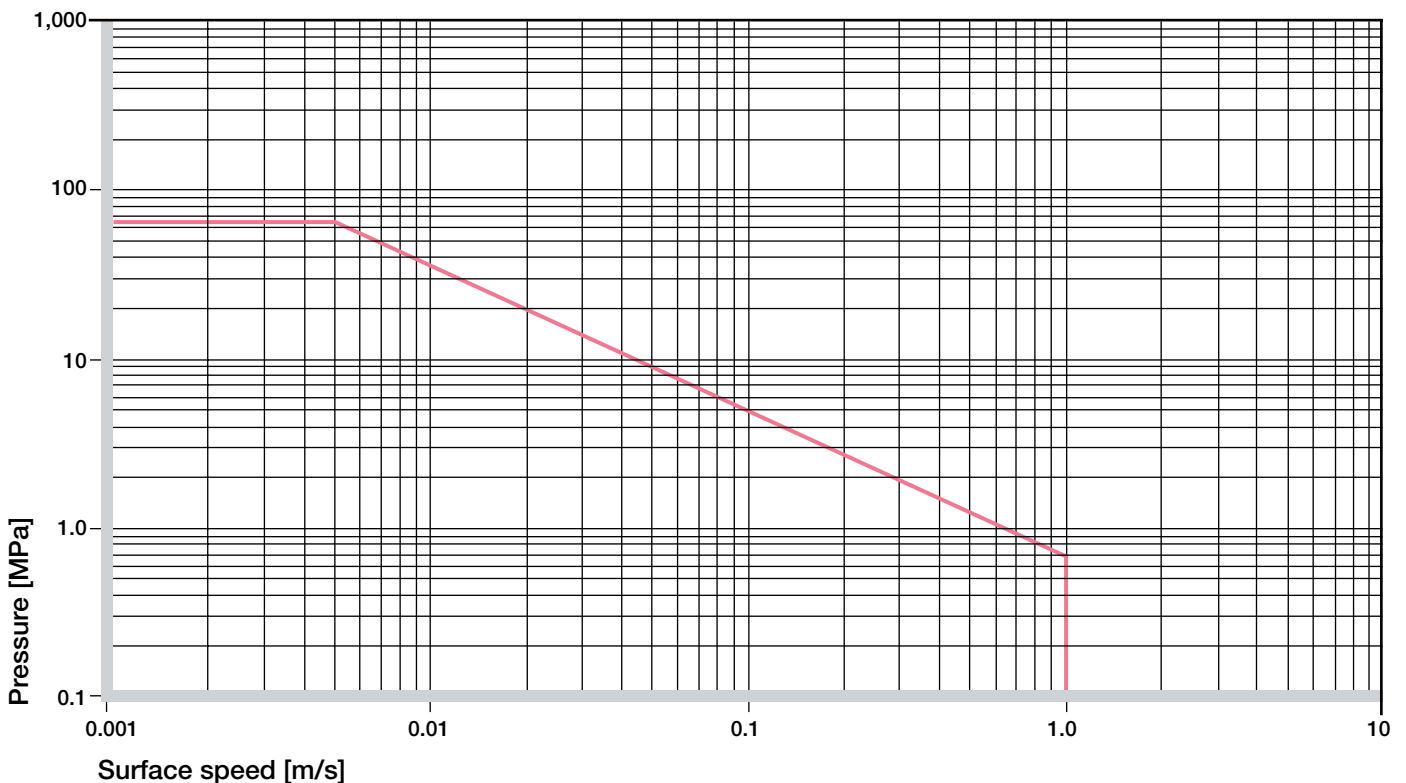


► [www.eu/automotive](http://www.eu/automotive)

