

Flexible, wear resistant & more – iglidur® P210



Standard range from stock

Low humidity absorption

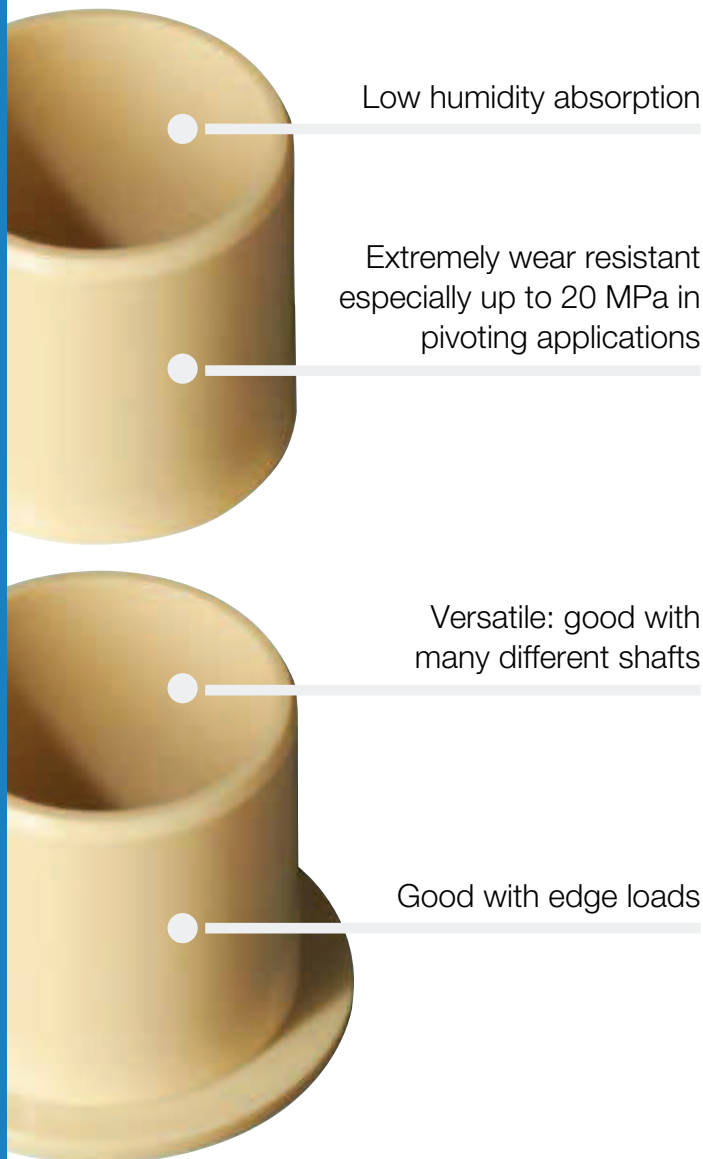
Extremely wear resistant especially up to 20 MPa
in pivoting applications

Versatile: good with many different shafts

Good with edge loads

iglidur® P210

Flexible, wear resistant & more. This versatile material has already proven its worth in many customer-specific solutions and as a bar stock material. Clip-on or pretensioned design as well as vehicle interior applications are possible. Now available in a standard size range.



When to use it?

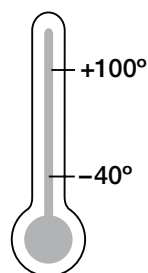
- When you need a universal bearing for use in a moist environment
- When you need a wear-resistant bearing for pivoting applications at medium loads
- When edge loads and shocks occur
- When the surface pressure of iglidur® J is insufficient



When not to use it?

- When you need a universal bearing with the largest possible range of dimensions
▶ iglidur® G, page 81
- When you need a bearing for highly loaded pivoting applications
▶ iglidur® Q, page 541
▶ iglidur® Q2, page 555
- When temperatures in excess of +100°C occur
▶ iglidur® G, page 81
▶ iglidur® J350, page 257

Temperature



Product range

2 types
Ø 6–20 mm
more dimensions
on request



Material properties table

General properties	Unit	iglidur® P210	Testing method
Density	g/cm ³	1.40	
Colour		yellow	
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	0.07–0.19	
pv value, max. (dry)	MPa · m/s	0.4	
Mechanical properties			
Modulus of elasticity	MPa	2,500	DIN 53457
Tensile strength at +20 °C	MPa	70	DIN 53452
Compressive strength	MPa	50	
Max. recommended surface pressure (+20 °C)	MPa	50	
Shore D hardness		75	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	0.25	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	K ⁻¹ · 10 ⁻⁵	8	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

