



ESD-compatible – iglidur® F2



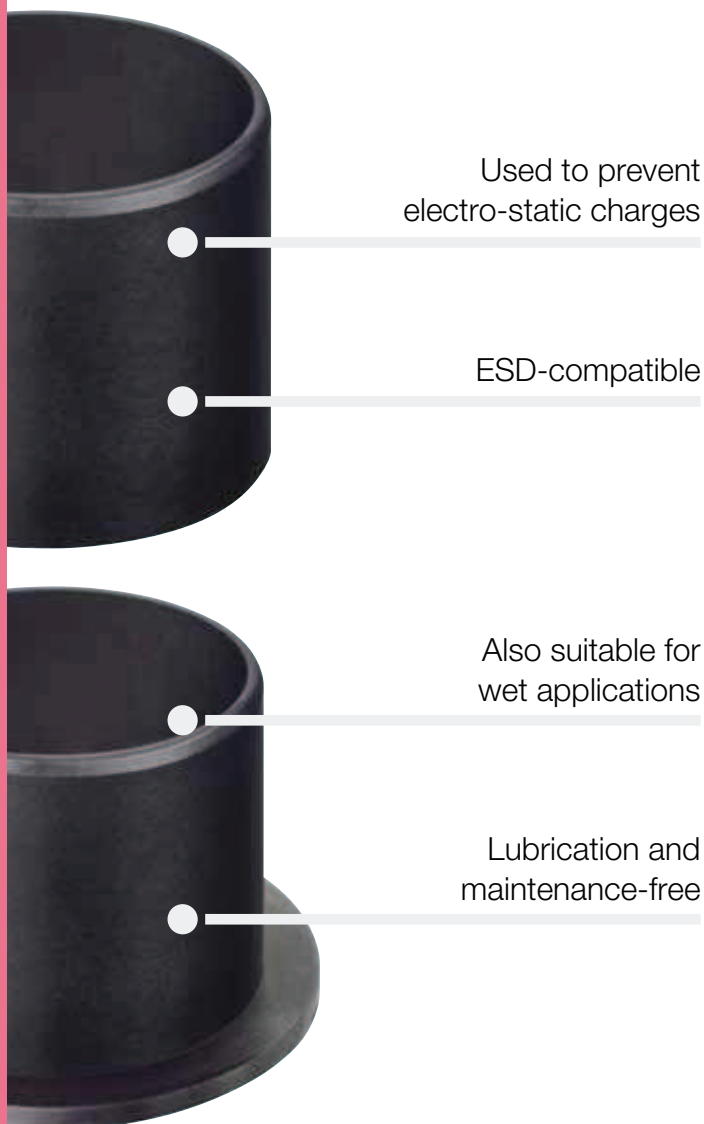
Standard range from stock

Used to prevent electro-static charges

Also suitable for wet applications

Lubrication and maintenance-free

ESD-compatible. iglidur® F2 helps to prevent electrostatic charging. Good resistance to media and temperature, applicability even in wet conditions due to low moisture absorption and good universal wear values pave the way for a wide range of applications.



When to use it?

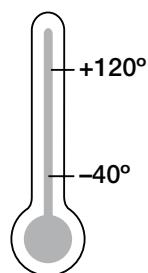
- When the bearing should be electrically discharging
- When a universal bearing is required for a broad application range



When not to use it?

- When a universal bearing without static discharge capacity is required
 - ▶ iglidur® G, page 81
 - ▶ iglidur® P, page 195
- For underwater application
 - ▶ iglidur® H370, page 375
- When extremely high wear resistance is required
 - ▶ iglidur® J, page 109
 - ▶ iglidur® W300, page 151

