

FDA-compliant general purpose material –
iglidur® A180
► From page 325

The food grade material, compliant with FDA specifications and EC Directive 10/2011 EC – **iglidur® A181**
► From page 333

FDA-compliant, for low speeds –
iglidur® A200
► From page 341

Temperature and wear-resistant, FDA-compliant –
iglidur® A350
► From page 351

Temperature and chemical resistance, FDA-compliant –
iglidur® A500
► From page 359

Chemicals & food, compliant with EC Directive 10/2011 EC –
iglidur® A160
► From page 367

Robust –
iglidur® A290
► From page 375

KTW-compliant –
iglidur® UW160
► From page 383

For the tobacco industry, FDA-compliant –
iglidur® T220
► From page 391


Contact with food

The iglidur® is at home where it should not be lubricated and the highest hygiene is required. Where is this more true than in food handling and processing?


This group comprises FDA-compliant materials for the most varied operating conditions in terms of moisture and temperature, including iglidur® T220, a material suitable even for the tobacco industry.


- Lubrication and maintenance free
- Low weight
- Good price/performance ratio
- Predictable service life

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

 max. +250 °C
min. -100 °C

 **9 materials**
Ø 1–50 mm 

 **Inch dimensions available**
► From page 1183

 **Available from stock**
Detailed information about delivery time online.

Contact with food



iglidur® bearings proved ideal, as they are cost effective and need no lubrication.



Lubrication free polymer plain bearings ensure malfunction-free operation. They are compatible with stainless steel as the friction partner.



The complete freedom from maintenance in areas of extreme dirt accumulation distinguishes the iglidur® plain bearings.



FDA-compliant iglidur® A500 bearings are the best for use in hot frying oil up to 220 °C.

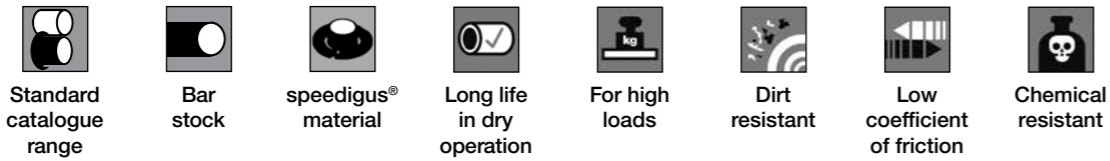


With this application, salami is cut into slices. As with all applications in contact with food, here too lubrication cannot be used.

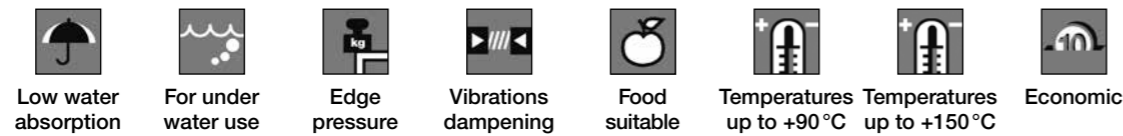


The components in this brewery machine must satisfy various requirements, such as temperature resistance.

Contact with food

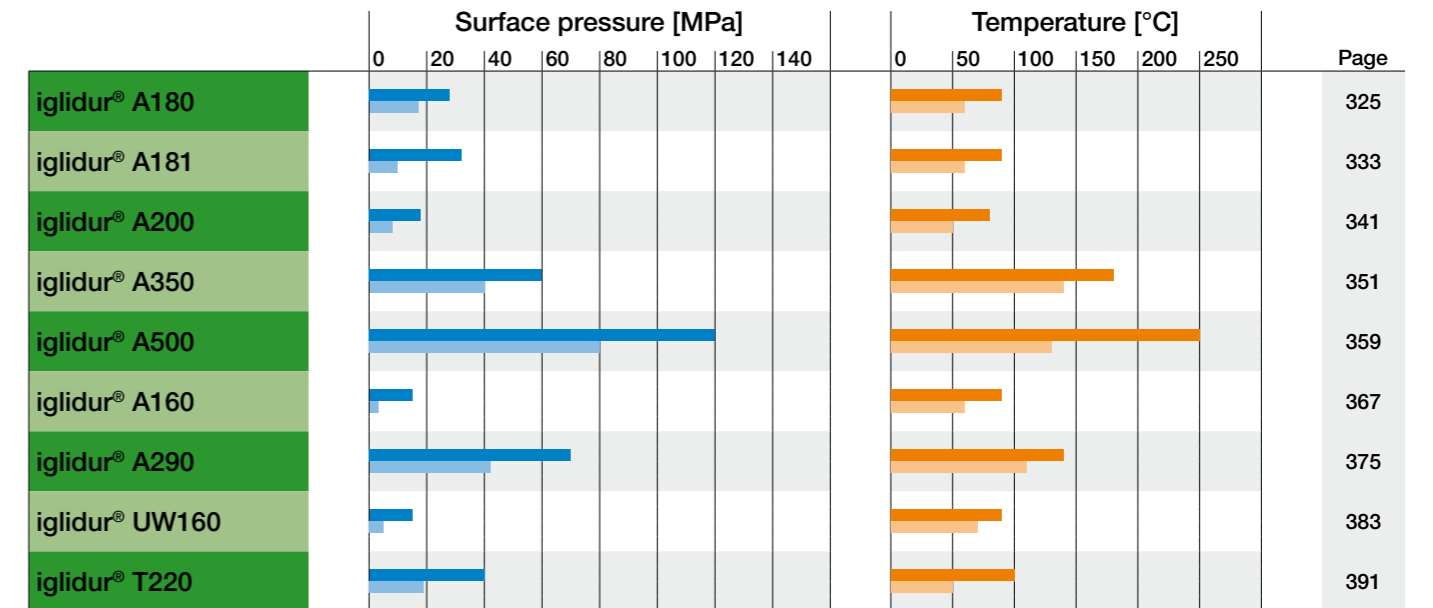


	Standard catalogue range	Bar stock	speedigus® material	Long life in dry operation	For high loads	Dirt resistant	Low coefficient of friction	Chemical resistant
iglidur® A180	●	●	●	●			●	
iglidur® A181	●	●		●			●	
iglidur® A200	●					●		
iglidur® A350	●	●		●			●	●
iglidur® A500	●				●			●
iglidur® A160	●	●						●
iglidur® A290	●				●			
iglidur® UW160	●	●						●
iglidur® T220		●						



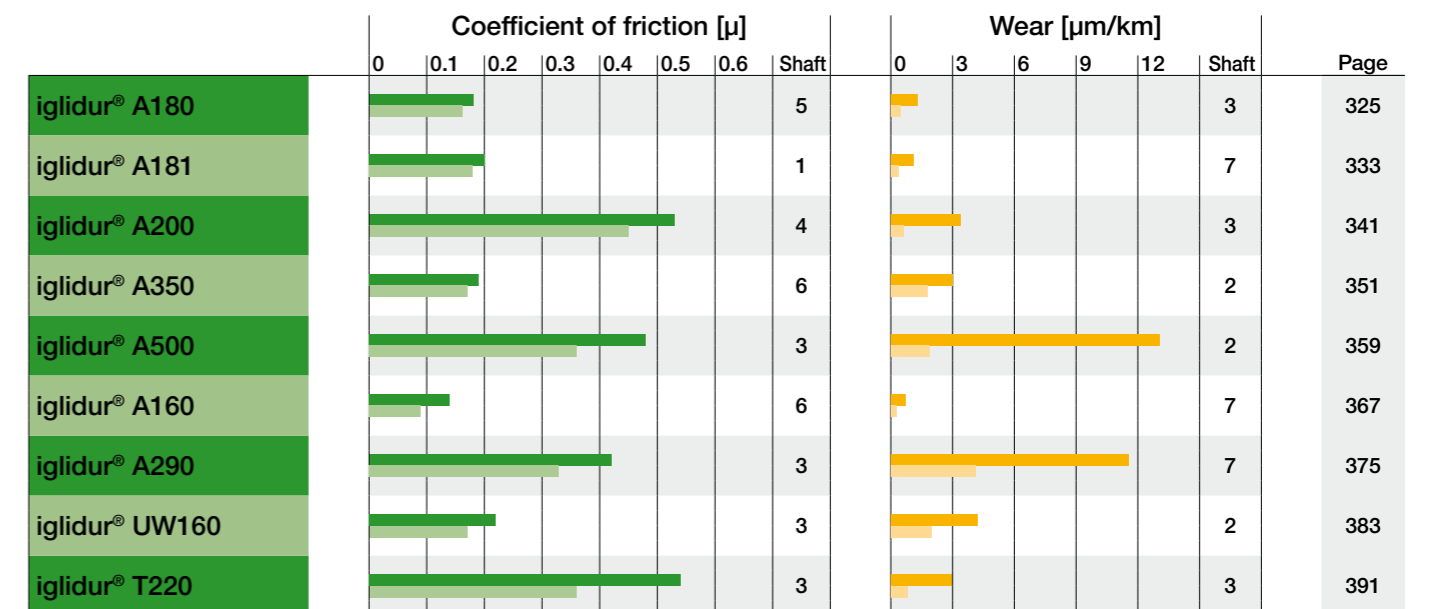
	Low water absorption	For under water use	Edge pressure	Vibrations dampening	Food suitable	Temperatures up to +90°C	Temperatures up to +150°C	Economic
iglidur® A180	●		●		●	●		●
iglidur® A181	●		●		●	●		●
iglidur® A200			●	●	●			
iglidur® A350	●	●	●		●	●	●	
iglidur® A500	●	●	●		●	●	●	
iglidur® A160	●				●	●		
iglidur® A290						●		
iglidur® UW160	●	●				●		●
iglidur® T220					●	●		

Contact with food



Maximum permissible surface pressure of iglidur® bearings at
 ● +20°C
 ● +80°C

Important temperature limits of iglidur® bearings
 ● Maximum permissible application temperature, continuous
 ● Temperature where bearings need to be secured against radial or axial movement in the housing

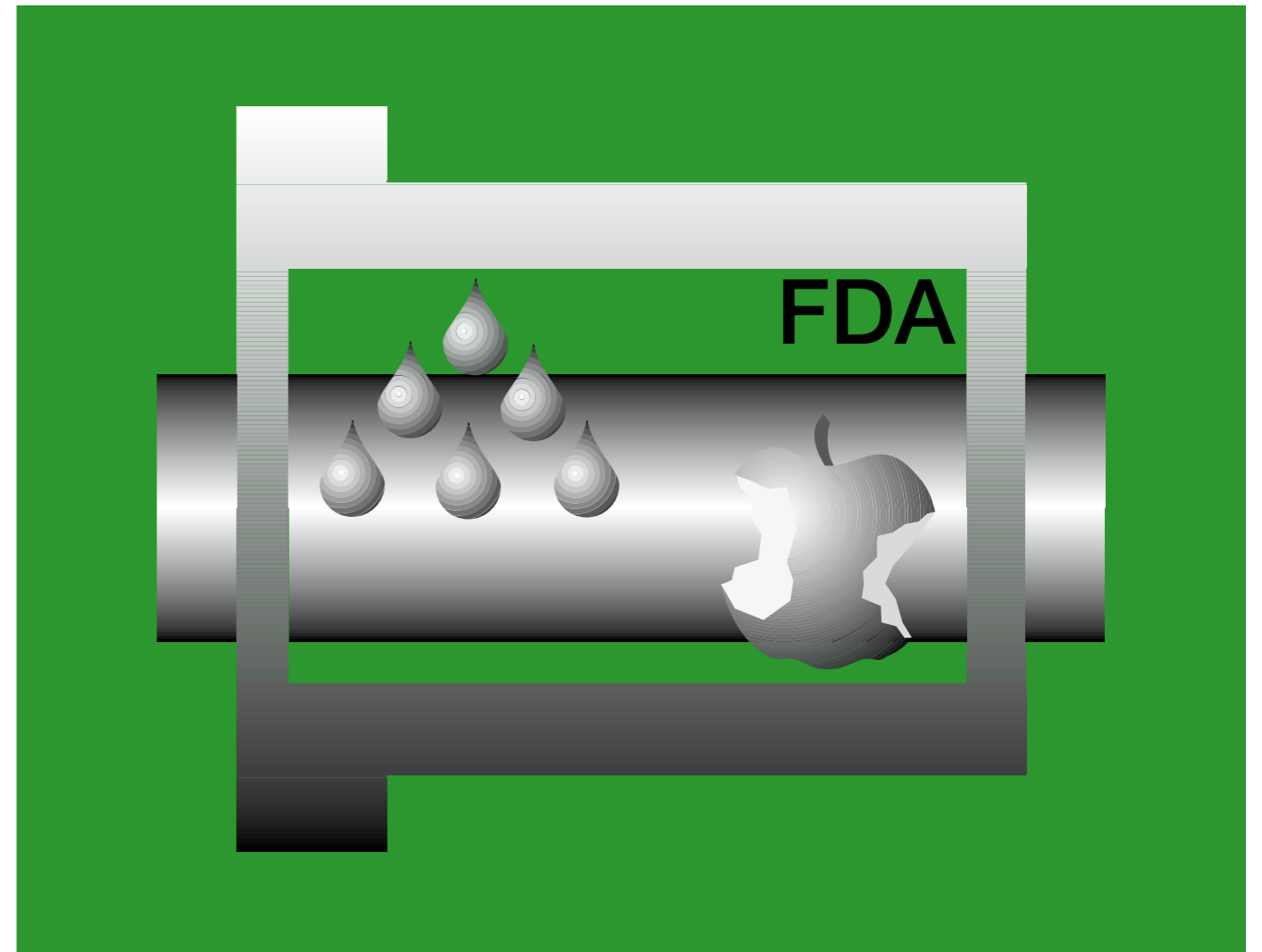


Coefficients of friction of iglidur® bearings against steel rotating, p = 1 MPa, v = 0.3 m/s
 ● Average of all the seven sliding combinations tested
 ● Coefficient of friction of best combination

Wear of iglidur® bearings against steel rotating, p = 1 MPa
 ● Average of all the seven sliding combinations tested
 ● Wear of best combination

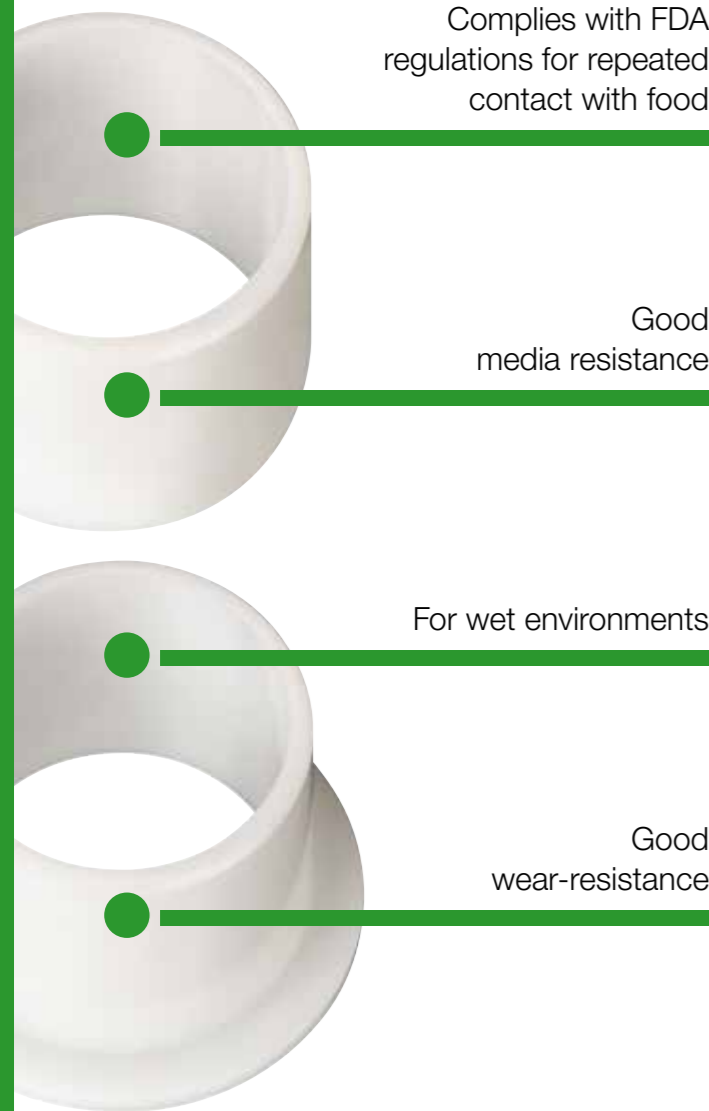
Shaft material:

1 = Cf53	3 = Alu. hc	5 = St37	7 = X90
2 = Cf53, hard chromed	4 = Free-cutting steel	6 = V2A	



FDA-compliant general purpose material – iglidur® A180

- The iglidur® T180 material complies with food and drug administration (FDA) regulations for repeated contact with food
- Good media resistance
- For wet environments
- Good wear-resistance
- Lubrication and maintenance free
- Standard range from stock



Complies with FDA regulations for repeated contact with food

Good media resistance

For wet environments

Good wear-resistance

FDA compliant material for applications with low to medium loads in immediate environs of (or contact with) food or drugs, as well as humidity.



When to use it?

- If the bearings have direct contact with food
- When FDA compliance is required
- If low noise level is required
- If low moisture absorption is requested



When not to use it?

- When the maximum abrasion resistance is necessary
 - ▶ iglidur® J, page 99
- When temperatures are continuously higher than +80 °C
 - ▶ iglidur® A350, page 351
 - ▶ iglidur® A500, page 359
- When a cost-effective universal bearing is required
 - ▶ iglidur® G, page 83
 - ▶ iglidur® P, page 149



iglidur® A180 material complies with the requirements of the FDA (Food and Drug Administration) specifications for repeated contact with food.



Available from stock

Detailed information about delivery time online.



max. +90 °C
min. -50 °C



Block pricing online

No minimum order value. From batch size 1



Ø 6–30 mm
more dimensions on request



Typical application areas

- Food industry
- Beverage technology
- Medical, etc.

Material properties table

General properties	Unit	iglidur® A180	Testing method
Density	g/cm ³	1.46	
Colour		white	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	0.2	DIN 53495
Max. water absorption	% weight	1.3	
Coefficient of sliding friction, dynamic against steel	μ	0.05–0.23	
pv value, max. (dry)	MPa · m/s	0.31	
Mechanical properties			
Modulus of elasticity	MPa	2,300	DIN 53457
Tensile strength at +20 °C	MPa	88	DIN 53452
Compressive strength	MPa	78	
Max. recommended surface pressure (+20 °C)	MPa	28	
Shore-D hardness		76	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+90	
Max. short term application temperature	°C	+110	
Min. application temperature	°C	-50	
Thermal conductivity	W/m · K	0.25	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	K ⁻¹ · 10 ⁻⁵	11	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

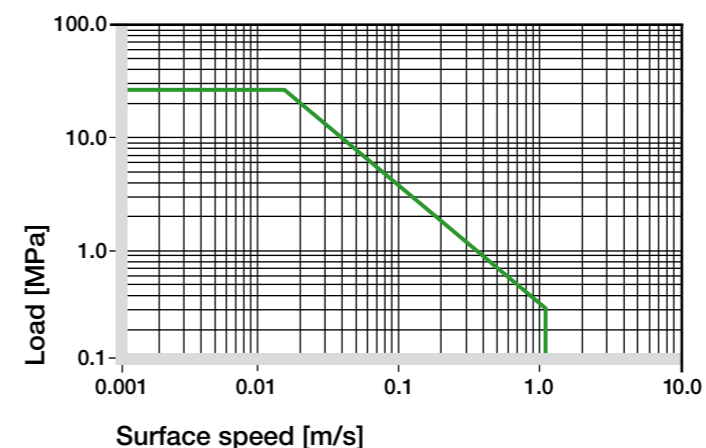


Diagram 01: Permissible pv values for iglidur® A180 bearings with a wall thickness of 1 mm dry running against a steel shaft, at +20 °C, mounted in a steel housing

Moisture absorption

The moisture absorption of iglidur® A180 plain bearings is approximately 0.2 % in ambient conditions. The saturation limit submerged in water is 5 %. This must be taken into account for these types of applications.

▶ Diagram, www.igus.eu/a180-moisture

Vacuum

When used in vacuum, the iglidur® A180 plain bearings release moisture as a vapour. Only dehumidified bearings are suitable in vacuum.

Radiation resistance

Plain bearings made from iglidur® A180 are resistant to radiation up to an intensity of 3 · 10² Gy.

UV resistance

iglidur® A180 bearings are resistant to UV radiation, but the tribological properties deteriorate with continuous exposure.

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

+ resistant 0 conditionally resistant – not resistant

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

Table 02: Chemical resistance

▶ Chemical table, page 1226

Bearings made from iglidur® A180 are suitable for application in direct contact with foodstuffs. Hence they are the ideal solution for bearing positions on machines for the food and packaging industries, the medical equipment manufacturing, for small equipment for households, etc. The iglidur® A180 distinguishes itself also in wet cleaning or where process-dependent contact with wet media is the business of the day by its extremely low humidity absorption.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® A180 plain bearings decreases. The diagram 02 shows this inverse relationship. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

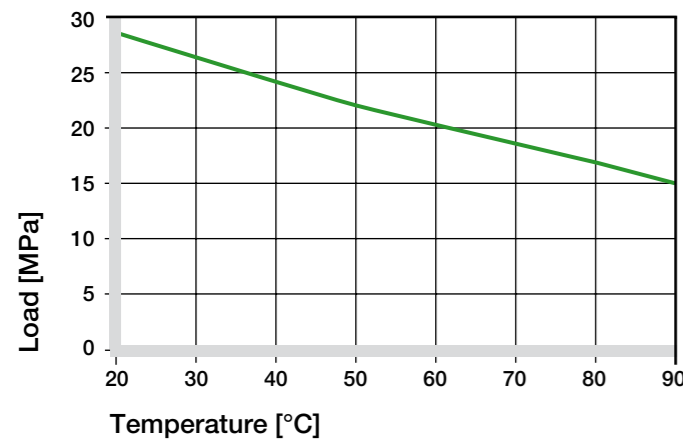


Diagram 02: Recommended maximum surface pressure of as a function of temperature (28 MPa at +20 °C)

Diagram 03 shows the elastic deformation of iglidur® A180 as a function of radial pressure. At the recommended maximum surface pressure of 20 MPa the deformation is less than 2.5%.

Plastic deformation is minimal up to this radial load. However, it is also dependent on the service time.

► Surface pressure, page 63

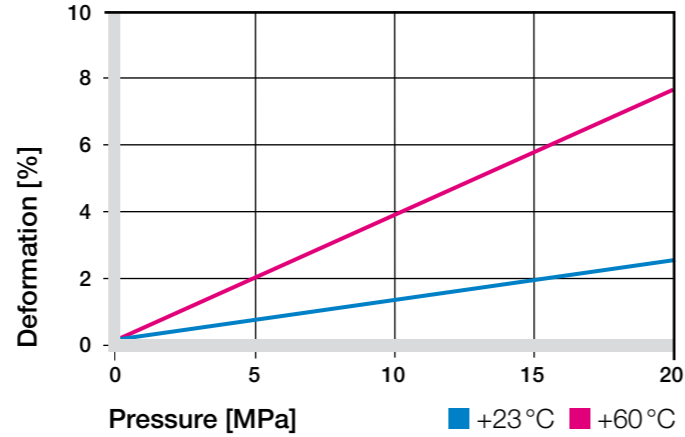


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® A180 is developed for low surface speeds. The given values in table 03 indicate the limits at which an increase up to the continuous permissible temperature occurs. In practice these limit values are not always reached due to interactions.

- Surface speed, page 65
- pv value and lubrication, page 65

m/s	Rotating	Oscillating	Linear
Continuous	0.8	0.6	3.5
Short term	1.2	1	5

Table 03: Maximum surface speeds

Temperatures

The short-term maximum application temperature is +110 °C. With increasing temperatures, the compressive strength of iglidur® A180 bearings decreases. The diagram 02 shows this relationship. The temperatures prevailing in the bearing system also have an influence on the bearing wear. At temperatures over +60 °C an additional securing is required.

- Application temperatures, page 66
- Additional securing, page 67

Friction and wear

Coefficient of friction and wear alter with the application parameters. With increasing load, the coefficient of friction however sinks markedly (diagrams 04 and 05).

- Coefficients of friction and surfaces, page 68
- Wear resistance, page 69

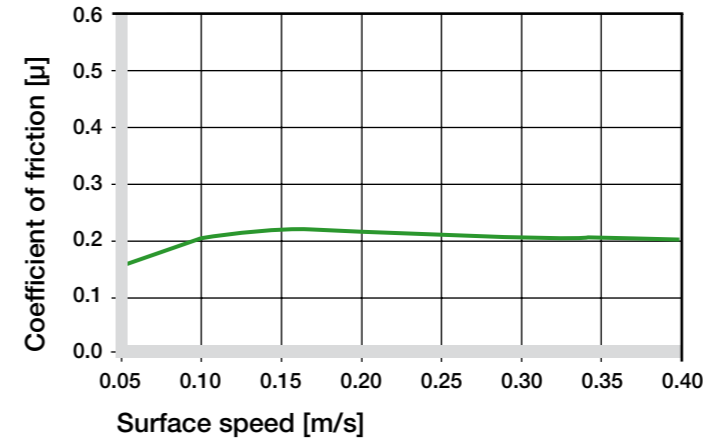


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75 MPa

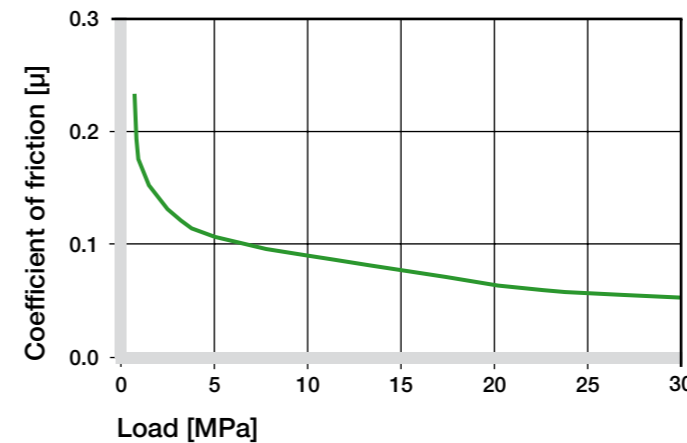


Diagram 05: Coefficient of friction as a function of the pressure, v = 0.01 m/s

Shaft materials

Diagram 06 shows the test results of iglidur® A180 bearings running against various shaft materials.

The combination "iglidur® A180/hard-anodised aluminium" clearly stands out. It attains good to excellent wear rates also with other shafts. With Cf53 shafts, the higher wear in pivoting applications is exemplary compared to rotating applications (diagram 07).

