



Electrically conductive Pressure-resistant igidur® F



When to use it?

- When the bearing should be electrically conductive
- For high static loads



When not to use?

- When mechanical reaming of the bore is necessary
igidur® M250
- When the highest wear resistance is required
igidur® W300
- When very low coefficient of friction in dry operation is required
igidur® J
- For underwater applications
igidur® H370
- When a universal plain bearing is required
igidur® G

Bearing technology | Plain bearing | iglidur® F



Ø
2.0 – 70.0mm



Also available as:



Bar stock, round bar
Page 657



Bar stock, plate
Page 683



tribo-tape liner
Page 691



Piston rings
Page 581



Two hole flange bearings
Page 603



Moulded special parts
Page 624



igubal® spherical balls
Page 841

Electrically conductive Pressure-resistant

Outstanding rigidity and hardness as well as high conductivity: iglidur® F plain bearings can only be used in dry operations to a limited extent, but offer their fully mechanical benefits when lubricated with oil and grease.

- Electrically conductive
- High compressive strength
- High temperature resistance
- High pv values
- High chemical resistance

Typical application areas

- Textile industry
- Automotive industry

Descriptive technical specifications

Wear resistance at +23°C	-	<div style="display: flex; width: 100px; height: 10px; background-color: #ccc;"><div style="width: 20%; background-color: #666;"></div></div>	+
Wear resistance at +90°C	-	<div style="display: flex; width: 100px; height: 10px; background-color: #ccc;"><div style="width: 20%; background-color: #666;"></div></div>	+
Wear resistance at +150°C	-	<div style="display: flex; width: 100px; height: 10px; background-color: #ccc;"><div style="width: 10%; background-color: #666;"></div></div>	+
Low coefficient of friction	-	<div style="display: flex; width: 100px; height: 10px; background-color: #ccc;"><div style="width: 20%; background-color: #666;"></div></div>	+
Low moisture absorption	-	<div style="display: flex; width: 100px; height: 10px; background-color: #ccc;"><div style="width: 10%; background-color: #666;"></div></div>	+
Wear resistance under water	-	<div style="display: flex; width: 100px; height: 10px; background-color: #ccc;"><div style="width: 20%; background-color: #666;"></div></div>	+
High media resistance	-	<div style="display: flex; width: 100px; height: 10px; background-color: #ccc;"><div style="width: 40%; background-color: #666;"></div></div>	+
Resistant to edge pressures	-	<div style="display: flex; width: 100px; height: 10px; background-color: #ccc;"><div style="width: 60%; background-color: #666;"></div></div>	+
Suitable for shock and impact loads	-	<div style="display: flex; width: 100px; height: 10px; background-color: #ccc;"><div style="width: 60%; background-color: #666;"></div></div>	+
Resistant to dirt	-	<div style="display: flex; width: 100px; height: 10px; background-color: #ccc;"><div style="width: 40%; background-color: #666;"></div></div>	+

Online product finder
www.igus.eu/iglidur-finder

Online service life calculation
www.igus.eu/iglidur-expert

Technical data

General properties		Testing method	
Density	g/cm ³	1.25	
Colour		black	
Max. moisture absorption at +23°C and 50% r.h.	% weight	1.8	DIN 53495
Max. moisture absorption	% weight	8.4	
Coefficient of friction, dynamic, against steel	μ	0.10 – 0.39	
pv value, max. (dry)	MPa · m/s	0.34	
Mechanical properties			
Flexural modulus	MPa	11,600	DIN 53457
Flexural strength at +20°C	MPa	260	DIN 53452
Compressive strength	MPa	98	
Max. recommended surface pressure (+20°C)	MPa	105	
Shore D hardness		84	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+140	
Max. application temperature short-term	°C	+180	
Min. application temperature	°C	-40	
Thermal conductivity	W/m · K	0.65	ASTM C 177
Coefficient of thermal expansion (at +23°C)	K ⁻¹ · 10 ⁻⁵	12	DIN 53752
Electrical properties ⁹⁾			
Specific contact resistance	Ωcm	< 10 ³	DIN IEC 93
Surface resistance	Ω	< 10 ²	DIN 53482

⁹⁾ The good conductivity of this material can favour the generation of corrosion on the metallic contact components.

Table 01: Material properties

When plain bearings need to be electrically conductive, especially in applications that should keep out static, iglidur® F is the right choice. Moreover, the iglidur® F plain bearings are extremely pressure-resistant. At room temperature, they could be statically loaded up to 105MPa.

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® F plain bearings is approximately 1.8% weight. The saturation limit in water is 8.4% weight. This must be taken into account for these types of applications.