Temperature



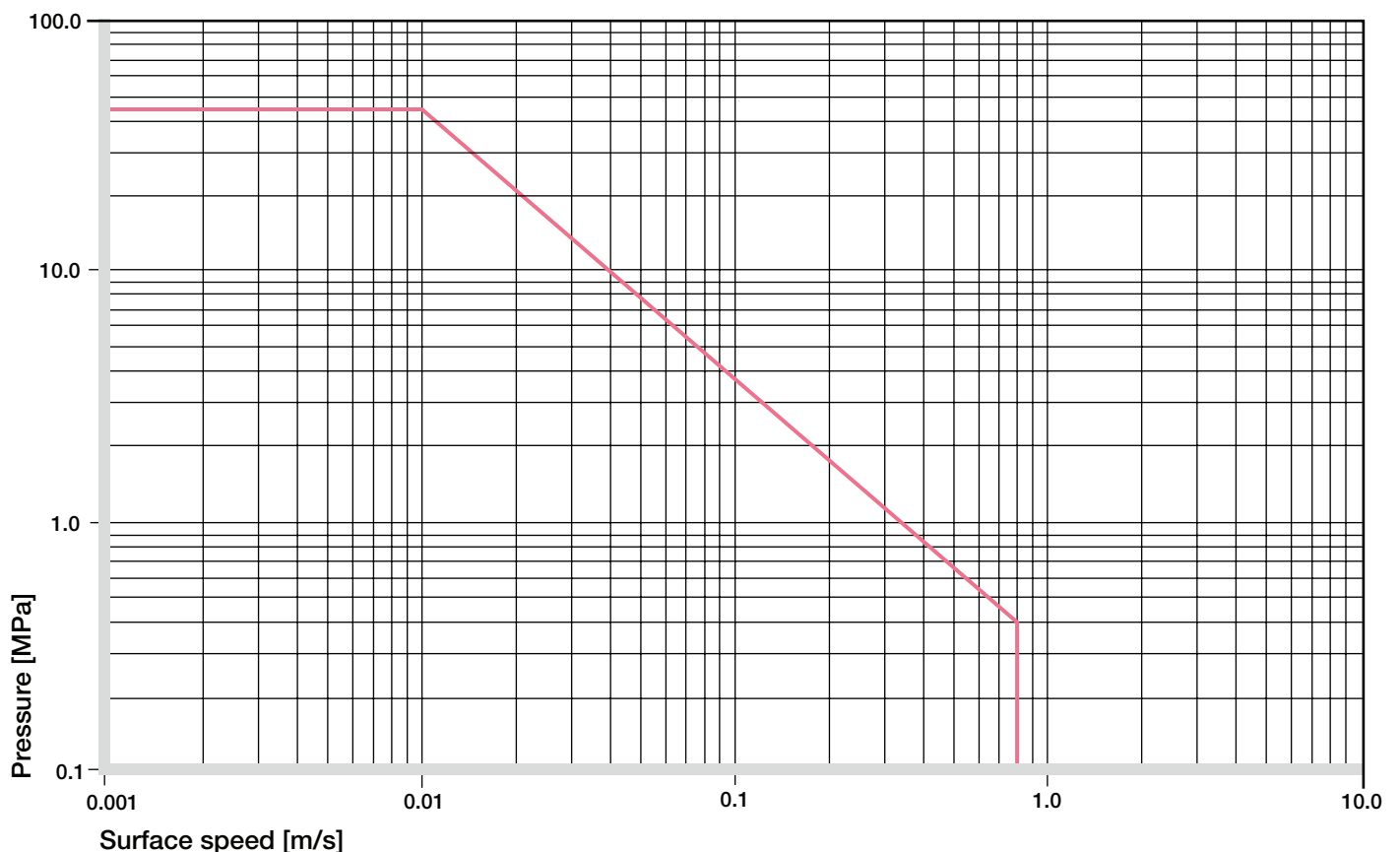
Product range

2 types
Ø 6–20 mm
more dimensions
on request

Material properties table

General properties	Unit	iglidur® F2	Testing method
Density	g/cm ³	1.52	
Colour		black	
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	0.16–0.22	
pv value, max. (dry)	MPa · m/s	0.31	
Mechanical properties			
Modulus of elasticity	MPa	7,418	DIN 53457
Tensile strength at +20 °C	MPa	93	DIN 53452
Compressive strength	MPa	61	
Max. recommended surface pressure (+20 °C)	MPa	47	
Shore D hardness		72	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+120	
Max. short term application temperature	°C	+165	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.61	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	K ⁻¹ · 10 ⁻⁵	5	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	< 10 ⁹	DIN IEC 93
Surface resistance	Ω	< 10 ⁹	DIN 53482

Table 01: Material properties table



The prevention of electrostatic charge is an important requirement in many application areas. At the same time other technical application parameters such as wear resistance, media and temperature resistance, applicability in a wet environment, etc., cannot be neglected. iglidur® F2 with its wide range of properties constitutes a new universal bearing for numerous “ESD-compatible” applications.