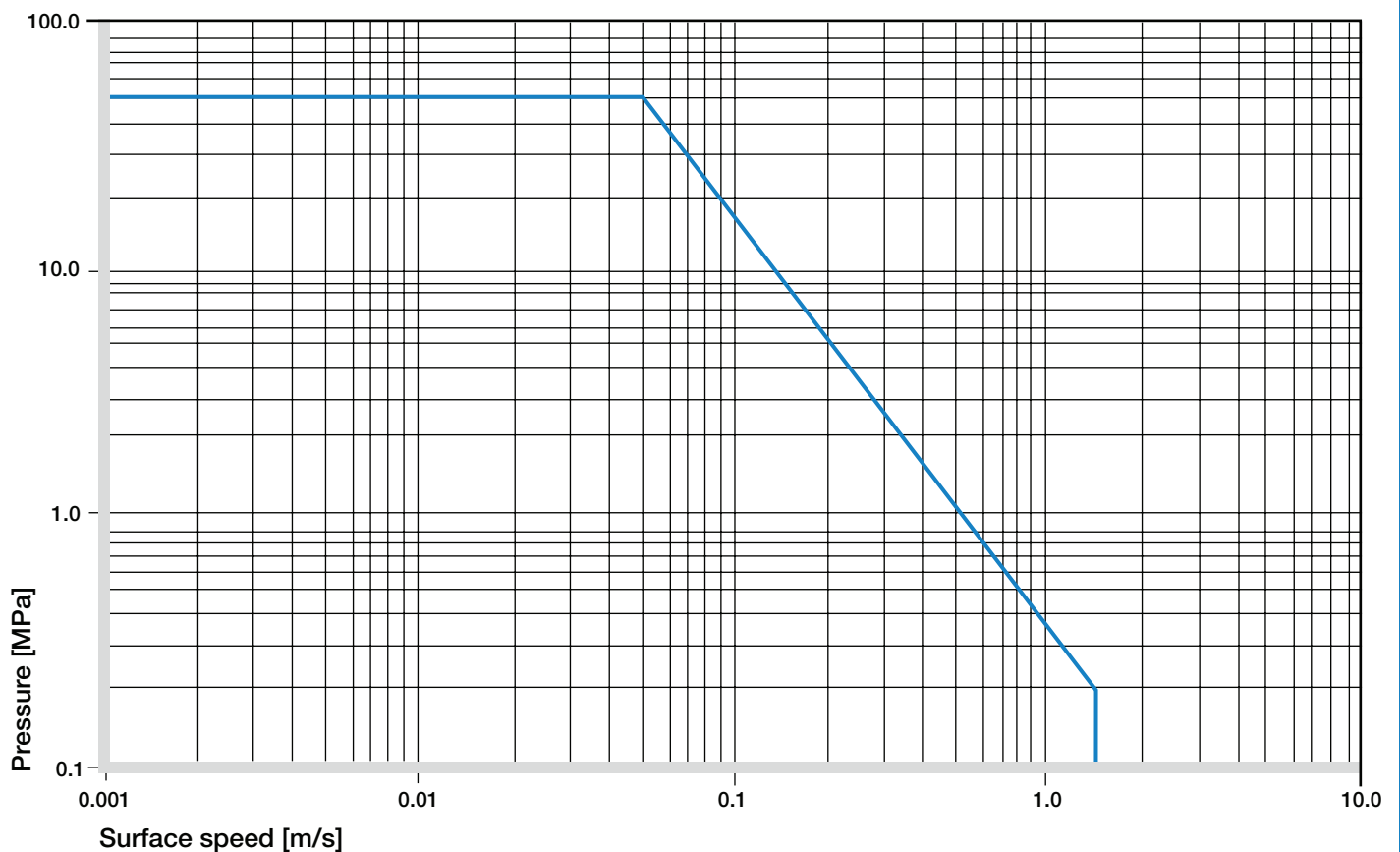


Diagram 01: Permissible pv values for iglidur® P210 with a wall thickness of 1 mm dry running against a steel shaft at +20 °C, mounted in a steel housing

iglidur® P210 plain bearings provide the user with versatile all-round bearings, which have proven to have above average service life, primarily in pivoting applications at medium loads of up to 20 MPa.