Vacuum

In vacuum, any present moisture is released as vapour. Use in vacuum is only possible with dehumidified iglidur® F bearings.

Radiation resistance

Plain bearings made from iglidur® F are resistant up to a radiation intensity of 3 · 10²Gy.

Resistance to weathering

iglidur® F plain bearings have limited resistance to weathering. The material properties are affected. Discoloration occurs. Practical tests under real application conditions are recommended.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® F plain bearings decreases. Diagram 02 shows this inverse relationship. However, at the long-term maximum temperature of +140°C the permissible surface pressure is around 50MPa. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this. Diagram 03 shows the elastic deformation of iglidur® F at radial loads. At the maximum recommended surface pressure of 105MPa at room temperature the deformation is less than 3%. A plastic deformation can be negligible up to this value. However, it is also dependent on the service time.

Surface pressure, page 41



-40°C up to +140°C



105MPa



HB



Permissible surface speeds

The maximum permitted surface speeds are based on the operation period and the type of motion. A plain bearing is the most stressed in long-term rotating motions. Here the maximum speed for the iglidur® F plain bearing is 0.8m/s. The speeds stated in table 03 are limit values for the lowest bearing loads. In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

Temperature

The ambient temperatures strongly influence the properties of plain bearings. With increasing temperatures, the compressive strength of iglidur® F plain bearings decreases. The wear also increases. For temperatures over +105°C an additional securing is required.

Application temperatures, page 49

Additional securing, page 49

Friction and wear

In dry operation, the coefficient of friction of iglidur® F plain bearings is not as favourable as those of many other iglidur® materials. However iglidur® plain bearings can be lubricated without any problems, and iglidur® F bearings attain excellent results among the lubricated iglidur® bearings.

Coefficient of friction and surfaces, page 47

Wear resistance, page 50

Shaft materials

Diagrams 06 and 07 show the test results of iglidur® F plain bearings running against various shaft materials. In the lowest load range, the hard-chromed shafts prove to be the most suitable shaft in rotating applications with iglidur® F bearings.

Shaft materials, page 52

Installation tolerances

iglidur® F plain bearings are standard bearings for shafts with h tolerance (recommended minimum h9). After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the D11 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

Testing methods, page 57

Chemicals	Resistance
Alcohols	+ up to 0
Diluted acids	0 up to -
Diluted alkalines	+
Fuels	+
Greases, oils without additives	+
Hydrocarbons	+
Strong acids	-
Strong alkalines	+ up to 0

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

Table 02: Chemical resistance

Chemical table, page 1636

	Rotating	Oscillating	linear
long-term	m/s 0.8	0.6	3.0
short-term	m/s 1.5	1.1	6.0

Table 03: Maximum surface speeds

	Dry	Greases	Oil	Water
Coefficient of friction μ	0.10 – 0.39	0.09	0.04	0.04

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

\varnothing d1 [mm]	Housing		Plain bearing		Shaft	
	H7 [mm]	D11 [mm]	D11 [mm]	h9 [mm]		
0 – 3	+0.000	+0.010	+0.020	+0.080	-0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.030	+0.105	-0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.040	+0.130	-0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.050	+0.160	-0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.065	+0.195	-0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.080	+0.240	-0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.100	+0.290	-0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.120	+0.340	-0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.145	+0.395	-0.100	+0.000

Table 05: Important tolerances for plain bearings according to ISO 3547-1 after press-fit

Technical data

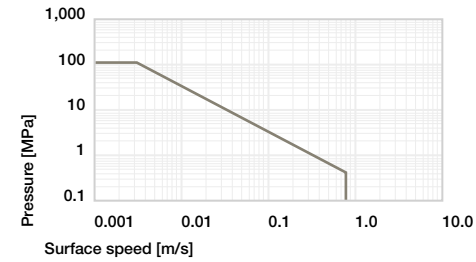


Diagram 01: Permissible pv values for iglidur® F plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

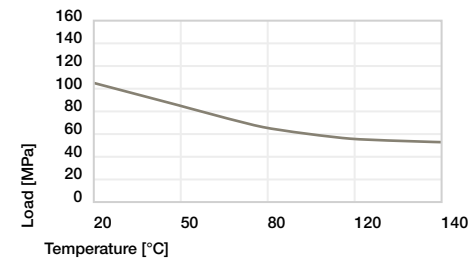


Diagram 02: Maximum recommended surface pressure as a function of temperature (105MPa at +20°C)

