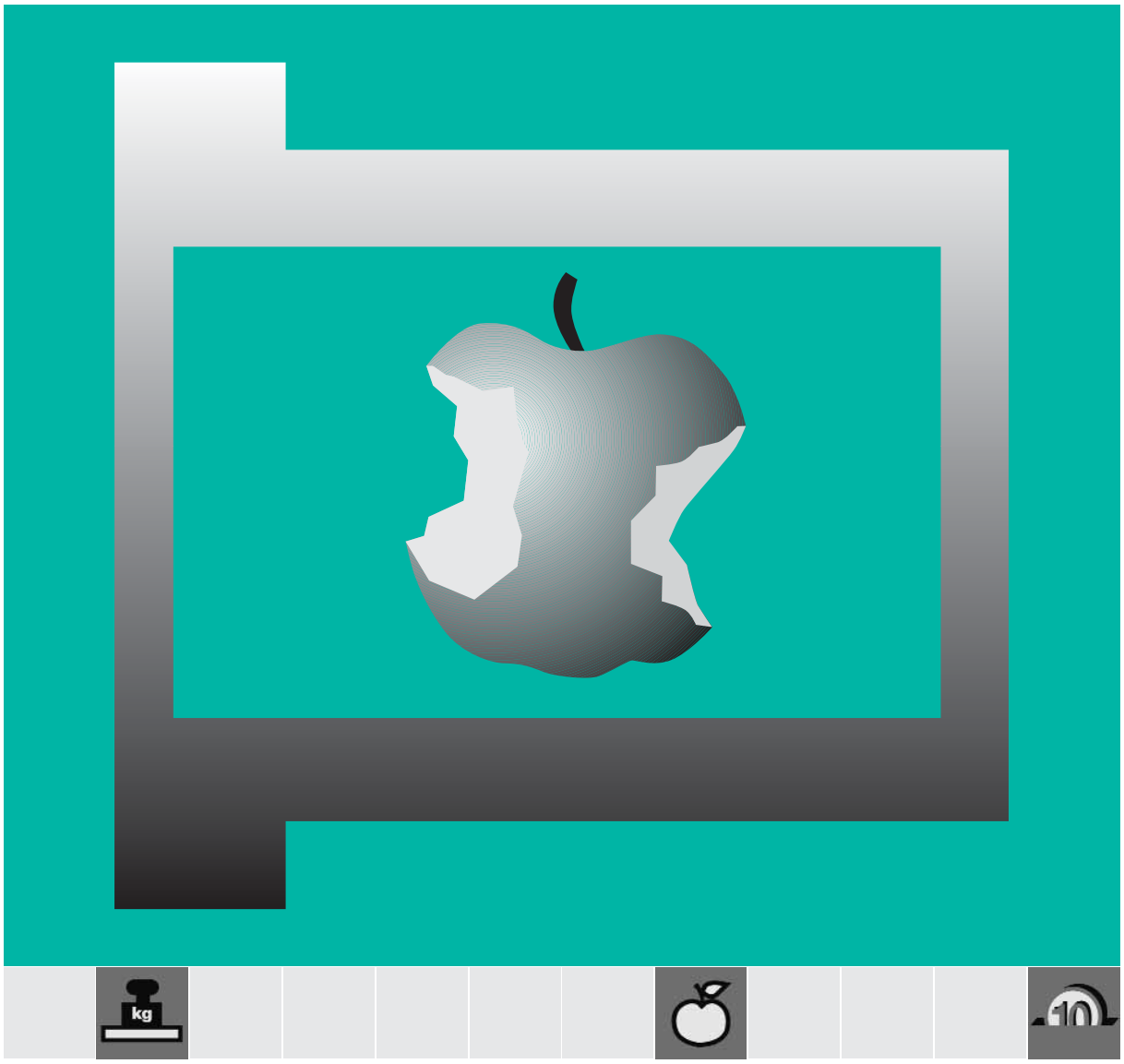

iglidur® A290 – Very Appetising

Suitable for direct contact with food

Physiologically safe

Good abrasion resistance

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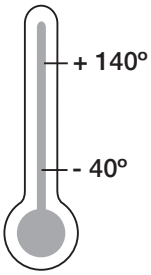
iglidur® A290 | **Very Appetising**

iglidur® A290 bearings are a further development for use in the food and pharmaceutical industry. When compared to iglidur® A200 bearings, the tribological properties are considerably improved.

