

Long life operation – iglidur® H1



Standard range from stock

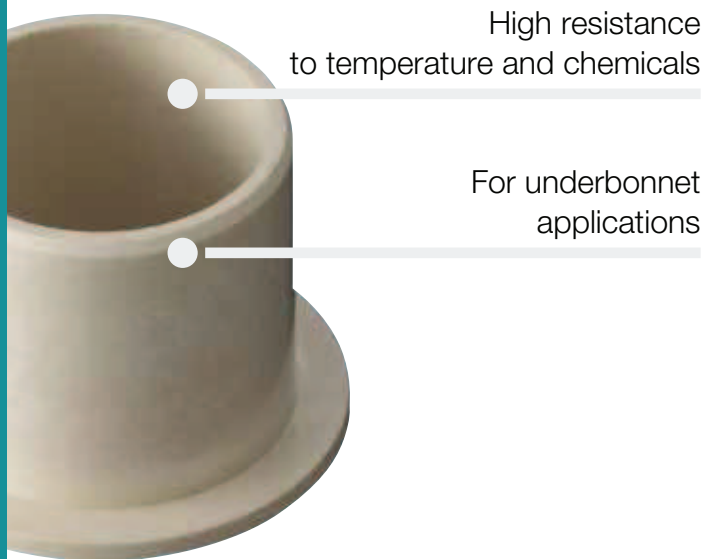
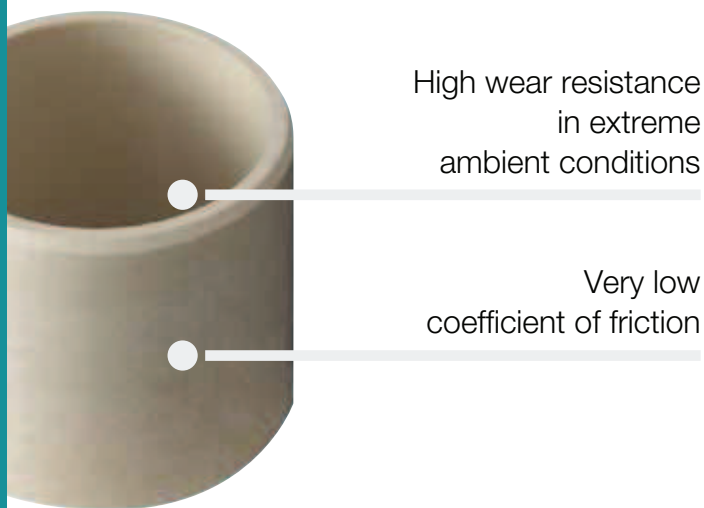
High wear resistance in extreme ambient conditions

Very low coefficient of friction

High resistance to temperature and chemicals

For underbonnet applications

Long life operation. iglidur® H1 is the first choice when high holding times are required in extreme environmental conditions. Extreme wear resistance is coupled with excellent resistance to temperature and chemicals – not only in the packaging and foodstuff industries or the automotive industry.



When to use it?

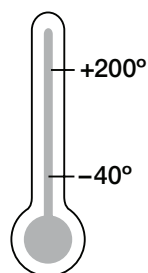
- When extreme service life is required under the influence of temperature and humidity
- When low coefficients of friction at high temperature are important
- When regular aggressive cleaning is required (splashes, steam blasting)
- When the bearings are used in the engine compartment



When not to use it?

- When high surface pressures occur
▶ iglidur® Z, page 327
- When the best universal chemical resistance is required
▶ iglidur® X, page 173
- When a cost-efficient high temperature bearing is sought, not the ideal wear resistance
▶ iglidur® H2, page 399
- When an FDA-compliant plain bearing with high temperature resistance is required
▶ iglidur® A500, page 457

Temperature



Product range

2 types
Ø 3–40 mm
more dimensions
on request

iglidur® H1 | Application Examples



Typical sectors of industry and application areas

- Beverage technology ● Automation
- Packaging ● Textile technology
- Optical industry etc.

