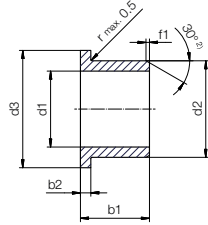


Bearing technology | Plain bearing | iglidur® P210

Flange bearing (form F)



²⁾ Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

i Dimensions according to ISO 3547-1 and special dimensions



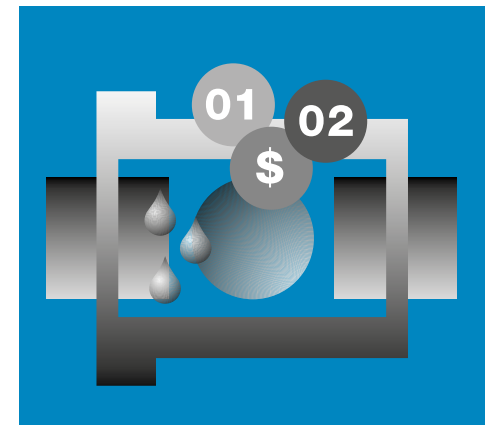
Order example: **P210FM-0608-04** – no minimum order quantity.

P210 iglidur® material **F** Flange bearing **M** Metric **06** Inner Ø d1 **08** Outer Ø d2 **04** Total length b1

d1	d1	d2	d3	b1	b2	Part No.
[mm]	Tolerance ³⁾	[mm]	d13 ³⁾	h13	h13	
6.0		8.0	12.0	4.0	1.00	P210FM-0608-04
6.0	+0.020	8.0	12.0	6.0	1.00	P210FM-0608-06
6.0	+0.068	8.0	12.0	8.0	1.00	P210FM-0608-08
8.0		10.0	15.0	5.5	1.00	P210FM-0810-05
8.0		10.0	15.0	7.5	1.00	P210FM-0810-07
8.0		10.0	15.0	9.5	1.00	P210FM-0810-09
8.0		10.0	15.0	10.0	1.00	P210FM-0810-10
8.0	+0.025	10.0	16.0	15.0	1.50	P210FM-081016-15
10.0	+0.083	12.0	18.0	7.0	1.00	P210FM-1012-07
10.0		12.0	18.0	9.0	1.00	P210FM-1012-09
10.0		12.0	18.0	10.0	1.00	P210FM-1012-10
10.0		12.0	18.0	12.0	1.00	P210FM-1012-12
10.0		12.0	18.0	17.0	1.00	P210FM-1012-17
12.0		14.0	20.0	7.0	1.00	P210FM-1214-07
12.0		14.0	20.0	9.0	1.00	P210FM-1214-09
12.0		14.0	20.0	12.0	1.00	P210FM-1214-12
12.0	+0.032	14.0	20.0	17.0	1.00	P210FM-1214-17
14.0	+0.102	16.0	22.0	12.0	1.00	P210FM-1416-12
14.0		16.0	22.0	17.0	1.00	P210FM-1416-17
15.0		17.0	23.0	9.0	1.00	P210FM-1517-09

d1	d1	d2	d3	b1	b2	Part No.
[mm]	Tolerance ³⁾	[mm]	d13 ³⁾	h13	h13	
15.0		17.0	23.0	12.0	1.00	P210FM-1517-12
15.0		17.0	23.0	17.0	1.00	P210FM-1517-17
16.0		18.0	24.0	12.0	1.00	P210FM-1618-12
16.0	+0.032	18.0	24.0	17.0	1.00	P210FM-1618-17
18.0	+0.102	20.0	26.0	12.0	1.00	P210FM-1820-12
18.0		20.0	26.0	17.0	1.00	P210FM-1820-17
18.0		20.0	26.0	22.0	1.00	P210FM-1820-22
20.0		23.0	30.0	11.5	1.50	P210FM-2023-11
20.0		23.0	30.0	16.5	1.50	P210FM-2023-16
20.0		23.0	30.0	21.5	1.50	P210FM-2023-21
25.0		28.0	35.0	11.5	1.50	P210FM-2528-11
25.0		28.0	35.0	16.5	1.50	P210FM-2528-16
25.0		28.0	35.0	21.5	1.50	P210FM-2528-21
30.0	+0.040	34.0	42.0	16.0	2.00	P210FM-3034-16
30.0	+0.124	34.0	42.0	26.0	2.00	P210FM-3034-26
35.0		39.0	47.0	16.0	2.00	P210FM-3539-16
35.0		39.0	47.0	26.0	2.00	P210FM-3539-26
40.0		44.0	52.0	30.0	2.00	P210FM-4044-30
40.0		44.0	52.0	40.0	2.00	P210FM-4044-40
45.0		50.0	58.0	50.0	2.00	P210FM-4550-50

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



The low-cost all-rounder

Well-balanced properties at a low price

iglidur® P230



When to use it?