► Shaft materials, page 71

iglidur® A180	Dry	Greases	Oil	Water
C. o. f. μ	0.05–0.23	0.09	0.04	0.04

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

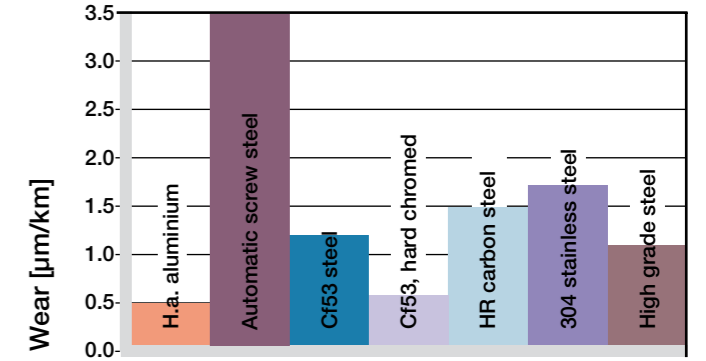


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1 MPa, v = 0.3 m/s

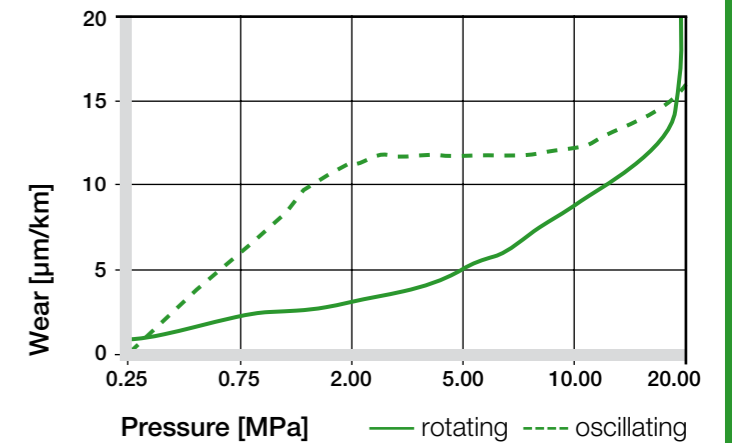


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the pressure

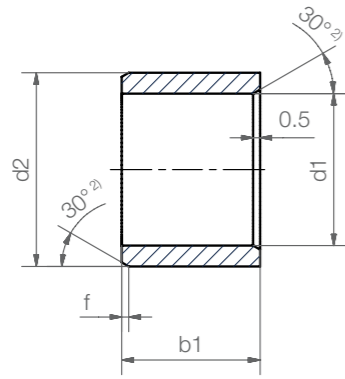
Installation tolerances

iglidur® A180 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. 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® A180 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

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



Order key

Type Dimensions
A180 S M-0608-10

iglidur® material	Form S	Metric	Inner-Ø d1 [mm]	Outer-Ø d2 [mm]	Length b1 [mm]
-------------------	--------	--------	-----------------	-----------------	----------------

i Dimensions according to ISO 3547-1 and special dimensions

²⁾ thickness < 1 mm, chamfer = 20°

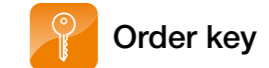
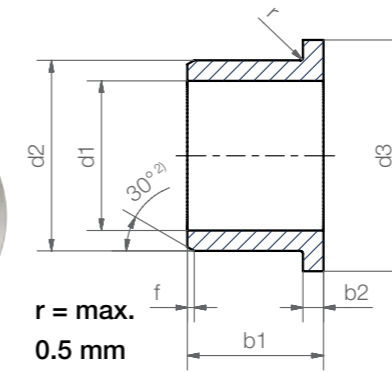
Chamfer in relation to the d1

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]

d1	d1-Tolerance ³⁾	d2	b1 h13	Part No.
6.0	+0.020 +0.068	8.0	10.0	A180SM-0608-10
8.0	+0.025 +0.083	10.0	10.0	A180SM-0810-10
10.0	+0.025 +0.083	12.0	10.0	A180SM-1012-10
12.0	+0.032 +0.102	14.0	15.0	A180SM-1214-15
16.0	+0.032 +0.102	18.0	15.0	A180SM-1618-15
20.0	+0.040 +0.124	23.0	20.0	A180SM-2023-20
25.0	+0.040 +0.124	28.0	30.0	A180SM-2528-30
30.0	+0.040 +0.124	34.0	20.0	A180SM-3034-20

³⁾ after pressfit. Testing methods ► Page 75



Order key

Type Dimensions
A180 F M-0608-06

iglidur® material	Form F	Metric	Inner-Ø d1 [mm]	Outer-Ø d2 [mm]	Length b1 [mm]
-------------------	--------	--------	-----------------	-----------------	----------------

i Dimensions according to ISO 3547-1 and special dimensions

²⁾ thickness < 1 mm, chamfer = 20°

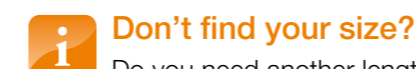
Chamfer in relation to the d1

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]

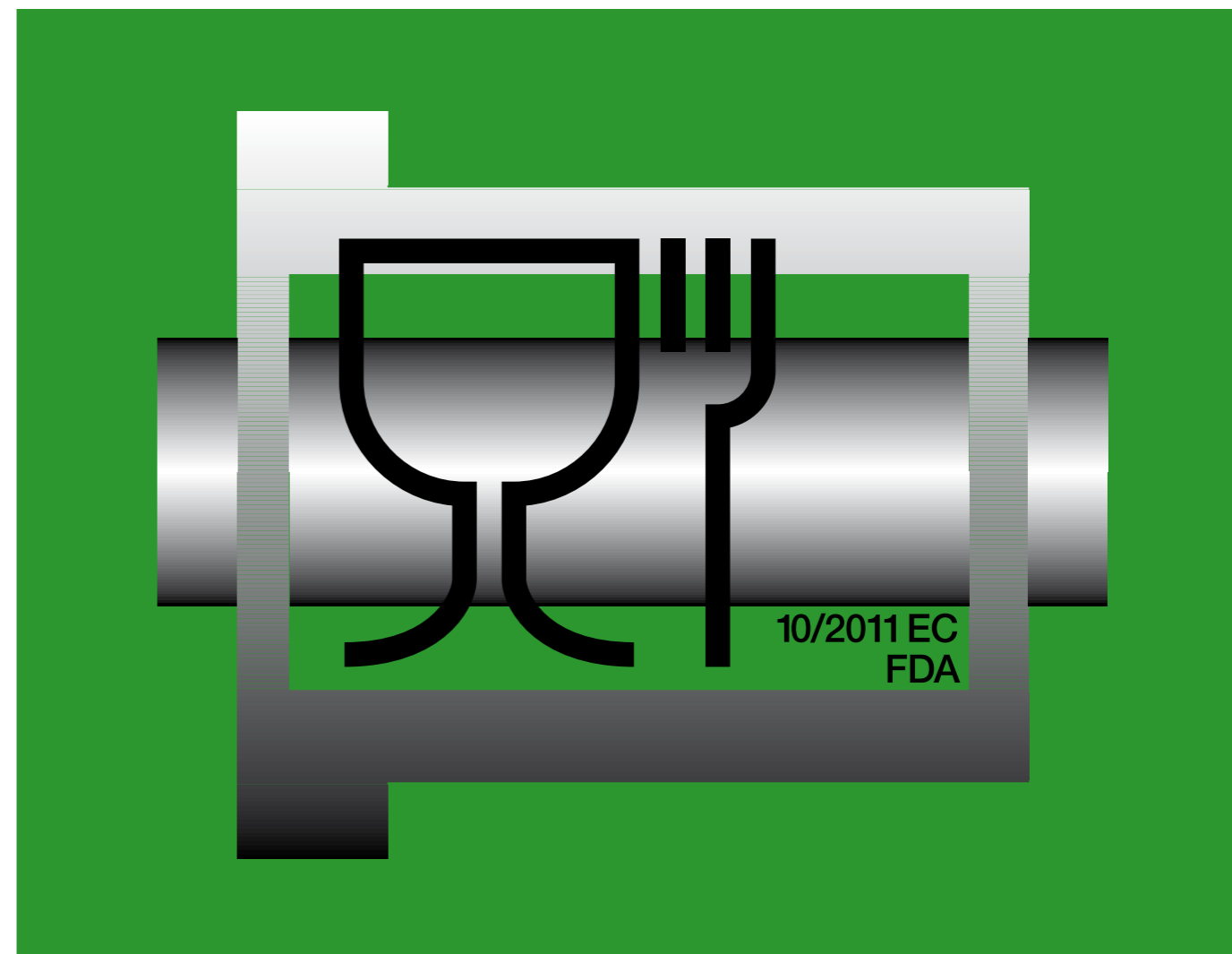
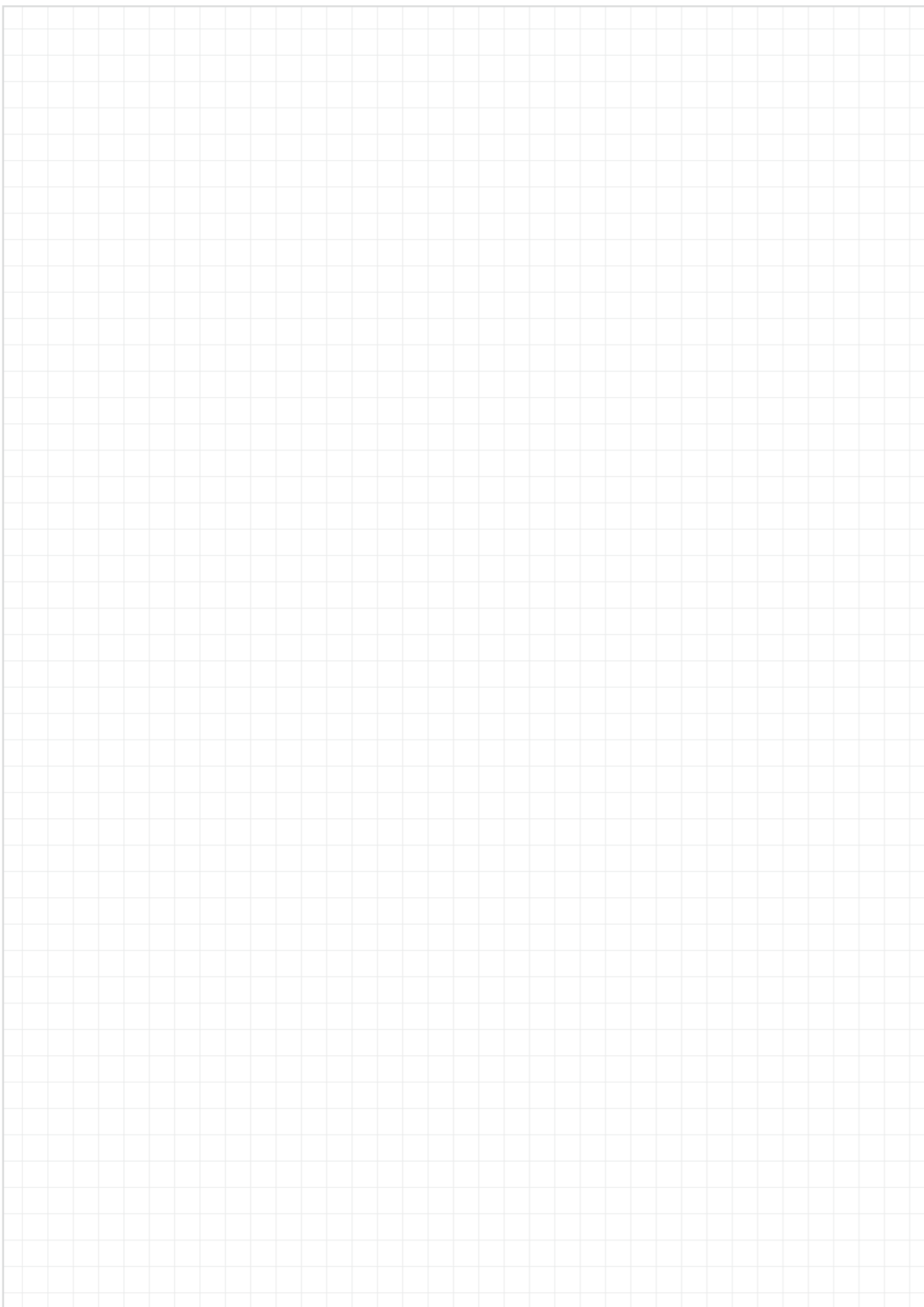
d1	d1-Tolerance ³⁾	d2	d3 d13	b1 h13	b2 -0.14	Part No.
6.0	+0.020 +0.068	8.0	12.0	6.0	1.0	A180FM-0608-06
8.0	+0.025 +0.083	10.0	15.0	10.0	1.0	A180FM-0810-10
10.0	+0.025 +0.083	12.0	18.0	10.0	1.0	A180FM-1012-10
12.0	+0.032 +0.102	14.0	20.0	15.0	1.0	A180FM-1214-15
16.0	+0.032 +0.102	18.0	24.0	17.0	1.0	A180FM-1618-17
20.0	+0.040 +0.124	23.0	30.0	21.5	1.5	A180FM-2023-21
25.0	+0.040 +0.124	28.0	35.0	21.5	1.5	A180FM-2528-21
30.0	+0.040 +0.124	34.0	42.0	26.0	2.0	A180FM-3034-26

³⁾ after pressfit. Testing methods ► Page 75



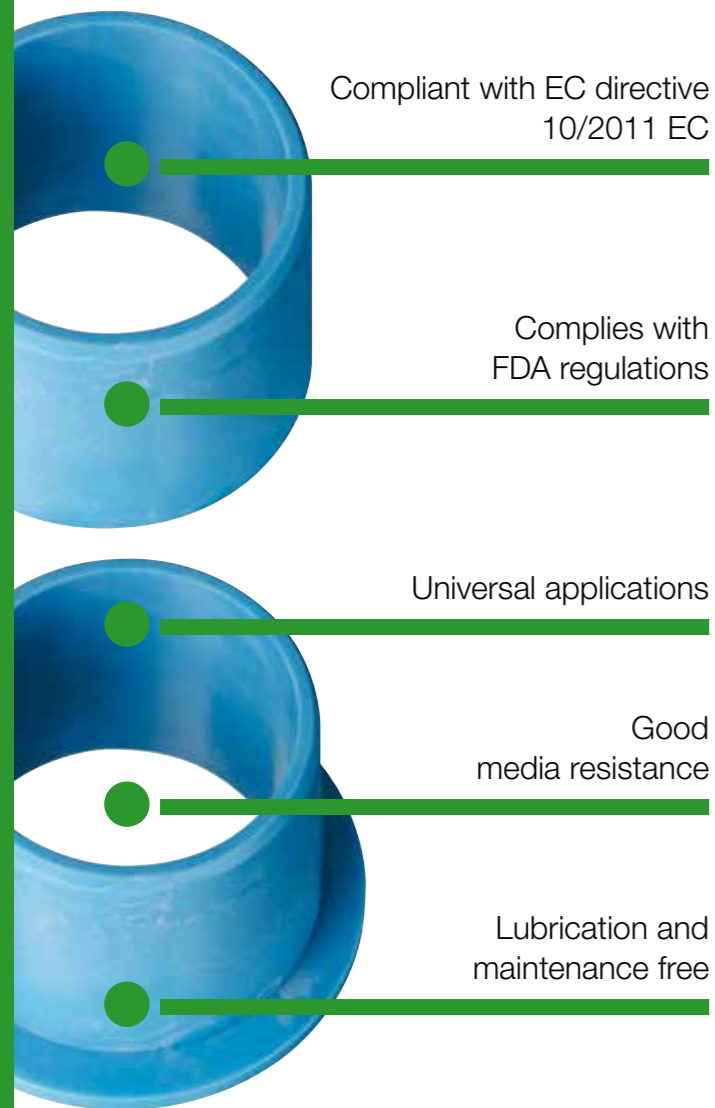
Don't find your size?

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.



The food grade material, compliant to FDA and per EC directive 10/2011 EC – iglidur® A181

- Compliant with EC directive 10/2011 EC
- FDA-compliant
- Universally applicable
- Good media resistance
- Wear-resistant
- Lubrication and maintenance free
- Standard range from stock



The iglidur® A181 material is food compliant with directive 10/2011 EC and also to FDA specifications. The blue colour also facilitates the often required "optical detectability" in the food industry.



When to use it?

- When FDA compliance is required
- When a material compliant with the 10/2011 EC is required
- When an universal material suitable for direct contact with food is required



When not to use it?

- When FDA and 10/2011 EG directive compliance are not required
▶ iglidur® J, page 99
- When temperatures are continuously greater than +90 °C
▶ iglidur® A350, page 351
- When a cost-effective universal bearing is required
▶ iglidur® G, page 83
▶ iglidur® P, page 149



iglidur® A181 material complies with EC Directive 10/2011 EC and also with FDA (Food and Drug Administration) specifications for repeated contact with food.



Available from stock

Detailed information about delivery time online.



max. +90 °C
min. -50 °C



Block pricing online

No minimum order value. From batch size 1



Ø 6–20 mm
more dimensions on request



Typical application areas

- Food industry ● Beverage technology ● Medical, etc.

Material properties table

General properties	Unit	iglidur® A181	Testing method
Density	g/cm³	1.38	
Colour		blue	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	0.2	DIN 53495
Max. water absorption	% weight	1.3	
Coefficient of sliding friction, dynamic against steel	μ	0.10–0.21	
pv value, max. (dry)	MPa · m/s	0.31	
Mechanical properties			
Modulus of elasticity	MPa	1,913	DIN 53457
Tensile strength at +20 °C	MPa	48	DIN 53452
Compressive strength	MPa	60	
Max. recommended surface pressure (+20 °C)	MPa	31	
Shore-D hardness		76	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+90	
Max. short term application temperature	°C	+110	
Min. application temperature	°C	-50	
Thermal conductivity	W/m · K	0.25	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	K ⁻¹ · 10 ⁻⁵	11	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 ¹²	DIN IEC 93
Surface resistance	Ω	> 10 ¹²	DIN 53482

Table 01: Material properties table

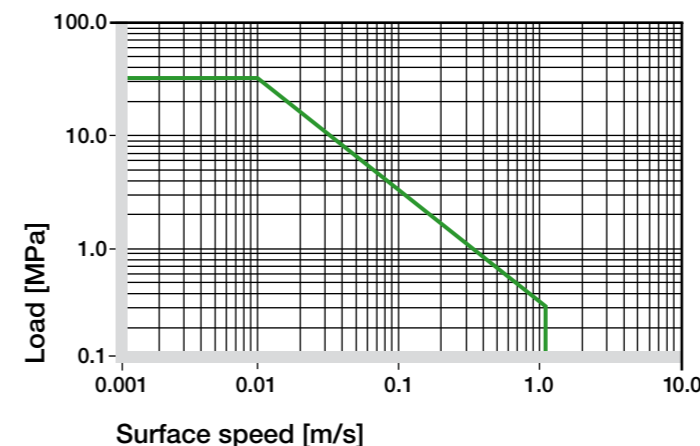


Diagram 01: Permissible pv values for iglidur® A181 bearings with a wall thickness of 1 mm dry running against a steel shaft, at +20 °C, mounted in a steel housing

Moisture absorption

The moisture absorption of iglidur® A181 plain bearings is approximately 0.2 % in ambient conditions. The saturation limit submerged in water is 1.3 %. This must be taken into account for these types of applications.

▶ **Diagram, www.igus.eu/a181-moisture**

Vacuum

When used in a vacuum environment, the iglidur® A181 plain bearings release moisture as a vapour. Use in a vacuum environment is only possible with dehumidified bearings.

Radiation resistance

Plain bearings made from iglidur® A181 are resistant to radiation up to an intensity of 2 · 10² Gy.

UV resistance

iglidur® A181 bearings are only conditionally resistant to UV radiation.

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

+ resistant 0 conditionally resistant – not resistant

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

Table 02: Chemical resistance

▶ **Chemical table, page 1226**

Due to their technical properties and their conformity with the relevant regulations, iglidur® A181 bearings are predestined for applications in food technology. Compared to iglidur® A180 with regard to the mechanical properties, temperature and media resistance, iglidur® A181 is more suitable with respect to the wear resistance in most cases.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® A181 plain bearings decreases. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

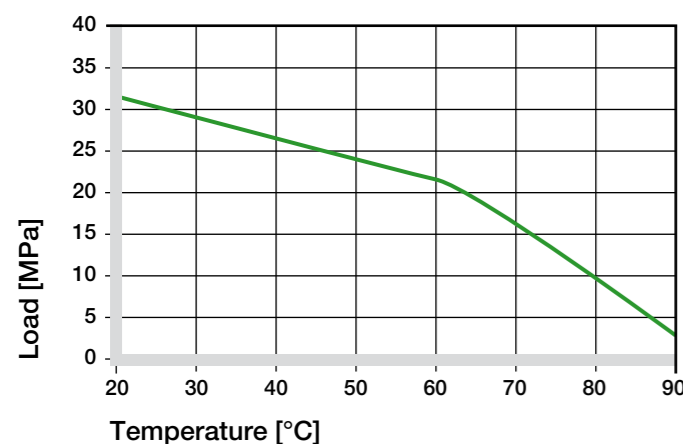


Diagram 02: Recommended maximum surface pressure of as a function of temperature (31 MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® A181 during radial loading.

► Surface pressure, page 63

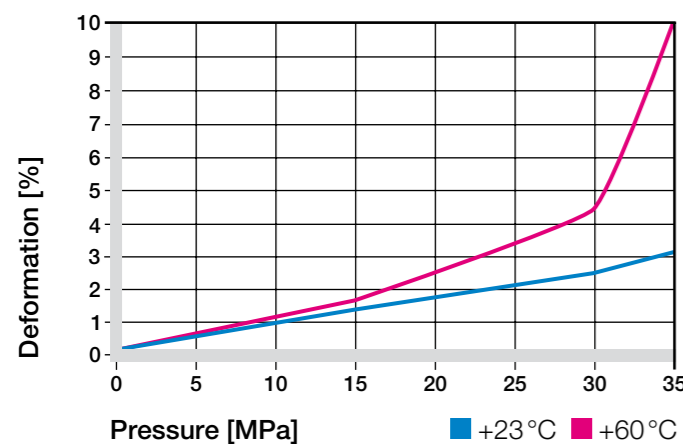


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® A181 was developed for low surface speeds. Maximum speeds up to 0.8 m/s (rotating) and 3.5 m/s (linear) respectively are permitted for continuous application in dry operation. The given values in table 03 indicate the limits at which an increase up to the continuous permissible temperature occurs. This increase is a result of friction. In practice, though, this temperature level is rarely reached, due to varying application conditions.

► Surface speed, page 65

► pv value and lubrication, page 65

m/s	Rotating	Oscillating	Linear
Continuous	0.8	0.6	3.5
Short term	1.2	1.0	5.0

Table 03: Maximum surface speeds

Temperatures

The longterm upper temperature limit of +90°C permits the broad use in applications with direct contact with food. As shown in diagram 02, with increasing temperatures, the compressive strength decreases. When considering temperatures, the additional frictional heat in the bearing system must be taken into account. At temperatures over +60°C an additional securing is required.

► Application temperatures, page 66

► Additional securing, page 67

Friction and wear

Coefficient of friction and wear resistance alter with the application parameters (diagrams 04 and 05). For iglidur® A181 bearings, the alteration of the coefficient of friction μ depends on surface speed and the shaft surface finish.

► Coefficients of friction and surfaces, page 68

► Wear resistance, page 69

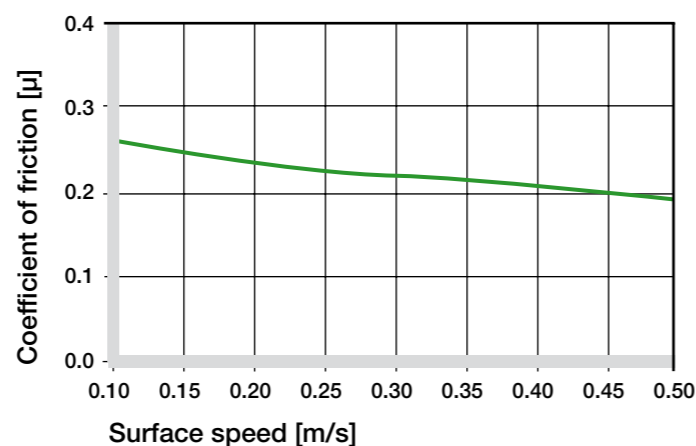


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1.0 MPa

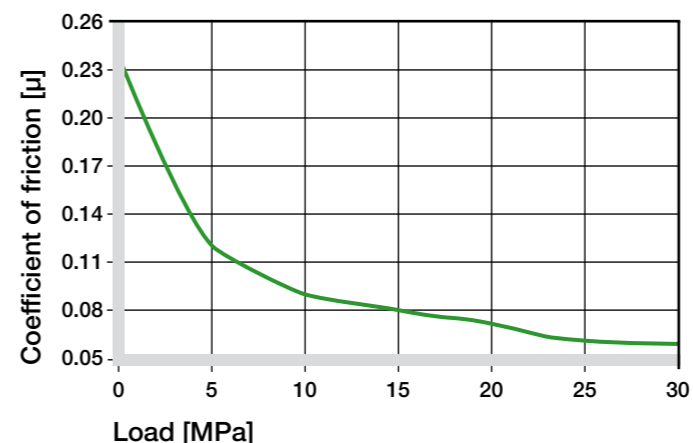


Diagram 05: Coefficient of friction as a function of the pressure, v = 0.01 m/s

Shaft materials

Diagram 06 shows results of testing different shaft materials with plain bearings made from iglidur® A181. Particular attention is paid in the food industry to the corrosion-resistant shaft types. Diagram 06 shows that very low wear rates can be achieved in combination with these shafts. As with many of the iglidur® materials, wear rate increases with otherwise identical parameters in rotation (diagram 07).