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

► www.igus.eu/iglidur-applications



► www.igus.eu/washing-chain



► www.igus.eu/form-fill-seal

Material properties table

General properties	Unit	iglidur® H1	Testing method
Density	g/cm ³	1.53	
Colour		cream	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	0.1	DIN 53495
Max. water absorption	% weight	0.3	
Coefficient of sliding friction, dynamic against steel	μ	0.06–0.20	
pv value, max. (dry)	MPa · m/s	0.8	
Mechanical properties			
Modulus of elasticity	MPa	2,800	DIN 53457
Tensile strength at +20 °C	MPa	55	DIN 53452
Compressive strength	MPa	78	
Max. recommended surface pressure (+20 °C)	MPa	80	
Shore D hardness		77	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+200	
Max. short term application temperature	°C	+240	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	K ⁻¹ · 10 ⁻⁵	6	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 ¹²	DIN IEC 93
Surface resistance	Ω	> 10 ¹¹	DIN 53482

Table 01: Material properties table

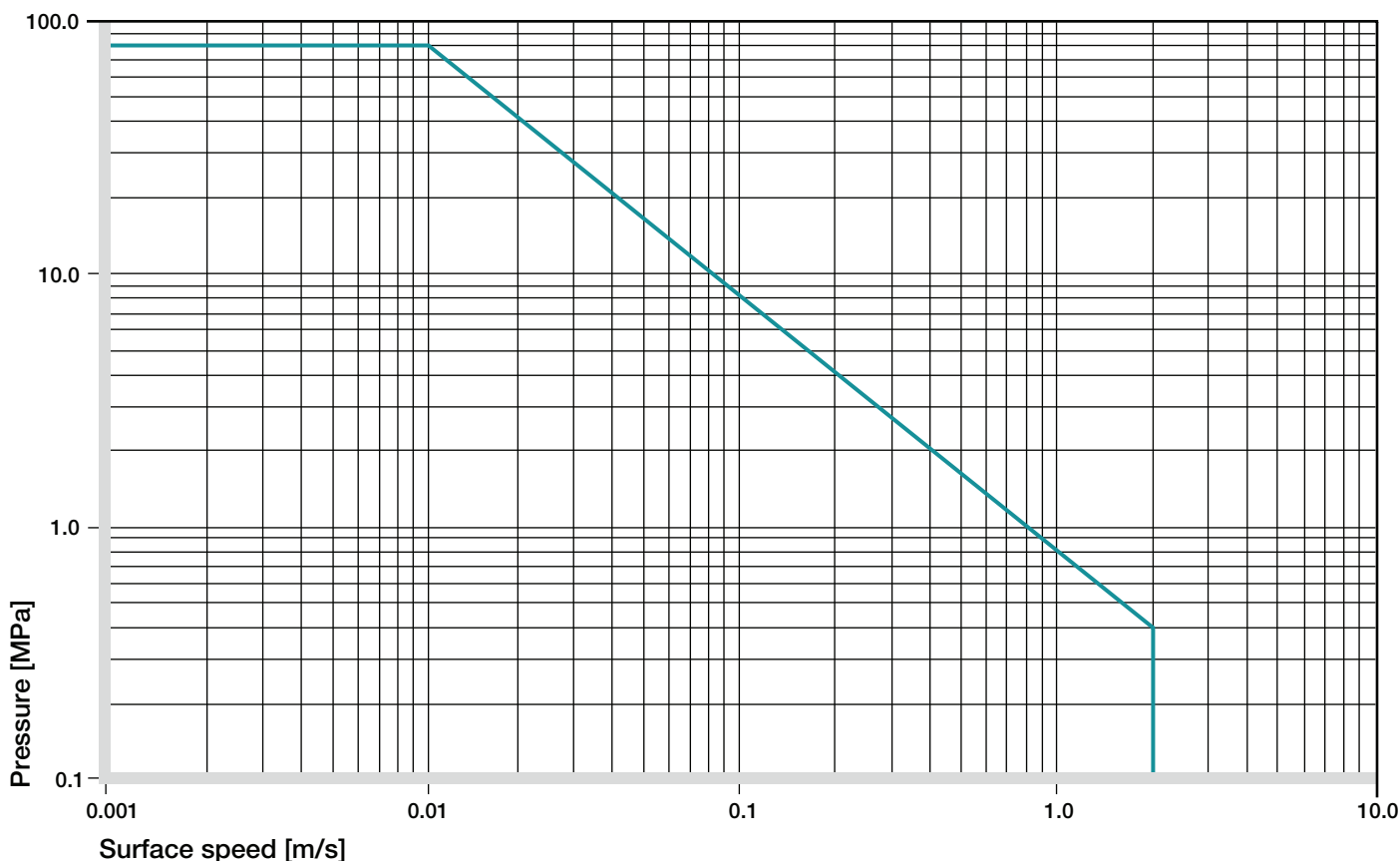


Diagram 01: Permissible pv values for iglidur® H1 with a wall thickness of 1 mm dry running against a steel shaft at +20 °C, mounted in a steel housing

iglidur® H1 plain bearings have been specially developed for use under extreme environmental conditions. Their strengths are the extremely high wear resistance and the excellent coefficients of friction even in applications in which the bearing is exposed to extreme temperatures and/or aggressive chemicals. iglidur® H1 bearings can be used completely free of lubrication; in wet area applications, the surrounding medium acts as additional lubricant.

Mechanical Properties