- When a cost-effective all-round bearing for high volumes is required
- When a low-cost bearing with low moisture absorption is required
- When low pv values occur



When not to use?

- When a cost-effective all-rounder for small quantities is required
iglidur® G
- When high wear resistance is required
iglidur® G, iglidur® G1
- When continuous operating temperatures are higher than +110°C
iglidur® G, iglidur® G1

Bearing technology | Plain bearing | iglidur® P230



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-



Also available as:



Bar stock, round bar
Page 657



Bar stock, plate
Page 683



tribo-tape liner
Page 691



Piston rings
Page 581



Two hole flange bearings
Page 603



Moulded special parts
Page 624



igubal® spherical balls
Page 841

The low-cost all-rounder Well-balanced properties at a low price

Developed for (large-scale) series application, iglidur® P230 has a well-balanced properties compared to other iglidur® low-cost materials.

- Good wear resistance
- High media resistance
- Cost-effective
- For low and medium loads
- For applications with low pv values

Typical application areas

- Industrial series-production applications
- Machine building and jig construction
- Two-wheeler

Descriptive technical specifications				
Wear resistance at +23°C	-	<div style="width: 25%; background-color: #0070C0;"></div>		+
Wear resistance at +90°C	-	<div style="width: 25%; background-color: #0070C0;"></div>		+
Wear resistance at +150°C	-	<div style="width: 10%; background-color: #0070C0;"></div>		+
Low coefficient of friction	-	<div style="width: 75%; background-color: #0070C0;"></div>		+
Low moisture absorption	-	<div style="width: 80%; background-color: #0070C0;"></div>		+
Wear resistance under water	-	<div style="width: 30%; background-color: #0070C0;"></div>		+
High media resistance	-	<div style="width: 80%; background-color: #0070C0;"></div>		+
Resistant to edge pressures	-	<div style="width: 80%; background-color: #0070C0;"></div>		+
Suitable for shock and impact loads	-	<div style="width: 80%; background-color: #0070C0;"></div>		+
Resistant to dirt	-	<div style="width: 40%; background-color: #0070C0;"></div>		+

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

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

Technical data

General properties		Testing method	
Density	g/cm³	1.57	
Colour		beige	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.1	DIN 53495
Max. moisture absorption	% weight	0.3	
Coefficient of friction, dynamic, against steel	μ	0.13 – 0.32	
pv value, max. (dry)	MPa · m/s	0.30	
Mechanical properties			
Flexural modulus	MPa	6,532	DIN 53457
Flexural strength at +20°C	MPa	173	
Compressive strength	MPa	101	
Max. recommended surface pressure (+20°C)	MPa	60	
Shore D hardness		80	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+110	
Max. application temperature short-term	°C	+180	
Min. application temperature	°C	-30	
Thermal conductivity	W/m · K	0.34	ASTM C 177
Coefficient of thermal expansion (at +23°C)	K ⁻¹ · 10 ⁻⁵	5	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	>10 ¹²	DIN IEC 93
Surface resistance	Ω	>10 ¹²	DIN 53482

Table 01: Material properties

iglidur® P230 is a material with low moisture absorption and well-balanced thermal properties for use in cost-sensitive series-production applications. Good wear resistance at low pv values and low to medium speeds and loads round off the all-round profile.

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® P230 plain bearings is approximately 0.1% weight. The saturation limit in water is 0.3% weight. This low moisture absorption is well below the values of iglidur® M250 or iglidur® G.

Vacuum

In vacuum, any present moisture is released as vapour. Use in vacuum is only possible with dehumidified iglidur® P230 bearings.

Radiation resistance

Plain bearings made from iglidur® P230 have limited use under radioactive radiation. They are resistant to radiation up to an intensity of 3 · 10²Gy.

Resistance to weathering

iglidur® P230 plain bearings have not yet been tested for their resistance to weathering. Please consult igus® if you're planning to use them outdoors.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® P230 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

Diagram 03 shows the elastic deformation of iglidur® P230 at radial loads. At the maximum recommended surface pressure of 60MPa at room temperature the deformation is less than 3%. A plastic deformation can be negligible up to this value. It is however also dependent on the duty cycle of the load.

Surface pressure, page 41



-30°C up to +110°C



60MPa



Permissible surface speeds

iglidur® P230 was developed for low to average surface speeds. During continuous operation, a maximum speed of 1.0m/s (rotating) or 3.0m/s (linear) is permissible. The maximum values shown in table 03 can only be achieved at low pressures. At the given speeds, friction can cause a temperature increase to maximum permissible levels. In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

Temperature

Due to its maximum long-term application temperature of +110°C, iglidur® P230 is suitable for a wide range of applications. If even higher temperatures are required, iglidur® G (+130°C) or the new standard iglidur® G1 (+180°C) are available. The temperatures prevailing in the bearing system also have an influence on the wear. The wear rises with increasing temperatures. For temperatures over +100°C an additional securing is required.