Mechanical Properties

With increasing temperatures, the compressive strength of iglidur® F2 plain bearings decreases. The Diagram 02 shows this relationship. At the longterm maximum temperature of +120 °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.

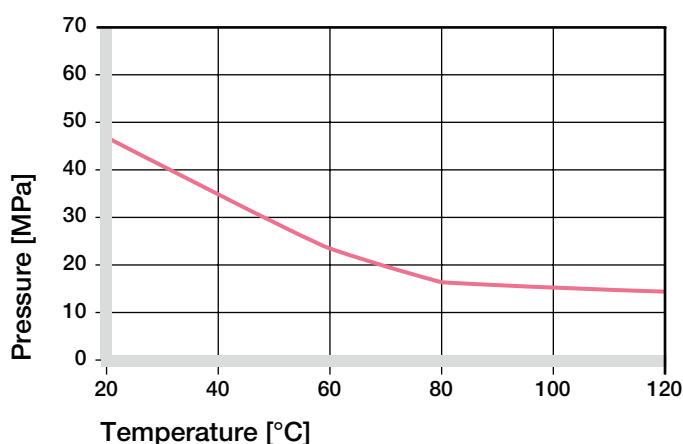


Diagram 02: Recommended maximum surface pressure as a function of temperature (47 MPa at +20 °C)

Diagram 03 shows the elastic deformation of iglidur® F2 during radial loading. At the recommended maximum surface pressure of 47 MPa the deformation is less than 2.6 %.

A plastic deformation can be ignored up to this value. It is nonetheless depending on the duration of the applied force.

► Surface Pressure, [page 63](#)

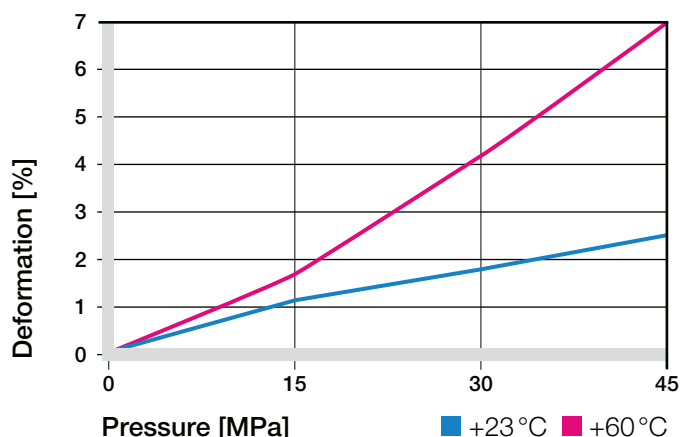


Diagram 03: Deformation under pressure and temperature

Permissible Surface Speeds

The maximum permitted surface speeds are based on the operation period and the type of motion. A bearing is the most stressed in long-term rotating motions. Here the maximum speed for the iglidur® F2 bearing is 0.8 m/s. The maximum values specified in Table 02 are not often attained in practice due to interactions.

► Surface Speed, [page 65](#)

m/s	Rotating	Oscillating	Linear
Continuous	0.8	0.7	3
Short term	1.4	1.1	5

Table 02: Maximum running speed

Temperatures

The ambient temperatures strongly influence the features of bearings. The shortterm permitted maximum temperature is +165 °C. Longterm operating temperatures should not exceed +120 °C.

With increasing temperatures, the compressive strength of iglidur® F2 bearings decreases. Diagram 02 clarifies this connection. The occurring temperatures in the bearing system strongly influence the wear of the bearings.