► Shaft materials, page 71

iglidur® A181	Dry	Greases	Oil	Water
C.o.f. μ	0.10–0.21	0.08	0.03	0.04

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

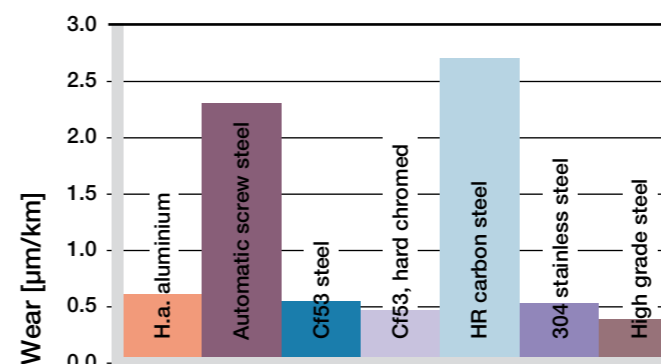


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1 MPa, v = 0.3 m/s

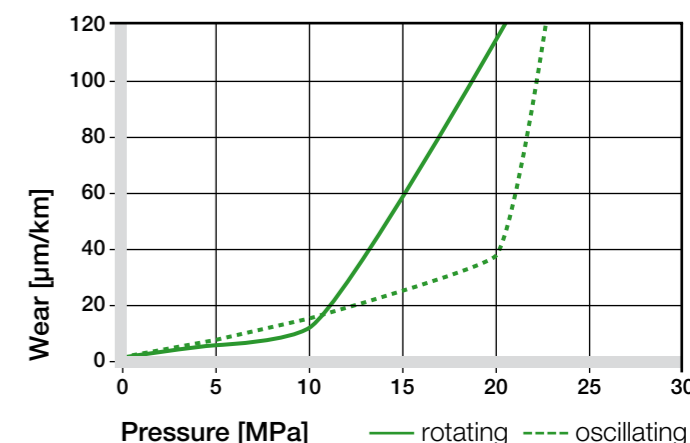


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the pressure

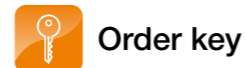
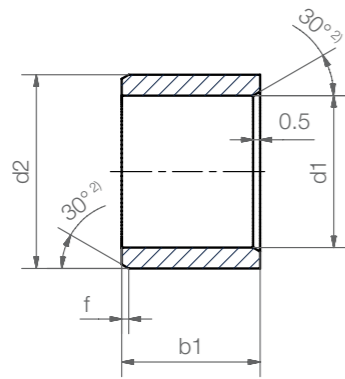
Installation tolerances

iglidur® A181 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® A181 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 05: Important tolerances for plain bearings according to ISO 3547-1 after pressfit



Order key

Type	Dimensions
A181 S	M-0608-06
iglidur® material	
Form S	
Metric	
Inner-Ø d1 [mm]	
Outer-Ø d2 [mm]	
Length b1 [mm]	

Dimensions according to ISO 3547-1 and special dimensions

²⁾ thickness < 1 mm, chamfer = 20°

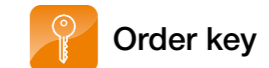
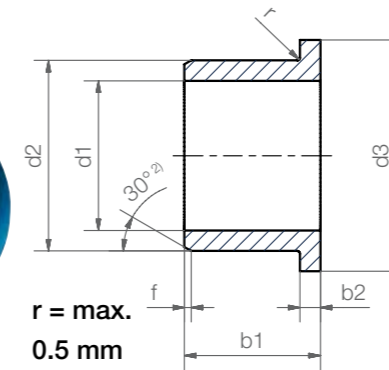
Chamfer in relation to the d1

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]

d1	d1-Tolerance ³⁾	d2	b1 h13	Part No.
6.0	+0.020 +0.068	8.0	6.0	A181SM-0608-06
8.0	+0.025 +0.083	10.0	10.0	A181SM-0810-10
10.0	+0.025 +0.083	12.0	10.0	A181SM-1012-10
12.0	+0.032 +0.102	14.0	12.0	A181SM-1214-12
16.0	+0.032 +0.102	18.0	15.0	A181SM-1618-15
20.0	+0.040 +0.124	23.0	20.0	A181SM-2023-20

³⁾ after pressfit. Testing methods ► Page 75



Order key

Type	Dimensions
A181 F	M-0608-06
iglidur® material	
Form F	
Metric	
Inner-Ø d1 [mm]	
Outer-Ø d2 [mm]	
Length b1 [mm]	

Dimensions according to ISO 3547-1 and special dimensions

²⁾ thickness < 1 mm, chamfer = 20°

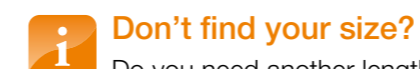
Chamfer in relation to the d1

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

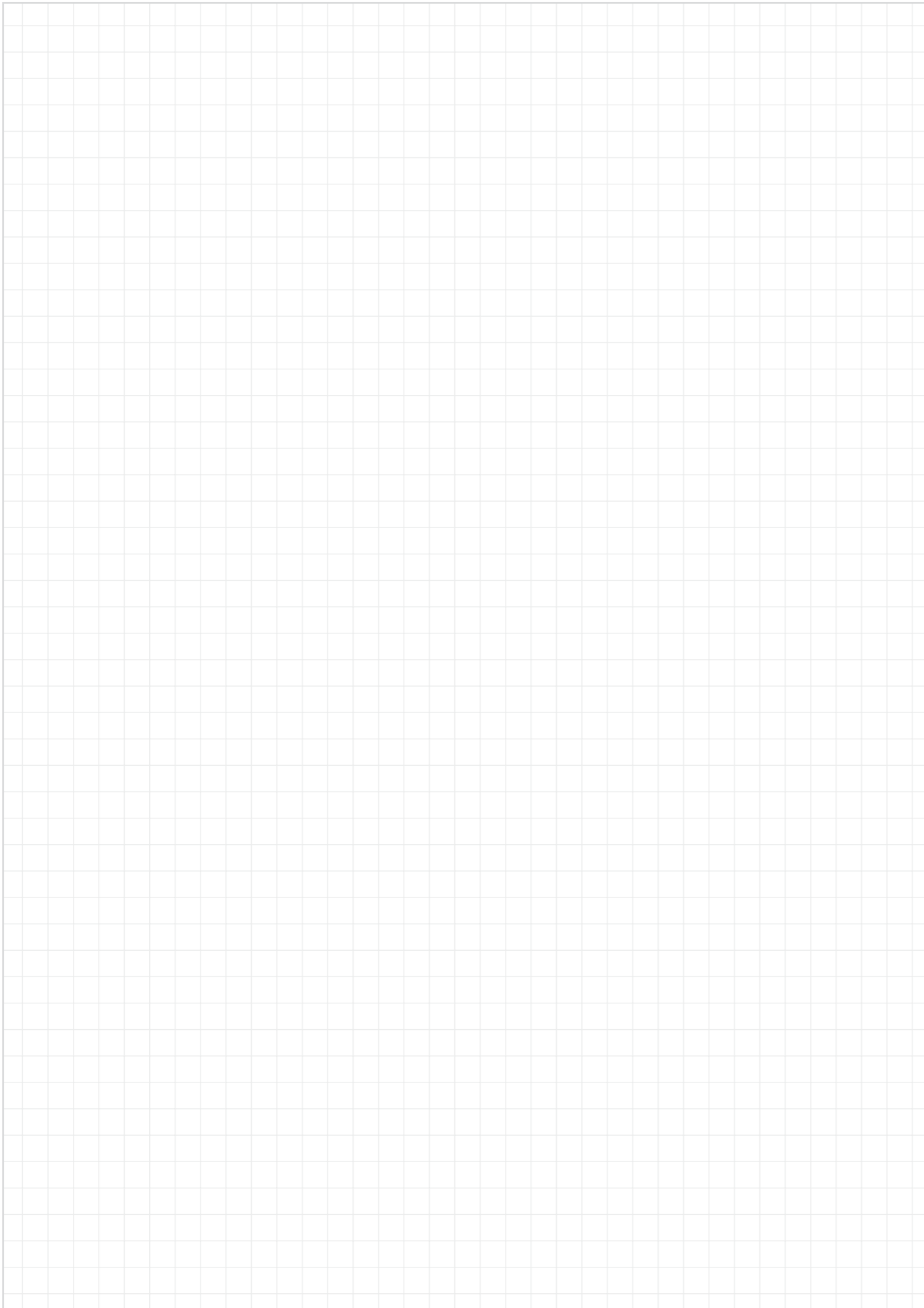
Dimensions [mm]

d1	d1-Tolerance ³⁾	d2	d3 d13	b1 h13	b2 -0.14	Part No.
6.0	+0.020 +0.068	8.0	12.0	6.0	1.0	A181FM-0608-06
8.0	+0.025 +0.083	10.0	15.0	10.0	1.0	A181FM-0810-10
10.0	+0.025 +0.083	12.0	18.0	10.0	1.0	A181FM-1012-10
12.0	+0.032 +0.102	14.0	20.0	12.0	1.0	A181FM-1214-12
16.0	+0.032 +0.102	18.0	24.0	17.0	1.0	A181FM-1618-17
20.0	+0.040 +0.124	23.0	30.0	21.5	1.5	A181FM-2023-21

³⁾ after pressfit. Testing methods ► Page 75

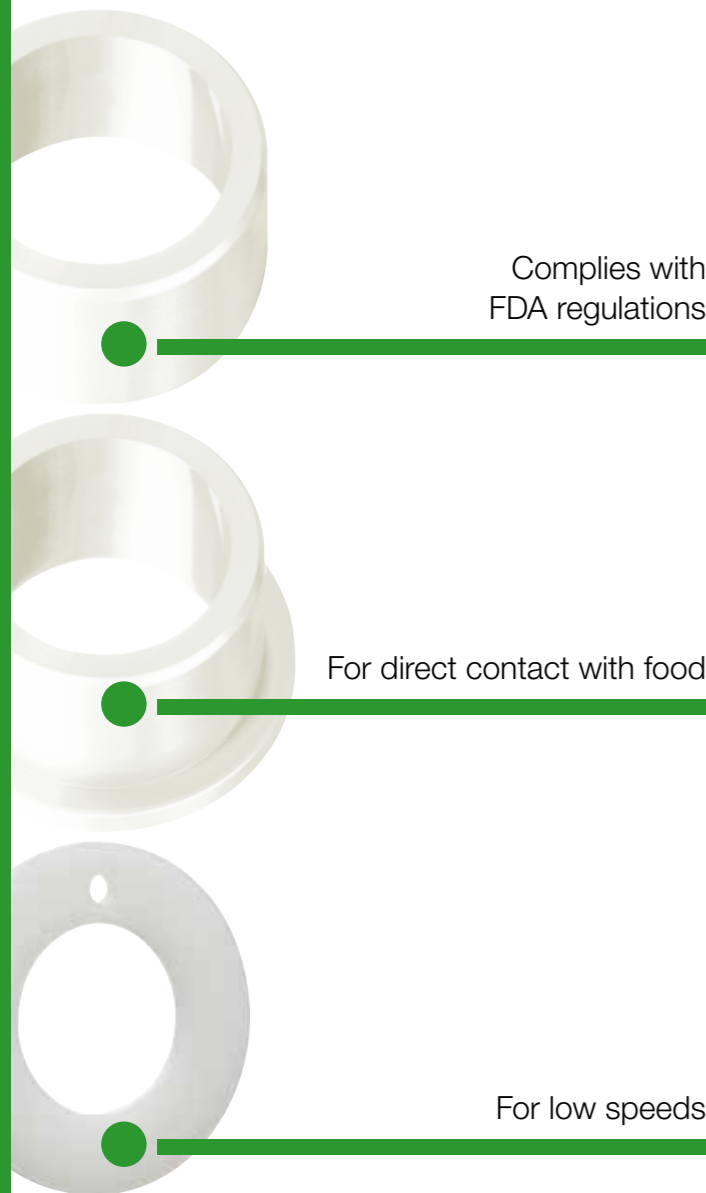


Do you need another length, other dimensions or tolerances? You need a particular design or alternative for your application? Please call us. igus® listens to your needs and provides you a solution in a very short time.



FDA-compliant – iglidur® A200

- iglidur® A200 material complies with food and drug administration (FDA) regulations
- For direct contact with food
- For low speeds
- Lubrication and maintenance free
- Standard range from stock



FDA-compliant material for applications with low to medium loads in immediate environs of (or contact) with food or drugs.



When to use it?

- Suitable for contact with food
- If low noise level is required
- When dirt needs to become embedded
- When FDA compliance is required



When not to use it?

- When the maximum abrasion resistance is necessary
 - ▶ iglidur® W300, page 121
- When temperatures are continuously higher than +80 °C
 - ▶ iglidur® A350, page 351
 - ▶ iglidur® A500, page 359
- When a cost-effective universal bearing is required
 - ▶ iglidur® G, page 83
- For operations in wet environments
 - ▶ iglidur® A180, page 325



iglidur® A200 material complies with the requirements of the FDA (Food and Drug Administration) specifications for repeated contact with food.



Available from stock

Detailed information about delivery time online.



max. +80 °C
min. -40 °C



Block pricing online

No minimum order value. From batch size 1



Ø 1–32 mm
more dimensions on request



Typical application areas

- Food industry



Inch dimensions available
▶ From page 1183

Material properties table

General properties	Unit	iglidur® A200	Testing method
Density	g/cm ³	1.14	
Colour		white	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	1.5	DIN 53495
Max. water absorption	% weight	7.6	
Coefficient of sliding friction, dynamic against steel	μ	0.10–0.40	
pv value, max. (dry)	MPa · m/s	0.09	
Mechanical properties			
Modulus of elasticity	MPa	2,500	DIN 53457
Tensile strength at +20 °C	MPa	116	DIN 53452
Compressive strength	MPa	54	
Max. recommended surface pressure (+20 °C)	MPa	18	
Shore-D hardness		81	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+80	
Max. short term application temperature	°C	+170	
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	10	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 ¹³	DIN IEC 93
Surface resistance	Ω	> 10 ¹²	DIN 53482

Table 01: Material properties table

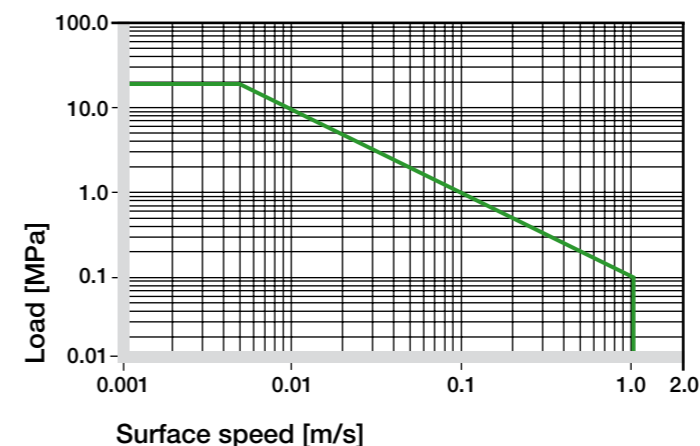


Diagram 01: Permissible pv values for iglidur® A200 bearings with a wall thickness of 1 mm dry running against a steel shaft, at +20 °C, mounted in a steel housing

Moisture absorption

The moisture absorption of iglidur® A200 plain bearings is approximately 1.5 % in ambient conditions. The saturation limit submerged in water is 7.6 %. This must be taken into account along with other environmental influences.

▶ Diagram, www.igus.eu/a200-moisture

Vacuum

In a vacuum environment, iglidur® A200 plain bearings have restricted use.

Radiation resistance

Plain bearings made from iglidur® A200 are resistant to radiation up to an intensity of 1 · 10⁴ Gy.

UV resistance

iglidur® A200 plain bearings are resistant to UV radiation.

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

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

Table 02: Chemical resistance

▶ Chemical table, page 1226

Bearings made from iglidur® A200 are suitable for application in direct contact with foodstuffs. Hence they are the ideal solution for bearing positions in machines for the food industry, medical equipment manufacturing, for small equipment for households, etc. As the admixture of lubricants should be foregone in favor of food compatibility, the thermoplastic composition of iglidur® A200 is particularly adjusted for abrasion resistance. In addition the iglidur® A200 is characterised by its capacity to embed dirt and by its quiet operating behavior.

The good wear properties, dirt resistance and the possibility for dry operation allow to replace elaborately sealed, lubricated bearings for little costs.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® A200 plain bearings decreases. The diagram 02 shows this inverse relationship. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

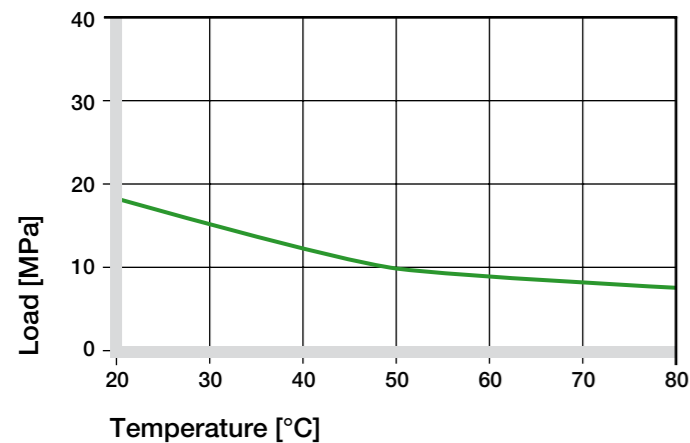


Diagram 02: Recommended maximum surface pressure of as a function of temperature (18 MPa at +20 °C)

Diagram 03 shows the elastic deformation of iglidur® A200 at radial load. At the recommended maximum surface pressure of 18 MPa the deformation is less than 2%. 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

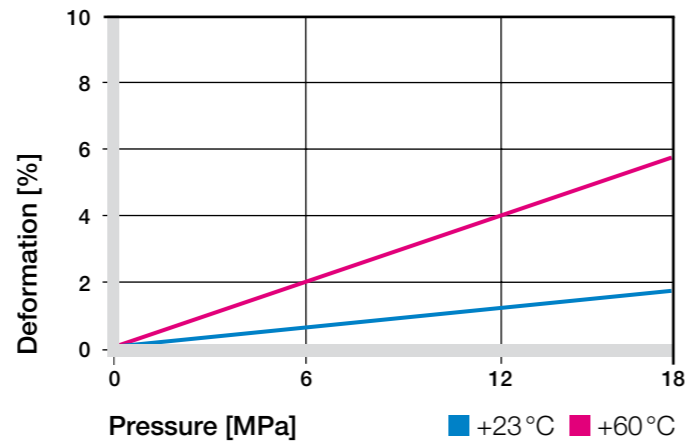


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® A200 was developed for low surface speeds. The given values in table 03 indicate the limits at which an increase up to the continuous permissible temperature occurs. This increase is a result of friction. In practice, these limit values are not often reached, due to varying application conditions.

► Surface speed, page 65

► pv value, page 65

m/s	Rotating	Oscillating	Linear
Continuous	0.8	0.6	2
Short term	1.5	1.1	3

Table 03: Maximum surface speeds

Temperatures

The maximum permissible short term temperature is +170 °C. With increasing temperatures, the compressive strength of iglidur® A200 plain bearings decreases. The diagram 02 shows this relationship. The ambient temperatures prevalent in the bearing system also have an effect on the bearing wear. At temperatures over +50 °C an additional securing is required.

► Application temperatures, page 66

► Additional securing, page 67

Friction and wear

Just as the wear resistance, the coefficient of friction also changes with the load (diagrams 04 and 05).

► Coefficients of friction and surfaces, page 68

► Wear resistance, page 69

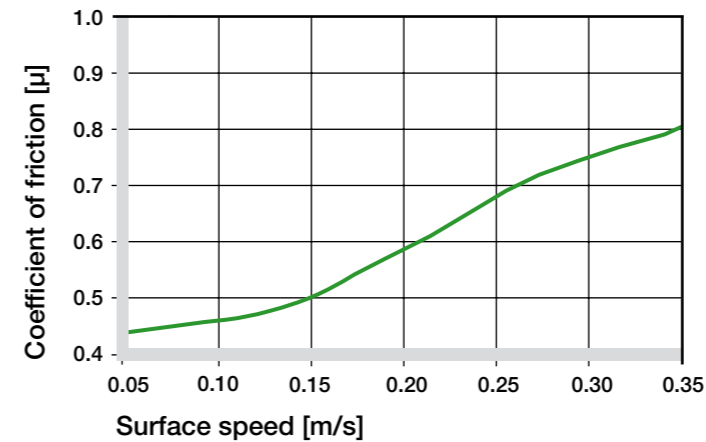


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75 MPa

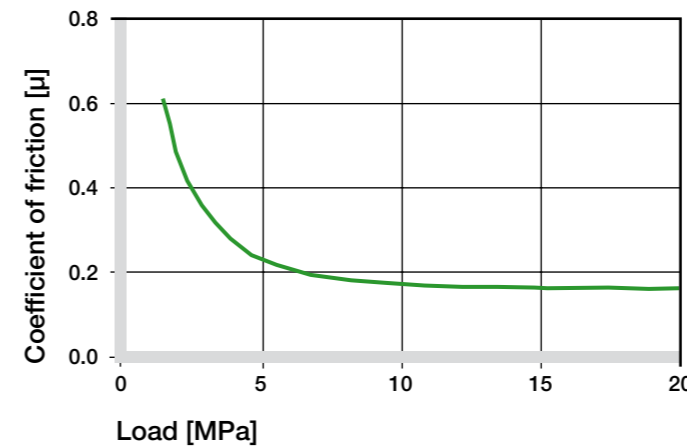


Diagram 05: Coefficient of friction as a function of the pressure, v = 0.01 m/s

Shaft materials

Diagrams 06 and 07 show the test results of iglidur® A200 bearings running against various shaft materials.

In pivoting applications below a load p = 2 MPa, the wear of iglidur® A200 bearings is higher than in rotating applications with equal load. Here the St37 shaft is a positive exception.

► Shaft materials, page 71

iglidur® A200	Dry	Greases	Oil	Water
C.o.f. μ	0.1–0.4	0.09	0.04	0.04

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

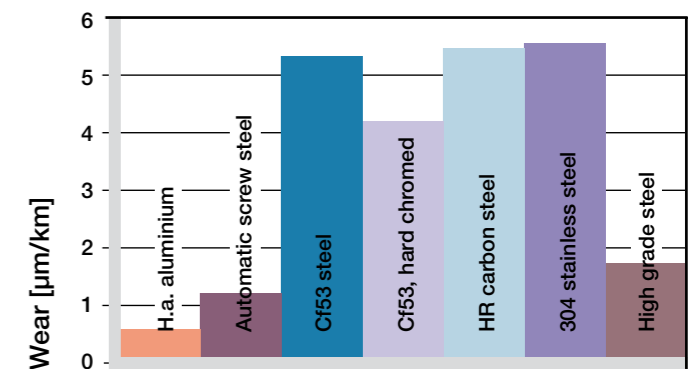


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1 MPa, v = 0.3 m/s

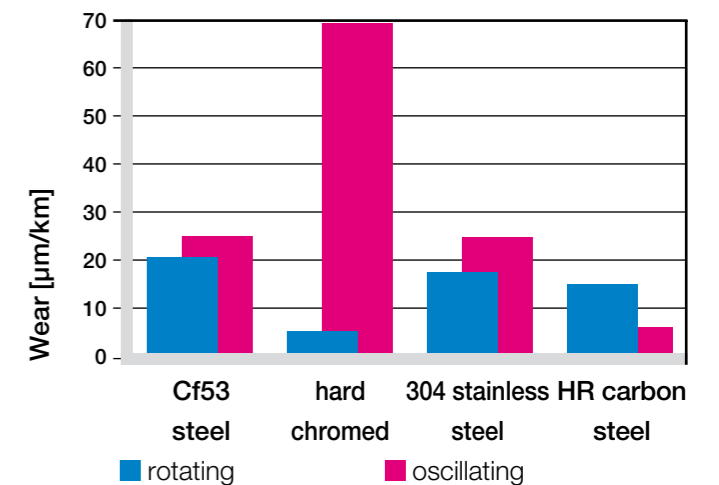


Diagram 07: Wear for rotating and oscillating applications with different shaft materials, p = 2 MPa

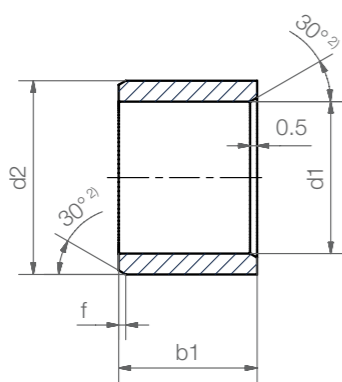
Installation tolerances

iglidur® A200 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 D11 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® A200 D11 [mm]	Housing H7 [mm]
up to 3	0–0.025	+0.020 +0.080	0 +0.010
> 3 to 6	0–0.030	+0.030 +0.105	0 +0.012
> 6 to 10	0–0.036	+0.040 +0.130	0 +0.015
> 10 to 18	0–0.043	+0.050 +0.160	0 +0.018
> 18 to 30	0–0.052	+0.065 +0.195	0 +0.021
> 30 to 50	0–0.062	+0.080 +0.240	0 +0.025

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



Order key

Type: **ASM-0103-02**

Dimensions:

- iglidur® material
- Form S
- Metric
- Inner-Ø d1 [mm]
- Outer-Ø d2 [mm]
- Length b1 [mm]



Dimensions according to ISO 3547-1 and special dimensions

²⁾ 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]

d1	d1- Tolerance ³⁾	d2	b1 h13	Part No.
1.0		3.0	2.0	ASM-0103-02
1.5		4.0	2.0	ASM-0104-02
2.0		5.0	2.0	ASM-0205-02
2.0	+0.020	5.0	3.0	ASM-0205-03
2.5	+0.080	6.0	3.0	ASM-0206-03
3.0		5.0	3.0	ASM-0305-03
3.0		5.0	4.0	ASM-0305-04
3.0		6.0	3.0	ASM-0306-03
3.0		6.0	4.0	ASM-0306-04
4.0		7.0	3.0	ASM-0407-03
4.0		7.0	4.0	ASM-0407-04
4.0		7.0	6.0	ASM-0407-06
4.0		8.0	6.0	ASM-0408-06
5.0		8.0	4.0	ASM-0508-04
5.0		8.0	5.0	ASM-0508-05
5.0		8.0	8.0	ASM-0508-08
5.0	+0.030	9.0	5.0	ASM-0509-05
5.0	+0.105	9.0	8.0	ASM-0509-08
6.0		8.0	10.0	ASM-0608-10
6.0		9.0	6.0	ASM-0609-06
6.0		10.0	4.0	ASM-0610-04
6.0		10.0	6.0	ASM-0610-06
6.0		10.0	10.0	ASM-0610-10
6.0		12.0	6.0	ASM-0612-06
6.0		12.0	10.0	ASM-0612-10
7.0	+0.040	10.0	5.0	ASM-0710-05
7.0	+0.130	10.0	8.0	ASM-0710-08
8.0		10.0	6.0	ASM-0810-06

d1	d1- Tolerance ³⁾	d2	b1 h13	Part No.
8.0		10.0	8.0	ASM-0810-08
8.0		10.0	10.0	ASM-0810-10
8.0		11.0	8.0	ASM-0811-08
8.0		11.0	12.0	ASM-0811-12
8.0		12.0	6.0	ASM-0812-06
8.0		12.0	8.0	ASM-0812-08
8.0		12.0	10.0	ASM-0812-10
8.0		12.0	12.0	ASM-0812-12
8.0	+0.040	14.0	6.0	ASM-0814-06
8.0	+0.130	14.0	10.0	ASM-0814-10
9.0		12.0	14.0	ASM-0912-14
10.0		12.0	10.0	ASM-1012-10
10.0		14.0	6.0	ASM-1014-06
10.0		14.0	8.0	ASM-1014-08
10.0		14.0	10.0	ASM-1014-10
10.0		14.0	16.0	ASM-1014-16
10.0		16.0	6.0	ASM-1016-06
10.0		16.0	10.0	ASM-1016-10
10.0		16.0	16.0	ASM-1016-16
12.0		14.0	20.0	ASM-1214-20
12.0		16.0	15.0	ASM-1216-15
12.0		16.0	20.0	ASM-1216-20
12.0		18.0	8.0	ASM-1218-08
12.0	+0.050	18.0	10.0	ASM-1218-10
12.0	+0.160	18.0	15.0	ASM-1218-15
12.0		18.0	20.0	ASM-1218-20
14.0		16.0	10.0	ASM-1416-10
14.0		16.0	15.0	ASM-1416-15

