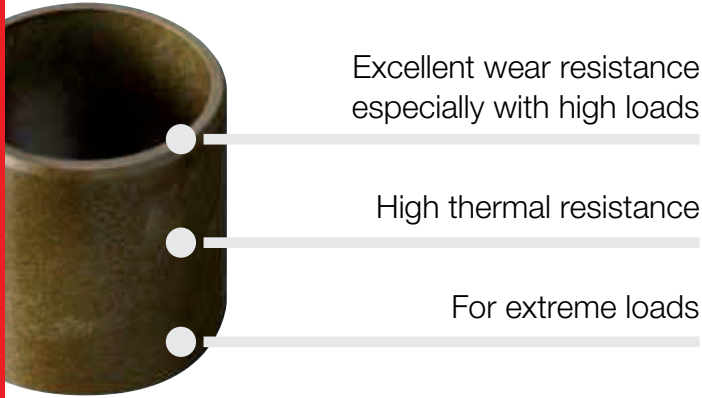


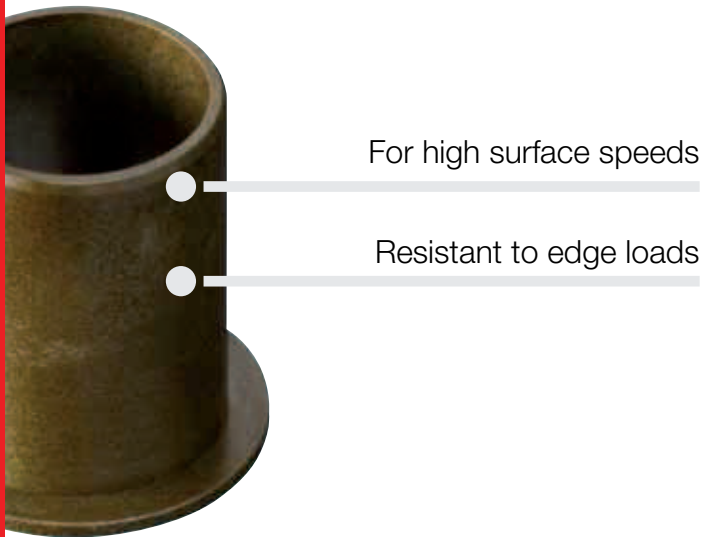
**Wear-resistant at high loads and temperatures.** Extremely high compressive strength coupled with high elasticity enables iglidur® Z bearings to attain their prominent features in association with soft shafts, edge loads and impacts. The bearings are at the same time suitable for temperatures up to +250°C.



Excellent wear resistance especially with high loads

High thermal resistance

For extreme loads

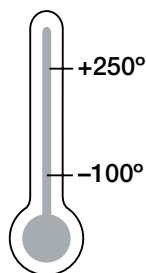


For high surface speeds

Resistant to edge loads



Temperature



### When to use it?

- For continuous temperatures up to +250°C long term or +310°C short term
- When high wear resistance is required especially under high radial loads
- For high surface speeds
- For edge loading in connection with high surface pressures



### When not to use it?

- For low loads and temperatures
  - ▶ iglidur® P, page 185
- When a cost-effective general purpose bearing is sought
  - ▶ iglidur® G, page 61
- When electrically conductive bearings are needed
  - ▶ iglidur® F, page 439
  - ▶ iglidur® H, page 325
  - ▶ iglidur® H370, page 347

### Product range

3 types  
 Ø 4–75 mm  
 more dimensions  
 on request



# iglidur® Z | Application Examples



## Typical sectors of industry and application areas

- Construction machinery
- Machine building ● Textile technology
- Aerospace engineering
- Glass industry etc.

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

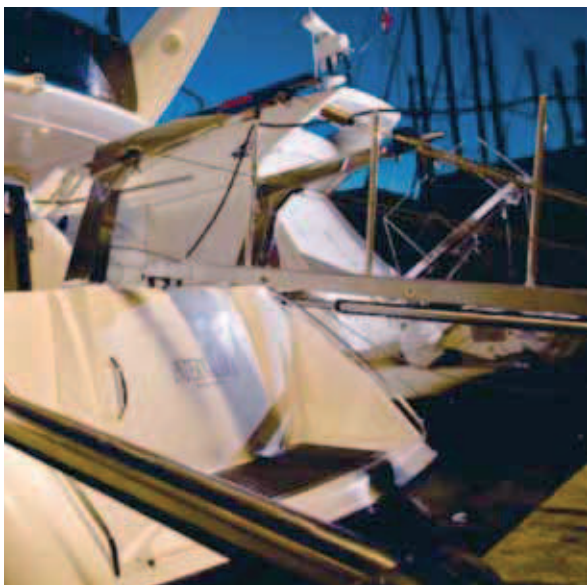
► [www.igus.eu/eu/iglidur-applications](http://www.igus.eu/eu/iglidur-applications)



► [www.igus.eu/hip-jointsystem](http://www.igus.eu/hip-jointsystem)