► Application Temperatures, [page 66](#)

iglidur® F2	Application temperature
Minimum	-40 °C
Max. long term	+120 °C
Max. short term	+165 °C
Add. securing is required from	+70 °C

Table 03: Temperature limits

Friction and Wear

Coefficient of friction and wear resistance alter with the application parameters. For iglidur® F2 bearings the coefficient of friction increases significantly with the surface speed. With increasing load, however, the friction coefficient decreases continuously, whereas the influence of the surface finish of the shaft is not very pronounced (Diagram 04–06).

► Coefficients of Friction and Surfaces, **page 68**

► Wear Resistance, **page 69**

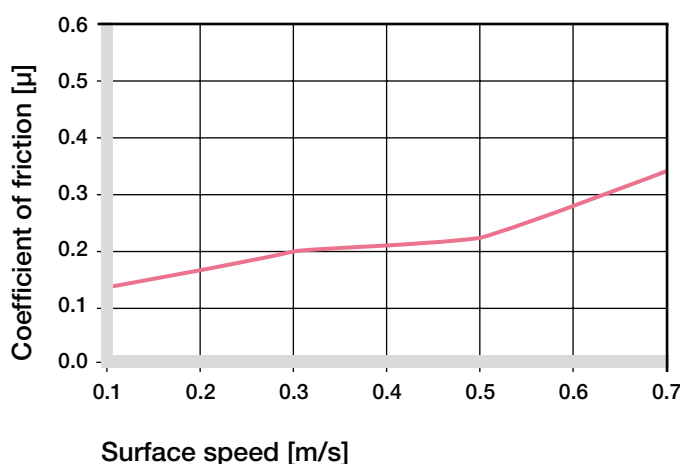


Diagram 04: Coefficient of friction as a function of the running speed, $p = 1.0 \text{ MPa}$

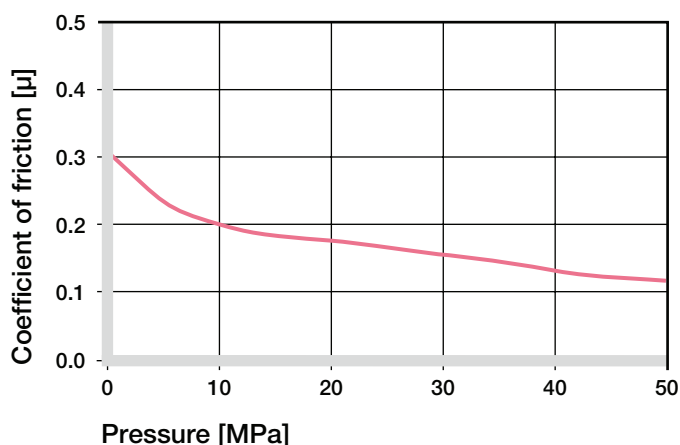


Diagram 05: Coefficient of friction as a function of the pressure, $v = 0.01 \text{ m/s}$

Shaft Materials

Diagrams 06 to 08 show results of testing different shaft materials with plain bearings made of iglidur® F2.

In the lower region of the load, cutting steel and hard anodised aluminium shafts, as well as St37 and hard-chromed steel shafts prove to be the most affordable counter partners in rotating applications with iglidur® F2 plain bearings with respect to wear.

Diagram 08 shows a significantly less wear in pivoting movements compared to rotation over the entire load range with otherwise comparable curve progression.

► Shaft Materials, **page 71**

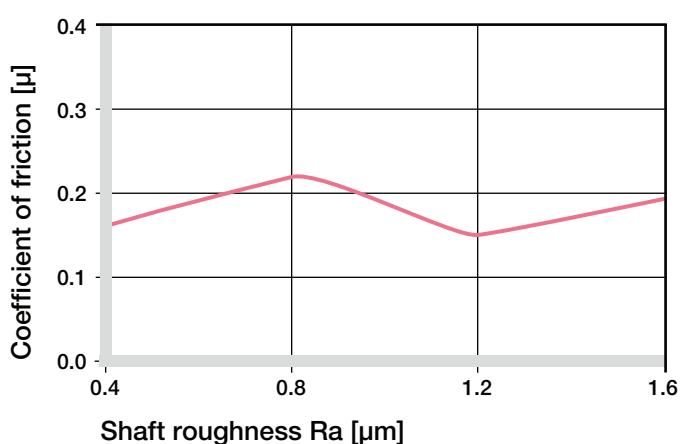


Diagram 06: Coefficient of friction as function of the shaft surface (Cf53 hardened and ground steel)