Material data			
General properties	Unit	iglidur® H4	Testing method
Density	g/cm <sup>3</sup>	1.79	
Colour		brown	
Max. moisture absorption at +23 °C/50 % r. h.	% weight	0.1	DIN 53495
Max. moisture absorption	% weight	0.2	
Coefficient of sliding friction, dynamic against steel	μ	0.08–0.25	
pv value, max. (dry)	MPa · m/s	0.7	
Mechanical properties			
Modulus of elasticity	MPa	7,500	DIN 53457
Tensile strength at +20 °C	MPa	120	DIN 53452
Compressive strength	MPa	50	
Max. recommended surface pressure (+20 °C)	MPa	65	
Shore D hardness		80	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+200	
Max. short term application temperature	°C	+240	
Min. application temperature	°C	+260	
Thermal conductivity	°C	–40	
Coefficient of thermal expansion (at +23 °C)	W/m · K	0.24	ASTM C 177
Wärmeausdehnungskoeffizient (bei +23 °C)	K <sup>-1</sup> · 10 <sup>-5</sup>	5	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 <sup>13</sup>	DIN IEC 93
Surface resistance	Ω	> 10 <sup>12</sup>	DIN 53482

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

**Table 01: Material data**

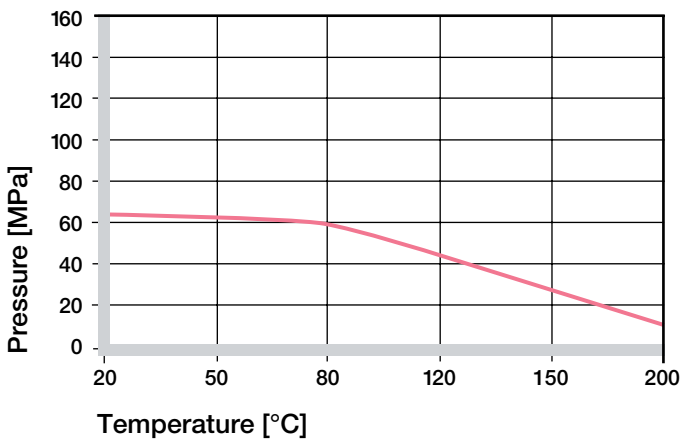


**Graph 01: Permissible pv values for iglidur® H4 with a wall thickness of 1 mm dry running against a steel shaft at +20 °C, mounted in a steel housing**

# iglidur<sup>®</sup> H4 | Technical Data

## Mechanical Properties

The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this. With increasing temperatures, the compressive strength of iglidur<sup>®</sup> H4 plain bearings decreases. The Graph 02 shows this inverse relationship. However, at the longterm maximum temperature of +200°C the permissible surface pressure is almost 10 MPa.

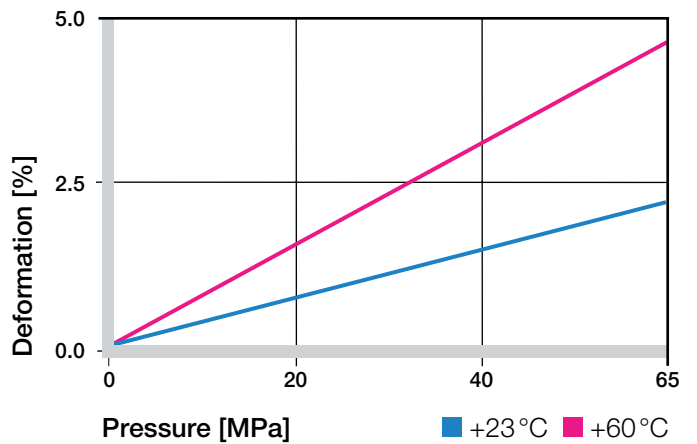


**Graph 02: Recommended maximum surface pressure of iglidur<sup>®</sup> H4 as a function of temperature (65 MPa at +20 °C)**

iglidur<sup>®</sup> H4 bearings stand for high carrying capacity, good abrasion resistance and good temperature resistance, besides the obvious economic factors. Temperatures up to +200°C, permitted surface pressure up to 65 MPa, and excellent chemical resistance are only some of the essential attributes. Solid lubricants lower the coefficient of friction and support the wear resistance, which was essentially improved compared to the likewise cost-efficient iglidur<sup>®</sup> H2 bearings. iglidur<sup>®</sup> H4 bearings are self-lubricating and suitable for all motions.