► [www.igus.eu/rollercoaster](http://www.igus.eu/rollercoaster)



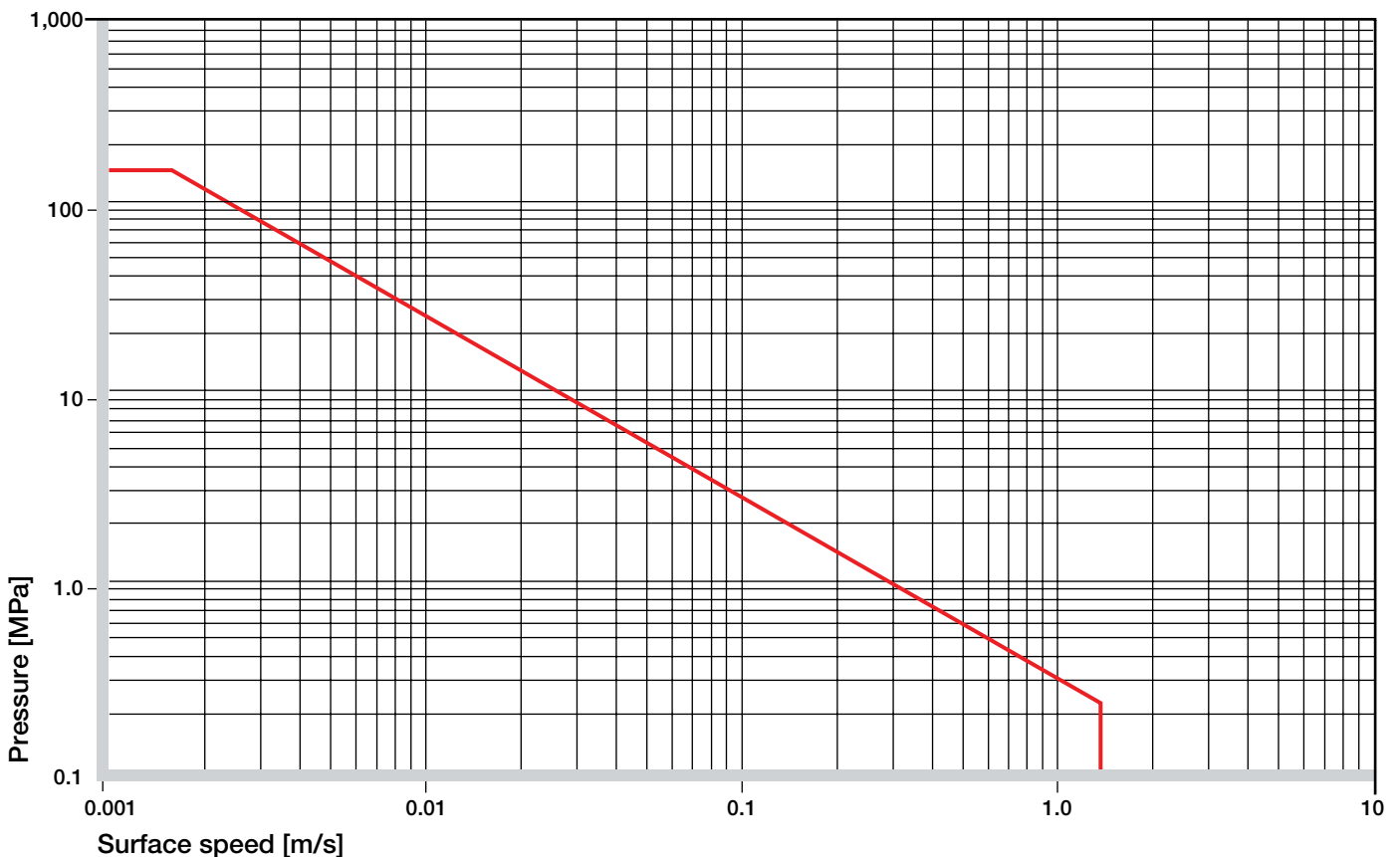
► [www.igus.eu/mooring-system](http://www.igus.eu/mooring-system)



► [www.igus.eu/railroad-platform](http://www.igus.eu/railroad-platform)

Material data			
General Properties	Unit	iglidur® Z	Testing method
Density	g/cm <sup>3</sup>	1.40	
Colour		brown	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	0.3	DIN 53495
Max. moisture absorption	% weight	1.1	
Coefficient of sliding friction, dynamic against steel	μ	0.06–0.14	
pv value, max. (dry)	MPa · m/s	0.84	
Mechanical properties			
Modulus of elasticity	MPa	2,400	DIN 53457
Tensile strength at +20 °C	MPa	95	DIN 53452
Compressive strength	MPa	65	
Max. recommended surface pressure (+20 °C)	MPa	150	
Shore D hardness		81	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+250	
Max. short term application temperature	°C	+310	
Min. application temperature	°C	-100	
Thermal conductivity	W/m · K	0.62	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	K <sup>-1</sup> · 10 <sup>-5</sup>	4	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 <sup>11</sup>	DIN IEC 93
Surface resistance	Ω	> 10 <sup>11</sup>	DIN 53482