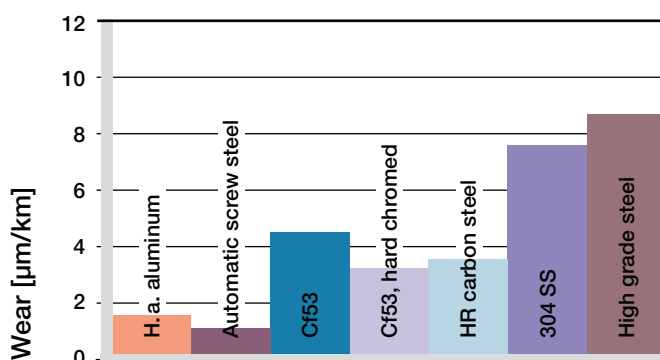


Diagram 07: Wear, rotating with different shaft materials, pressure $p = 1 \text{ MPa}$, $v = 0.3 \text{ m/s}$

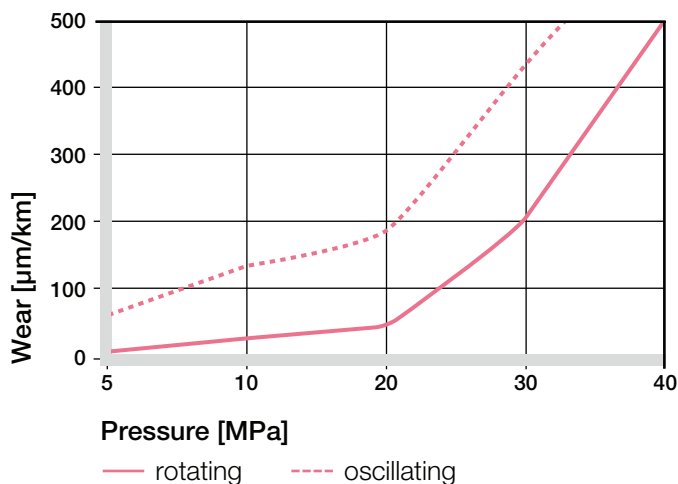


Diagram 08: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the pressure

iglidur® F2	Dry	Greases	Oil	Water
C.o.f. μ	0.16–0.22	0.1	0.05	0.03

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

Additional Properties

Chemical Resistance

iglidur® F2 plain bearings have a good resistance to chemicals. They are resistant to most lubricants.

iglidur® F2 is not attacked by most weak organic and inorganic acids.

► Chemical Table, page 1258

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

+ resistant 0 conditionally resistant – not resistant

All data given at room temperature [+20 °C]

Table 05: Chemical resistance

Radiation Resistance

Plain bearings of iglidur® F2 are radiation resistant up to a radiation intensity of $3 \cdot 10^2$ Gy.

UV Resistance

iglidur® F2 plain bearings are partially UV resistant.

Vacuum

iglidur® F2 plain bearings outgas in a vacuum. Use in a vacuum environment is only possible with dehumidified bearings.

Electrical Properties

iglidur® F2 plain bearings are electrically conductive.

Volume resistance	$< 10^9 \Omega\text{cm}$
Surface resistance	$< 10^9 \Omega$

iglidur® F2 | Technical Data

Moisture Absorption

The moisture absorption of iglidur® F2 plain bearings is approximately 0.2 % in standard atmosphere. The saturation limit in water is 0.4 %. This must be taken into account along with the other applicable conditions.