With increasing temperatures, the compressive strength of iglidur® H1 plain bearings decreases. The Diagram 02 shows this inverse relationship. However, at the longterm maximum temperature of +200° C the permissible surface pressure is almost 10 MPa. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

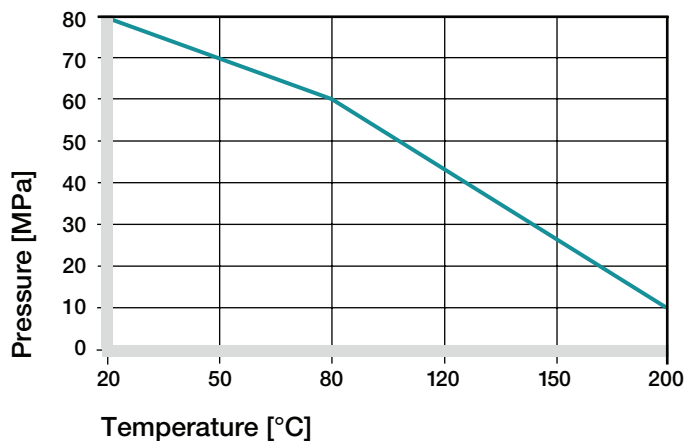


Diagram 02: Recommended maximum surface pressure as a function of temperature (80 MPa at +20° C)

Diagram 03 shows the elastic deformation of iglidur® H1 at radial loads. Among the iglidur® H materials, iglidur® H1 material has the greatest elasticity. This must be considered for applications with high pressure or strong edge pressure.

► Surface Pressure, [page 63](#)

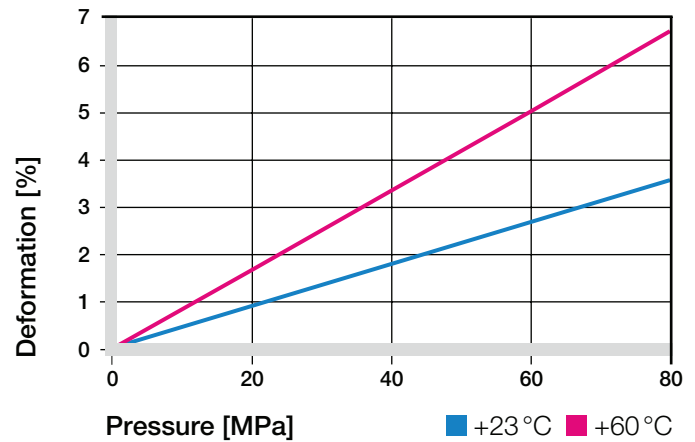


Diagram 03: Deformation under pressure and temperature

Permissible Surface Speeds

Due to the excellent coefficients of friction, rotating surface speeds up to 2 m/s are possible with iglidur® H1 plain bearings in dry operation. Linear speeds up to 5 m/s are attained. 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 65](#)

m/s	Rotating	Oscillating	Linear
Continuous	2	1.0	5
Short term	2.5	1.5	7

Table 02: Maximum running speed

Temperatures

iglidur® H is an extremely temperature-resistant material. The short term maximum temperature is +240° C. The pressure-resistance of iglidur® H1 decreases with rising temperature. Apart from the surrounding temperature, the friction heat resulting from the movement of the shaft in the bearing must be considered. The ambient temperatures that are prevalent in applications also have an effect on the bearing wear. The wear rate rises with higher temperatures, but with iglidur® H1, this increase is small.