2 styles
> 25 dimensions
Ø 3–50 mm



Price index

Very Appetising

When to use iglidur® A290 plain bearings:

- Suitable for contact with food
- For low speeds
- When quiet operation is important
- Good abrasion resistance
- Physiologically safe
- Very good mechanical properties

When not to use iglidur® A290 plain bearings:

- When the material's FDA compliance is necessary
  ▶ iglidur® A180 (chapter 7), A200 (chapter 8), A500 (chapter 10)
- When the highest wear resistance is required
  ▶ iglidur® W300 (chapter 5)
- When temperatures are continuously greater than 140°C
  ▶ iglidur® A500 (chapter 10), H (chapter 12), X (chapter 6)
- When a cost-effective universal bearing is required
  ▶ iglidur® G (chapter 2)

The material iglidur® A290 complies with the requirements of the BfR for contact with food.

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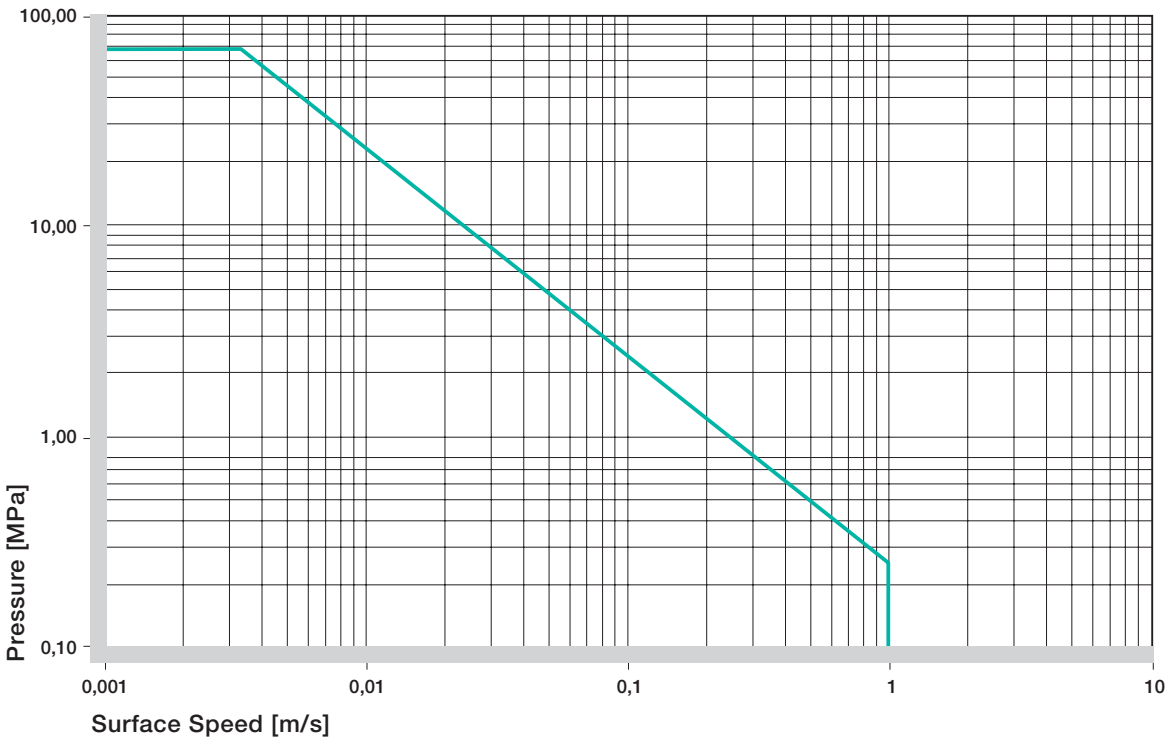
Material Table