Graph 03 shows the elastic deformation of iglidur<sup>®</sup> H4 with radial loads.

► Surface Pressure, **page 43**



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

## Permissible Surface Speeds

In contrast to the similarly cost-efficient iglidur<sup>®</sup> H2 bearings, the iglidur<sup>®</sup> H4 has an essentially favorable coefficient of friction. This accounts for the higher permitted surface speeds that can be attained with these bearings. In the dry operation, long-term speeds of 0.8 m/s are possible. The speeds stated in Table 02 are limit values for the lowest bearing loads. With higher loads, the permitted speed drops with the extent of the load due to the limitations by the pv value.

► Surface Speed, **page 45**

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

**Table 02: Maximum running speed**

## Temperatures

iglidur<sup>®</sup> H4 is a temperature resistant material. The short-term maximum permissible temperature is +240 °C, and therefore allows for the use of iglidur<sup>®</sup> H4 plain bearings in applications where the bearings for instance undergo a drying process without further loading. The compressive strength of iglidur<sup>®</sup> H4, however, decreases with increasing temperatures.

The additional friction heat in the bearing system should be considered in the temperatures.

► Application Temperatures, **page 46**

iglidur® H4	Application temperature
Minimum	-40 °C
Max. long term	+200 °C
Max. short term	+240 °C
Add. securing is required from	+110 °C

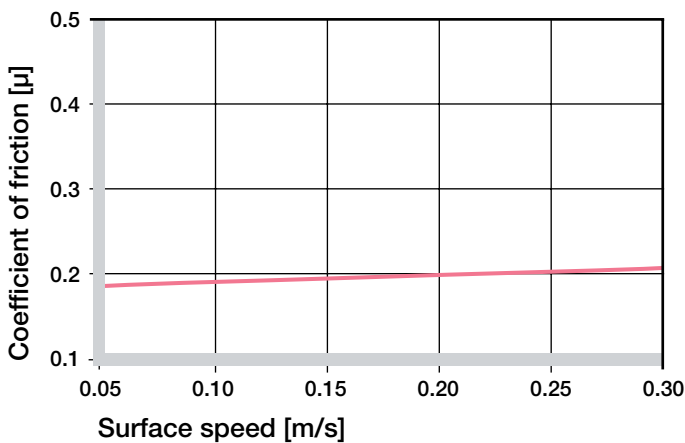
**Table 03: Temperature limits**

## Friction and Wear

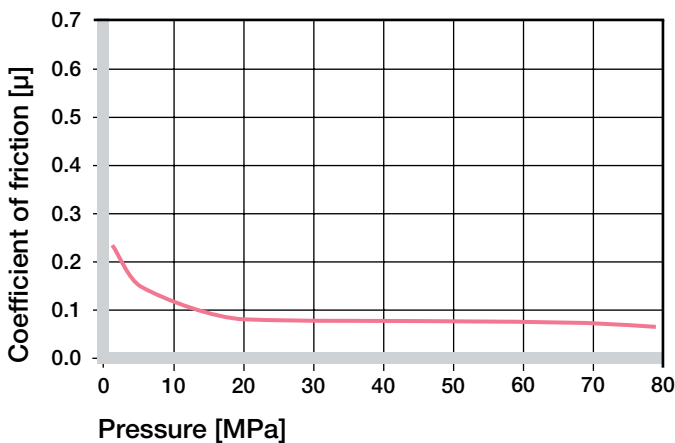
The coefficient of friction of the iglidur® H4 bearing is very low. However it must be noted that an extremely coarse gliding partner can increase the friction. We recommend a shaft surface finish (Ra) of 0.1 to maximum 0.4 µm. The coefficient of friction of the iglidur® H4 bearings is dependent on the surface speed only to a minor extent. The influence of the load is greater; an increase in load lowers the coefficient of friction up to 0.08.