The temperature above which we recommend an additional axial securing is +80° C for iglidur® H1, lower than for the other iglidur® H materials.

► Application Temperatures, [page 66](#)

iglidur® H1	Application temperature
Minimum	-40 °C
Max. long term	+200 °C
Max. short term	+240 °C
Add. securing is required from	+ 80 °C

Table 03: Temperature limits

Friction and Wear

The coefficient of friction alters like the wear resistance with increasing load and speed. At constant load the coefficient of friction μ increases with the speed. At constant speed the coefficient of friction lowers with increasing load, whereupon almost constant values result from 40 MPa.

As the counter partner has a large influence on friction and wear, the choice of the appropriate shaft can be decisive. Smoother shafts than $R_a = 0.1 \mu\text{m}$ raises the coefficient of friction. For applications with high loads, we recommend hardened and smoothed surfaces with an average surface finish of $R_a = 0.3$ to $0.4 \mu\text{m}$.

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

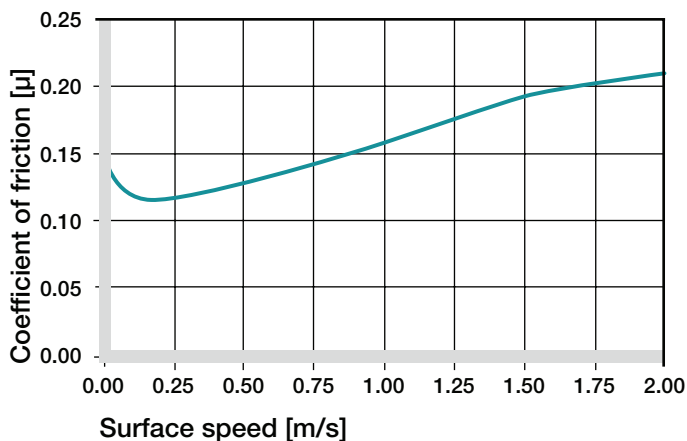


Diagram 04: Coefficient of friction as a function of the running speed, $p = 0.75 \text{ MPa}$

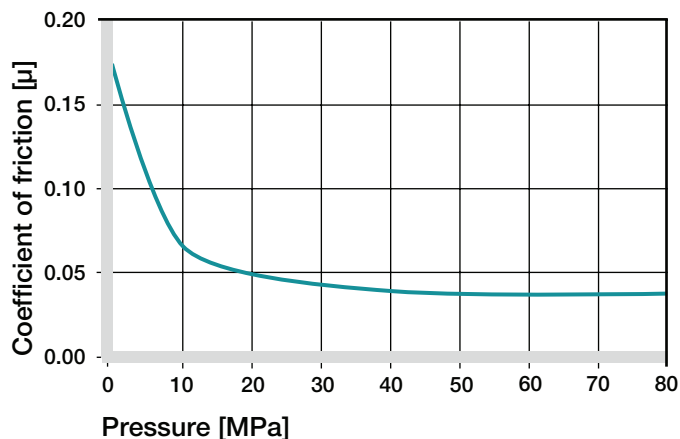


Diagram 05: Coefficient of friction as a function of the pressure, $v = 0.01 \text{ m/s}$

Shaft Materials

Diagrams 06 to 09 display a summary of the results of tests with different shaft materials conducted with iglidur® H1 plain bearings in the igus® laboratory.

The iglidur® H1 plain bearings display excellent wear behavior in combination with a wide variety of shaft materials both in rotating and pivoting operations. On the V2A shafts in particular, iglidur® H1 attains very low wear rates both in rotating and pivoting operations. Even on hard-coated aluminum shafts, iglidur® H1 plain bearings attain high service life in rotating applications with low to medium loads.