General Properties	Unit	iglidur® A290	Testing Method
Density	g/cm³	1,41	
Colour		White	
Max moisture absorption at 23°C/50% r.F.	% weight	1,7	DIN 53495
Max. moisture absorption	% weight	7,3	
Coefficient of sliding friction, dynamic against steel	µ	0,13 - 0,40	
p x v value, max. (dry)	MPa x 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 x K	0,24	ASTM C 177
Coefficient of thermal expansion	$K^{-1} \times 10^{-5}$	7	DIN 53752
Electrical Properties			
Specific volume resistance	Ωcm	$> 10^{11}$	DIN IEC 93
Surface resistance	Ω	$> 10^{11}$	DIN 53482

Table 9.1: Material Data



Graph 9.1: Permissible p x v value for iglidur® A290 running dry against a steel shaft at 20°C

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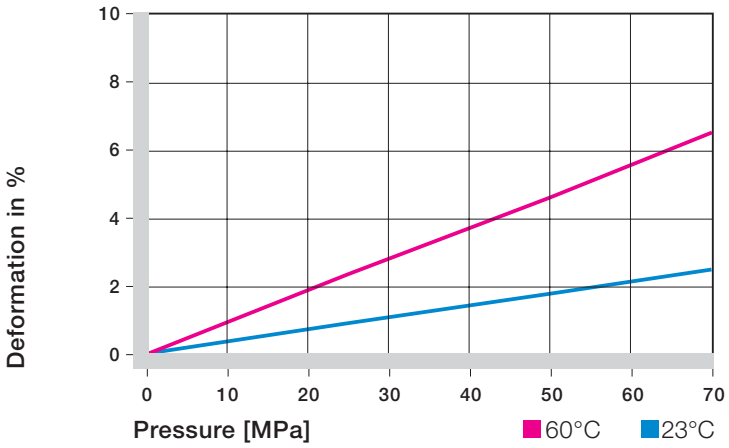


Graph 9.2: Deformation under pressure and temperature

Surface Pressure

iglidur® A290 plain bearings are a further development for use in the food industry. Compared to bearings made of the material iglidur® A200, the tribological properties are considerably improved. For example, the recommended maximum surface pressure is 70 MPa. At this load, the deformation at room temperature is only 2.5%. Plastic deformation is close to zero up to this load. However, it is also affected by the cycle time.

Graph 9.2
▶ Surface Pressure, page 1.18

m/s	Rotating	Oscillating	Linear
Continuous	1	0,7	3
Short term	2	1,4	4

Table 9.2: Maximum surface speeds

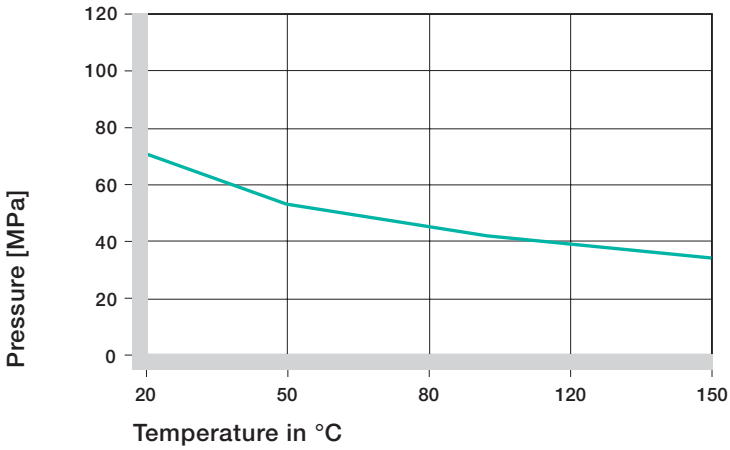
Permissible Surface Speeds

iglidur® A290 is suitable for low surface speeds.
Because of the relatively high friction rate in the low load range, plain bearings made of iglidur® A290 heat up more than other bearings. At high speed, the friction additionally increases.