► Coefficients of Friction and Surfaces, **page 48**

► Wear Resistance, **page 49**



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

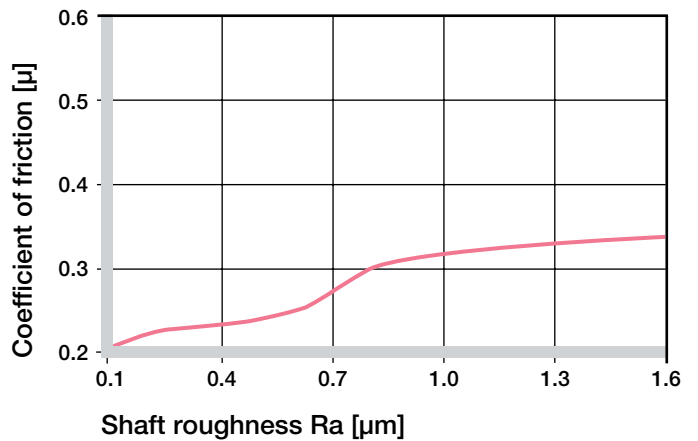


**Graph 05: Coefficient of friction as a function of the pressure, v = 0.01 m/s**

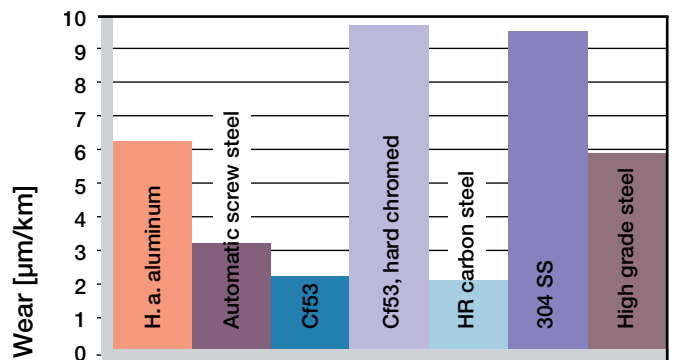
## Shaft Materials

In many of the usable shaft materials, the iglidur® H4 is the economical alternative to many other high-temperature bearings. The important thing is however the selection of the suitable shaft material. It cannot be generally stated that iglidur® H4 is better suited for hard or soft shafts. Tests have however shown that pivoting motions yield better wear data. In rotating applications, the wear increases markedly from 10 MPa.