Table 01: Material data

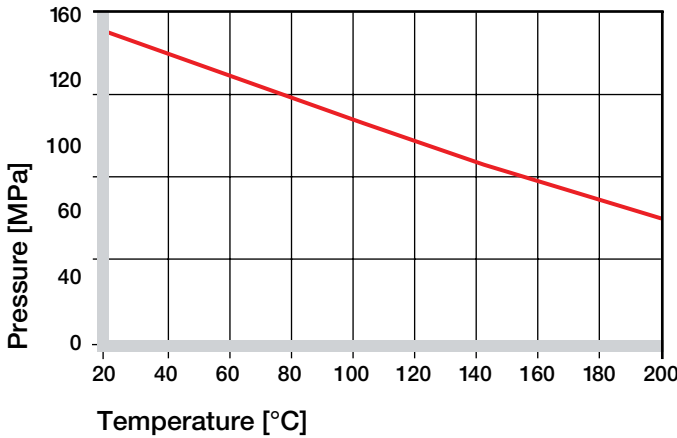


Graph 01: Permissible pv values for iglidur® Z with a wall thickness of 1 mm dry running against a steel shaft at +20 °C, mounted in a steel housing

# iglidur® Z | Technical Data

## Mechanical Properties

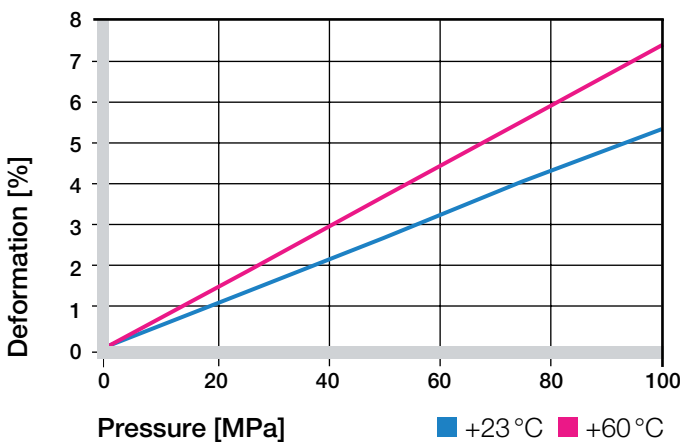
The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this. With increasing temperatures, the compressive strength of iglidur® Z plain bearings decreases. The Graph 02 shows this inverse relationship. However, at the longterm maximum temperature of +60°C the permissible surface pressure is almost 200 MPa.



**Graph 02: Recommended maximum surface pressure as a function of temperature (150 MPa at +20°C)**

iglidur® Z is suited for both average and high speeds due to its high thermal resistance. Graph 03 shows the elastic deformation of iglidur® Z during radial loading. At the recommended maximum surface pressure of 150 MPa the deformation is ca. 5.5%.

### ► Surface Pressure, page 43



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

## Permissible Surface Speeds

iglidur® Z is a high temperature bearing material, which is suited for applications with very high specific loads. 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 45

m/s	Rotating	Oscillating	Linear
Continuous	1.5	1.1	5
Short term	3.5	2.5	6

**Table 02: Maximum running speed**

## Temperatures

The maximum permissible short term temperature is +310°C. This is among the highest thermal resistance of any iglidur® material. Abb. 02 shows this relationship.

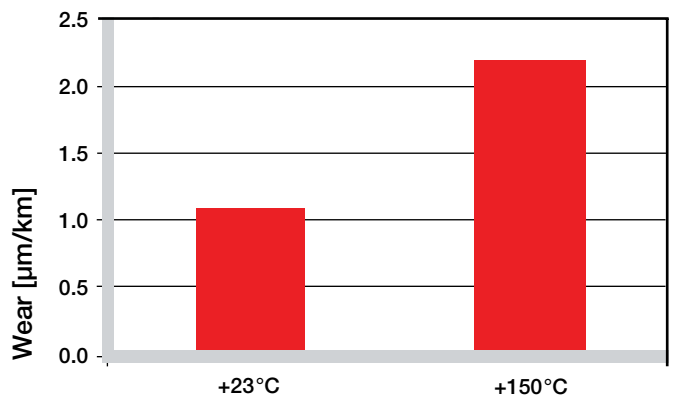
The ambient temperatures in the bearing system also have an effect on the bearing wear. With increasing temperatures, the wear rate increases.

At high temperatures iglidur® Z is also the most wear resistant material when running dry.