▶ Surface Speed, page 1.22
▶ p x v value, page 1.23

iglidur® A290	Application Temperature
Minimum	- 40 °C
Max. long term	+ 140 °C
Max. short term	+ 180 °C

Table 9.3: Temperature limits for iglidur® A290



Graph 9.3: Recommended maximum surface pressure of iglidur® A290 as a function of temperature

Temperatures

The maximum permissible short-term temperature is 180°C.
With an increase in temperature, the compressive strength of iglidur® A290 plain bearings decreases. Graph 9.3 shows this relationship.
The ambient temperatures prevalent in the bearing system also have an effect on wear. With rising temperatures, an increase in wear results. From temperatures of 120°C, this effect becomes significant.

Graph 9.3
▶ Application Temperatures, page 1.23

iglidur® A290	Dry	Grease	Oil	Water
C.o.f. [µ]	0,13 - 0,40	0,09	0,04	0,04

Table 9.4: Coefficients of friction for iglidur® A290 against steel (Ra = 1µm, 50 HRC)

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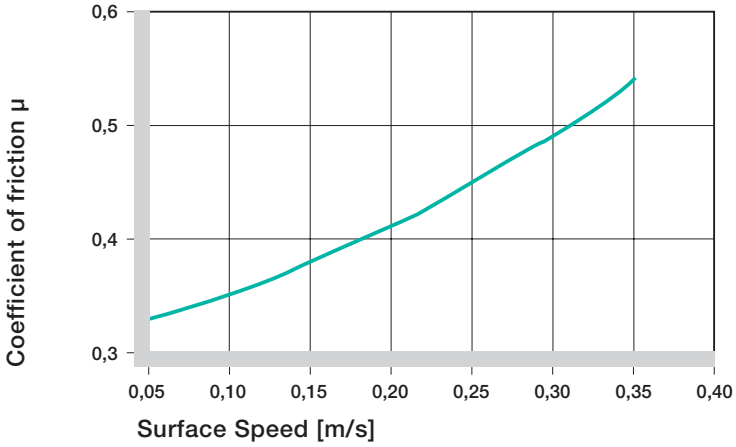
Friction and Wear

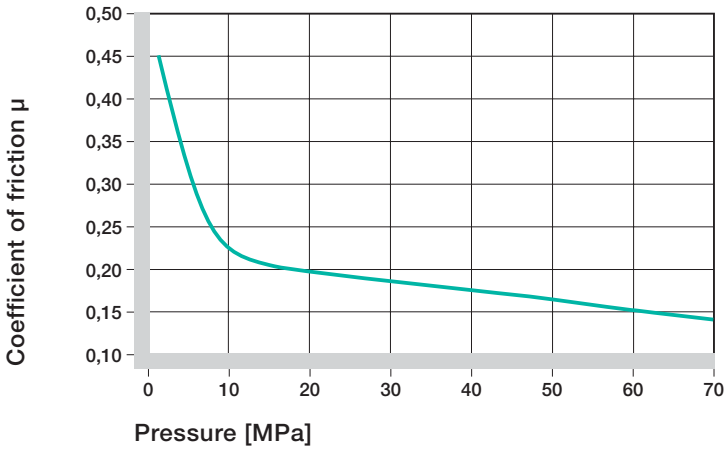
Just as the wear resistance, the coefficient of friction μ also changes with the load. With increasing speeds and a constant load, the coefficient of friction constantly increases. On the other hand, for increasing load and a constant speed, an inverse relationship is shown (see Graphs 9.4 and 9.5).

To a large extent, friction and wear are dependent on the shaft material. Shafts that are too smooth increase both the coefficient of friction and the wear of the bearing. iglidur® A290 proves to be relatively resistant to shaft surfaces. iglidur® A290 plain bearings have a coefficient of friction μ around 0.4 for an average roughness of Ra = 0.4 to 1.6 μm.