³⁾ after pressfit. Testing methods ► Page 75

Dimensions [mm]

d1	d1- Tolerance ³⁾	d2	b1 h13	Part No.
14.0		16.0	20.0	ASM-1416-20
14.0		20.0	10.0	ASM-1420-10
14.0		20.0	15.0	ASM-1420-15
14.0		20.0	20.0	ASM-1420-20
15.0		17.0	10.0	ASM-1517-10
15.0		17.0	15.0	ASM-1517-15
15.0		21.0	10.0	ASM-1521-10
15.0		21.0	15.0	ASM-1521-15
15.0		21.0	20.0	ASM-1521-20
16.0		18.0	12.0	ASM-1618-12
16.0	+0.050	18.0	20.0	ASM-1618-20
16.0	+0.160	20.0	20.0	ASM-1620-20
16.0		20.0	25.0	ASM-1620-25
16.0		22.0	12.0	ASM-1622-12
16.0		22.0	15.0	ASM-1622-15
16.0		22.0	16.0	ASM-1622-16
16.0		22.0	20.0	ASM-1622-20
16.0		22.0	25.0	ASM-1622-25
18.0		24.0	12.0	ASM-1824-12
18.0		24.0	20.0	ASM-1824-20
18.0		24.0	30.0	ASM-1824-30
20.0		23.0	15.0	ASM-2023-15
20.0		23.0	20.0	ASM-2023-20
20.0		25.0	15.0	ASM-2025-15
20.0	+0.065	25.0	20.0	ASM-2025-20
20.0	+0.195	25.0	30.0	ASM-2025-30
20.0		26.0	15.0	ASM-2026-15
20.0		26.0	20.0	ASM-2026-20
20.0		26.0	30.0	ASM-2026-30
22.0		26.0	15.0	ASM-2226-15

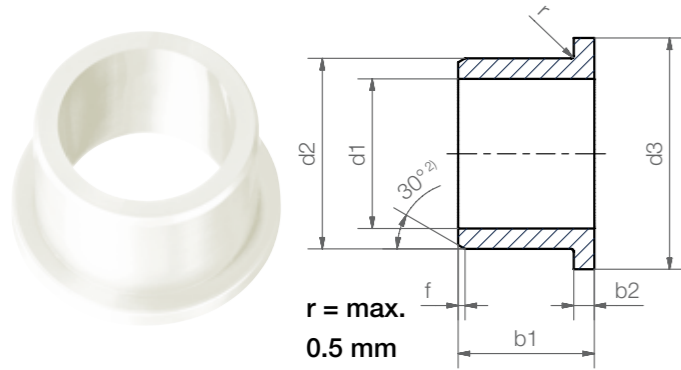
d1	d1- Tolerance ³⁾	d2	b1 h13	Part No.
22.0		28.0	10.0	ASM-2228-10
22.0		28.0	15.0	ASM-2228-15
22.0		28.0	20.0	ASM-2228-20
22.0		28.0	30.0	ASM-2228-30
24.0		30.0	15.0	ASM-2430-15
24.0		30.0	20.0	ASM-2430-20
24.0		30.0	30.0	ASM-2430-30
25.0		28.0	12.0	ASM-2528-12
25.0		28.0	20.0	ASM-2528-20
25.0		30.0	20.0	ASM-2530-20
25.0		30.0	30.0	ASM-2530-30
25.0		30.0	40.0	ASM-2530-40
25.0	+0.065	32.0	20.0	ASM-2532-20
25.0	+0.195	32.0	30.0	ASM-2532-30
25.0		32.0	40.0	ASM-2532-40
26.0		30.0	20.0	ASM-2630-20
26.0		32.0	30.0	ASM-2632-30
27.0		34.0	20.0	ASM-2734-20
27.0		34.0	30.0	ASM-2734-30
27.0		34.0	40.0	ASM-2734-40
28.0		33.0	20.0	ASM-2833-20
28.0		36.0	20.0	ASM-2836-20
28.0		36.0	30.0	ASM-2836-30
28.0		36.0	40.0	ASM-2836-40
30.0		38.0	20.0	ASM-3038-20
30.0		38.0	30.0	ASM-3038-30
30.0		38.0	40.0	ASM-3038-40
32.0		40.0	20.0	ASM-3240-20
32.0	+0.080	40.0	30.0	ASM-3240-30
32.0	+0.240	40.0	40.0	ASM-3240-40

³⁾ 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.



²⁾ 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]

d1	d1- Tolerance ³⁾	d2	d3 d13	b1 h13	b2 -0.14	Part No.
1.0		3.0	5.0	2.0	1.0	AFM-0103-02
1.5	+0.020	4.0	6.0	2.0	1.0	AFM-0104-02
2.0		5.0	8.0	3.0	1.5	AFM-0205-03
2.5	+0.080	6.0	9.0	3.0	1.5	AFM-0206-03
3.0		6.0	9.0	4.0	1.5	AFM-0306-04
4.0		8.0	12.0	4.0	2.0	AFM-0408-04
4.0		8.0	12.0	6.0	2.0	AFM-0408-06
5.0		7.0	11.0	5.0	1.0	AFM-0507-05
5.0		9.0	13.0	5.0	2.0	AFM-0509-05
5.0	+0.030	9.0	13.0	6.0	2.0	AFM-0509-06
5.0		9.0	13.0	8.0	2.0	AFM-0509-08
6.0	+0.105	10.0	14.0	4.0	2.0	AFM-0610-04
6.0		10.0	14.0	6.0	2.0	AFM-0610-06
6.0		10.0	14.0	10.0	2.0	AFM-0610-10
6.0		12.0	14.0	6.0	3.0	AFM-0612-06
6.0		12.0	14.0	10.0	3.0	AFM-0612-10
7.0		11.0	15.0	8.0	2.0	AFM-0711-08
8.0		11.0	13.0	8.0	2.0	AFM-0811-08
8.0		12.0	16.0	6.0	2.0	AFM-0812-06
8.0		12.0	16.0	8.0	2.0	AFM-0812-08
8.0		12.0	16.0	12.0	2.0	AFM-0812-12
8.0	+0.040	12.0	16.0	22.0	2.0	AFM-0812-22
8.0	+0.130	14.0	18.0	6.0	3.0	AFM-0814-06
8.0		14.0	18.0	10.0	3.0	AFM-0814-10
9.0		14.0	19.0	6.0	2.0	AFM-0914-06
9.0		14.0	19.0	10.0	2.0	AFM-0914-10
9.0		14.0	19.0	14.0	2.0	AFM-0914-14
10.0		16.0	22.0	6.0	3.0	AFM-1016-06

³⁾ after pressfit. Testing methods ► Page 75



Order key

Type	Dimensions
A F M	-0103-02
iglidur® material	
Form F	
Metric	
Inner-Ø d1 [mm]	
Outer-Ø d2 [mm]	
Length b1 [mm]	



Dimensions according to ISO 3547-1 and special dimensions

d1	d1- Tolerance ³⁾	d2	d3 d13	b1 h13	b2 -0.14	Part No.
10.0		16.0	22.0	8.0	3.0	AFM-1016-08
10.0	+0.040	16.0	22.0	10.0	3.0	AFM-1016-10
10.0	+0.130	16.0	22.0	16.0	3.0	AFM-1016-16
10.0		16.0	20.0	10.0	3.0	AFM-101620-10
12.0		14.0	20.0	12.0	1.0	AFM-1214-12
12.0		18.0	24.0	8.0	3.0	AFM-1218-08
12.0		18.0	22.0	10.0	3.0	AFM-1218-10
12.0		18.0	24.0	12.0	3.0	AFM-1218-12
12.0		18.0	22.0	15.0	3.0	AFM-1218-15
12.0		18.0	22.0	20.0	3.0	AFM-1218-20
14.0		20.0	25.0	10.0	3.0	AFM-1420-10
14.0		20.0	25.0	15.0	3.0	AFM-1420-15
14.0		20.0	25.0	20.0	3.0	AFM-1420-20
15.0	+0.050	21.0	27.0	10.0	3.0	AFM-1521-10
15.0		21.0	27.0	15.0	3.0	AFM-1521-15
15.0	+0.160	21.0	27.0	20.0	3.0	AFM-1521-20
15.0		21.0	27.0	25.0	3.0	AFM-1521-25
16.0		22.0	28.0	12.0	3.0	AFM-1622-12
16.0		22.0	28.0	15.0	3.0	AFM-1622-15
16.0		22.0	28.0	20.0	3.0	AFM-1622-20
16.0		22.0	28.0	25.0	3.0	AFM-1622-25
18.0		24.0	30.0	12.0	3.0	AFM-1824-12
18.0		24.0	30.0	18.0	3.0	AFM-1824-18
18.0		24.0	30.0	20.0	3.0	AFM-1824-20
18.0		24.0	30.0	30.0	3.0	AFM-1824-30
20.0	+0.065	26.0	32.0	15.0	3.0	AFM-2026-15
20.0		26.0	32.0	20.0	3.0	AFM-2026-20
20.0	+0.195	26.0	32.0	30.0	3.0	AFM-2026-30

Dimensions [mm]

d1	d1- Tolerance ³⁾	d2	d3 d13	b1 h13	b2 -0.14	Part No.
22.0		28.0	34.0	15.0	3.0	AFM-2228-15
22.0		28.0	34.0	20.0	3.0	AFM-2228-20
22.0		28.0	34.0	30.0	3.0	AFM-2228-30
24.0		30.0	36.0	15.0	3.0	AFM-2430-15
24.0	+0.065	30.0	36.0	20.0	3.0	AFM-2430-20
24.0		30.0	36.0	30.0	3.0	AFM-2430-30
25.0	+0.195	32.0	38.0	20.0	4.0	AFM-2532-20
25.0		32.0	38.0	30.0	4.0	AFM-2532-30
25.0		32.0	38.0	40.0	4.0	AFM-2532-40
27.0		34.0	40.0	20.0	4.0	AFM-2734-20
27.0		34.0	40.0	30.0	4.0	AFM-2734-30

³⁾ after pressfit. Testing methods ► Page 75

d1	d1- Tolerance ³⁾	d2	d3 d13	b1 h13	b2 -0.14	Part No.
27.0		34.0	40.0	40.0	4.0	AFM-2734-40
28.0		36.0	42.0	20.0	4.0	AFM-2836-20
28.0		36.0	42.0	30.0	4.0	AFM-2836-30
28.0	+0.065	36.0	42.0	40.0	4.0	AFM-2836-40
28.0	+0.195	36.0	42.0	40.0	4.0	AFM-2836-40
30.0		38.0	44.0	20.0	4.0	AFM-3038-20
30.0		38.0	44.0	30.0	4.0	AFM-3038-30
30.0		38.0	44.0	40.0	4.0	AFM-3038-40
32.0	+0.080	40.0	46.0	20.0	4.0	AFM-3240-20
32.0		40.0	46.0	30.0	4.0	AFM-3240-30
32.0	+0.240	40.0	46.0	40.0	4.0	AFM-3240-40



Don't find your size?

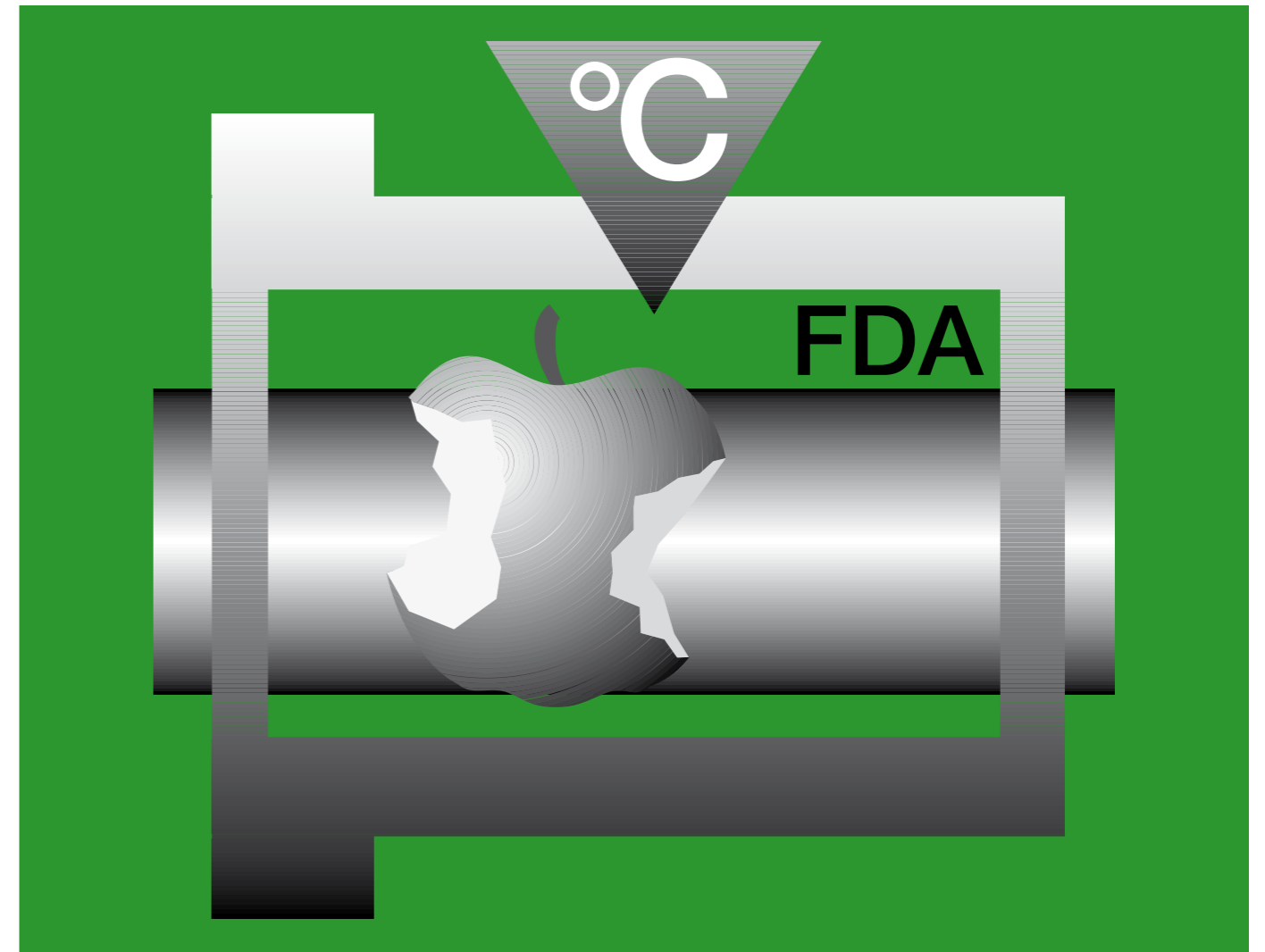
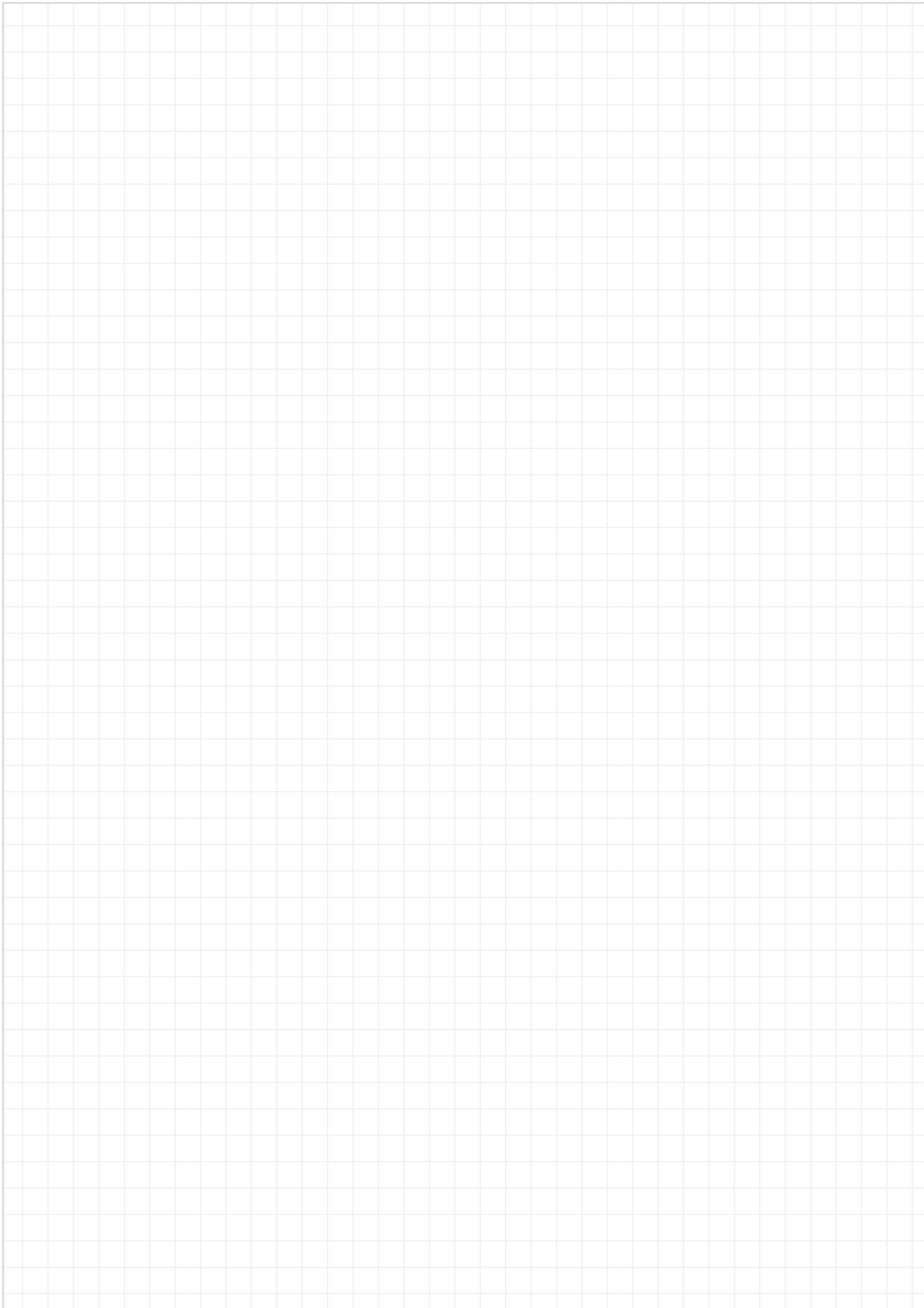
Do you need another length, other dimensions or tolerances? You need a particular design or alternative for your application? Please call us. igus® listens to your needs and provides you a solution in a very short time.



Even more dimensions from stock

More than 300 dimensions are now available. Search online for your required bearing.

► www.igus.eu/iglidur-specialbearings



Temperature and wear-resistant, FDA-compliant – iglidur® A350

- Compliant with EC directive 10/2011 EC
- FDA-compliant
- For use with temperatures up to +180°C
- For medium and high loads
- Equally good for both oscillating and rotating applications
- Lubrication and maintenance free
- Standard range from stock

Compliant with EC
directive 10/2011 EC

For use with
temperatures up
to +180 °C

For medium
and high loads

Equally good for
both oscillating and
rotating applications

A very universal bearing for use in the area of food and pharmaceutical industries. Composition of FDA-conform materials allows the use in areas where due to the contact with food other bearings cannot be used. With good tribological and mechanical properties, iglidur® A350 bearings are suitable for general purpose use in food machinery.



When to use it?

- When FDA compliance is required
- If wear-resistance and FDA-conformance is necessary at high loads
- If the bearing is use in acid environment



When not to use it?

- When temperatures are continuously greater than +180 °C
▶ iglidur® A500, page 359
- When the maximum abrasion resistance is necessary
▶ iglidur® J, page 99
- When a low-priced FDA bearing is required
▶ iglidur® A200, page 341
▶ iglidur® A180, page 325
- For high speeds
▶ iglidur® J, page 99



iglidur® A350 material complies with EC Directive 10/2011 EC and also with FDA (Food and Drug Administration) specifications for repeated contact with food.



Available from stock

Detailed information about delivery time online.



max. +180 °C
min. -100 °C



Block pricing online

No minimum order value. From batch size 1



Ø 6–50 mm
more dimensions on request



Typical application areas

- Food industry
- Beverage technology
- Medical, etc.

Material properties table

General properties	Unit	iglidur® A350	Testing method
Density	g/cm³	1.42	
Colour		blue	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	0.6	DIN 53495
Max. water absorption	% weight	1.9	
Coefficient of sliding friction, dynamic against steel	μ	0.1–0.2	
pv value, max. (dry)	MPa · m/s	0.4	
Mechanical properties			
Modulus of elasticity	MPa	2,000	DIN 53457
Tensile strength at +20 °C	MPa	110	DIN 53452
Compressive strength	MPa	78	
Max. recommended surface pressure (+20 °C)	MPa	60	
Shore-D hardness		76	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+180	
Max. short term application temperature	°C	+210	
Min. application temperature	°C	-100	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	K ⁻¹ · 10 ⁻⁵	8	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 ¹¹	DIN IEC 93
Surface resistance	Ω	> 10 ¹¹	DIN 53482

Table 01: Material properties table

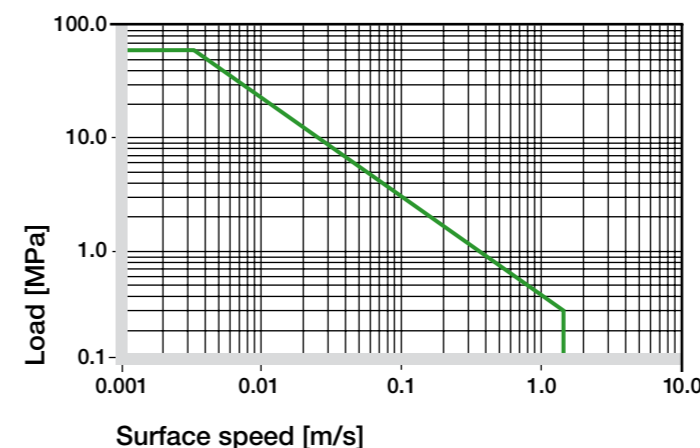


Diagram 01: Permissible pv values for iglidur® A350 bearings with a wall thickness of 1 mm dry running against a steel shaft, at +20 °C, mounted in a steel housing

Moisture absorption

The humidity absorption of iglidur® A350 is low and can be ignored when using standard-bearings. Even when saturated with water, iglidur® A350 does not absorb more than 1.9 % of water (by weight).

▶ Diagram, www.igus.eu/a350-moisture

Vacuum

When used in a vacuum, the iglidur® A350 plain bearings release moisture as a vapour. Only dehumidified bearings are suitable in vacuum.

Radiation resistance

Plain bearings made from iglidur® A350 are resistant to radiation up to an intensity of 2 · 10² Gy.

UV resistance

iglidur® A350 bearings are resistant to UV radiation.

Medium	Resistance
Alcohols	+
Hydrocarbons	+ to 0
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 02: Chemical resistance

▶ Chemical table, page 1226

iglidur® A350 bearings are made for practically all loads in food and packaging machinery. Even high loads, often seen in lifting equipment, are taken easily and the bearings work flawlessly without any external lubrication.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® A350 plain bearings decreases. The diagram 02 shows this inverse relationship. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

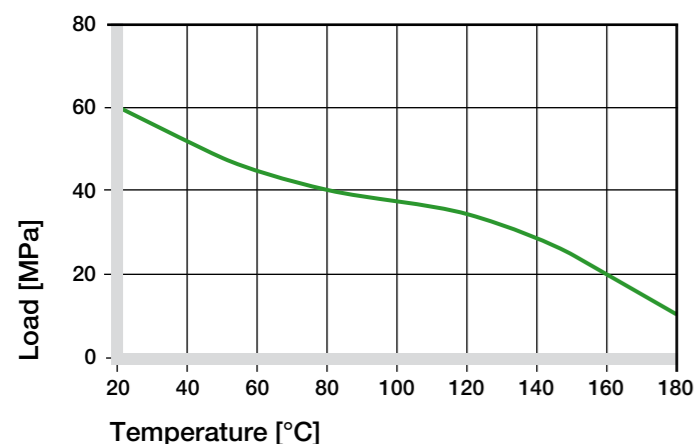


Diagram 02: Recommended maximum surface pressure of as a function of temperature (60 MPa at +20 °C)

Diagram 03 shows the elastic deformation of iglidur® A350 under different loads. At the recommended maximum surface pressure of 60 MPa the deformation at room temperature is less than 5%.

► Surface pressure, page 63

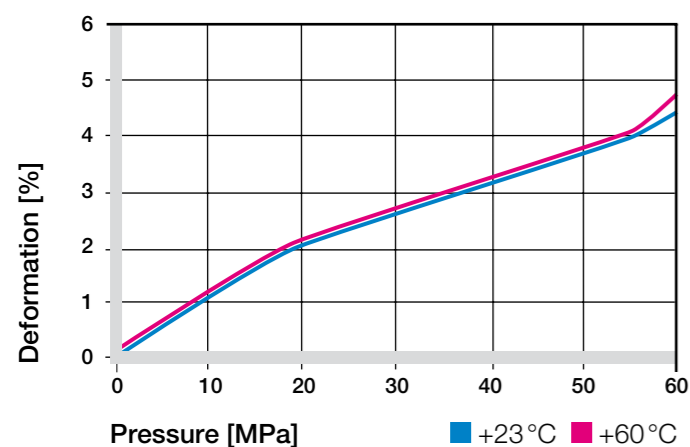


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® A350 bearings are suitable for low and medium speeds in rotating and oscillating use. Even linear movements can often be realised with iglidur® A350. With high sliding speeds, iglidur® J or iglidur® L250 can be interesting alternatives because the wear rate of these materials is better.

► Surface speed, page 65

m/s	Rotating	Oscillating	Linear
Continuous	1	0.8	2.5
Short term	1.2	0.9	3

Table 03: Maximum surface speeds

Temperatures

Its temperature resistance makes iglidur® A350 an ideal material for bearing in the area of foodstuffs. At temperatures over +140°C an additional securing is required. The wear-rate of iglidur® A350 bearings rises only little with higher temperatures. Tests have shown good wear results at +100°C on all tested shaft materials.