### ► Application Temperatures, page 46

iglidur® Z	Application temperature
Minimum	-100°C
Max. long term	+250°C
Max. short term	+310°C
Add. securing is required from	+145°C

**Table 03: Temperature limits**



**Graph 04: Wear as a function of temperature, rotation with  $p = 0.75$  MPa,  $v = 0.5$  m/s (CF53 hardened and ground steel)**



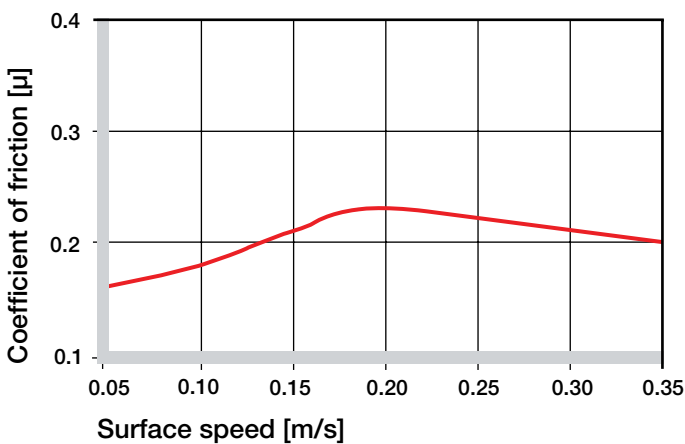
## Friction and Wear

The coefficient of friction alters only slightly like the wear resistance with increasing load.

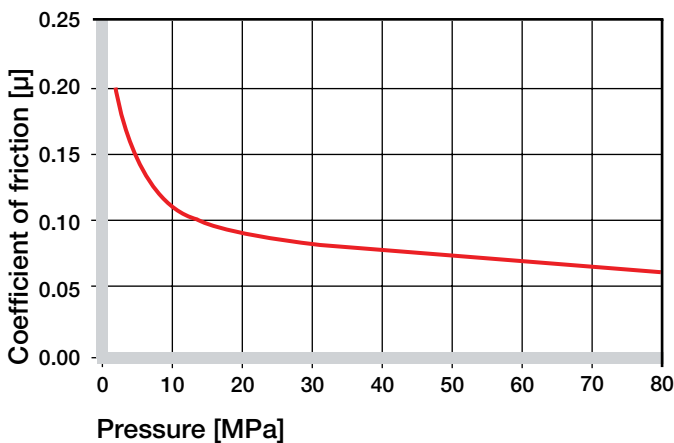
Friction and wear also depend to a high degree on the reverse partner. Very smooth shafts increase the coefficient of both friction and wear. iglidur® Z proves to be relatively insensitive with regard to the shaft surface. The best suited is a smoothed surface with an average surface finish coefficient of friction 0.4 to 0.7  $\mu\text{m}$ , if the friction should be minimized.

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

► Wear Resistance, **page 49**



Graph 05: Coefficient of friction as a function of the running speed,  $p = 0.75 \text{ MPa}$



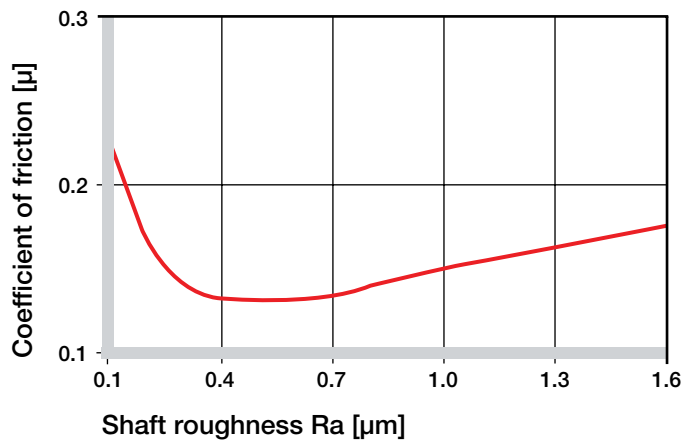
Graph 06: Coefficient of friction as a function of the pressure,  $v = 0.01 \text{ m/s}$

## Shaft Materials

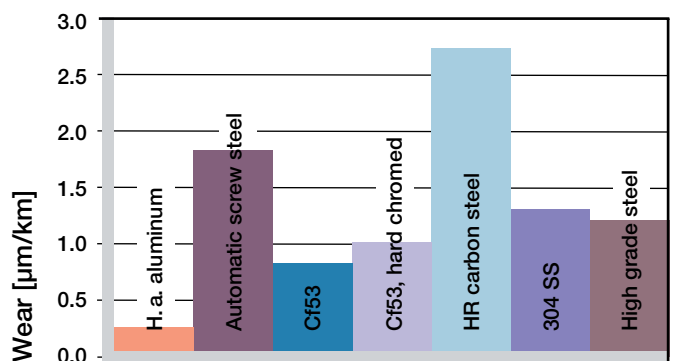
Graphs 08-11 show wear rates in the lower load range, which are very similar to those of other wear-resistant iglidur® materials. However, in the upper load range iglidur® Z outperforms all other materials in wear resistance. Provided a Cf53 hardened and ground steel shaft is used, the wear is at 45 MPa still only 15  $\mu\text{m}/\text{km}$ .

For low loads iglidur® Z plain bearings wear less in oscillating operation than in rotation. 303 Stainless Steel and hard chromed shaft are of interest here. With higher loads the behavior reverses, but even with 100 MPa, iglidur® Z attains excellent coefficients of wear.