- Shaft Materials, **page 71**

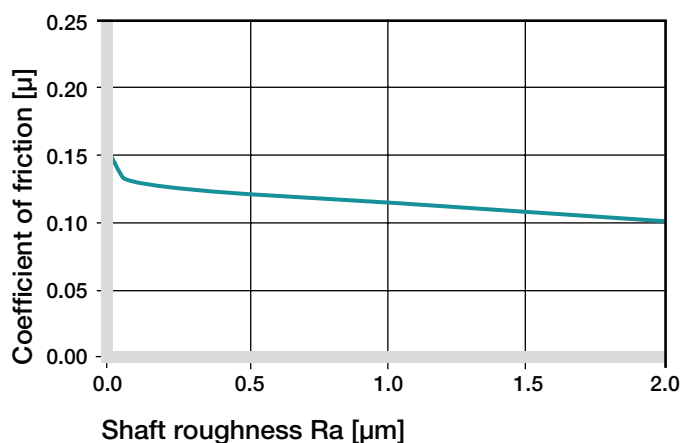


Diagram 06: Coefficient of friction as function of the shaft surface (Cf53 hardened and ground steel)

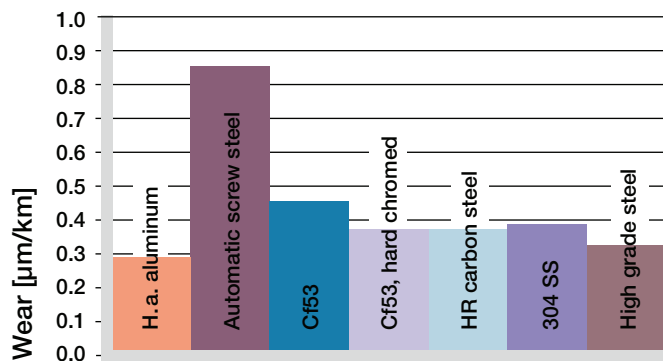


Diagram 07: Wear, rotating with different shaft materials, pressure $p = 1 \text{ MPa}$, $v = 0.3 \text{ m/s}$

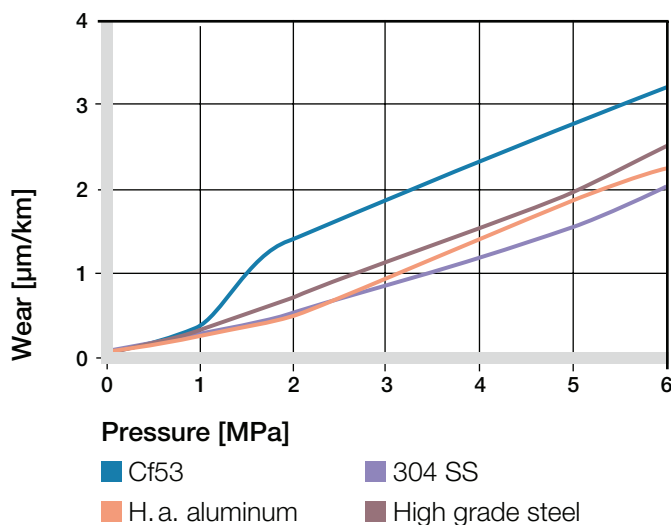


Diagram 08: Wear with different shaft materials in rotational operation, as a function of the pressure

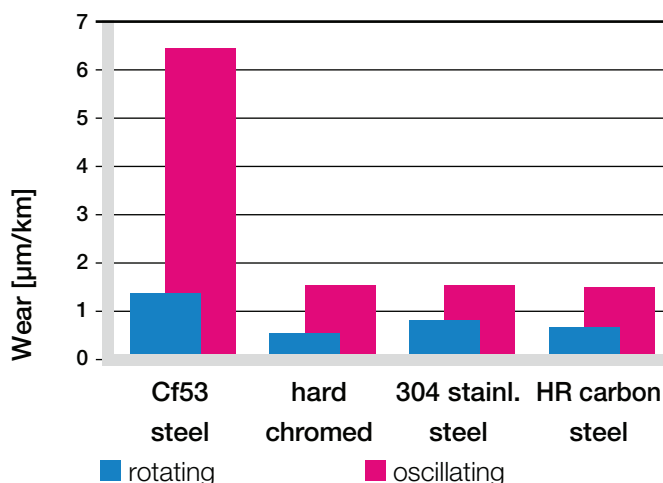


Diagram 09: Wear for rotating and oscillating applications with different shaft materials, $p = 2 \text{ MPa}$