► Shaft Materials, **page 51**

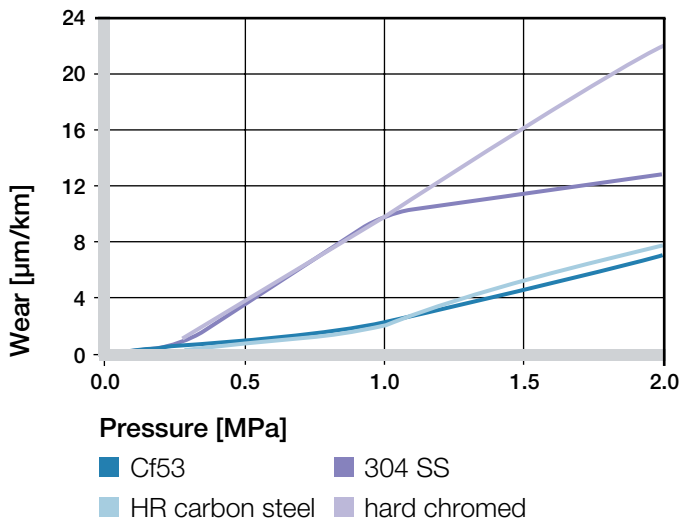


**Graph 06: Coefficient of friction as function of the shaft surface (Cf53 hardened and ground steel)**

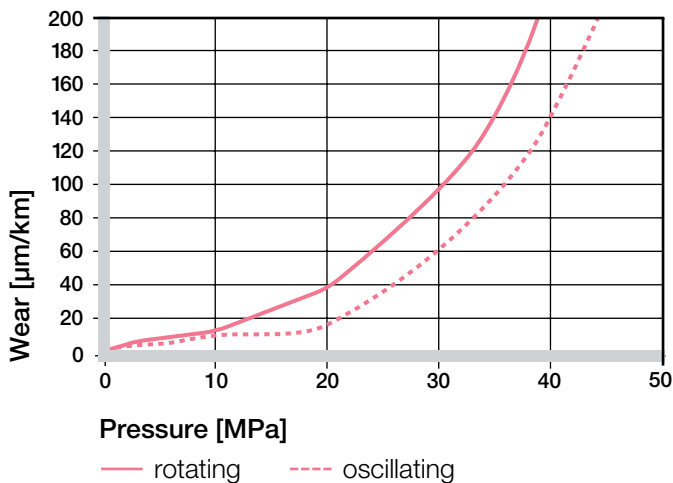


**Graph 07: Wear, rotating with different shaft materials, pressure p = 0.75 MPa, v = 0.5 m/s**

# iglidur® H4 | Technical Data



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



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

iglidur® H4	Dry	Greases	Oil	Water
C.o.f. $\mu$	0.08-0.25	0.09	0.04	0.04

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

## Additional Properties

### Chemical Resistance

iglidur® H4 plain bearings feature good chemical resistance. They are resistant to most lubricants. The iglidur® H4 is not affected by most weak organic and inorganic acids.

► Chemical Table, page 974

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

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

**Table 05: Chemical resistance**

### Radiation Resistance

iglidur® H4 withstands neutron radiation as well as gamma radiation without noticeable losses of its excellent mechanical characteristics. Plain bearings of iglidur® H4 are radiation resistant up to a radiation intensity of  $2 \cdot 10^2$  Gy.

### UV Resistance

iglidur® H4 plain bearings change under the influence of UV radiation and other climatic influences. The surface gets rougher, and the compressive strength decreases. The use of iglidur® H4 in applications directly exposed to atmospheric conditions should therefore be tested.

### Vacuum

In a vacuum, any moisture present will out gas. Use in a vacuum is usually possible.

### Electrical Properties

iglidur® H4 plain bearings are electrically insulating.

Volume resistance	$> 10^{13} \Omega\text{cm}$
Surface resistance	$> 10^{12} \Omega$

## Moisture Absorption

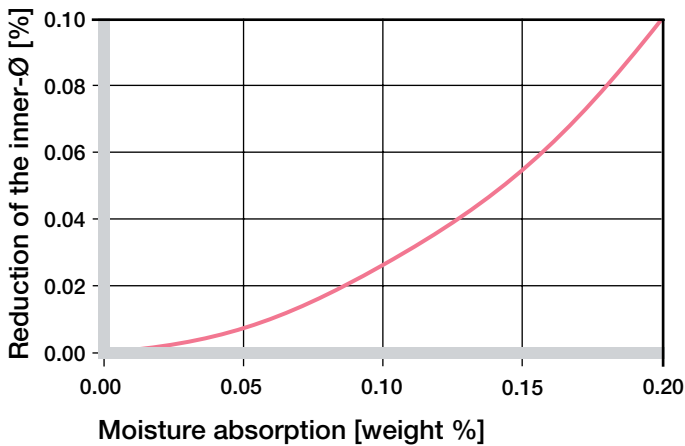
The moisture absorption of iglidur® H4 plain bearings is below 0.1 % in standard atmosphere. The saturation limit in water is 0.2 %. iglidur® H4 is therefore an ideal material for wet environments.