Application temperatures, page 49

Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the surface speed and load (diagram 04).

Coefficient of friction and surfaces, page 47

Wear resistance, page 50

Shaft materials

Diagram 06 shows results of testing different shaft materials with plain bearings made from iglidur® P230. For rotational movement with 1MPa radial load, wear on all shafts is low, with the "soft" shaft types resulting in a higher coefficient of wear. The comparison of pivoting and rotational movements (diagram 07) shows fewer differences than with many other iglidur® materials. The limitation of iglidur® P230 to low to medium loads becomes clear.

Shaft materials, page 52

Installation tolerances

iglidur® P230 plain bearings are standard bearings for shafts with h tolerance (recommended minimum h9). The bearings are designed for press-fit into a housing machined to a H7 tolerance. After being assembled into a nominal size housing, 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 57

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

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

Table 02: Chemical resistance

Chemical table, page 1636

	Rotating	Oscillating	linear
long-term m/s	1.0	0.7	3.0
short-term m/s	2.0	1.4	4.0

Table 03: Maximum surface speeds

	Dry	Greases	Oil	Water
Coefficient of friction μ	0.13 – 0.32	0.09	0.04	0.04

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

Ø d1 [mm]	Housing		Plain bearing		Shaft	
	H7 [mm]	E10 [mm]	E10 [mm]	h9 [mm]	h9 [mm]	h9 [mm]
0 – 3	+0.000	+0.010	+0.014	+0.054	-0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.020	+0.068	-0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.025	+0.083	-0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.032	+0.102	-0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.040	+0.124	-0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.050	+0.150	-0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.060	+0.180	-0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.072	+0.212	-0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.085	+0.245	-0.100	+0.000

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

iglidur® P230 plain bearings are currently manufactured to special order.

Technical data

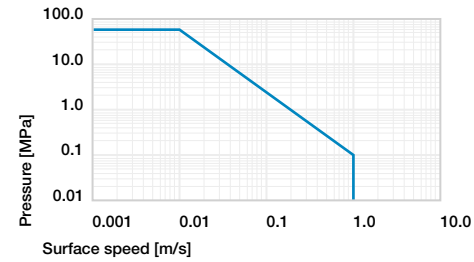


Diagram 01: Permissible pv values for iglidur® P230 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

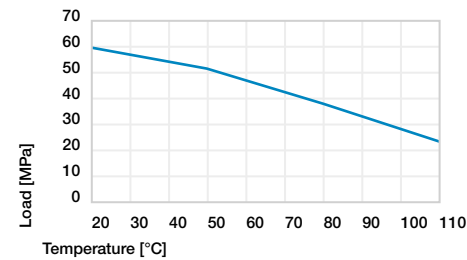


Diagram 02: Maximum recommended surface pressure as a function of temperature (60MPa at +20°C)

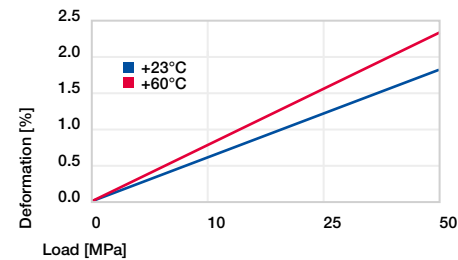


Diagram 03: Deformation under pressure and temperature

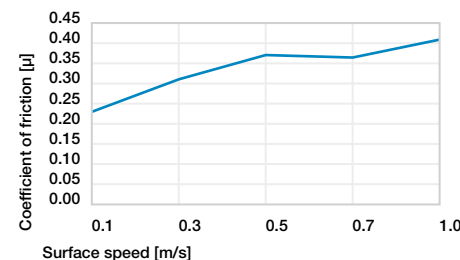


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

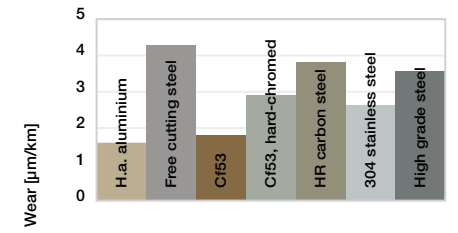


Diagram 05: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

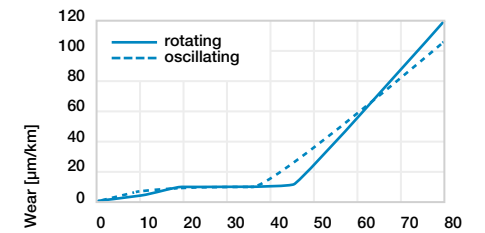


Diagram 06: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load