► Application temperatures, page 66

► Additional securing, page 67

Friction and wear

The coefficient of friction of iglidur® A350 on a steel shaft are in the mid range (diagrams 04 and 05).

► Coefficients of friction and surfaces, page 68

► Wear resistance, page 69

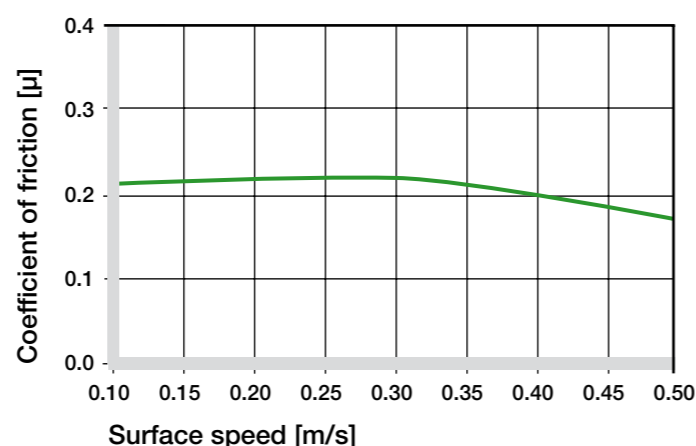


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1 MPa

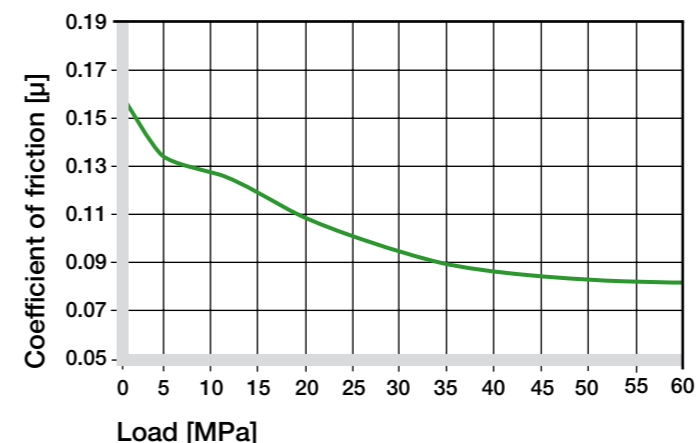


Diagram 05: Coefficient of friction as a function of the pressure, v = 0.01 m/s

Shaft materials

The corrosion-resistant steels are rather considered a natural choice for use in the food industry. The trials were therefore carried out especially on such materials. It has been shown that there is no clear favourite and V2A, X90 and hard chrome plated steel are all suitable. Hard-anodised aluminium is also well suited for both linear and rotating movements.

► Shaft materials, page 71

iglidur® A350	Dry	Greases	Oil	Water
C.o.f. μ	0.1–0.2	0.09	0.04	0.04

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

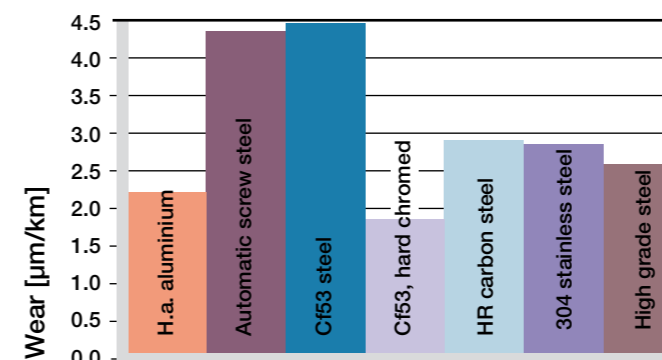


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1 MPa, v = 0.3 m/s

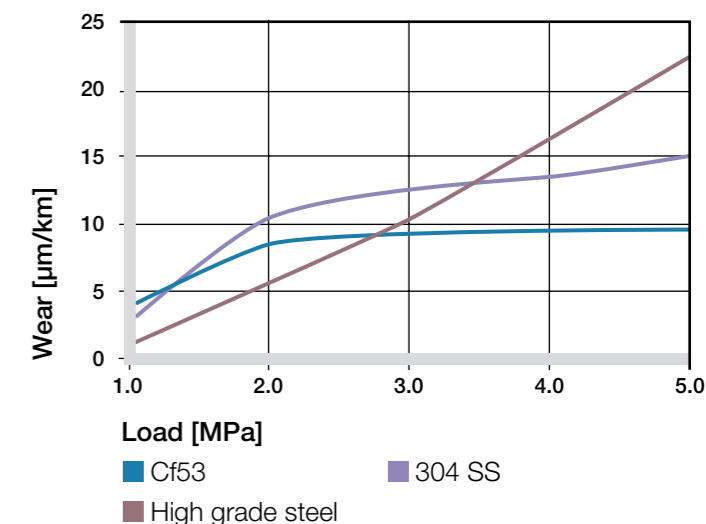


Diagram 07: Wear, rotating with different shaft materials, as a function of the pressure

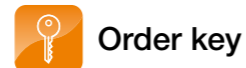
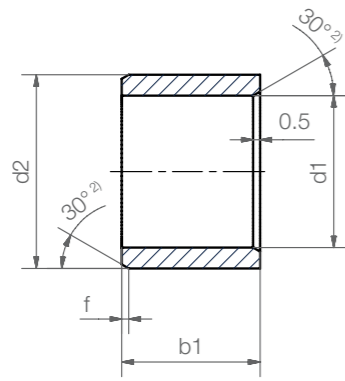
Installation tolerances

iglidur® A350 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® A350 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 05: Important tolerances for plain bearings according to ISO 3547-1 after pressfit



Order key

Type Dimensions
A350 S M-06 08-06

iglidur® material	Form S	Metric	Inner-Ø d1 [mm]	Outer-Ø d2 [mm]	Length b1 [mm]
-------------------	--------	--------	-----------------	-----------------	----------------

Dimensions according to ISO 3547-1 and special dimensions

²⁾ thickness < 1 mm, chamfer = 20°

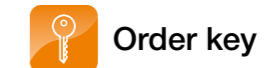
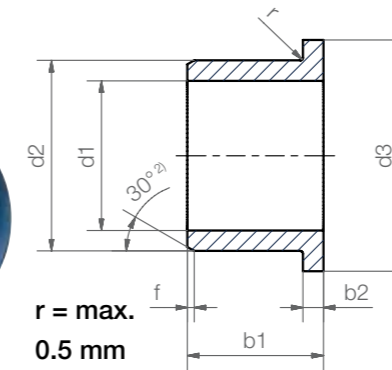
Chamfer in relation to the d1

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]

d1	d1-Tolerance ³⁾	d2	b1 h13	Part No.
6.0	+0.010 +0.058	8.0	6.0	A350SM-0608-06
8.0	+0.013 +0.071	10.0	10.0	A350SM-0810-10
10.0	+0.013 +0.071	12.0	10.0	A350SM-1012-10
12.0	+0.016 +0.068	14.0	12.0	A350SM-1214-12
16.0	+0.016 +0.068	18.0	15.0	A350SM-1618-15
16.0	+0.016 +0.068	18.0	25.0	A350SM-1618-25
20.0	+0.020 +0.104	23.0	20.0	A350SM-2023-20
20.0	+0.020 +0.104	23.0	30.0	A350SM-2023-30
24.0	+0.020 +0.104	28.0	30.0	A350SM-2428-30
28.0	+0.020 +0.104	32.0	30.0	A350SM-2832-30
32.0	+0.025 +0.125	36.0	40.0	A350SM-3236-40
40.0	+0.025 +0.125	44.0	50.0	A350SM-4044-50
50.0	+0.025 +0.125	55.0	50.0	A350SM-5055-50

³⁾ after pressfit. Testing methods ► Page 75



Order key

Type Dimensions
A350 F M-06 08-06

iglidur® material	Form F	Metric	Inner-Ø d1 [mm]	Outer-Ø d2 [mm]	Length b1 [mm]
-------------------	--------	--------	-----------------	-----------------	----------------

Dimensions according to ISO 3547-1 and special dimensions

²⁾ thickness < 1 mm, chamfer = 20°

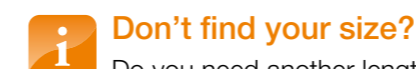
Chamfer in relation to the d1

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

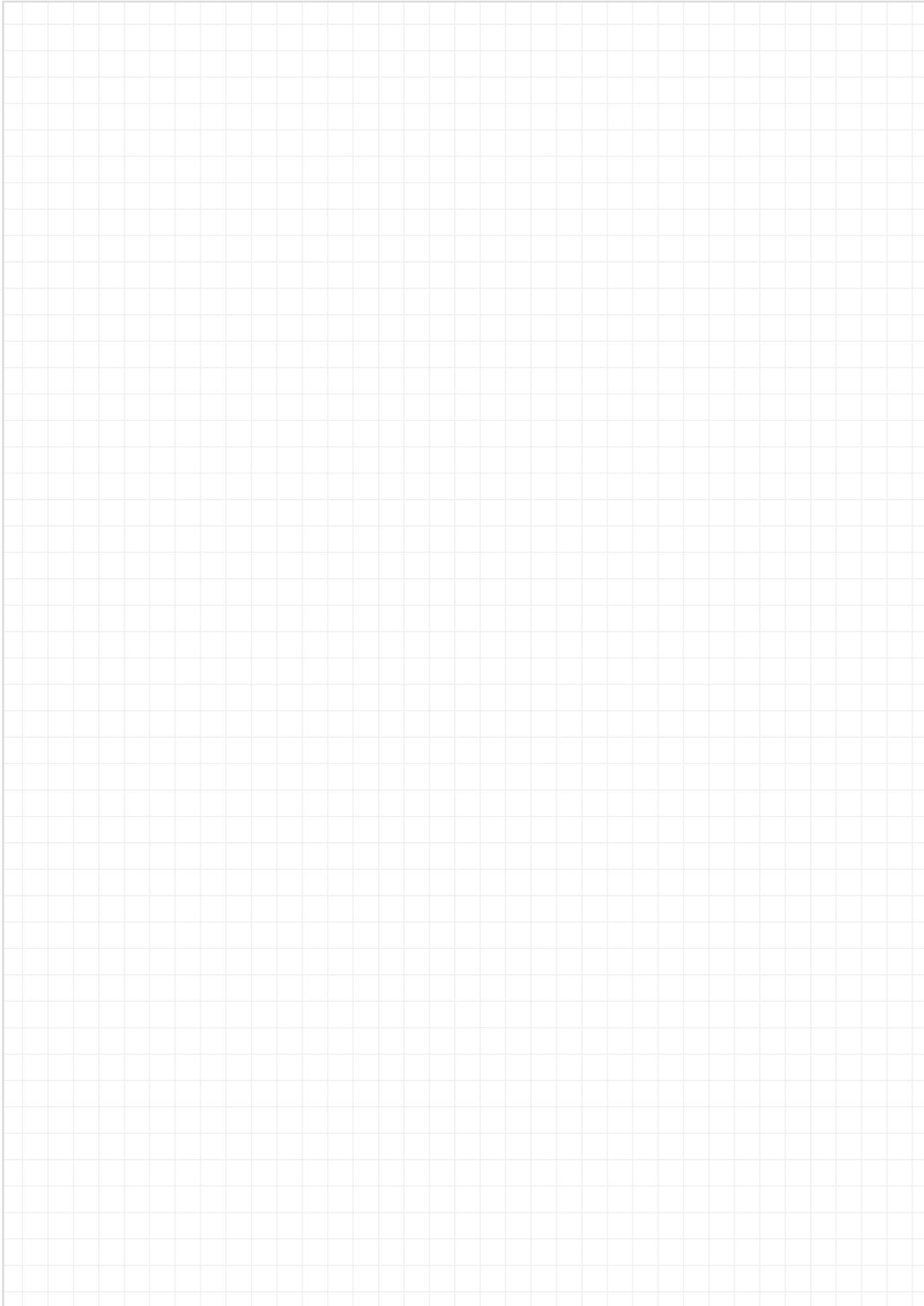
Dimensions [mm]

d1	d1-Tolerance ³⁾	d2	d3 d13	b1 h13	b2 -0.14	Part No.
5.0	+0.010 +0.058	7.0	11.0	5.0	1.0	A350FM-0507-05
6.0	+0.010 +0.058	8.0	12.0	6.0	1.0	A350FM-0608-06
8.0	+0.013 +0.071	10.0	15.0	10.0	1.0	A350FM-0810-10
10.0	+0.013 +0.071	12.0	18.0	10.0	1.0	A350FM-1012-10
12.0	+0.016 +0.068	14.0	20.0	12.0	1.0	A350FM-1214-12
16.0	+0.016 +0.068	18.0	24.0	17.0	1.0	A350FM-1618-17
20.0	+0.020 +0.104	23.0	30.0	21.5	1.5	A350FM-2023-21
35.0	+0.025 +0.125	39.0	47.0	26.0	2.0	A350FM-3539-26

³⁾ after pressfit. Testing methods ► Page 75



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.



Temperature and chemical resistance, FDA-compliant – iglidur® A500

- Compliant with EC directive 10/2011 EC
- FDA-compliant
- Temperature resistant from -100°C to $+250^{\circ}\text{C}$
- High chemical resistance
- Lubrication and maintenance free
- Standard range from stock

Compliant with EC directive 10/2011 EC

Temperature resistant from -100°C to +250°C

High chemical resistance

Polymer bearings made from iglidur® A500 can be exposed to extremely high temperatures and consist of materials suitable for direct contact with food (FDA-conformity).



When to use it?

- When FDA compliance is required
- When a high chemical resistance is required
- Good abrasion resistance
- Temperature resistant from -100°C to +250°C



When not to use it?

- When extremely high wear resistance is required
 - ▶ iglidur® X6, page 247
 - ▶ iglidur® Z, page 263
- If no resistance to temperature or chemicals is required
 - ▶ iglidur® A180, page 325
 - ▶ iglidur® A200, page 341
- When a cost-effective universal bearing is required
 - ▶ iglidur® G, page 83
 - ▶ iglidur® P, page 149



iglidur® A500 material complies with EC Directive 10/2011 EC and also with FDA (Food and Drug Administration) specifications for repeated contact with food.



Available from stock

Detailed information about delivery time online.



max. +250°C
min. -100°C



Block pricing online

No minimum order value. From batch size 1



Ø 4–50 mm
more dimensions on request



Typical application areas

- Food industry
- Beverage technology
- Medical, etc.

Material properties table

General properties	Unit	iglidur® A500	Testing method
Density	g/cm³	1.28	
Colour		brown	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	0.3	DIN 53495
Max. water absorption	% weight	0.5	
Coefficient of sliding friction, dynamic against steel	μ	0.26–0.41	
pv value, max. (dry)	MPa · m/s	0.28	
Mechanical properties			
Modulus of elasticity	MPa	3,600	DIN 53457
Tensile strength at +20 °C	MPa	140	DIN 53452
Compressive strength	MPa	118	
Max. recommended surface pressure (+20 °C)	MPa	120	
Shore-D hardness		83	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+250	
Max. short term application temperature	°C	+300	
Min. application temperature	°C	-100	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	K ⁻¹ · 10 ⁻⁵	9	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 ¹⁴	DIN IEC 93
Surface resistance	Ω	> 10 ¹³	DIN 53482

Table 01: Material properties table

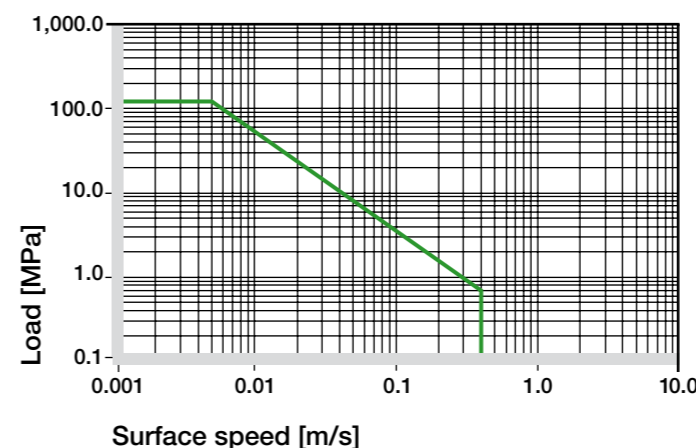


Diagram 01: Permissible pv values for iglidur® A500 bearings with a wall thickness of 1 mm dry running against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

The moisture absorption of iglidur® A500 plain bearings is only 0.5 % when saturated.

▶ **Diagram, www.igus.eu/a500-moisture**

Vacuum

In a vacuum, iglidur® A500 plain bearings can only be used to a limited degree.

Radiation resistance

The iglidur® A500 bearings are resistant up to a radiation intensity of 2 · 10⁵ Gy.

UV resistance

To a large extent, iglidur® A500 plain bearings are resistant to UV radiation.

Medium	Resistance
Alcohols	+
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 02: Chemical resistance

▶ **Chemical table, page 1226**

Bearings made from iglidur® A500 can be used at high temperatures and are permitted for use in direct contact with foodstuffs (FDA compatible). They exhibit an exceptionally good chemical resistance and are suitable for heavy-duty use in machinery for the food industry. Though iglidur® A500 is an extremely soft material, it simultaneously possesses an excellent compressive strength even at high temperatures.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® A500 plain bearings decreases. The diagram 02 shows this inverse relationship. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

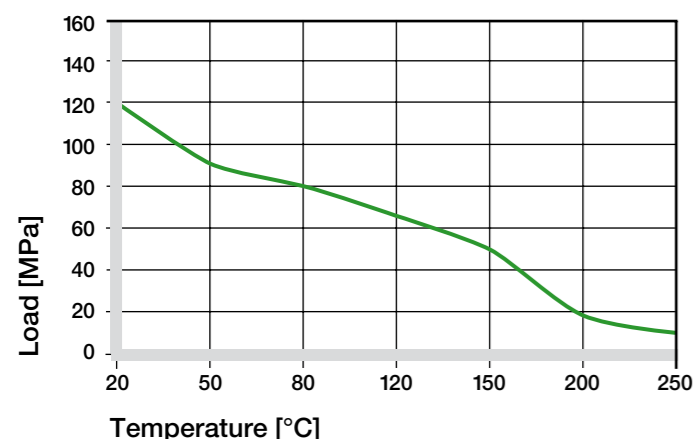


Diagram 02: Recommended maximum surface pressure of as a function of temperature (120 MPa at +20 °C)

Diagram 02 shows the maximum recommended surface pressure of the bearing dependent on the temperature. This combination of high stability and high flexibility acts very positively with vibrations and edge loads. As the wear of the bearing rapidly escalates from pressures of 10 to 20 MPa, we recommend a particularly accurate testing of the application above these limits.

► Surface pressure, page 63

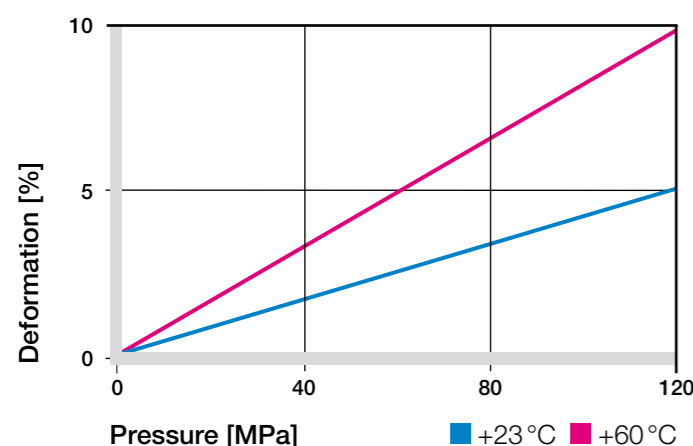


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® A500 also permits high surface speeds due to the high temperature resistance. The coefficient of friction rises however by these high rotary speeds leading to a higher heating up of the bearing. Tests show that bearings made from iglidur® A500 have a better wear resistance and higher permitted pv values in pivoting applications.

► Surface speed, page 65

m/s	Rotating	Oscillating	Linear
Continuous	0.6	0.4	1
Short term	1	0.7	2

Table 03: Maximum surface speeds

Temperatures

The short-term permitted maximum application temperature is +300 °C. With increasing temperatures, the compressive strength of iglidur® J500 plain bearings decreases. The diagram 02 shows this relationship. The temperatures prevailing in the bearing system also have an influence on the bearing wear. At temperatures over +130 °C an additional securing is required.

► Application temperatures, page 66

► Additional securing, page 67

Friction and wear

The coefficient of friction is dependent on the load that acts on the bearing (diagrams 04 and 05).

► Coefficients of friction and surfaces, page 68

► Wear resistance, page 69

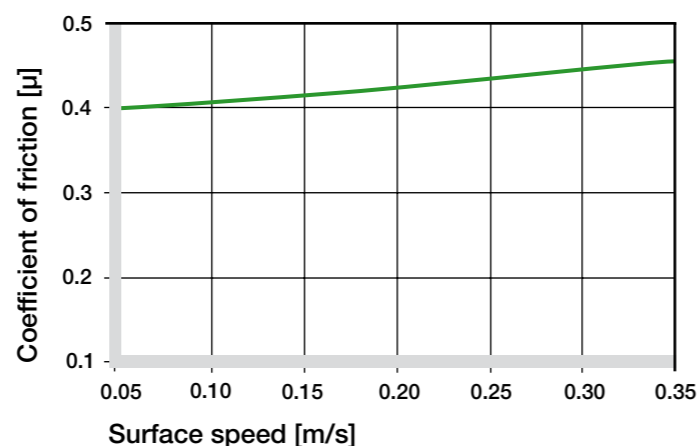


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75 MPa

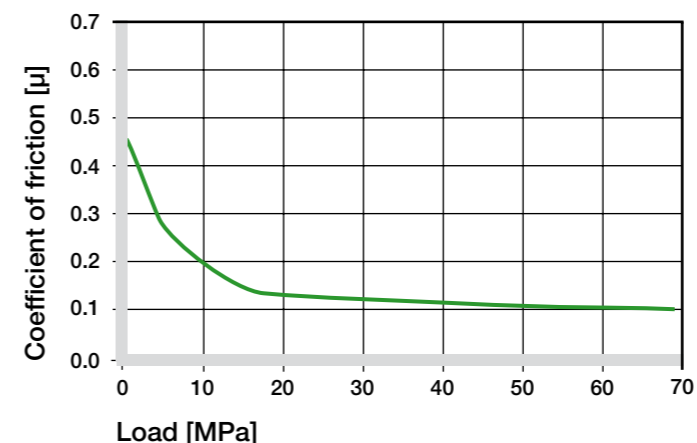


Diagram 05: Coefficient of friction as a function of the pressure, v = 0.01 m/s

Shaft materials

Diagram 06 displays a summary of the results of tests with different shaft materials conducted with bearings made from iglidur® A500. The combination "iglidur® A500/hard-chromed shaft" clearly stands out in rotating application. Up to about 2.0 MPa, the wear of this combination remains largely independent of load. In pivoting applications with Cf53 shafts, the wear resistance is better than in rotations under equal load.

Please contact us in case the shaft material scheduled by you is not included in these figures.

► Shaft materials, page 71

iglidur® A500	Dry	Greases	Oil	Water
C. o. f. μ	0.26–0.41	0.09	0.04	0.04

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

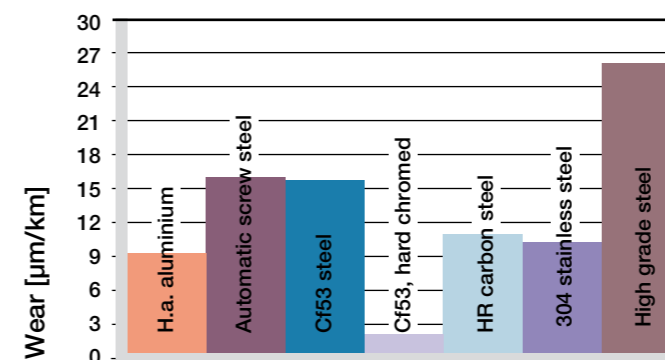


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1 MPa, v = 0.3 m/s

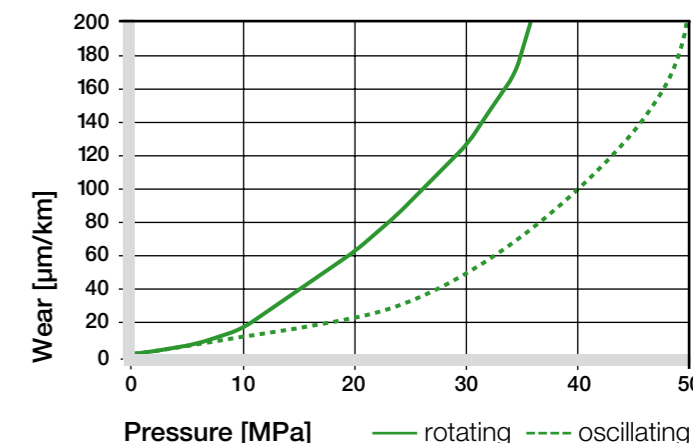


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the pressure

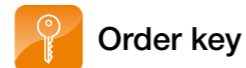
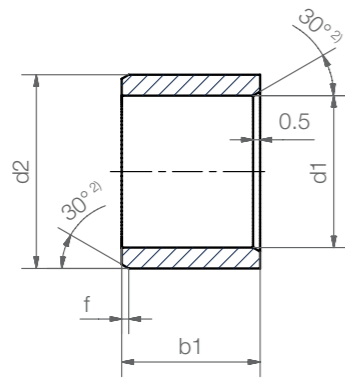
Installation tolerances

iglidur® A500 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® A500 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 05: Important tolerances for plain bearings according to ISO 3547-1 after pressfit



Order key

Type Dimensions
A500 S M-0507-05

iglidur® material	Form S	Metric	Inner-Ø d1 [mm]	Outer-Ø d2 [mm]	Length b1 [mm]
-------------------	--------	--------	-----------------	-----------------	----------------

Dimensions according to ISO 3547-1 and special dimensions

²⁾ thickness < 1 mm, chamfer = 20°

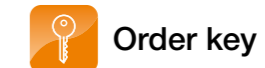
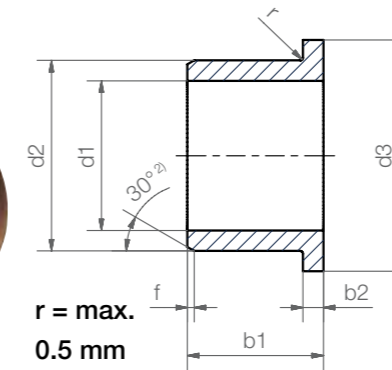
Chamfer in relation to the d1

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]

d1	d1-Tolerance ³⁾	d2	b1 h13	Part No.
5.0	+0.010 +0.058	7.0	5.0	A500SM-0507-05
8.0	+0.013 +0.071	10.0	6.0	A500SM-0810-06
8.0	+0.013 +0.071	10.0	10.0	A500SM-0810-10
8.0	+0.013 +0.071	10.0	12.0	A500SM-0810-12
10.0	+0.013 +0.071	12.0	12.0	A500SM-1012-12
12.0	+0.016 +0.086	14.0	15.0	A500SM-1214-15
12.0	+0.016 +0.086	15.0	15.0	A500SM-1215-15
14.0	+0.016 +0.086	16.0	16.0	A500SM-1416-16
20.0	+0.020 +0.104	23.0	30.0	A500SM-2023-30
22.0	+0.020 +0.104	25.0	30.0	A500SM-2225-30
25.0	+0.020 +0.104	28.0	30.0	A500SM-2528-30
32.0	+0.025 +0.125	36.0	30.0	A500SM-3236-30
35.0	+0.025 +0.125	39.0	50.0	A500SM-3539-50
50.0	+0.025 +0.125	55.0	30.0	A500SM-5055-30

³⁾ after pressfit. Testing methods ► Page 75



Order key

Type Dimensions
A500 F M-0405-04

iglidur® material	Form F	Metric	Inner-Ø d1 [mm]	Outer-Ø d2 [mm]	Length b1 [mm]
-------------------	--------	--------	-----------------	-----------------	----------------

Dimensions according to ISO 3547-1 and special dimensions

²⁾ thickness < 1 mm, chamfer = 20°

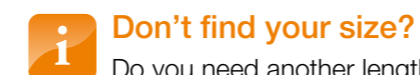
Chamfer in relation to the d1

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]

d1	d1-Tolerance ³⁾	d2	d3 d13	b1 h13	b2 -0.14	Part No.
4.0	+0.010 +0.058	5.5	9.5	4.0	0.75	A500FM-0405-04
4.0	+0.010 +0.058	8.0	12.0	6.0	2.0	A500FM-0408-06
6.0	+0.010 +0.058	8.0	12.0	6.0	1.0	A500FM-0608-06
6.0	+0.010 +0.058	8.0	12.0	8.0	1.0	A500FM-0608-08
8.0	+0.013 +0.071	10.0	15.0	10.0	1.0	A500FM-0810-10
10.0	+0.013 +0.071	12.0	18.0	7.0	1.0	A500FM-1012-07
10.0	+0.013 +0.071	12.0	18.0	9.0	1.0	A500FM-1012-09
10.0	+0.013 +0.071	12.0	18.0	15.0	1.0	A500FM-1012-15
12.0	+0.016 +0.086	14.0	20.0	13.0	1.0	A500FM-1214-13
12.0	+0.016 +0.086	14.0	20.0	15.0	1.0	A500FM-1214-15
15.0	+0.016 +0.086	17.0	23.0	17.0	1.0	A500FM-1517-17
16.0	+0.016 +0.086	18.0	24.0	17.0	1.0	A500FM-1618-17
20.0	+0.020 +0.104	23.0	30.0	21.5	1.5	A500FM-2023-21
30.0	+0.020 +0.104	34.0	42.0	40.0	2.0	A500FM-3034-40
35.0	+0.025 +0.125	39.0	47.0	40.0	2.0	A500FM-3539-40

³⁾ 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.