### Maximum moisture absorption

At +23 °C/50 % r. h. 0.1 % weight

Max. moisture absorption 0.2 % weight

**Table 06: Moisture absorption**



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

## Installation Tolerances

iglidur® H4 bearings are standard bearings for shafts with h-tolerance (recommended minimum h9).

After the installation in a housing bore with H7 tolerance, the inner diameter of the bearing automatically adjusts to F10 tolerance.

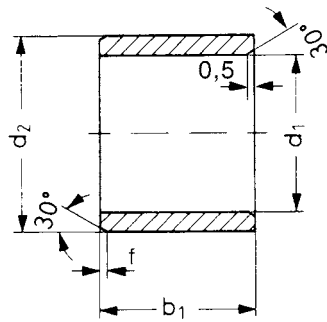
► Testing Methods, page 55

Diameter d1 [mm]	Shaft h9 [mm]	iglidur® H4 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**

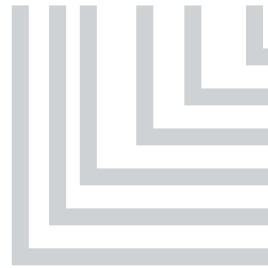
# iglidur® H4 | Product Range

## Sleeve bearing



### Order key

**H4SM-0405-04**



- Length b1
- Outer diameter d2
- Inner diameter d1
- Metric
- Type (Form S)
- Material: iglidur® H4

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
H4SM-0405-04	4.0	+0.010 +0.058	5.5	4.0
H4SM-0608-08	6.0	+0.010 +0.058	8.0	8.0
H4SM-0810-20	8.0	+0.013 +0.071	10.0	20.0
H4SM-1618-20	16.0	+0.016 +0.086	18.0	20.0
H4SM-1820-15	18.0	+0.016 +0.086	20.0	15.0
H4SM-2022-15	20.0	+0.020 +0.104	22.0	15.0

\* after pressfit. Testing methods ► page 55



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



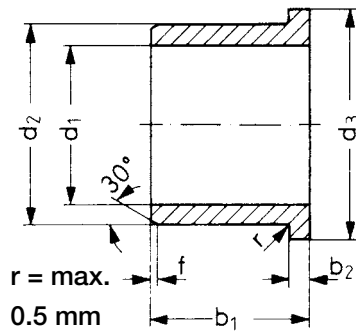
**prices** price list online  
www.igus.eu/eu/h4



**order** part number  
**example** H4SM-0405-04



## Flange bearing



### Order key

**H4FM-0608-08**



- Length b1
- Outer diameter d2
- Inner diameter d1
- Metric
- Type (Form F)
- Material: iglidur® H4

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
H4FM-0608-08	6.0	+0.010 +0.058	8.0	12.0	8.0	1.0
H4FM-0810-10	8.0	+0.013 +0.071	10.0	15.0	10.0	1.0
H4FM-1012-05	10.0	+0.013 +0.071	12.0	18.0	5.0	1.0
H4FM-1012-12	10.0	+0.013 +0.071	12.0	18.0	12.0	1.0
H4FM-1214-12	12.0	+0.016 +0.086	14.0	20.0	12.0	1.0
H4FM-1517-12	15.0	+0.016 +0.086	17.0	23.0	12.0	1.0
H4FM-1618-17	16.0	+0.016 +0.086	18.0	24.0	17.0	1.0
H4FM-1820-17	18.0	+0.016 +0.086	20.0	26.0	17.0	1.0
H4FM-2023-21	20.0	+0.020 +0.104	23.0	30.0	21.5	1.5
H4FM-2528-21	25.0	+0.020 +0.104	28.0	35.0	21.5	1.5
H4FM-3034-30	30.0	+0.020 +0.104	34.0	40.0	30.0	2.0
H4FM-4044-40	40.0	+0.030 +0.150	44.0	52.0	40.0	2.0

\* after pressfit. Testing methods ► page 55

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

**prices** price list online  
[www.igus.eu/eu/h4](http://www.igus.eu/eu/h4)

**order** part number  
**example** H4FM-0608-08