Mechanical Properties

With increasing temperatures, the compressive strength of iglidur® P210 plain bearings decreases. The Diagram 02 shows this inverse relationship. However, at the longterm maximum temperature of +100 °C the permissible surface pressure is almost 10 MPa. The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

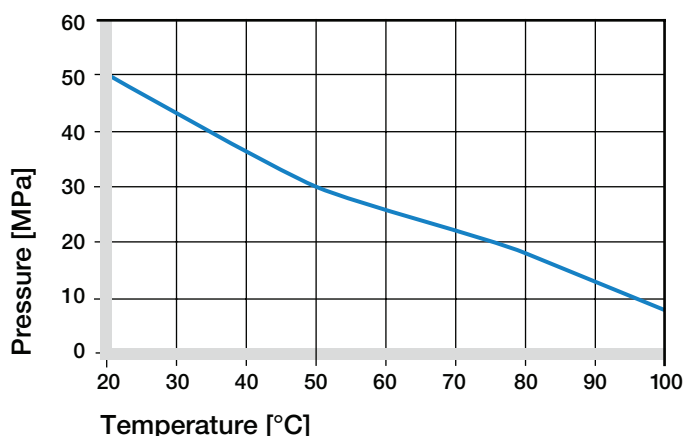


Diagram 02: Recommended maximum surface pressure as a function of temperature (50 MPa at +20 °C)

Diagram 03 shows the elastic deformation of iglidur® P210 as a function of radial pressure. At the recommended maximum surface pressure of 50 MPa the deformation at room temperature is less than 3 %.

► Surface Pressure, page 63

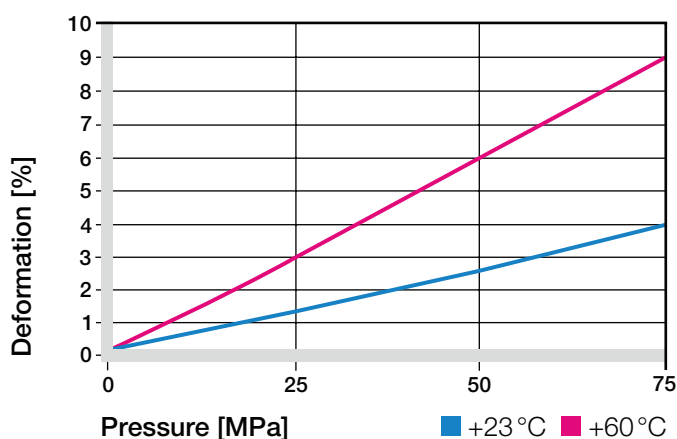


Diagram 03: Deformation under pressure and temperature

Permissible Surface Speeds

Plain bearings made of iglidur® P210 are maintenance-free plain bearings, which were developed for low to average surface speeds. The maximum values given in table 02 can only be achieved at a very low surface pressure. The maximum speed given is the speed at which an increase up to the continuous use temperature occurs due to friction.

► Surface Speed, page 65

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

Table 02: Maximum running speed

Temperatures

With its highest long term application temperature of +100 °C, iglidur® P210 is suitable for a large application spectrum. If higher temperatures are required, the best seller iglidur® G with a maximum longterm temperature of +130 °C can be used. The ambient temperatures in the bearing system also have an effect on the bearing wear. With increasing temperatures, the wear increases.

► Application Temperatures, page 66

iglidur® P210	Application temperature
Minimum	-40 °C
Max. long term	+100 °C
Max. short term	+160 °C
Add. securing is required from	+50 °C

Table 03: Temperature limits

Friction and Wear

With regard to iglidur® P210, the coefficient of friction increases continuously with the speed. Just as the wear resistance, the coefficient of friction changes greatly with increasing load. Diagram 05 shows how the coefficient of friction drops when the load increases. Starting at approximately 10 MPa, the coefficient of friction is already below 0.1.

iglidur® P210 plain bearings obtain a minimum coefficient of friction on shafts with a roughness Ra from 0.5 to 0.6 µm. Both smoother and rougher shaft surface finish cause the friction to increase significantly.