Even more dimensions from stock

More than 300 dimensions are now available. Search online for your required bearing.

► www.igus.eu/iglidur-specialbearings



Chemicals & food, compliant per EC directive 10/2011 EC – iglidur® A160

- Compliant with EC directive 10/2011 EC
- FDA-compliant
- High media resistance
- Low priced
- Lubrication and maintenance free
- Standard range from stock

Compliant with EC directive 10/2011 EC

High media resistance

Low priced

Lubrication and maintenance free

iglidur® A160 offers maximum media resistance in the medium temperature range and is therefore a true low-cost iglidur®. The profile of properties is completed by the suitability for applications in the food industry.



When to use it?

- When a bearing with maximum media resistance is required at normal temperatures
- When a very cost-effective bearing with high media resistance is required
- When a material compliant with the 10/2011 EC is required



When not to use it?

- When a universal material for the food industry is required
 - ▶ iglidur® A180, page 325
 - ▶ iglidur® A181, page 333
- When a very media-resistant bearing is required for applications at more than +90 °C
 - ▶ iglidur® A500, page 359
 - ▶ iglidur® X, page 133
- When a low-cost material with high wear resistance is required for dry running
 - ▶ iglidur® R, page 223



iglidur® A160 material complies with EC Directive 10/2011 EC and also with FDA (Food and Drug Administration) specifications for repeated contact with food.



Available from stock

Detailed information about delivery time online.



max. +90 °C
min. -50 °C



Block pricing online

No minimum order value. From batch size 1



Ø 6–20 mm
more dimensions on request



Typical application areas

- Food industry
- Beverage technology
- Medical, etc.

Material properties table

General properties	Unit	iglidur® A160	Testing method
Density	g/cm³	1.00	
Colour		blue	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	0.1	DIN 53495
Max. water absorption	% weight	0.1	
Coefficient of sliding friction, dynamic against steel	μ	0.09–0.19	
pv value, max. (dry)	MPa · m/s	0.25	
Mechanical properties			
Modulus of elasticity	MPa	1,151	DIN 53457
Tensile strength at +20 °C	MPa	19	DIN 53452
Compressive strength	MPa	37	
Max. recommended surface pressure (+20 °C)	MPa	15	
Shore-D hardness		60	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+90	
Max. short term application temperature	°C	+100	
Min. application temperature	°C	-50	
Thermal conductivity	W/m · K	0.30	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	K ⁻¹ · 10 ⁻⁵	11	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 ¹²	DIN IEC 93
Surface resistance	Ω	> 10 ¹²	DIN 53482

Table 01: Material properties table

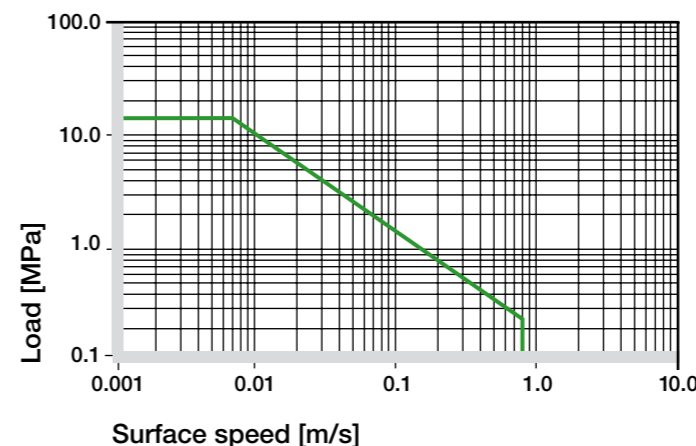


Diagram 01: Permissible pv values for iglidur® A160 bearings with a wall thickness of 1 mm dry running against a steel shaft, at +20 °C, mounted in a steel housing

Moisture absorption

The moisture absorption of iglidur® A160 plain bearings is approximately 0.1 % in ambient conditions. The saturation limit submerged in water is also approximately 0.1 %.

▶ Diagram, www.igus.eu/a160-moisture

Vacuum

When used in a vacuum, the iglidur® A160 plain bearings release moisture as a vapour. Use in a vacuum environment is only possible with dehumidified bearings.

Radiation resistance

Plain bearings made from iglidur® A160 are resistant to radiation up to an intensity of 1 · 10⁵ Gy.

UV resistance

iglidur® A160 plain bearings are partially resistant to UV radiation.

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

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

Table 02: Chemical resistance

▶ Chemical table, page 1226

iglidur® A160 plain bearings are characterised by extreme media resistance at a low cost. Tribologically optimised, the material can be used in up to +90 °C and also possesses conformities demanded in the food processing sector. The profile of properties is completed by the "optical detectability", i.e. the blue colour, often required in the industry.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® A160 plain bearings decreases. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

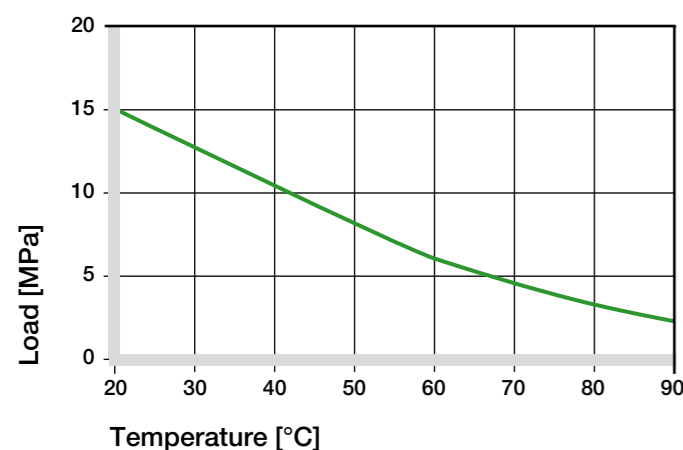


Diagram 02: Recommended maximum surface pressure of as a function of temperature (15 MPa at +20 °C)

Diagram 03 shows the elastic deformation of iglidur® A160 during radial loading. Plastic deformation is minimal up to a radial load of 15 MPa. It is nonetheless depending on the duration of the applied force.

► Surface pressure, page 63

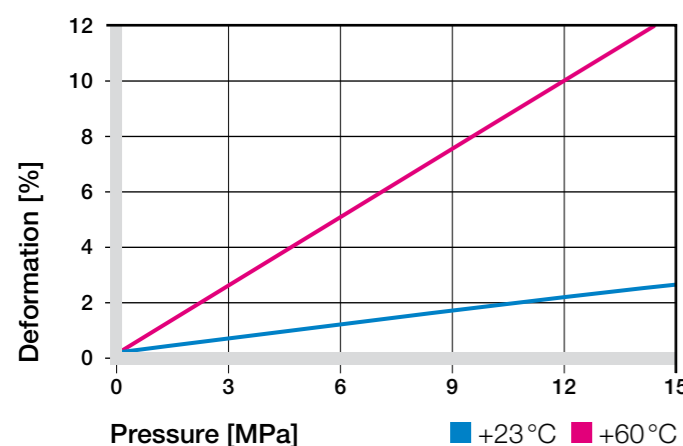


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® A160 was developed for low surface speeds. Maximum speeds up to 0.5 m/s (rotating) and 2.0 m/s (linear) respectively are permitted for continuous application in dry operation.

The given values in table 03 indicate the limits at which an increase up to the continuous permissible temperature occurs. This increase is a result of friction. In practice, though, this temperature level is rarely reached, due to varying application conditions.

► Surface speed, page 65

► pv value and lubrication, page 65

m/s	Rotating	Oscillating	Linear
Continuous	0.5	0.4	2
Short term	0.7	0.6	3

Table 03: Maximum surface speeds

Temperatures

With increasing temperatures, the compressive strength of iglidur® A160 plain bearings decreases. The diagram 02 shows this inverse relationship. The temperatures prevailing in the bearing system also have an influence on the bearing wear. At temperatures over +60 °C an additional securing is required.

► Application temperatures, page 66

► Additional securing, page 67

Friction and wear

Coefficient of friction and wear resistance alter with the application parameters. For iglidur® A160 bearings, the alteration of the coefficient of friction μ depends on surface speed and the shaft surface finish is only negligently pronounced. With increasing load, the coefficient of friction however sinks markedly. In the Ra range between 0.6 and 0.7 μm , the coefficient of friction attains the optimum value.

► Coefficients of friction and surfaces, page 68

► Wear resistance, page 69

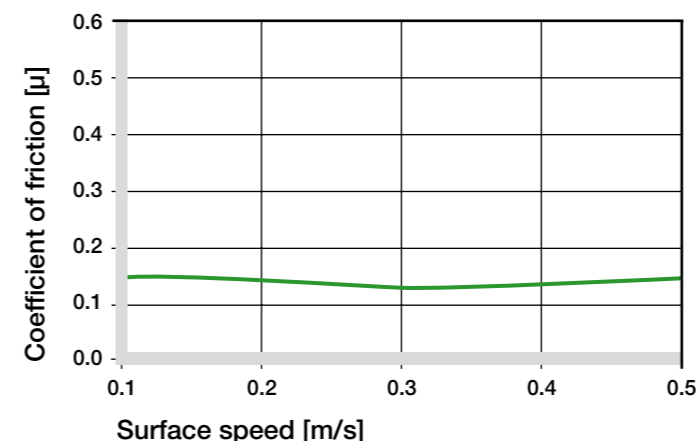


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1 MPa

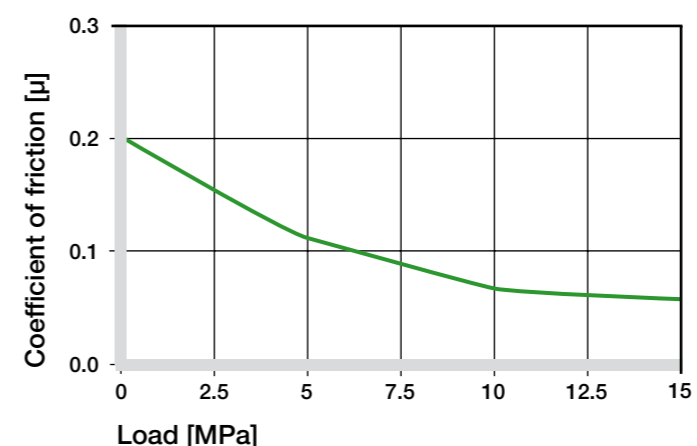


Diagram 05: Coefficient of friction as a function of the pressure, v = 0.01 m/s

Shaft materials

Diagram 06 shows results of testing different shaft materials with plain bearings made from iglidur® A160 running dry. For rotational applications with low loads, the most interesting, media- and corrosion-resistant shaft materials V2A, X90 and hard chrome-plated steel reveal themselves as particularly good counter partners. On X90 shafts, however, the wear increases the fastest with the load (diagram 06). With Cf53 shafts, the wear in pivoting applications is exemplary compared to rotating applications. In rotation the wear, as with many other iglidur® materials, is higher than when pivoting (diagram 07).

► Shaft materials, page 71

iglidur® A160	Dry	Greases	Oil	Water
C.o.f. μ	0.09–0.19	0.08	0.03	0.04

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

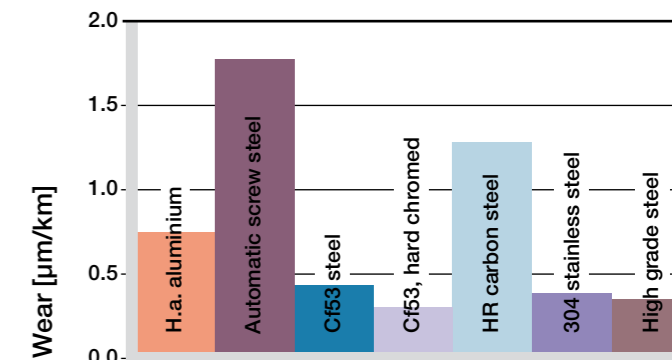


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1 MPa, v = 0.3 m/s

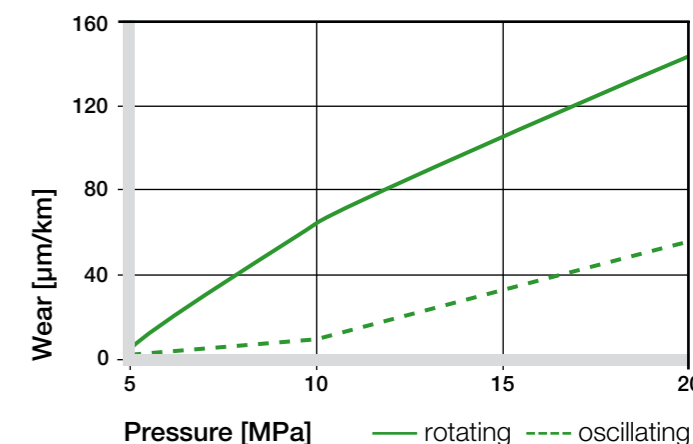


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the pressure

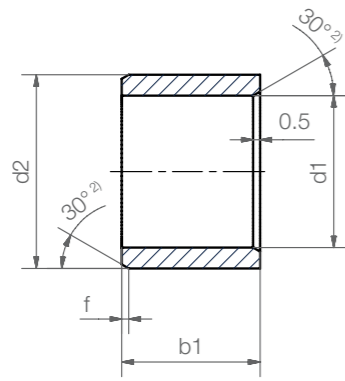
Installation tolerances

iglidur® A160 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® A160 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

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



Order key

Type Dimensions
A160 S M-0608-06

iglidur® material	Form S	Metric	Inner-Ø d1 [mm]	Outer-Ø d2 [mm]	Length b1 [mm]
-------------------	--------	--------	-----------------	-----------------	----------------

Dimensions according to ISO 3547-1 and special dimensions

²⁾ thickness < 1 mm, chamfer = 20°

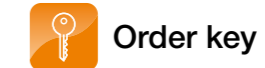
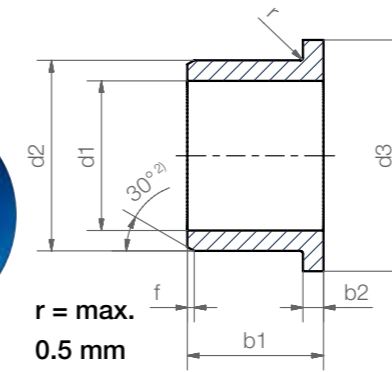
Chamfer in relation to the d1

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]

d1	d1-Tolerance ³⁾	d2	b1 h13	Part No.
6.0	+0.020 +0.068	8.0	6.0	A160SM-0608-06
8.0	+0.025 +0.083	10.0	10.0	A160SM-0810-10
10.0	+0.025 +0.083	12.0	10.0	A160SM-1012-10
12.0	+0.032 +0.102	14.0	12.0	A160SM-1214-12
16.0	+0.032 +0.102	18.0	15.0	A160SM-1618-15
20.0	+0.040 +0.124	23.0	20.0	A160SM-2023-20

³⁾ after pressfit. Testing methods ► Page 75



Order key

Type Dimensions
A160 F M-0608-06

iglidur® material	Form F	Metric	Inner-Ø d1 [mm]	Outer-Ø d2 [mm]	Length b1 [mm]
-------------------	--------	--------	-----------------	-----------------	----------------

Dimensions according to ISO 3547-1 and special dimensions

²⁾ thickness < 1 mm, chamfer = 20°

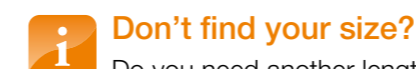
Chamfer in relation to the d1

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

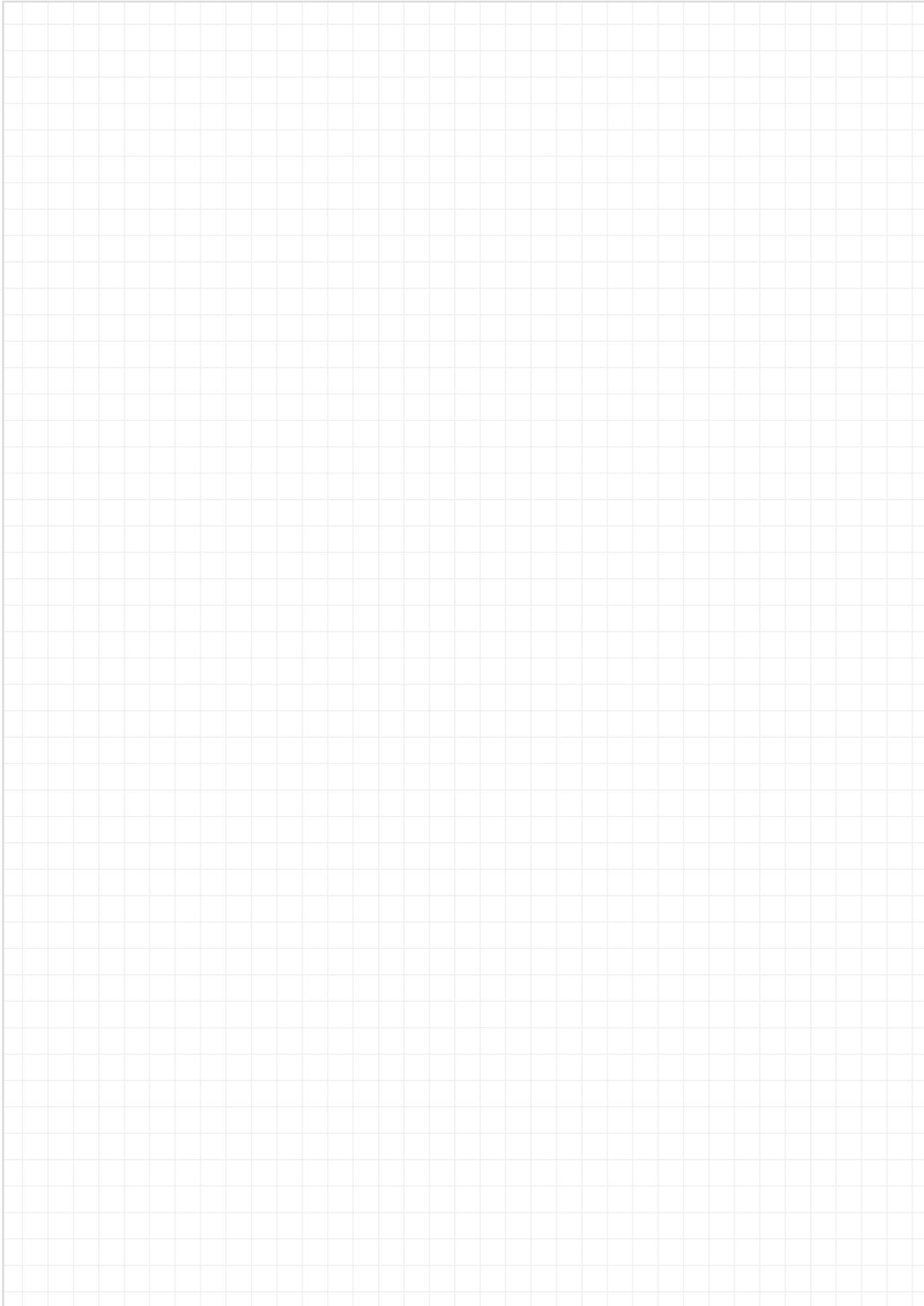
Dimensions [mm]

d1	d1-Tolerance ³⁾	d2	d3 d13	b1 h13	b2 -0.14	Part No.
6.0	+0.020 +0.068	8.0	12.0	6.0	1.0	A160FM-0608-06
8.0	+0.025 +0.083	10.0	15.0	10.0	1.0	A160FM-0810-10
10.0	+0.025 +0.083	12.0	18.0	10.0	1.0	A160FM-1012-10
12.0	+0.032 +0.102	14.0	20.0	12.0	1.0	A160FM-1214-12
16.0	+0.032 +0.102	18.0	24.0	17.0	1.0	A160FM-1618-17
20.0	+0.040 +0.124	23.0	30.0	21.5	1.5	A160FM-2023-21

³⁾ after pressfit. Testing methods ► Page 75

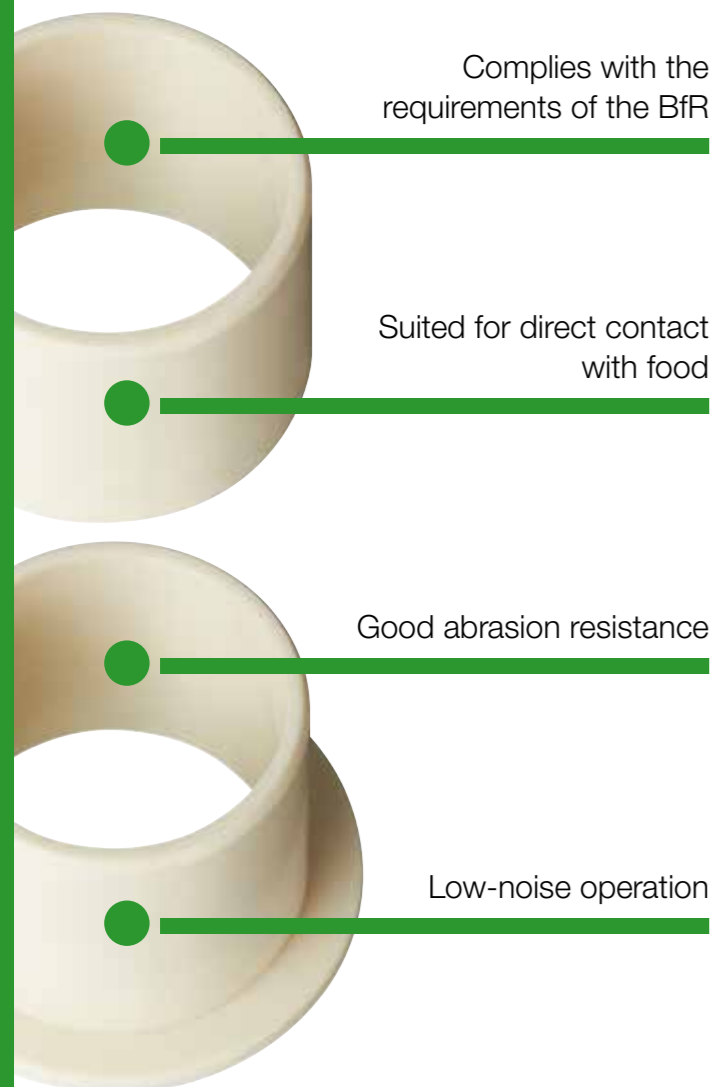


Do you need another length, other dimensions or tolerances? You need a particular design or alternative for your application? Please call us. igus® listens to your needs and provides you a solution in a very short time.



Robust – iglidur® A290

- Complies with the requirements of the BfR
- For direct contact with food
- Good abrasion resistance
- If low noise level is required
- Lubrication and maintenance free
- Standard range from stock



The bearings comply with the requirements of the BfR for contact with food. For medium and high loads.



When to use it?

- Suitable for contact with food
- For low speeds
- If low noise level is required
- Physiologically safe
- Very good mechanical properties



When not to use it?

- When the material's FDA compliance is necessary
 - ▶ iglidur® A180, page 325
 - ▶ iglidur® A200, page 341
 - ▶ iglidur® A500, page 359
- When highest wear resistance is required
 - ▶ iglidur® W300, page 121
- When temperatures are continuously greater than +140 °C
 - ▶ iglidur® A500, page 359
 - ▶ iglidur® H, page 283
 - ▶ iglidur® X, page 133
- When a cost-effective universal bearing is required
 - ▶ iglidur® G, page 83



The material iglidur® A290 complies with the requirements of the BfR (German institute for food safety) for contact with food.