► Shaft Materials, **page 51**

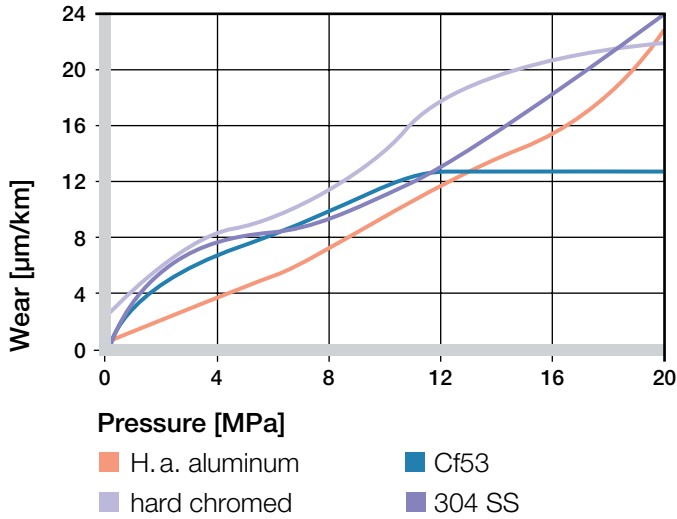


Graph 07: Coefficient of friction as function of the shaft surface (Cf53 hardened and ground steel)

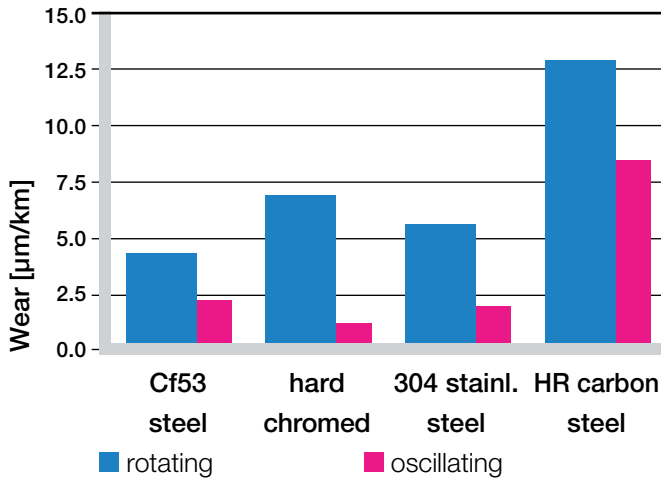


Graph 08: Wear, rotating with different shaft materials, pressure  $p = 0.75 \text{ MPa}$ ,  $v = 0.5 \text{ m/s}$

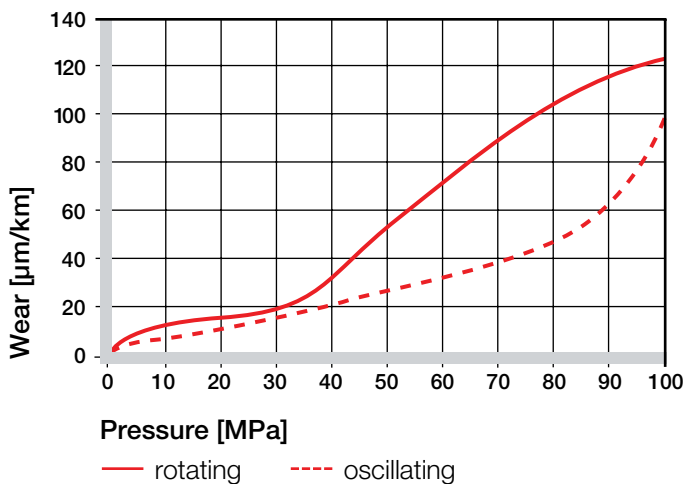
# iglidur<sup>®</sup> Z | Technical Data



Graph 09: Wear with different shaft materials in rotational operation, as a function of the pressure



Graph 10: Wear for rotating and oscillating applications with different shaft materials, p = 2 MPa



Graph 11: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the pressure

iglidur <sup>®</sup> Z	Dry	Greases	Oil	Water
C.o.f. $\mu$	0,06–0,14	0,09	0,04	0,04

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

## Additional Properties

### Chemical Resistance

iglidur<sup>®</sup> Z plain bearings have a very good resistance to chemicals. They have an excellent resistance against organic solvents, fuels, oils and greases. The material is only partially resistant against weak acids.

► Chemical Table, page 974

Medium	Resistance
Alcohol	0
Hydrocarbons	+
Greases, oils without additives	+
Fuels	+
Diluted acids	+
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 made from iglidur<sup>®</sup> Z are resistant to radiation up to an intensity of  $1 \cdot 10^5$  Gy.

### UV Resistance

UV radiation causes approximately 50% decline of the tribological properties (wear resistance) of plain bearings made from iglidur<sup>®</sup> Z.

### Vacuum

For use in a vacuum environment, moisture content is released as vapour. Therefore, only dehumidified bearings made of iglidur<sup>®</sup> Z are suitable for a vacuum environment.