► Coefficients of Friction and Surfaces, page 68

► Wear Resistance, page 69

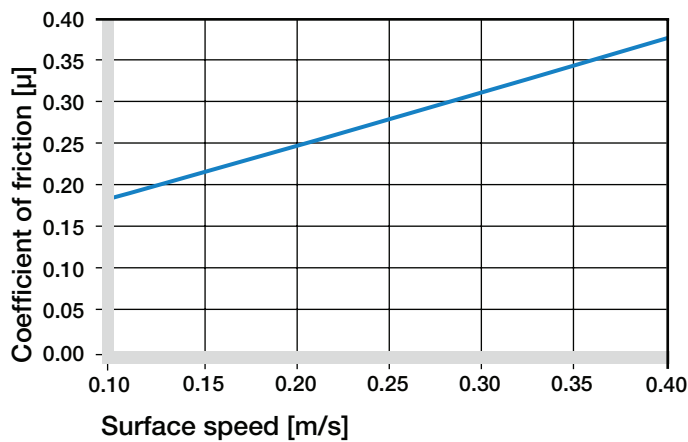


Diagram 04: Coefficient of friction as a function of the running speed, $p = 1 \text{ MPa}$

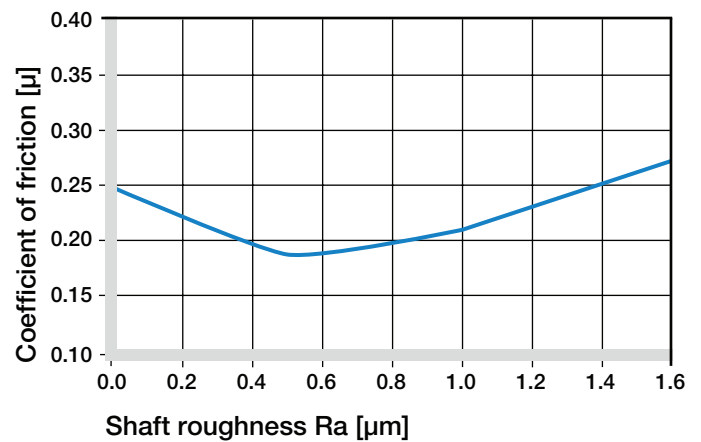


Diagram 06: Coefficient of friction as function of the shaft surface (Cf53 hardened and ground steel)

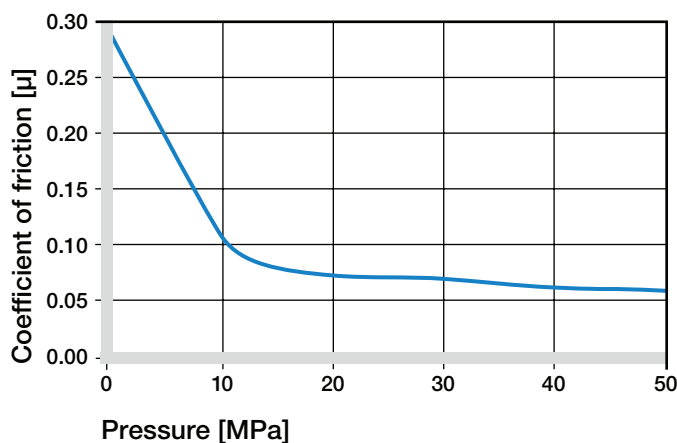


Diagram 05: Coefficient of friction as a function of the pressure, $v = 0.01 \text{ m/s}$

Shaft Materials

Diagrams 06 to 08 show results of testing different shaft materials with plain bearings made of iglidur® P210. For rotating motions at radial loads below 1 MPa, iglidur® P210 has generally very low wear. Wear is only significantly higher in combination with St37 shafts. Generally, rotational wear will be higher than for a pivoting application of equal load. This is only reversed at loads above 25 MPa (Diagram 08).