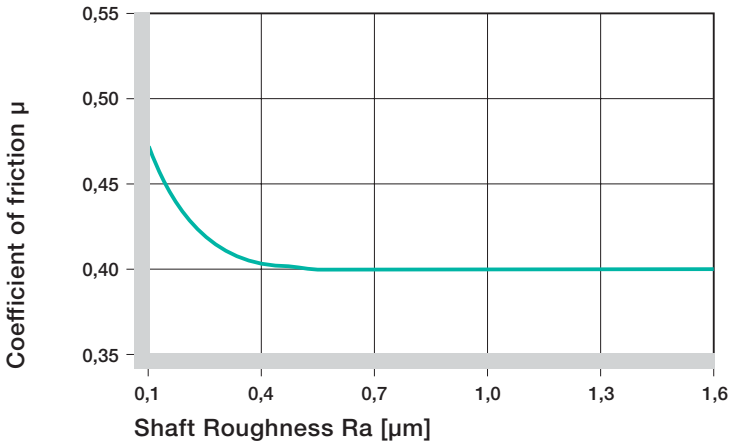
Graphs 9.4 to 9.6
▶ Coefficients of Friction and Surfaces, page 1.25
▶ Wear Resistance, page 1.26



Graph 9.4: Coefficients of friction for iglidur® A290 as a function of the surface speed; p = 0.75 MPa



Graph 9.5: Coefficients of friction of iglidur® A290 as a function of the pressure, v = 0.01 m/s



Graph 9.6: Coefficients of friction of iglidur® A290 as a function of the shaft surface (Cf53 hardened and ground steel)

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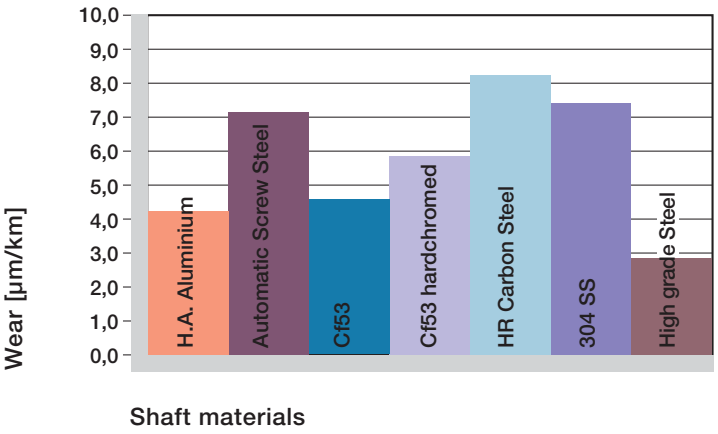
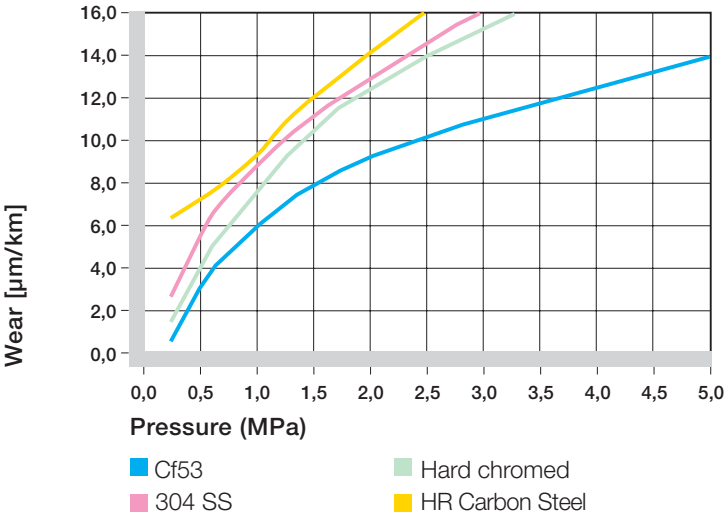
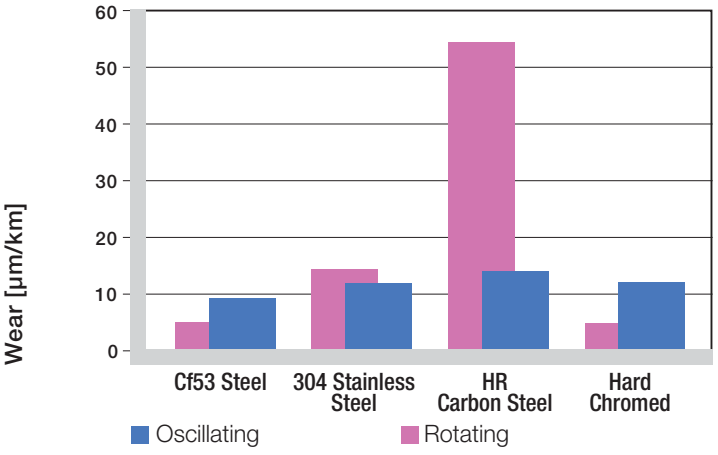