### Electrical Properties

iglidur<sup>®</sup> Z plain bearings are electrically insulating.

Volume resistance	> $10^{11}$ $\Omega$ cm
Surface resistance	> $10^{11}$ $\Omega$ 10

## Moisture Absorption

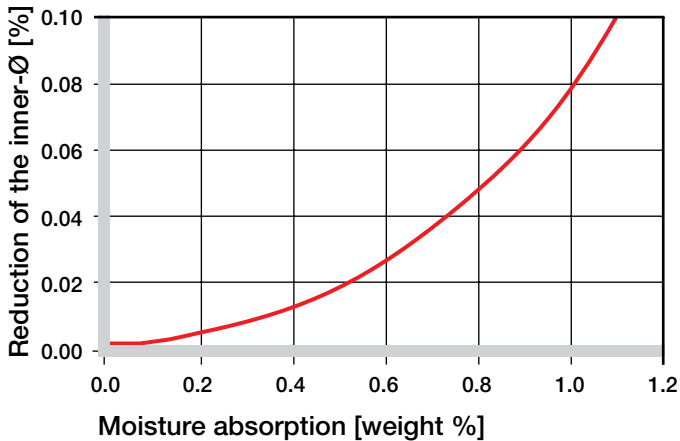
The moisture absorption of iglidur<sup>®</sup> Z plain bearings is approximately 0.3% in standard atmosphere. The saturation limit in water is 1.1%.

### Maximum moisture absorption

At +23 °C/50 % r.h. 0.3 % weight

Max. moisture absorption 1.1 % weight

Table 06: Moisture absorption



Graph 12: Effect of moisture absorption on plain bearings

## Installation Tolerances

iglidur<sup>®</sup> Z 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, the inner diameter adjusts to meet the specified tolerances.

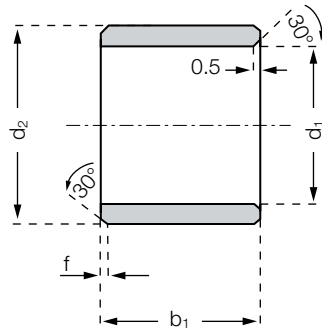
► Testing Methods, page 55

Diameter d1 [mm]	Shaft h9 [mm]	iglidur <sup>®</sup> Z 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® Z | Product Range

## Sleeve bearing



### Order key

## ZSM-0405-04



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

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
ZSM-0405-04	4.0	+0.010 +0.058	5.5	4.0
ZSM-0507-05	5.0	+0.010 +0.058	7.0	5.0
ZSM-0608-08	6.0	+0.010 +0.058	8.0	8.0
ZSM-0608-12	6.0	+0.010 +0.058	8.0	12.0
ZSM-0810-08	8.0	+0.013 +0.071	10.0	8.0
ZSM-0810-10	8.0	+0.013 +0.071	10.0	10.0
ZSM-1012-08	10.0	+0.013 +0.071	12.0	8.0
ZSM-1012-10	10.0	+0.013 +0.071	12.0	10.0
ZSM-1012-12	10.0	+0.013 +0.071	12.0	12.0
ZSM-1214-15	12.0	+0.016 +0.086	14.0	15.0
ZSM-1517-15	15.0	+0.016 +0.086	17.0	15.0
ZSM-1618-12	16.0	+0.016 +0.086	18.0	12.0
ZSM-1618-15	16.0	+0.016 +0.086	18.0	15.0
ZSM-1820-20	18.0	+0.016 +0.086	20.0	20.0
ZSM-2023-15	20.0	+0.020 +0.104	23.0	15.0

Part number	d1	d1-Tolerance*	d2	b1 h13
ZSM-2023-20	20.0	+0.020 +0.104	23.0	20.0
ZSM-2023-30	20.0	+0.020 +0.104	23.0	30.0
ZSM-2023-35	20.0	+0.020 +0.104	23.0	35.0
ZSM-2225-20	22.0	+0.020 +0.104	25.0	20.0
ZSM-2528-20	25.0	+0.020 +0.104	28.0	20.0
ZSM-2528-30	25.0	+0.020 +0.104	28.0	30.0
ZSM-2528-48	25.0	+0.020 +0.104	28.0	48.0
ZSM-3034-30	30.0	+0.020 +0.104	34.0	30.0
ZSM-3034-40	30.0	+0.020 +0.104	34.0	40.0
ZSM-3539-20	35.0	+0.025 +0.125	39.0	20.0
ZSM-4044-40	40.0	+0.025 +0.125	44.0	40.0
ZSM-4044-47	40.0	+0.020 +0.104	44.0	47.0
ZSM-5055-60	50.0	+0.025 +0.125	55.0	60.0
ZSM-6065-60	60.0	+0.030 +0.150	65.0	60.0