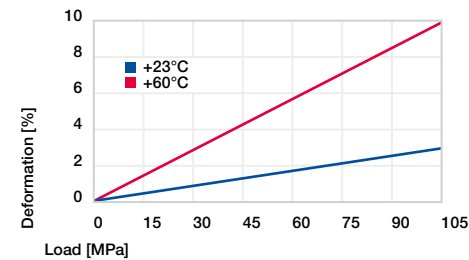


Diagram 03: Deformation under pressure and temperature

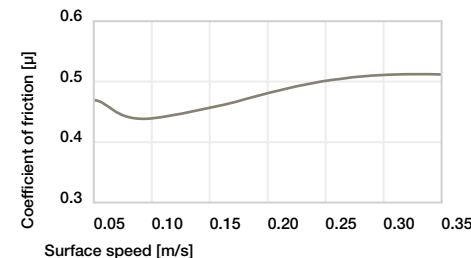


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

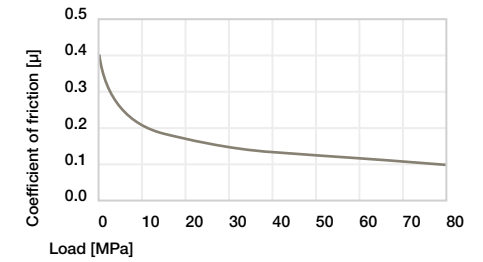


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

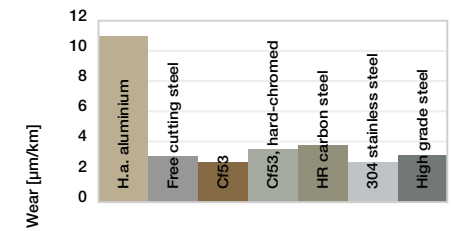


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

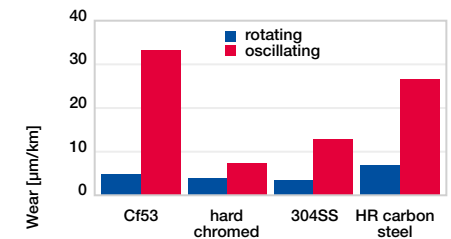
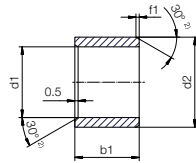


Diagram 07: Wear for rotating and oscillating applications with different shaft materials, p = 2MPa

Bearing technology | Plain bearing | iglidur® F

Sleeve bearing (form S)



²⁾ Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 1-6	Ø 6-12	Ø 12-30	Ø > 30
f1 [mm]	0.3	0.5	0.8	1.2

i Dimensions according to ISO 3547-1 and special dimensions



Order example: FSM-0203-03 – no minimum order quantity.

F iglidur® material S Sleeve bearing M Metric 02 Inner Ø d1 03 Outer Ø d2 03 Total length b1

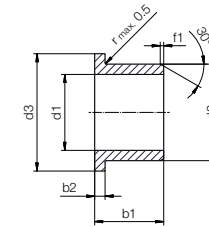
d1	d1	d2	b1	Part No.
[mm]	Tolerance ³⁾	[mm]	h13	
2.0	+0.020	3.5	3.0	FSM-0203-03
3.0	+0.080	4.5	3.0	FSM-0304-03
4.0		5.5	4.0	FSM-0405-04
5.0		7.0	5.0	FSM-0507-05
5.0	+0.030	7.0	8.0	FSM-0507-08
6.0	+0.105	8.0	6.0	FSM-0608-06
6.0		8.0	8.0	FSM-0608-08
6.0		8.0	10.0	FSM-0608-10
6.0		8.0	13.8	FSM-0608-13
7.0		9.0	10.0	FSM-0709-10
7.0		9.0	12.0	FSM-0709-12
8.0		10.0	8.0	FSM-0810-08
8.0	+0.040	10.0	10.0	FSM-0810-10
8.0	+0.130	10.0	15.0	FSM-0810-15
10.0		12.0	6.0	FSM-1012-06
10.0		12.0	9.0	FSM-1012-09
10.0		12.0	10.0	FSM-1012-10
12.0		14.0	10.0	FSM-1214-10
12.0		14.0	15.0	FSM-1214-15
13.0		15.0	20.0	FSM-1315-20
14.0	+0.050	16.0	15.0	FSM-1416-15
15.0	+0.160	17.0	15.0	FSM-1517-15
15.0		17.0	20.0	FSM-1517-20
16.0		18.0	15.0	FSM-1618-15