Available from stock

Detailed information about delivery time online.



max. +140 °C
min. -40 °C



Block pricing online

No minimum order value. From batch size 1



Ø 3–50 mm
more dimensions on request



Typical application areas

- Food industry

Material properties table

General properties	Unit	iglidur® A290	Testing method
Density	g/cm³	1.41	
Colour		white	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	1.7	DIN 53495
Max. water absorption	% weight	7.3	
Coefficient of sliding friction, dynamic against steel	μ	0.13–0.40	
pv value, max. (dry)	MPa · m/s	0.23	
Mechanical properties			
Modulus of elasticity	MPa	8,800	DIN 53457
Tensile strength at +20 °C	MPa	250	DIN 53452
Compressive strength	MPa	91	
Max. recommended surface pressure (+20 °C)	MPa	70	
Shore-D hardness		88	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+140	
Max. short term application temperature	°C	+180	
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	7	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 ¹¹	DIN IEC 93
Surface resistance	Ω	> 10 ¹¹	DIN 53482

Table 01: Material properties table

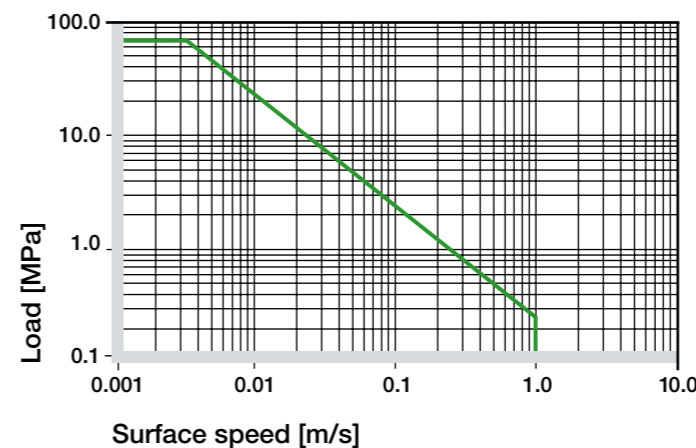


Diagram 01: Permissible pv values for iglidur® A290 bearings with a wall thickness of 1 mm dry running against a steel shaft, at +20 °C, mounted in a steel housing

Moisture absorption

The moisture absorption of iglidur® A290 bearings is approximately 1.7 % in ambient conditions. The saturation limit in water is 7.3 %, a disadvantage which must be accounted for by all means in applications in humid and wet areas.

▶ Diagram, www.igus.eu/a290-moisture

Vacuum

In a vacuum environment iglidur® A290 plain bearings have limited use due to the high moisture absorption.

Radiation resistance

Plain bearings made from iglidur® A290 are resistant to radiation up to an intensity of 3 · 10² Gy.

UV resistance

iglidur® A290 is resistant to UV radiation but its tribological properties can be affected.

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

+ resistant 0 conditionally resistant - not resistant

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

Table 02: Chemical resistance

▶ Chemical table, page 1226

iglidur® A290 bearings are an advanced development for the use in food industry. Compared to the bearings made from iglidur® A200, the tribological properties could be significantly improved.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® A290 plain bearings decreases. The diagram 02 shows this inverse relationship. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

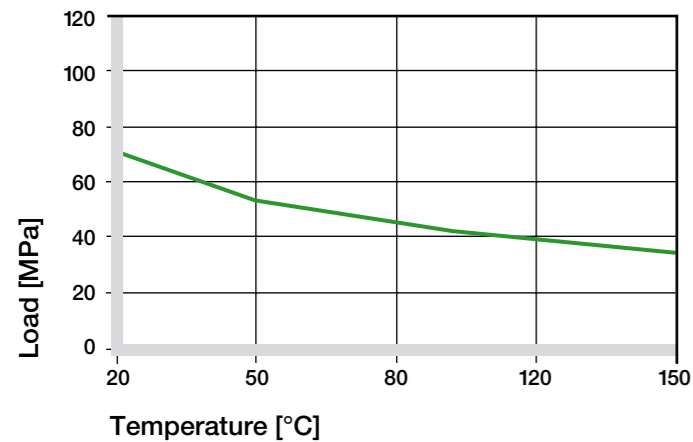


Diagram 02: Recommended maximum surface pressure of as a function of temperature (70 MPa at +20 °C)

At this load, the deformation is only about 2.5% at room temperature. A plastic deformation can be negligible up to this load. It is nonetheless depending on the duration of the applied pressure. Diagram 03 shows the deformation of iglidur® A290 as a function of radial pressure.

► Surface pressure, page 63

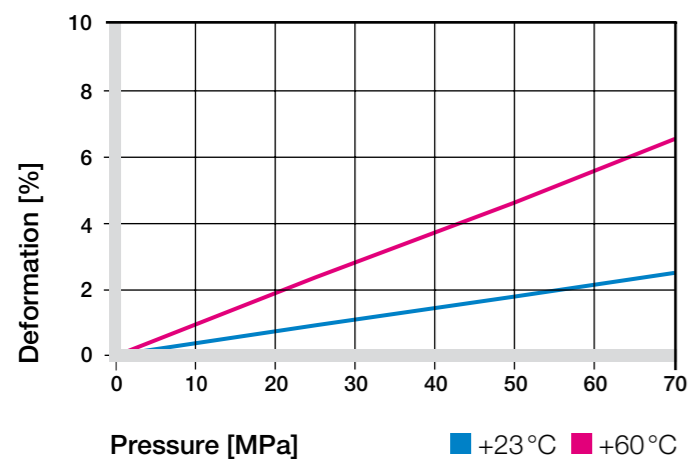


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® A290 is suitable for low surface speeds. Due to the relatively high friction particularly in the low load range, the bearings made from iglidur® A290 heat more strongly than other bearings. With higher speeds, the friction also increases.

► Surface speed, page 65

m/s	Rotating	Oscillating	Linear
Continuous	1	0.7	3
Short term	2	1.4	4

Table 03: Maximum surface speeds

Temperatures

With increasing temperatures, the compressive strength of iglidur® A290 plain bearings decreases. The diagram 02 shows this relationship. The ambient application temperature has a direct impact on bearing wear, an increase in temperature results in an increase in wear. With increasing temperatures, the wear increases and this effect is significant when temperatures rise over +120 °C. At temperatures over +110 °C an additional securing is required.

- Application temperatures, page 66
- Additional securing, page 67

Friction and wear

The coefficient of friction alters like the wear resistance with increasing load and speed (diagrams 04 and 05).

- Coefficients of friction and surfaces, page 68
- Wear resistance, page 69

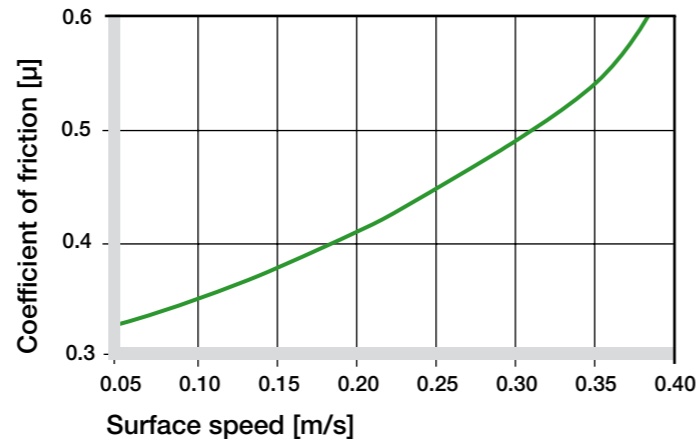


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75 MPa

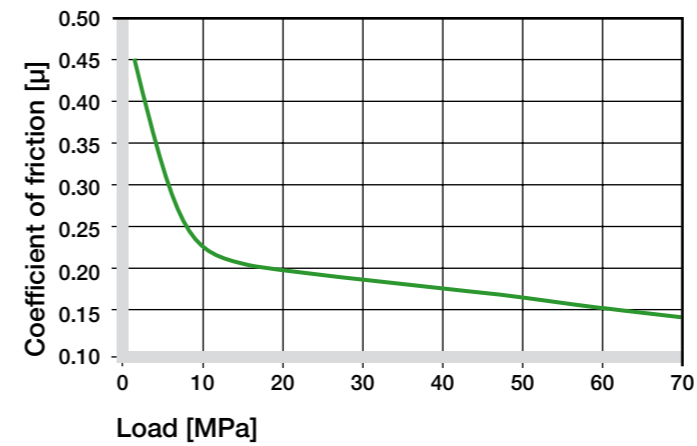


Diagram 05: Coefficient of friction as a function of the pressure, v = 0.01 m/s

Shaft materials

Diagrams 06 and 07 display a summary of the results of tests with different shaft materials conducted with bearings made from iglidur® A290. Compared to iglidur® A200, the improved tribological properties of iglidur® A290 are also reflected in the wear. At low loads, the differences in the wear resistance of the combinations of iglidur® A290 with different shaft materials are very distinct.

► Shaft materials, page 71

iglidur® A290	Dry	Greases	Oil	Water
C.o.f. μ	0.13–0.40	0.09	0.04	0.04

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

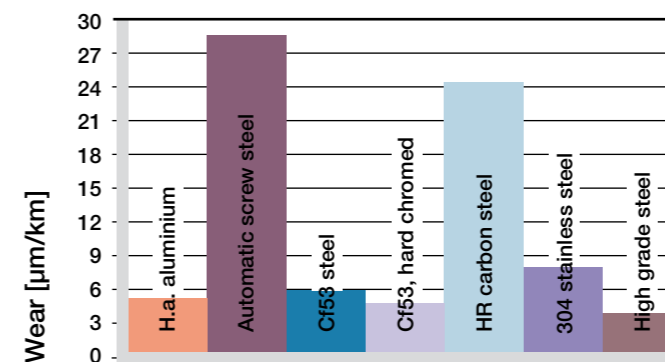


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1 MPa, v = 0.3 m/s

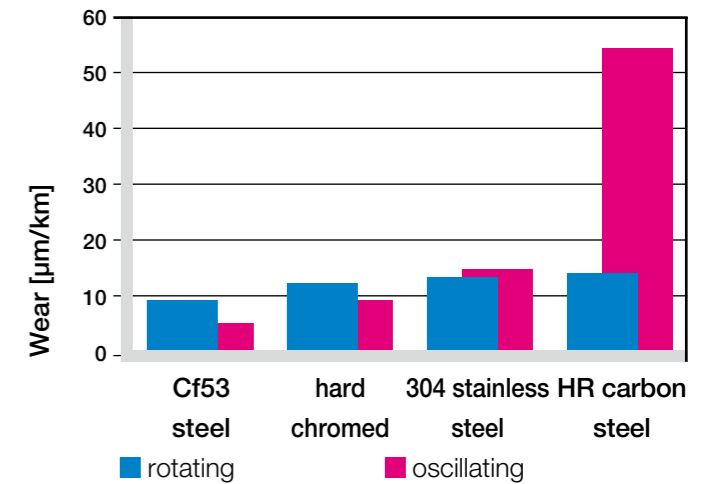


Diagram 07: Wear for rotating and oscillating applications with different shaft materials, p = 2 MPa

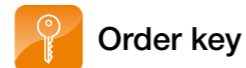
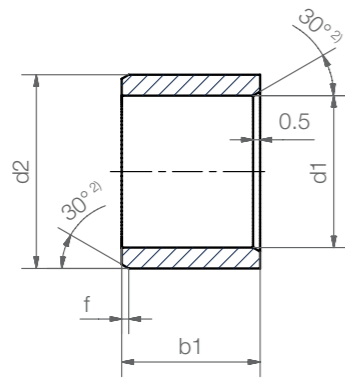
Installation tolerances

iglidur® A290 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 D11 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® A290 D11 [mm]	Housing H7 [mm]
up to 3	0–0.025	+0.020 +0.080	0 +0.010
> 3 to 6	0–0.030	+0.030 +0.105	0 +0.012
> 6 to 10	0–0.036	+0.040 +0.130	0 +0.015
> 10 to 18	0–0.043	+0.050 +0.160	0 +0.018
> 18 to 30	0–0.052	+0.065 +0.195	0 +0.021
> 30 to 50	0–0.062	+0.080 +0.240	0 +0.025
> 50 to 80	0–0.074	+0.100 +0.290	0 +0.030

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



Order key

Type Dimensions
A290 S M-0304-03

iglidur® material	Form S	Metric	Inner-Ø d1 [mm]	Outer-Ø d2 [mm]	Length b1 [mm]
-------------------	--------	--------	-----------------	-----------------	----------------

Dimensions according to ISO 3547-1 and special dimensions

²⁾ thickness < 1 mm, chamfer = 20°

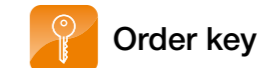
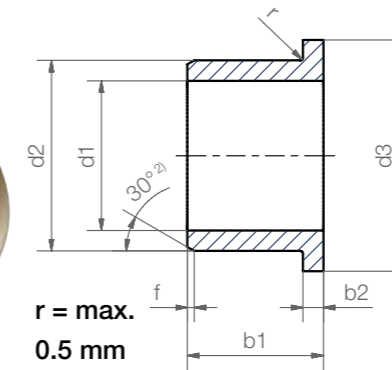
Chamfer in relation to the d1

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]

d1	d1-Tolerance ³⁾	d2	b1 h13	Part No.
3.0	+0.020 +0.080	4.5	3.0	A290SM-0304-03
4.0	+0.030 +0.105	5.5	4.0	A290SM-0405-04
5.0	+0.030 +0.105	7.0	5.0	A290SM-0507-05
6.0	+0.030 +0.105	8.0	6.0	A290SM-0608-06
8.0	+0.040 +0.130	10.0	8.0	A290SM-0810-08
10.0	+0.040 +0.130	12.0	10.0	A290SM-1012-10
12.0	+0.050 +0.160	14.0	15.0	A290SM-1214-15
15.0	+0.050 +0.160	17.0	15.0	A290SM-1517-15
16.0	+0.050 +0.160	18.0	15.0	A290SM-1618-15
18.0	+0.050 +0.160	20.0	15.0	A290SM-1820-15
20.0	+0.065 +0.195	23.0	20.0	A290SM-2023-20
25.0	+0.065 +0.195	28.0	20.0	A290SM-2528-20
30.0	+0.065 +0.195	34.0	30.0	A290SM-3034-30
35.0	+0.080 +0.240	39.0	40.0	A290SM-3539-40
40.0	+0.080 +0.240	44.0	50.0	A290SM-4044-50
50.0	+0.080 +0.240	55.0	40.0	A290SM-5055-40

³⁾ after pressfit. Testing methods ► Page 75



Order key

Type Dimensions
A290 F M-0405-06

iglidur® material	Form F	Metric	Inner-Ø d1 [mm]	Outer-Ø d2 [mm]	Length b1 [mm]
-------------------	--------	--------	-----------------	-----------------	----------------

Dimensions according to ISO 3547-1 and special dimensions

²⁾ thickness < 1 mm, chamfer = 20°

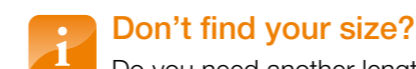
Chamfer in relation to the d1

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

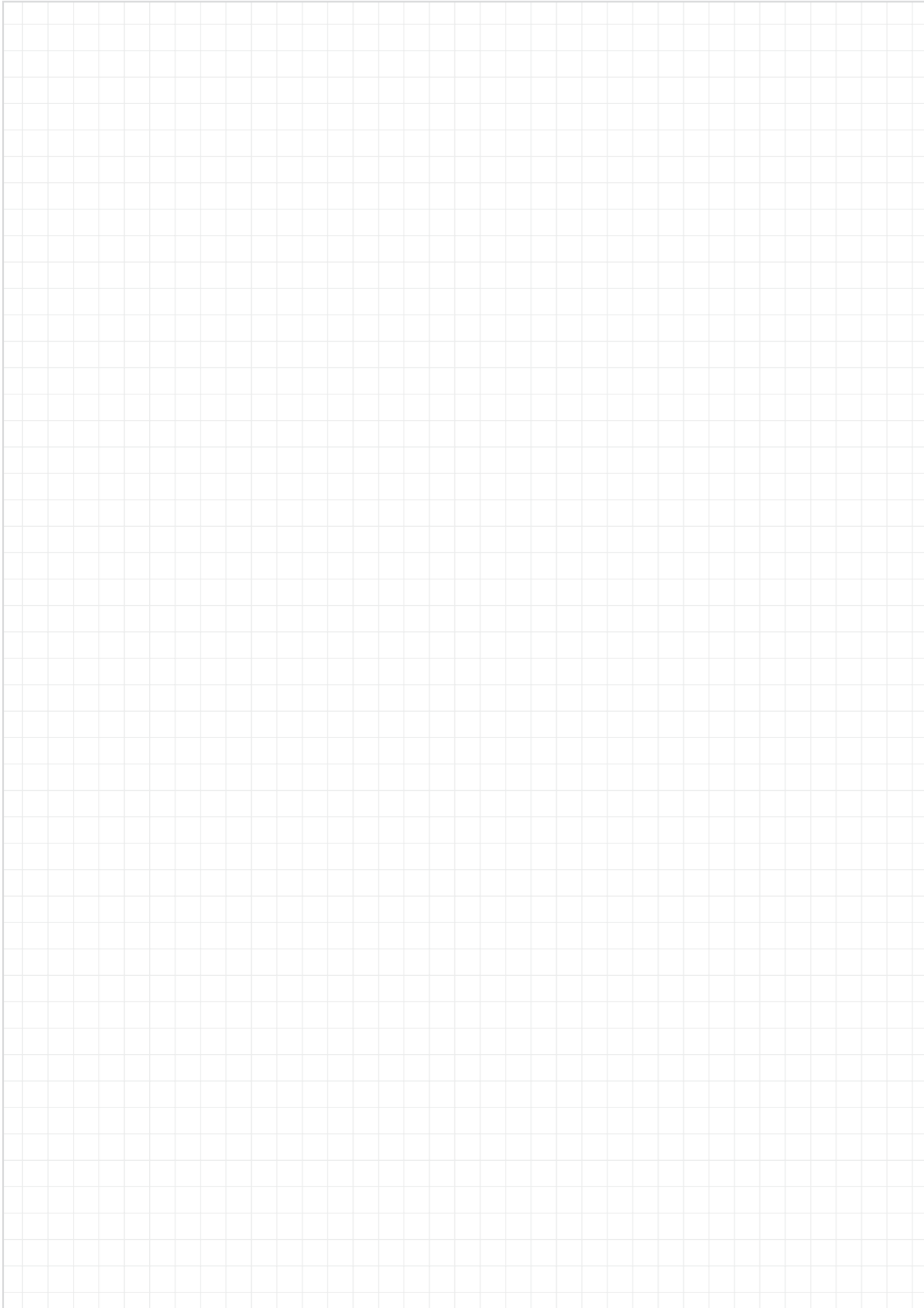
Dimensions [mm]

d1	d1-Tolerance ³⁾	d2	d3 d13	b1 h13	b2 -0.14	Part No.
4.0	+0.030 +0.105	5.5	9.5	6	0.75	A290FM-0405-06
5.0	+0.030 +0.105	7.0	11.0	5	1.00	A290FM-0507-05
6.0	+0.030 +0.105	8.0	12.0	8	1.00	A290FM-0608-08
8.0	+0.040 +0.130	10.0	15.0	9	1.00	A290FM-0810-09
10.0	+0.040 +0.130	12.0	18.0	9	1.00	A290FM-1012-09
12.0	+0.050 +0.160	14.0	20.0	12	1.00	A290FM-1214-12
15.0	+0.050 +0.160	17.0	23.0	17	1.00	A290FM-1517-17
16.0	+0.050 +0.160	18.0	24.0	17	1.00	A290FM-1618-17
20.0	+0.065 +0.195	23.0	30.0	21	1.50	A290FM-2023-21
25.0	+0.065 +0.195	28.0	35.0	21	1.50	A290FM-2528-21
30.0	+0.065 +0.195	34.0	42.0	26	2.00	A290FM-3034-26
35.0	+0.080 +0.240	39.0	47.0	26	2.00	A290FM-3539-26
40.0	+0.080 +0.240	44.0	52.0	40	2.00	A290FM-4044-40
50.0	+0.080 +0.240	55.0	63.0	40	2.00	A290FM-5055-40

³⁾ after pressfit. Testing methods ► Page 75



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.



KTW-compliant – iglidur® UW160

- Extremely wear-resistant in liquid at longterm operation
- Suitable for contact with drinking water (KTW-compliant)
- Good media resistance
- Lubrication and maintenance free
- Standard range from stock



iglidur® UW160 is tribologically optimised for continuous use in liquid media. Its superior media resistance not only permits uses with potable water contact.



When to use it?

- When a KTW-compliant material is required
- When a wear-resistant material is required for continuous use in liquid media



When not to use it?

- When a media-resistant plain bearing for recurring media contact and in the meantime for dry operation is required
▶ iglidur® A160, page 367
- When a media- and temperature-resistant universal bearing is required
▶ iglidur® X, page 133
- When a standard bearing is required for use in a wet environment
▶ iglidur® P, page 149



Available from stock

Detailed information about delivery time online.



max. +90 °C
min. -50 °C



Block pricing online

No minimum order value. From batch size 1



Ø 3–10 mm
more dimensions on request



Typical application areas

- Fluid technology ● Pumps ● Water meters, etc.

Material properties table

General properties	Unit	iglidur® UW160	Testing method
Density	g/cm³	1.04	
Colour		grey	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	0.1	DIN 53495
Max. water absorption	% weight	0.1	
Coefficient of sliding friction, dynamic against steel	μ	0.17–0.31	
pv value, max. (dry)	MPa · m/s	0.22	
Mechanical properties			
Modulus of elasticity	MPa	1,349	DIN 53457
Tensile strength at +20 °C	MPa	22	DIN 53452
Compressive strength	MPa	32	
Max. recommended surface pressure (+20 °C)	MPa	15	
Shore-D hardness		60	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+90	
Max. short term application temperature	°C	+100	
Min. application temperature	°C	-50	
Thermal conductivity	W/m · K	0.50	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	K ⁻¹ · 10 ⁻⁵	18	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 ¹²	DIN IEC 93
Surface resistance	Ω	> 10 ¹²	DIN 53482

Table 01: Material properties table

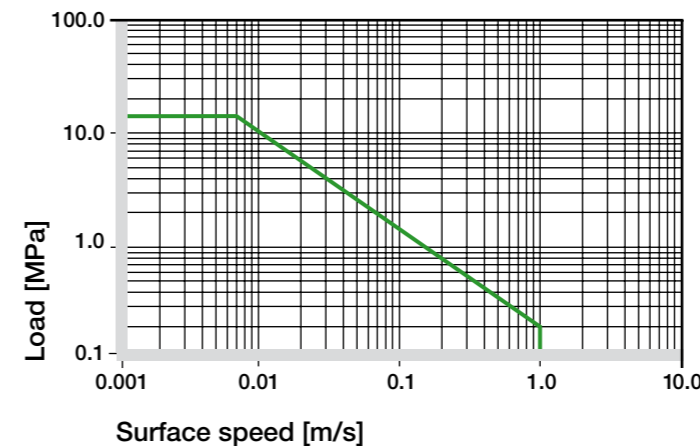


Diagram 01: Permissible pv values for iglidur® UW160 bearings with a wall thickness of 1 mm dry running against a steel shaft, at +20 °C, mounted in a steel housing

Moisture absorption

The moisture absorption of iglidur® UW160 plain bearings is approximately 0.1 % in ambient conditions. The saturation limit submerged in water is 0.1 %.

▶ **Diagram, www.igus.eu/uw160-moisture**

Vacuum

When used in a vacuum environment, the iglidur® UW160 plain bearings release moisture as a vapour. Use in a vacuum environment is only possible with dehumidified bearings.

Radiation resistance

Plain bearings made from iglidur® UW160 are resistant to radiation up to an intensity of 3 · 10² Gy.

UV resistance

iglidur® UW160 bearings are only conditionally resistant to UV radiation.

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

+ resistant 0 conditionally resistant – not resistant

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

Table 02: Chemical resistance

▶ **Chemical table, page 1226**

iglidur® UW160 was developed quite specifically with regard to maximum wear resistance in media-based continuous operation. In such applications, low radial loads and moderate temperatures usually occur. The suitability for contact with drinking water and very good durability complete the profile of properties.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® UW160 plain bearings decreases. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

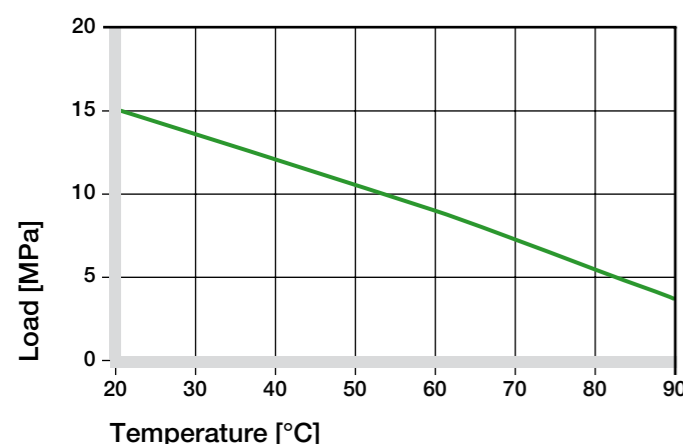


Diagram 02: Recommended maximum surface pressure of as a function of temperature (15 MPa at +20 °C)

Diagram 03 shows the elastic deformation of iglidur® UW160 during radial loading.

► Surface pressure, page 63

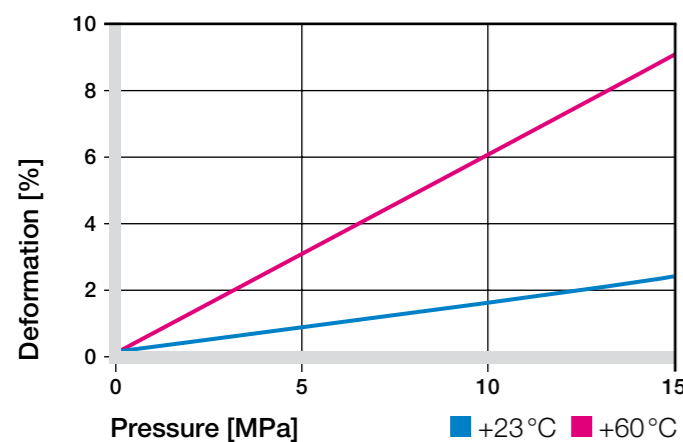


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

The maximum allowable sliding speed is based on the friction heat generated at the bearing surface. The temperature should only be permitted to increase to a value that will ensure a sustainable use of the bearing with respect to wear and dimensional integrity.

The maximum values specified in table 03 are for the dry operation. In media-based application, sometimes significantly higher speeds are achieved due to reduced heat generation depending on the installation.

► Surface speed, page 65

m/s	Rotating	Oscillating	Linear
Continuous	0.3	0.3	1
Short term	0.5	0.4	2.5

Table 03: Maximum surface speeds

Temperatures

iglidur® UW160 was developed for use in liquid media in normal and medium temperature range.

As with all thermoplastics, the compression resistance of iglidur® UW160 decreases with increasing temperature. The occurring temperatures in the bearing system also have an effect on the bearing wear. The wear rate rises with increasing temperatures. At temperatures over +70 °C an additional securing is required.