delivery available  
time from stock



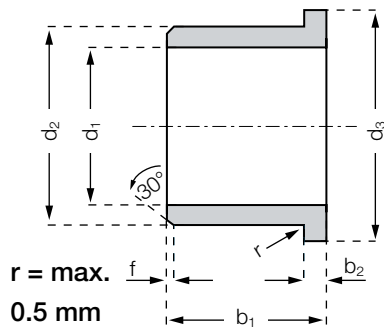
prices price list online  
www.igus.eu/eu/z



order part number  
example ZSM-0405-04



## Flange bearing



### Order key

**ZFM-0405-04**



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

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
ZFM-0405-04	4.0	+0.010 +0.058	5.5	9.5	4.0	0.75
ZFM-0507-05	5.0	+0.010 +0.058	7.0	11.0	5.0	1.0
ZFM-0608-08	6.0	+0.010 +0.058	8.0	12.0	8.0	1.0
ZFM-0810-055	8.0	+0.013 +0.071	10.0	15.0	5.5	1.0
ZFM-0810-09	8.0	+0.013 +0.071	10.0	15.0	9.0	1.0
ZFM-1012-05	10.0	+0.013 +0.071	12.0	18.0	5.0	1.0
ZFM-1012-09	10.0	+0.013 +0.071	12.0	18.0	9.0	1.0
ZFM-1214-09	12.0	+0.016 +0.086	14.0	20.0	9.0	1.0
ZFM-1214-12	12.0	+0.016 +0.086	14.0	20.0	12.0	1.0
ZFM-1214-20	12.0	+0.016 +0.086	14.0	20.0	20.0	1.0
ZFM-1416-17	14.0	+0.016 +0.086	16.0	22.0	17.0	1.0
ZFM-1517-11	15.0	+0.016 +0.086	17.0	23.0	11.0	1.0
ZFM-1517-15	15.0	+0.016 +0.086	17.0	23.0	15.0	1.0
ZFM-1820-04	18.0	+0.016 +0.086	20.0	26.0	4.0	1.0
ZFM-1820-17	18.0	+0.016 +0.086	20.0	26.0	17.0	1.0
ZFM-2022-21	20.0	+0.020 +0.104	22.0	30.0	21.0	1.0
ZFM-2023-11	20.0	+0.020 +0.104	23.0	30.0	11.5	1.5
ZFM-2023-21	20.0	+0.020 +0.104	23.0	30.0	21.5	1.5
ZFM-2023-31	20.0	+0.020 +0.104	23.0	30.0	31.5	1.5
ZFM-2528-16	25.0	+0.020 +0.104	28.0	35.0	16.5	1.5
ZFM-2528-21	25.0	+0.020 +0.104	28.0	35.0	21.5	1.5
ZFM-2528-31	25.0	+0.020 +0.104	28.0	35.0	31.5	1.5
ZFM-3034-20	30.0	+0.020 +0.104	34.0	42.0	20.0	2.0
ZFM-3034-26	30.0	+0.020 +0.104	34.0	42.0	26.0	2.0
ZFM-3034-37	30.0	+0.020 +0.104	34.0	42.0	37.0	2.0

\* after pressfit. Testing methods ► page 55



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



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



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



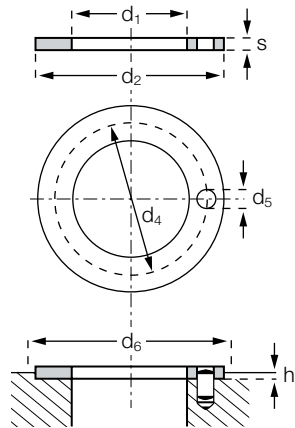
Flange bearing

## Dimensions [mm]

Part number	d1	d1-Tolerance*	d2	d3 d13	b1 h13	b2 -0.14
ZFM-3539-26	35.0	+0.025 +0.125	39.0	47.0	26.0	2.0
ZFM-4044-20	40.0	+0.025 +0.125	44.0	52.0	20.0	2.0
ZFM-4044-40	40.0	+0.025 +0.125	44.0	52.0	40.0	2.0
ZFM-5055-50	50.0	+0.025 +0.125	55.0	63.0	50.0	2.0
ZFM-6065-50	60.0	+0.030 +0.150	65.0	73.0	50.0	2.5
ZFM-7580-50	75.0	+0.030 +0.150	80.0	88.0	50.0	2.5

\* after pressfit. Testing methods ► page 55

## Thrust washer



### Order key

## ZTM-1527-015



- Thickness s
- Outer diameter d2
- Inner diameter d1
- Metric
- Type (Form T)
- Material iglidur® Z