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

Table 06: Moisture absorption

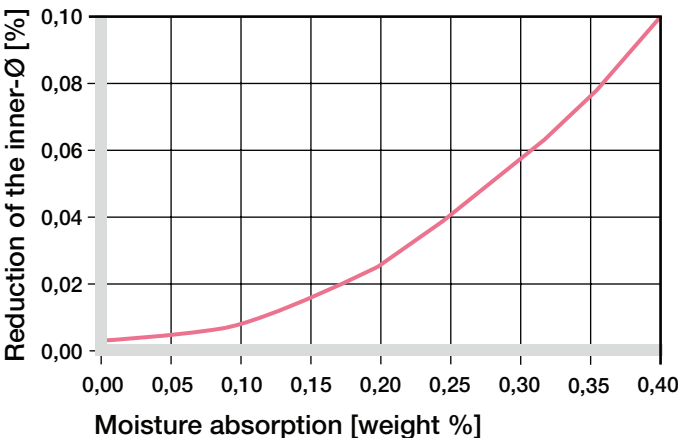


Diagram 09: Effect of moisture absorption on plain bearings

Installation Tolerances

iglidur® F2 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.

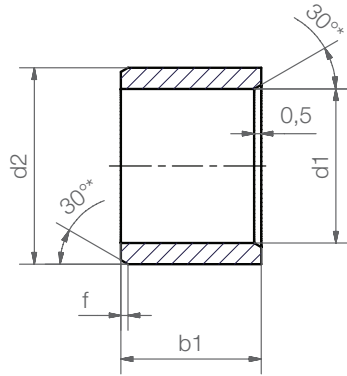
After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the E10 tolerances.

► Testing Methods, page 75

Diameter d1 [mm]	Shaft h9 [mm]	iglidur® F2 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

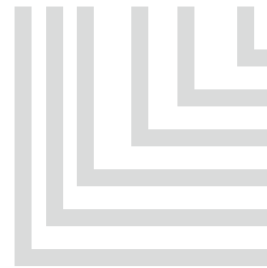
Table 07: Important tolerances for plain bearings according to ISO 3547-1 after pressfit

Sleeve bearing



Order key

F2SM-0608-06



Length b1

Outer diameter d2

Inner diameter d1

Metric

Type (Form S)

Material iglidur® F2

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
F2SM-0608-06	New!	6.0	+0.020 +0.068	8.0	6.0
F2SM-0810-10	New!	8.0	+0.025 +0.083	10.0	10.0
F2SM-1012-10	New!	10.0	+0.025 +0.083	12.0	10.0
F2SM-1214-12	New!	12.0	+0.032 +0.102	14.0	12.0
F2SM-1618-15	New!	16.0	+0.032 +0.102	18.0	15.0
F2SM-2023-20	New!	20.0	+0.040 +0.124	23.0	20.0

* after pressfit. Testing methods ► page 75

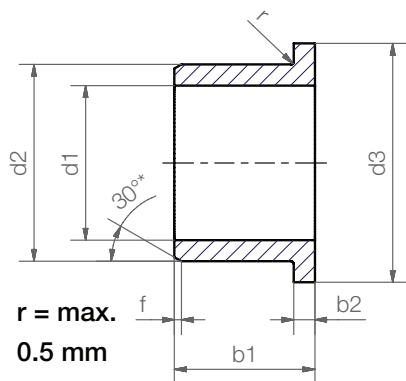


delivery from stock
time



prices price list online
www.igus.eu/eu/f2

Flange bearing



Order key

F2FM-0608-06



Length b1

Outer diameter d2

Inner diameter d1

Metric

Type (Form F)

Material iglidur® F2

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
F2FM-0608-06	New!	6.0	+0.020 +0.068	8.0	12.0	6.0	1.0
F2FM-0810-10	New!	8.0	+0.025 +0.083	10.0	15.0	10.0	1.0
F2FM-1012-10	New!	10.0	+0.025 +0.083	12.0	18.0	10.0	1.0
F2FM-1214-12	New!	12.0	+0.032 +0.102	14.0	20.0	12.0	1.0
F2FM-1618-17	New!	16.0	+0.032 +0.102	18.0	24.0	17.0	1.0
F2FM-2023-21	New!	20.0	+0.040 +0.124	23.0	30.0	21.5	1.5

* after pressfit. Testing methods ► page 75

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