Graph 9.7: Wear of iglidur® A290, rotating application with different shaft materials, p = 0.75 MPa, v = 0.5 m/s



Graph 9.8: Wear of iglidur® A290 with different shaft materials in rotating applications



Graph 9.9: Wear with different shaft materials, oscillating and rotating

Shaft Materials

Graphs 9.7 to 9.9 show results of testing different shaft materials with plain bearings made of iglidur® A290.

The improved tribological properties compared to iglidur® A200 are also reflected in the wear values. For low loads, the differences in wear resistance for iglidur® A290 with different shaft materials is very pronounced. Graph 9.8 shows that with increasing loads, the advantage of hard chromed shafts increases. Hard chromed shafts are also wellsuited for oscillating applications, frequently found in packaging machines. Other hardened surfaces are also recommended for oscillating movements. Example: Cf53 hardened and ground steel.

Graphs 9.7 to 9.9
▶ Shaft Materials, page 1.28

Installation Tolerances

iglidur® A290 plain bearings are meant to be oversized before pressfit. The bearings are designed for pressfit into a housing machined to a H7 tolerance. After being assembled into a nominal size housing, the inner diameter is adjusted to meet our specified tolerances. Please adhere to the catalogue specifications for housing bore and recommended shaft sizes. This will help to ensure optimal performance of iglidur® A290 plain bearings.

▶ Testing Methods, page 1.32/1.33

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Chemical Resistance

iglidur® A290 plain bearings have a good chemical resistance. They are resistant to most lubricants. iglidur® A290 is also resistant to most weak organic and inorganic acids.
The moisture absorption of iglidur® A290 bearings is approximately 1.7% in standard atmosphere. The saturation limit in water is 7.3%. This is a disadvantage that must be taken into account with regard to applications in moist or wet environments. If you have questions concerning the tolerances in wet applications, please contact us.

Graph 9.10
▶ Chemical Table, pages 70.1

Radiation Resistance

Plain bearings made from iglidur® A290 are resistant to radiation up to an intensity of 3 x 10^2 Gy.

UV Resistance

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

Vacuum

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

Electrical Properties

iglidur® A290 plain bearings are electrically insulating.

Diameter d1 [mm]			Shaft h9 [mm]	iglidur® A290 D11 [mm]
up	to	3	0 - 0,025	+0,020 + 0,080
> 3	to	6	0 - 0,030	+0,030 + 0,105
> 6	to	10	0 - 0,036	+0,040 + 0,130
> 10	to	18	0 - 0,043	+0,050 + 0,160
> 18	to	30	0 - 0,052	+0,065 + 0,195
> 30	to	50	0 - 0,062	+0,080 + 0,240

Table 9.5: Essential tolerances for iglidur® A290 plain bearings according to ISO 3547-1 after pressfit

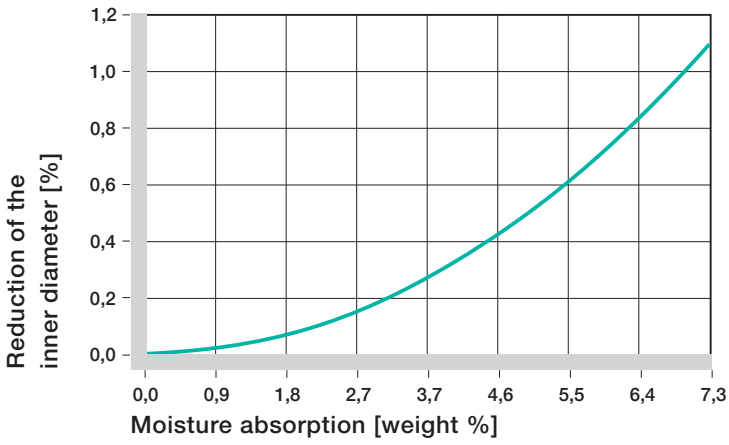
Medium	Resistance
Alcohol	+ to 0
Hydrocarbons	+
Greases, oils without additives	+
Fuels	+
Diluted acids	0 to –
Strong acids	–
Diluted alkalines	+
Strong alkalines	+ to 0