iglidur® H1	Dry	Greases	Oil	Water
C.o.f. μ	0.06–0.20	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® H1 bearings have a good resistance against chemicals. Hence even chemicals can act as lubricants. The iglidur® H1 plain bearings are not resistant against hot, oxidizing acids and some other particularly aggressive chemicals.

► Chemical Table, page 1258

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

+ resistant 0 conditionally resistant – not resistant

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

Table 05: Chemical resistance

Radiation Resistance

Resistant to radiation up to an intensity of $2 \cdot 10^2 \text{ Gy}$.

UV Resistance

iglidur® H1 bearings are only conditionally resistant to UV rays. The surface of iglidur® H1 becomes coarser under the influence of atmospheric conditions and the wear increases. Therefore the use of iglidur® H1 plain bearings in applications directly exposed to weathering should be tested in individual cases.

Vacuum

Water elements, even if only little, should be degassed for use in vacuum. The use in vacuum is generally possible.

Electrical Properties

iglidur® H1 plain bearings are electrically insulating.

Volume resistance	$> 10^{12} \text{ Ωcm}$
Surface resistance	$> 10^{11} \text{ Ω}$

Moisture Absorption

The moisture absorption of iglidur® H1 bearings is approximately 0.1 % in standard climatic conditions. The saturation limit in water is 0.3 %. Therefore iglidur® H1 is very well suited for use in wet environments.

Maximal moisture absorption

At +23 °C/50 % r.h. 0.1 % weight

Max. water absorption 0.3 % weight

Table 06: Moisture absorption

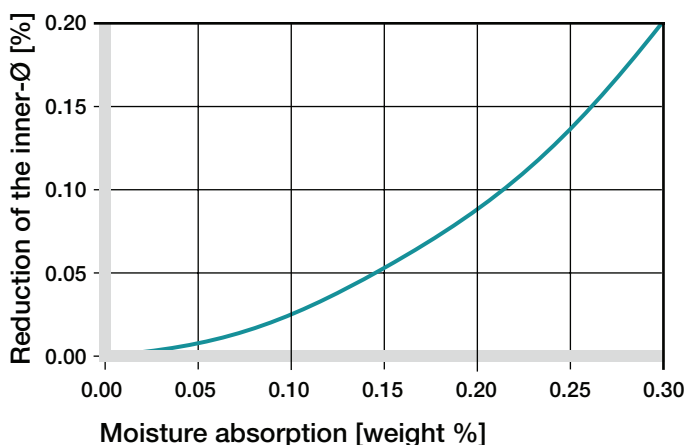


Diagram 10: Effect of moisture absorption on plain bearings

Installation Tolerances

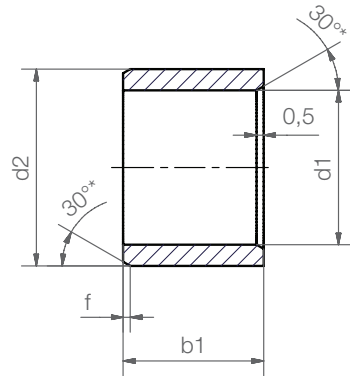
iglidur® H1 plain bearings are standard bearings for shafts with h-tolerance (recommended minimum h9). The bearings are designed for pressfit into a housing machined to a H7 tolerance. After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

► Testing Methods, page 75

Diameter d1 [mm]	Shaft h9 [mm]	iglidur® H1 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

H1SM-0304-05



Length b1
Outer diameter d2
Inner diameter d1
Metric
Type (Form S)
Material iglidur® H1