► Shaft Materials, page 71

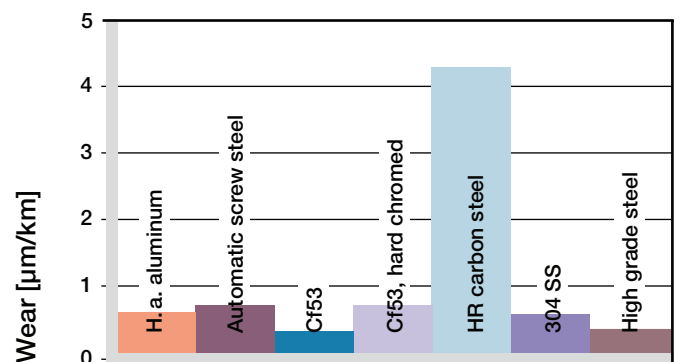


Diagram 07: Wear, rotating with different shaft materials, pressure $p = 1 \text{ MPa}$, $v = 0.3 \text{ m/s}$

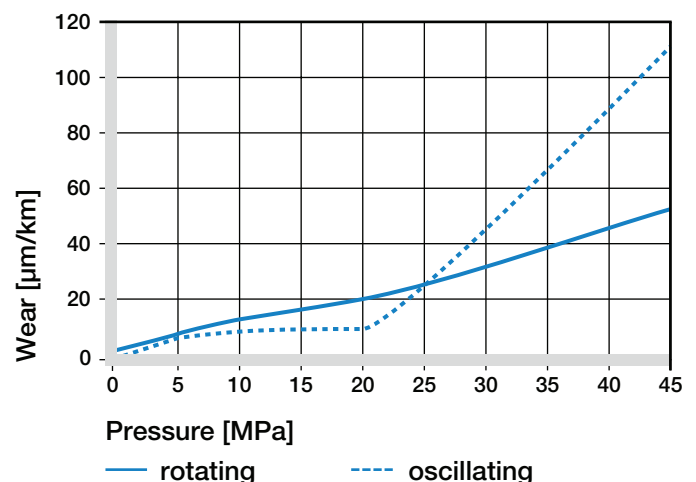


Diagram 08: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the pressure

iglidur® P210	Dry	Greases	Oil	Water
C.o.f. μ	0.07–0.19	0.09	0.04	0.04

Table 04: Coefficient of friction against steel ($R_a = 1 \text{ μm}$, 50 HRC)

Additional Properties

Chemical Resistance

iglidur® P210 plain bearings have a good resistance to chemicals. They are resistant to most lubricants.

iglidur® P210 is not attacked by most weak organic and inorganic acids.

► Chemical Table, page 1258

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

+ resistant **0** conditionally resistant **–** not resistant

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

Table 05: Chemical resistance

Radiation Resistance

Plain bearings made of iglidur® P210 have limited use under radioactive radiation. They are resistant to radiation up to an intensity of $3 \cdot 10^2$ Gy.

UV Resistance

iglidur® P210 plain bearings are partially UV resistant.

Vacuum

In a vacuum environment, any existing moisture in iglidur® P210 plain bearings is released as a vapour. Use in vacuum is limited.

Electrical Properties

iglidur® P210 plain bearings are electrically insulating.

Volume resistance	$> 10^{12} \Omega \text{cm}$
Surface resistance	$> 10^{11} \Omega$

Moisture Absorption

The moisture absorption of iglidur® P210 plain bearings is approximately 0.3 % in standard atmosphere. The saturation limit in water is 0.5 %. This low moisture absorption is well below the values of iglidur® G.

Maximum moisture absorption

At +23 °C/50 % r.h. 0.3 % weight

Max. water absorption 0.5 % weight

Table 06: Moisture absorption

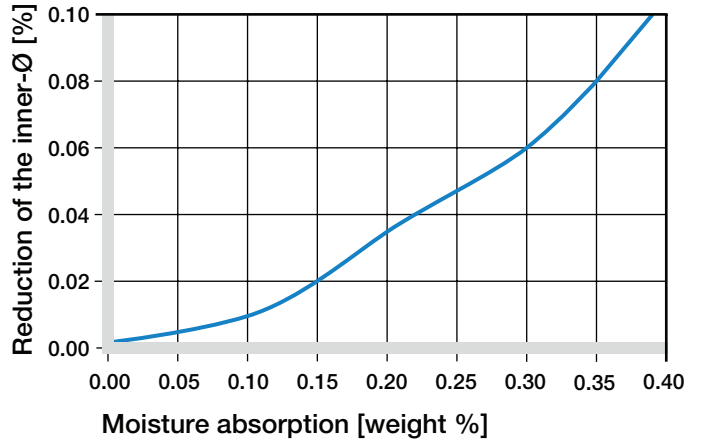


Diagram 09: Effect of moisture absorption on plain bearings

Installation Tolerances

iglidur® P210 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).