³⁾ After press-fit. Testing methods, page 57

d1	d1	d2	b1	Part No.
[mm]	Tolerance ³⁾	[mm]	h13	
18.0		20.0	12.0	FSM-1820-12
18.0	+0.050	20.0	15.0	FSM-1820-15
18.0	+0.160	20.0	20.0	FSM-1820-20
20.0		22.0	14.5	FSM-2022-14
20.0		22.0	20.0	FSM-2022-20
20.0		23.0	15.0	FSM-2023-15
20.0		23.0	20.0	FSM-2023-20
22.0		25.0	15.0	FSM-2225-15
25.0	+0.065	28.0	20.0	FSM-2528-20
28.0	+0.195	32.0	20.0	FSM-2832-20
28.0		32.0	30.0	FSM-2832-30
30.0		34.0	20.0	FSM-3034-20
30.0		34.0	30.0	FSM-3034-30
30.0		34.0	40.0	FSM-3034-40
32.0		36.0	30.0	FSM-3236-30
35.0		39.0	30.0	FSM-3539-30
35.0		39.0	40.0	FSM-3539-40
40.0	+0.080	44.0	30.0	FSM-4044-30
40.0	+0.240	44.0	50.0	FSM-4044-50
45.0		50.0	50.0	FSM-4550-50
50.0		55.0	40.0	FSM-5055-40
55.0	+0.100	60.0	50.0	FSM-5560-50
60.0	+0.290	65.0	60.0	FSM-6065-60

Bearing technology | Plain bearing | iglidur® F

Flange bearing (form F)



²⁾ Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 1-6	Ø 6-12	Ø 12-30	Ø > 30
f1 [mm]	0.3	0.5	0.8	1.2

i Dimensions according to ISO 3547-1 and special dimensions



Order example: FFM-0405-04 – no minimum order quantity.

F iglidur® material F Flange bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 04 Total length b1

d1	d1	d2	d3	b1	b2	Part No.
[mm]	Tolerance ³⁾	[mm]	d13 ³⁾	h13	h13	
4.0		5.5	9.5	4.0	0.75	FFM-0405-04
4.0		5.5	9.5	6.0	0.75	FFM-0405-06
5.0	+0.030	7.0	11.0	5.0	1.00	FFM-0507-05
6.0	+0.105	8.0	12.0	6.0	1.00	FFM-0608-06
6.0		8.0	12.0	8.0	1.00	FFM-0608-08
8.0		10.0	15.0	6.0	1.00	FFM-0810-06
8.0		10.0	15.0	9.0	1.00	FFM-0810-09
10.0	+0.040	12.0	18.0	6.0	1.00	FFM-1012-06
10.0	+0.130	12.0	18.0	8.0	1.00	FFM-1012-08
10.0		12.0	18.0	9.0	1.00	FFM-1012-09
10.0		12.0	18.0	15.0	1.00	FFM-1012-15
10.0		12.0	18.0	18.0	1.00	FFM-1012-18
12.0		14.0	20.0	9.0	1.00	FFM-1214-09
12.0	+0.050	14.0	20.0	12.0	1.00	FFM-1214-12
14.0	+0.160	16.0	22.0	12.0	1.00	FFM-1416-12
14.0		16.0	22.0	17.0	1.00	FFM-1416-17
15.0		17.0	23.0	12.0	1.00	FFM-1517-12

³⁾ After press-fit. Testing methods, page 57

d1	d1	d2	d3	b1	b2	Part No.
[mm]	Tolerance ³⁾	[mm]	d13 ³⁾	h13	h13	
15.0		17.0	23.0	17.0	1.00	FFM-1517-17
16.0	+0.050	18.0	24.0	17.0	1.00	FFM-1618-17
18.0	+0.160	20.0	26.0	12.0	1.00	FFM-1820-12
18.0		20.0	26.0	17.0	1.00	FFM-1820-17
20.0		23.0	30.0	21.0	1.50	FFM-2023-21
25.0	+0.065	28.0	35.0	21.0	1.50	FFM-2528-21
30.0	+0.195	34.0	42.0	26.0	2.00	FFM-3034-26
32.0		36.0	45.0	26.0	2.00	FFM-3236-26
35.0		39.0	47.0	6.0	2.00	FFM-3539-06
35.0		39.0	47.0	16.0	2.00	FFM-3539-16
35.0		39.0	47.0	26.0	2.00	FFM-3539-26
40.0	+0.080	44.0	52.0	30.0	2.00	FFM-4044-30
40.0	+0.240	44.0	52.0	40.0	2.00	FFM-4044-40
45.0		50.0	58.0	50.0	2.00	FFM-4550-50
50.0		55.0	63.0	10.0	2.00	FFM-5055-10
50.0		55.0	63.0	40.0	2.00	FFM-5055-40
60.0	+0.100	65.0	73.0	40.0	2.00	FFM-6065-40
70.0	+0.290	75.0	83.0	40.0	2.00	FFM-7075-40