Dimensions according to ISO 3547-1 and special dimensions

### Dimensions [mm]

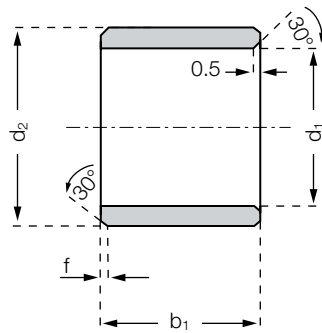
Part number	d1 ±0.25	d2 -0.25	s -0.05	d4 -0.12 +0.12	d5 +0.375 +0.125	h +0.2 -0.2	d6 +0.12
ZTM-1527-015	15.0	27.0	1.5	-	-	1.0	27.0
ZTM-1623-015	16.0	23.0	1.5	-	-	1.0	23.0
ZTM-2644-015	26.0	44.0	1.5	35.0	3.0	1.0	44.0
ZTM-3254-015	32.0	54.0	1.5	43.0	4.0	1.0	54.0
ZTM-4874-020	48.0	74.0	2.0	61.0	4.0	1.5	74.0
ZTM-6290-020	62.0	90.0	2.0	-	-	1.5	90.0

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

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

 **order** part number  
**example** ZTM-1527-015

## Sleeve bearings



### Order key

**ZSI-0203-03**



Length b1  
Outer diameter d2  
Inner diameter d1  
Inch  
Type (Form S)  
Material iglidur® Z

### Chamfer in relation to the d1

d1 [Inch]:	Ø 0.040–0.236	Ø 0.236–0.472	Ø 0.472–1.18	Ø > 1.18
f [Inch]:	0.012	0.019	0.031	0.047

### Dimensions [Inch]

Part number	d1	d2	b1	d1*		Housing bore		Shaft size	
				max.	min.	max.	min.	max.	min.
ZSI-0203-03	1/8	3/16	3/16	.1269	.1251	.1878	.1873	.1243	.1236
ZSI-0506-06	5/16	3/8	3/8	.3148	.3125	.3753	.3747	.3115	.3106
ZSI-0607-04	3/8	15/32	1/4	.3768	.3745	.4691	.4684	.3740	.3731
ZSI-0607-06	3/8	15/32	3/8	.3768	.3745	.4691	.4684	.3740	.3731
ZSI-0607-08	3/8	15/32	1/2	.3768	.3745	.4691	.4684	.3740	.3731
ZSI-0708-08	7/16	17/32	1/2	.4399	.4371	.5316	.5309	.4365	.4355
ZSI-0809-12	1/2	19/32	3/4	.5024	.4996	.5941	.5934	.4990	.4980
ZSI-0810-12	1/2	5/8	3/4	.5034	.5006	.6260	.6250	.5000	.4990
ZSI-1011-12	5/8	23/32	3/4	.6274	.6246	.7192	.7184	.6240	.6230
ZSI-1214-12	3/4	7/8	3/4	.7532	.7499	.8755	.8747	.7491	.7479
ZSI-1214-16	3/4	7/8	1	.7532	.7499	.8755	.8747	.7491	.7479
ZSI-1416-16	7/8	1	1	.8782	.8749	1.0005	.9997	.8741	.8729
ZSI-1618-16	1	1 1/8	1	1.0032	.9999	1.1255	1.1247	.9991	.9979
ZSI-1618-24	1	1 1/8	1 1/2	1.0032	.9999	1.1255	1.1247	.9991	.9979
ZSI-1820-24	1 1/8	1 9/32	1 1/2	1.1279	1.1246	1.2818	1.2808	1.1238	1.1226
ZSI-2022-20	1 1/4	1 13/32	1 1/4	1.2537	1.2498	1.4068	1.4058	1.2488	1.2472
ZSI-2426-24	1 1/2	1 21/32	1 1/2	1.5037	1.4998	1.6568	1.6558	1.4988	1.4972
ZSI-2831-32	1 3/4	1 15/16	2	1.7536	1.7497	1.9381	1.9371	1.7487	1.7471

\* after pressfit. Testing methods ► page 55



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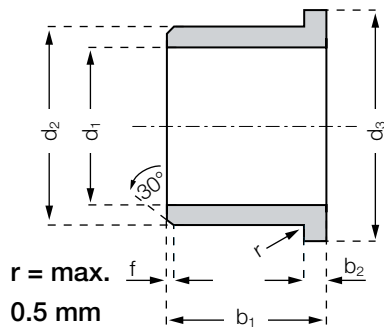


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order part number  
example ZSI-0203-03

## Flange bearing



### Order key

**ZSI-3235-16**



- Length b1
- Outer diameter d2
- Inner diameter d1
- Inch
- Type (Form F)
- Material iglidur® Z

### Chamfer in relation to the d1

d1 [Inch]:	Ø 0.040–0.236	Ø 0.236–0.472	Ø 0.472–1.18	Ø > 1.18
f [Inch]:	0.012	0.019	0.031	0.047

### Dimensions [Inch]

Part number	d1	d2	b1	d1*		Housing bore		Shaft size	
				max.	min.	max.	min.	max.	min.
ZSI-3235-16	2	23/16	1	2.0040	1.9993	2.1883	2.1871	1.9981	1.9969
ZSI-3235-32	2	23/16	2	2.0040	1.9993	2.1883	2.1871	1.9981	1.9969
ZSI-3639-32	2 1/4	27/16	2	2.2556	2.2519	2.4377	2.4365	2.2507	2.2489

\* after pressfit. Testing methods ► page 55

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**order** part number example ZSI-3235-16