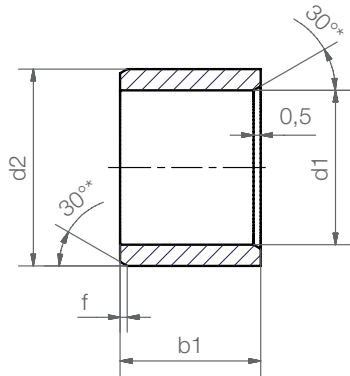
► Testing Methods, page 75

Diameter d1 [mm]	Shaft h9 [mm]	iglidur® P210 E10 [mm]	Housing H7 [mm]
up to 3	0–0.025	+0.014 +0.054	0 +0.010
> 3 to 6	0–0.030	+0.020 +0.068	0 +0.012
> 6 to 10	0–0.036	+0.025 +0.083	0 +0.015
> 10 to 18	0–0.043	+0.032 +0.102	0 +0.018
> 18 to 30	0–0.052	+0.040 +0.124	0 +0.021
> 30 to 50	0–0.062	+0.050 +0.150	0 +0.025
> 50 to 80	0–0.074	+0.060 +0.180	0 +0.030
> 80 to 120	0–0.087	+0.072 +0.212	0 +0.035
> 120 to 180	0–0.100	+0.085 +0.245	0 +0.040

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

iglidur® P210 | Product Range

Sleeve bearing



Order key

P210SM-0608-06



Length b1
Outer diameter d2
Inner diameter d1
Metric
Type (Form S)
Material iglidur® P210

Dimensions according to ISO 3547-1 and special dimensions

* thickness < 1 mm, chamfer = 20°

Chamfer in relation to the d1

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

Dimensions [mm]

Part number	d1	d1-Tolerance*	d2	b1 h13
P210SM-0608-06	6.0	+0.020 +0.068	8.0	6.0
P210SM-0810-10	8.0	+0.025 +0.083	10.0	10.0
P210SM-1012-10	10.0	+0.025 +0.083	12.0	10.0
P210SM-1214-12	12.0	+0.032 +0.102	14.0	12.0
P210SM-1618-15	16.0	+0.032 +0.102	18.0	15.0
P210SM-2023-20	20.0	+0.040 +0.124	23.0	20.0

* after pressfit. Testing methods ► page 75

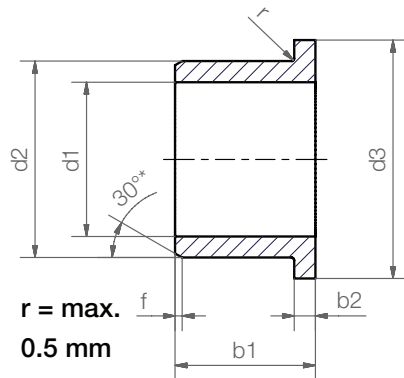


delivery from stock
time



prices price list online
www.igus.eu/eu/p210

Flange bearing



Order key

P210FM-0608-06



Length b1

Outer diameter d2

Inner diameter d1

Metric

Type (Form F)

Material iglidur® P210

Dimensions according to ISO 3547-1 and special dimensions

* thickness < 1 mm, chamfer = 20°

Chamfer in relation to the d1

d1 [mm]: Ø 1-6 | Ø 6-12 | Ø 12-30 | Ø > 30

f [mm]: 0.3 | 0.5 | 0.8 | 1.2

Dimensions [mm]

Part number	d1	d1-Tolerance*	d2	d3 d13	b1 h13	b2 -0.14
P210FM-0608-06	6.0	+0.020 +0.068	8.0	12.0	6.0	1.0
P210FM-0810-10	8.0	+0.025 +0.083	10.0	15.0	10.0	1.0
P210FM-1012-10	10.0	+0.025 +0.083	12.0	18.0	10.0	1.0
P210FM-1214-12	12.0	+0.032 +0.102	14.0	20.0	12.0	1.0
P210FM-1618-17	16.0	+0.032 +0.102	18.0	24.0	17.0	1.0
P210FM-2023-21	20.0	+0.040 +0.124	23.0	30.0	21.5	1.5

* after pressfit. Testing methods ► page 75



Don't find your size?

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



delivery from stock
time



prices price list online
www.igus.eu/eu/p210