Dimensions according to ISO 3547-1 and special dimensions

* thickness < 1 mm, chamfer = 20°

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
H1SM-0304-05	3.0	+0.006 +0.046	4.5	5.0
H1SM-0507-05	5.0	+0.010 +0.058	7.0	5.0
H1SM-0608-06	6.0	+0.010 +0.058	8.0	6.0
H1SM-0608-10	6.0	+0.010 +0.058	8.0	10.0
H1SM-0810-10	8.0	+0.013 +0.071	10.0	10.0
H1SM-0810-15	8.0	+0.013 +0.071	10.0	15.0
H1SM-1012-10	10.0	+0.013 +0.071	12.0	10.0
H1SM-1012-15	10.0	+0.013 +0.071	12.0	15.0
H1SM-1214-12	12.0	+0.016 +0.086	14.0	12.0
H1SM-1618-15	16.0	+0.016 +0.086	18.0	15.0
H1SM-2023-15	20.0	+0.020 +0.104	23.0	15.0
H1SM-2023-20	20.0	+0.020 +0.104	23.0	20.0
H1SM-2023-30	20.0	+0.020 +0.104	23.0	30.0
H1SM-2528-30	25.0	+0.020 +0.104	28.0	30.0
H1SM-3034-30	30.0	+0.020 +0.104	34.0	30.0
H1SM-3539-30	35.0	+0.025 +0.125	39.0	30.0
H1SM-4044-40	40.0	+0.025 +0.125	44.0	40.0

* after pressfit. Testing methods ► page 75

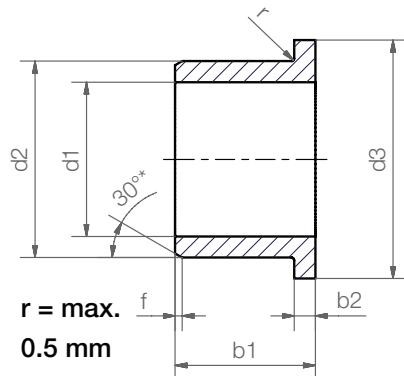


delivery from stock
time



prices price list online
www.igus.eu/eu/h1

Flange bearing



Order key

H1FM-0304-05


Length b1
Outer diameter d2
Inner diameter
Metric
Type (Form F)
Material iglidur® H1

Dimensions according to ISO 3547-1 and special dimensions

* thickness < 1 mm, chamfer = 20°

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
H1FM-0304-05	3.0	+0.006 +0.046	4.5	7.5	5.0	0.75
H1FM-0507-05	5.0	+0.010 +0.058	7.0	11.0	5.0	1.0
H1FM-0608-06	6.0	+0.010 +0.058	8.0	12.0	6.0	1.0
H1FM-0608-10	6.0	+0.010 +0.058	8.0	12.0	10.0	1.0
H1FM-0810-065	8.0	+0.013 +0.071	10.0	15.0	6.5	1.0
H1FM-0810-10	8.0	+0.013 +0.071	10.0	15.0	10.0	1.0
H1FM-1012-10	10.0	+0.013 +0.071	12.0	18.0	10.0	1.0
H1FM-1214-12	12.0	+0.016 +0.086	14.0	20.0	12.0	1.0
H1FM-1214-20	12.0	+0.016 +0.086	14.0	20.0	20.0	1.0
H1FM-1618-17	16.0	+0.016 +0.086	18.0	24.0	17.0	1.0
H1FM-1618-25	16.0	+0.016 +0.086	18.0	24.0	25.0	1.0
H1FM-1820-12	18.0	+0.016 +0.086	20.0	26.0	12.0	1.0
H1FM-2023-21	20.0	+0.020 +0.104	23.0	30.0	21.5	1.5
H1FM-2023-30	20.0	+0.020 +0.104	23.0	30.0	30.0	1.5
H1FM-2528-21	25.0	+0.020 +0.104	28.0	35.0	21.0	1.5
H1FM-3034-26	30.0	+0.020 +0.104	34.0	42.0	26.0	2.0
H1FM-3539-26	35.0	+0.025 +0.125	39.0	47.0	26.0	2.0
H1FM-4044-40	40.0	+0.025 +0.125	44.0	52.0	40.0	2.0

* after pressfit. Testing methods ► page 75



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
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