► Application temperatures, page 66

► Additional securing, page 67

Friction and wear

Coefficient of friction and wear alter with the application parameters. The influence of surface speed and surface finish of the shaft on the friction coefficient is low, but with increasing radial load the coefficient of friction decreases significantly, mainly in the range of up to 7.5 MPa.

► Coefficients of friction and surfaces, page 68

► Wear resistance, page 69

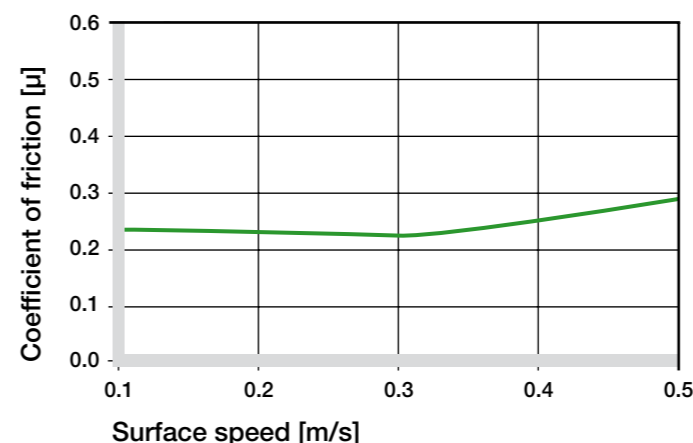


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1.0 MPa

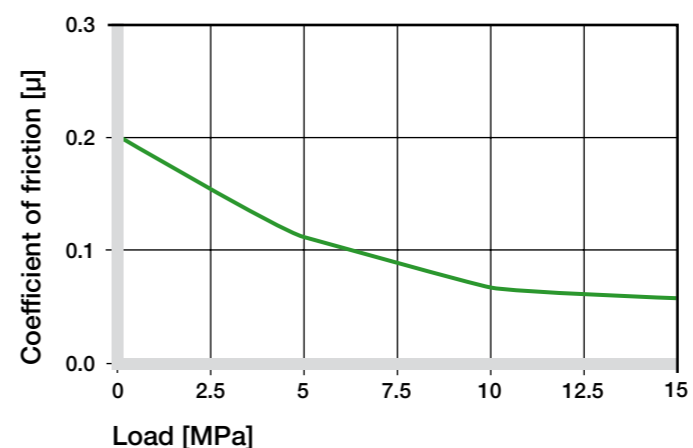


Diagram 05: Coefficient of friction as a function of the pressure, v = 0.01 m/s

Shaft materials

Diagram 06 shows results of testing different shaft materials with plain bearings made from iglidur® UW160 running dry. In the example of a rotational movement with radial loads of 1 MPa and a speed of 0.3 m/s, it becomes clear that iglidur® UW160 achieves good wear values with the most varied shafts up to the pairing with V2A shafts. It is also clear that there are better iglidur® materials for dry running. As with many other iglidur® materials in dry running, diagram 07 shows the significantly higher wear in rotation than in pivoting with otherwise identical parameters.

► Shaft materials, page 71

iglidur® UW160	Dry	Greases	Oil	Water
C. o. f. μ	0.17–0.31	0.08	0.03	0.03

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

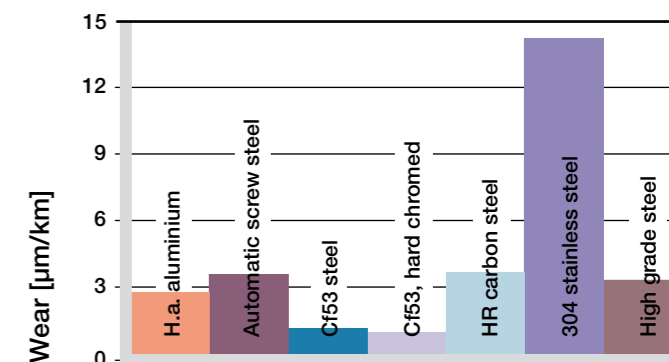


Diagram 06: Wear, rotating with different shaft materials, p = 1 MPa, v = 0.3 m/s

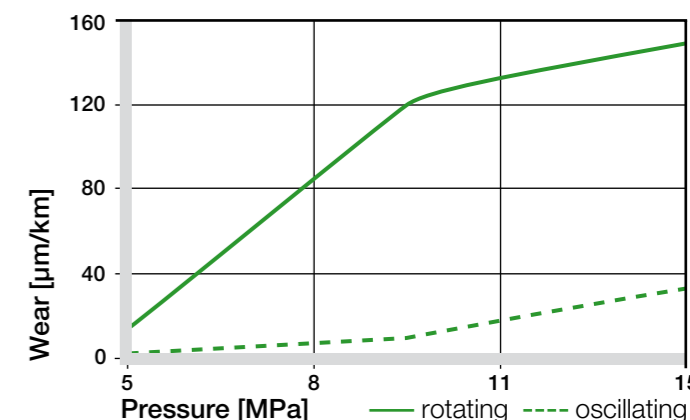


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the pressure

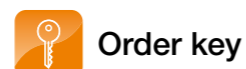
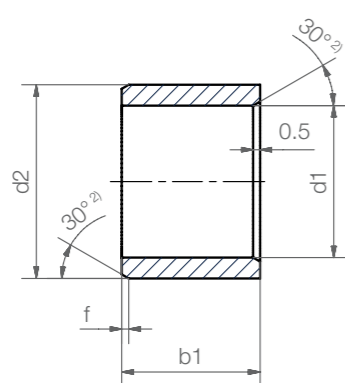
Installation tolerances

iglidur® UW160 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® UW160 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 05: Important tolerances for plain bearings according to ISO 3547-1 after pressfit



Order key

Type Dimensions

UW160 S M-03 04-03

iglidur® material	Form S	Metric	Inner-Ø d1 [mm]	Outer-Ø d2 [mm]	Length b1 [mm]
-------------------	--------	--------	-----------------	-----------------	----------------

Dimensions according to ISO 3547-1 and special dimensions

²⁾ thickness < 1 mm, chamfer = 20°

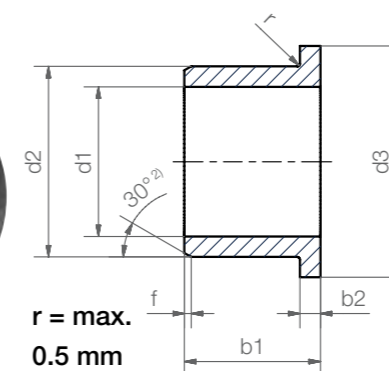
Chamfer in relation to the d1

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]

d1	d1-Tolerance ³⁾	d2	b1 h13	Part No.
3.0	+0.014 +0.054	4.0	3.0	UW160SM-0304-03
4.0	+0.014 +0.054	5.0	4.0	UW160SM-0405-04
5.0	+0.020 +0.068	7.0	5.0	UW160SM-0507-05
6.0	+0.020 +0.068	8.0	6.0	UW160SM-0608-06
8.0	+0.025 +0.083	10.0	10.0	UW160SM-0810-10
10.0	+0.025 +0.083	12.0	10.0	UW160SM-1012-10

³⁾ after pressfit. Testing methods ► Page 75



Order key

Type Dimensions

UW160 F M-03 04-05

iglidur® material	Form F	Metric	Inner-Ø d1 [mm]	Outer-Ø d2 [mm]	Length b1 [mm]
-------------------	--------	--------	-----------------	-----------------	----------------

Dimensions according to ISO 3547-1 and special dimensions

²⁾ thickness < 1 mm, chamfer = 20°

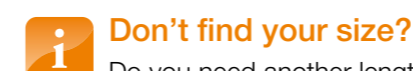
Chamfer in relation to the d1

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

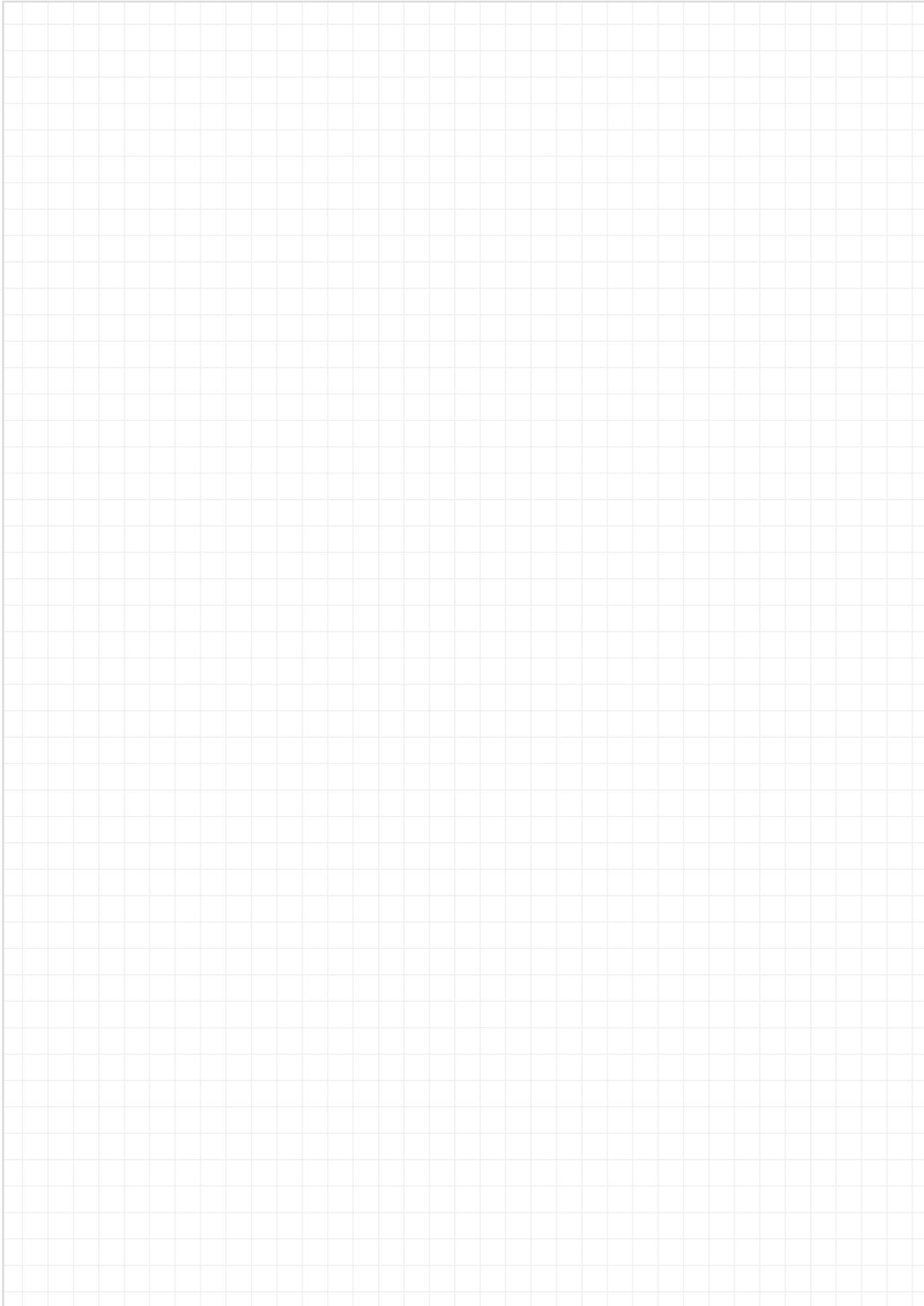
Dimensions [mm]

d1	d1-Tolerance ³⁾	d2	d3 d13	b1 h13	b2 -0.14	Part No.
3.0	+0.014 +0.054	4.5	7.5	5.0	0.75	UW160FM-0304-05
4.0	+0.014 +0.054	5.5	9.5	6.0	0.75	UW160FM-0405-06
5.0	+0.020 +0.068	7.0	11.0	7.0	1.0	UW160FM-0507-07
6.0	+0.020 +0.068	8.0	12.0	6.0	1.0	UW160FM-0608-06
8.0	+0.025 +0.083	10.0	14.0	10.0	1.0	UW160FM-0810-10
10.0	+0.025 +0.083	12.0	18.0	10.0	1.0	UW160FM-1012-10

³⁾ after pressfit. Testing methods ► Page 75

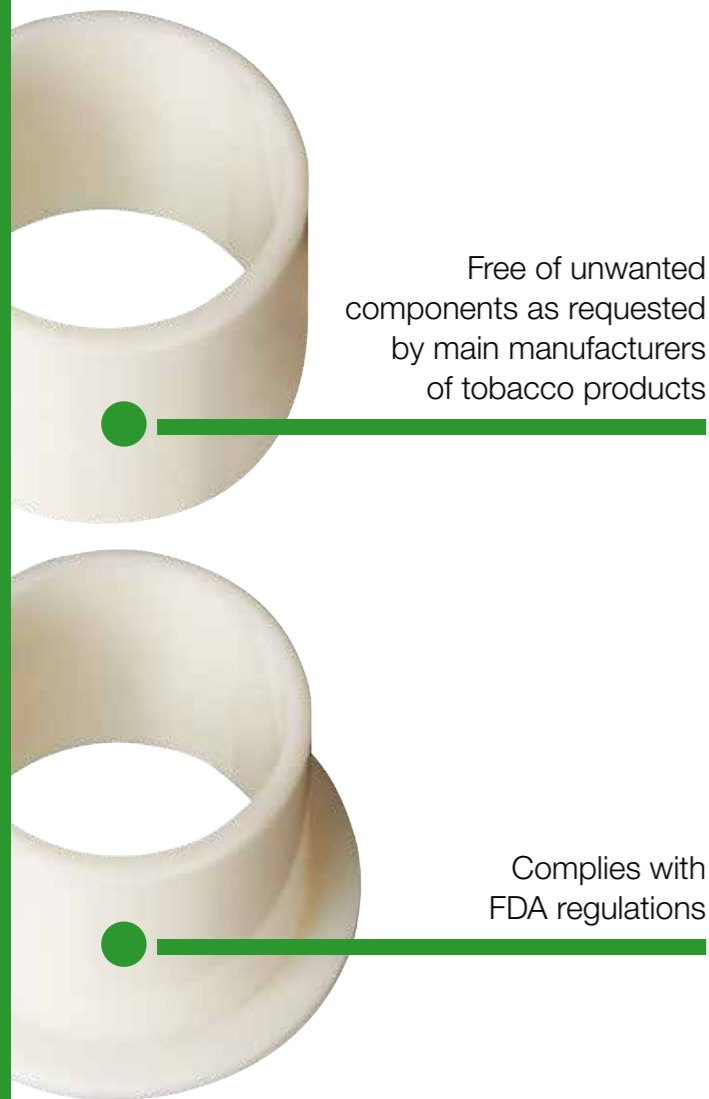


Do you need another length, other dimensions or tolerances? You need a particular design or alternative for your application? Please call us. igus® listens to your needs and provides you a solution in a very short time.



For the tobacco industry, FDA-compliant – iglidur® T220

- Free of unwanted components as requested by main manufacturers of tobacco products
- The iglidur® T220 material complies with food and drug administration (FDA) regulations
- Lubrication and maintenance free



Bearings that constitute only materials "recommended" for the tobacco industry. They are free from carcinogenic additives like, for instance, PTFE.



When to use it?

- When my bearings need to be free of substances that are not permitted for applications in the tobacco industry
- When FDA compliance is required



When not to use it?

- When high surface pressures occur
 - ▶ iglidur® Z, page 263
- When a cost-effective universal bearing is required
 - ▶ iglidur® G, page 83
 - ▶ iglidur® M250, page 111
- If highest wear resistance and low pressure load is necessary
 - ▶ iglidur® J, page 99
- If the bearing should be free merely from PTFE and silicon
 - ▶ iglidur® C, page 491
 - ▶ iglidur® R, page 223



iglidur® T220 material complies with the requirements of the FDA (Food and Drug Administration) specifications for repeated contact with food.



Available on request

Detailed information about delivery time online.



max. +100 °C
min. -40 °C



Order-related



Order-related



Typical application areas

- Tobacco processing industry

Material properties table

General properties	Unit	iglidur® T220	Testing method
Density	g/cm³	1.28	
Colour		white	
Max. moisture absorption at +23 °C/50 % r.h.	% weight	0.3	DIN 53495
Max. water absorption	% weight	0.5	
Coefficient of sliding friction, dynamic against steel	μ	0.20–0.32	
pv value, max. (dry)	MPa · m/s	0.28	
Mechanical properties			
Modulus of elasticity	MPa	1,800	DIN 53457
Tensile strength at +20 °C	MPa	65	DIN 53452
Compressive strength	MPa	55	
Max. recommended surface pressure (+20 °C)	MPa	40	
Shore-D hardness		76	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	+100	
Max. short term application temperature	°C	+160	
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	11	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 ¹⁰	DIN IEC 93
Surface resistance	Ω	> 10 ¹⁰	DIN 53482

Table 01: Material properties table

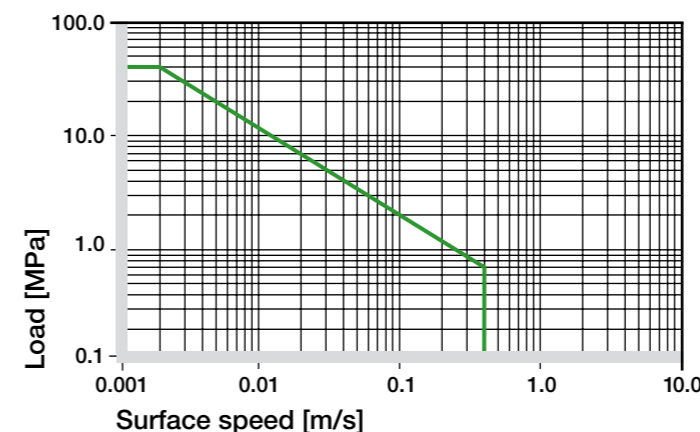


Diagram 01: Permissible pv values for iglidur® T220 bearings with a wall thickness of 1 mm dry running against a steel shaft, at +20 °C, mounted in a steel housing

Moisture absorption

The moisture absorption of iglidur® T220 plain bearings is approximately 0.3 % in ambient conditions. The saturation limit in water is 0.5 %. These values are so low that consideration of expansion by moisture absorption is only required under extreme circumstances.

▶ **Diagram, www.igus.eu/t220-moisture**

Vacuum

Only dehumidified bearings of iglidur® T220 should be tested in vacuum.

Radiation resistance

Plain bearings of iglidur® T220 are radiation resistant up to a radiation intensity of 3 · 10² Gy.

UV resistance

iglidur® T220 plain bearings are not resistant to UV radiation.

Medium	Resistance
Alcohols	+
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 02: Chemical resistance

▶ **Chemical table, page 1226**

iglidur® T220 is a special material for applications in the tobacco processing industry. It fulfills the demands of the tobacco industry (engineering database). The material is free of undesirable or banned ingredients, as requested by reputed manufacturers from 2004 onward.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® T220 plain bearings decreases. The diagram 02 shows this inverse relationship. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

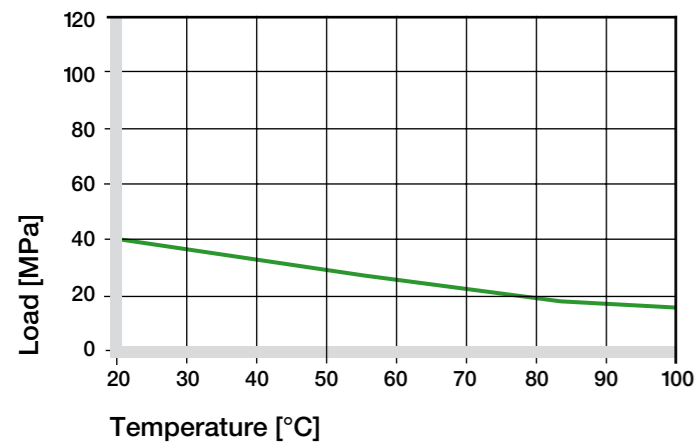


Diagram 02: Recommended maximum surface pressure of as a function of temperature (40 MPa at +20 °C)

iglidur® T220 bearings can be stressed up to the permitted limit of 45 MPa, the elastic deformation is less than 2 % at room temperature. The permitted load is limited by higher temperatures (diagram 03).

► Surface pressure, page 63

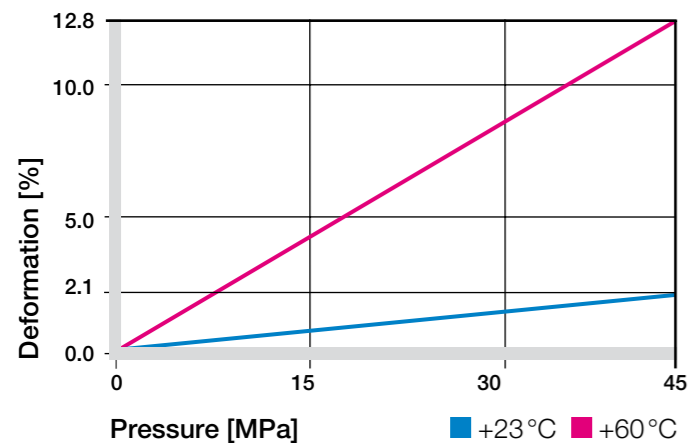


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

The maximum speeds of iglidur® T220 bearings amount to 0.4 m/s with continuous rotation. The friction and the entailing heating limit the permitted speeds. From this it follows that intermittent service or in linear movements, higher speeds can be attained.

► Surface speed, page 65

m/s	Rotating	Oscillating	Linear
Continuous	0.4	0.3	1
Short term	1	0.7	2

Table 03: Maximum surface speeds

Temperatures

The elasticity of the bearings depends on the temperature. A clear increase in elasticity occurs already at +60 °C. At temperatures over +50 °C an additional securing is required.

► Application temperatures, page 66

► Additional securing, page 67

Friction and wear

By the observance of the tobacco processing industry specifications, the coefficient of friction and the wear of iglidur® T220 remain behind those of the best iglidur® bearings. The coefficient of friction decreases with the load and increases only slightly with higher speeds.

► Coefficients of friction and surfaces, page 68

► Wear resistance, page 69

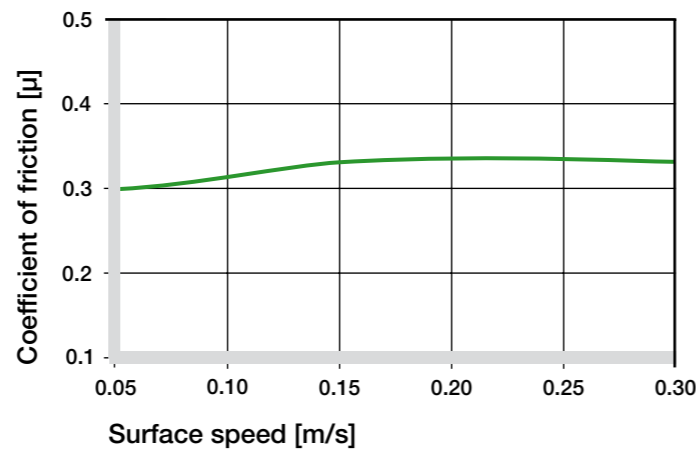


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75 MPa

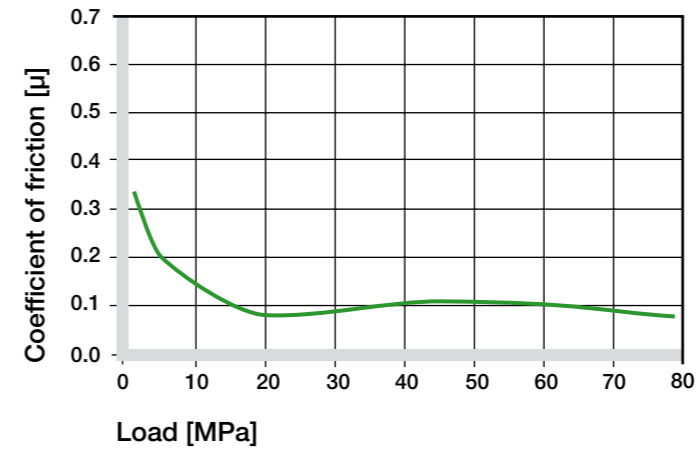


Diagram 05: Coefficient of friction as a function of the pressure, v = 0.01 m/s

Shaft materials

Diagram 06 shows the test results of iglidur® T220 bearings running against various shaft materials.

Diagram 07 shows that the bearings react with a heavy increase in wear when the load is increased. Therefore it should be observed that the load should be kept below 5 MPa by the correct dimensioning of the bearings.

► Shaft materials, page 71

iglidur® T220	Dry	Greases	Oil	Water
C. o. f. μ	0.2–0.32	0.09	0.04	0.04

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

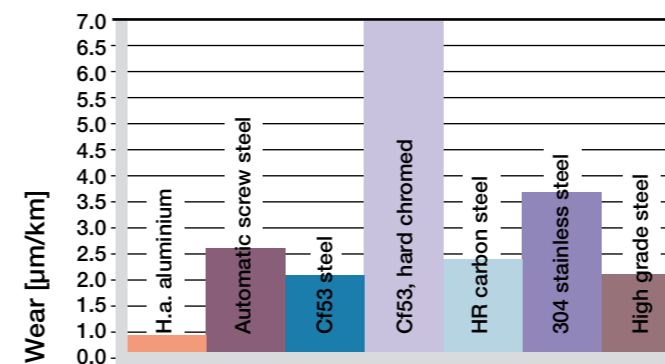


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1 MPa, v = 0.3 m/s

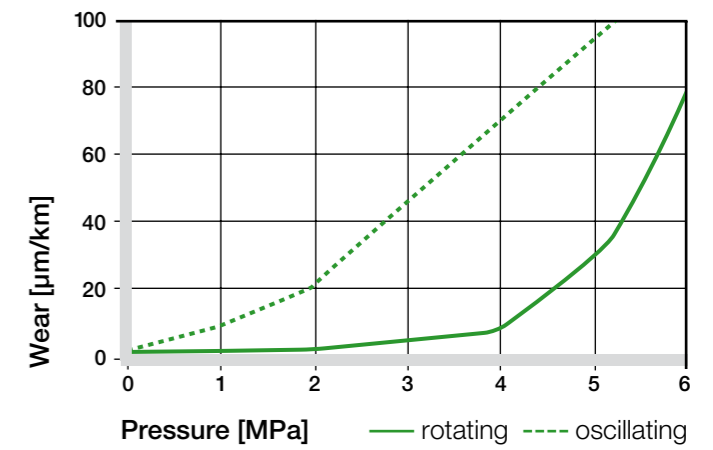


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the pressure

Installation tolerances

iglidur® T220 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. 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® T220 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 05: Important tolerances for plain bearings according to ISO 3547-1 after pressfit

Product range

iglidur® T220 plain bearings are manufactured to special order.