Table 9.6: Chemical resistance of iglidur® A290 – detailed list, page 70.1

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

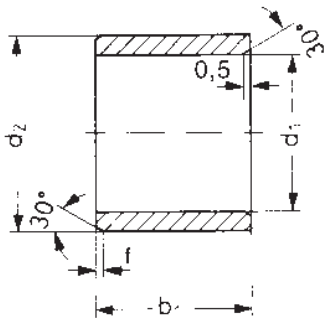
iglidur® A290	
Specific volume resistance	> 10^{11} Ωcm
Surface resistance	> 10^{11} Ω

Table 9.7: Electrical properties of iglidur® A290



Graph 9.10: Effect of moisture absorption on iglidur®A290 plain bearings

iglidur® A290 | Sleeve Bearing | mm



Structure – part no.
Data in mm

A290 S M-0304-03

b1
d2
d1
Metric
Type
Material

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 according to ISO 3547-1
and special dimensions

Part Number	d1	d1 Tolerance*	d2	b1 h13
A290SM-0304-03	3,0	+0,020 +0,080	4,5	3,0
A290SM-0405-04	4,0	+0,030 +0,105	5,5	4,0
A290SM-0507-05	5,0	+0,030 +0,105	7,0	5,0
A290SM-0608-06	6,0	+0,030 +0,105	8,0	6,0
A290SM-0810-08	8,0	+0,040 +0,130	10,0	8,0
A290SM-1012-10	10,0	+0,040 +0,130	12,0	10,0
A290SM-1214-15	12,0	+0,050 +0,160	14,0	15,0
A290SM-1517-15	15,0	+0,050 +0,160	17,0	15,0
A290SM-1618-15	16,0	+0,050 +0,160	18,0	15,0
A290SM-1820-15	18,0	+0,050 +0,160	20,0	15,0
A290SM-2023-20	20,0	+0,065 +0,195	23,0	20,0
A290SM-2528-20	25,0	+0,065 +0,195	28,0	20,0
A290SM-3034-30	30,0	+0,065 +0,195	34,0	30,0
A290SM-3539-40	35,0	+0,080 +0,240	39,0	40,0
A290SM-4044-50	40,0	+0,080 +0,240	44,0	50,0
A290SM-5055-40	50,0	+0,080 +0,240	55,0	40,0

*after pressfit. Testing methods ► page 1.32/1.33


Type S


Type F

Order example

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25–49	200–499	2500–4999

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mm
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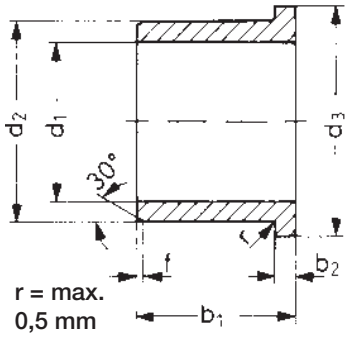

r = max.
0,5 mm

Data in mm

Structure – part no.

A290 F M-0405-06

b1
d2
d1
Metric
Type
Material

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 according to ISO 3547-1
and special dimensions

Part Number	d1	d1 Tolerance*	d2	d3 d13	b1 h13	b2 -0,14
A290FM-0405-06	4,0	+0,030 +0,105	5,5	9,5	6	0,75
A290FM-0507-05	5,0	+0,030 +0,105	7,0	11,0	5	1,00
A290FM-0608-08	6,0	+0,030 +0,105	8,0	12,0	8	1,00
A290FM-0810-09	8,0	+0,040 +0,130	10,0	15,0	9	1,00
A290FM-1012-09	10,0	+0,040 +0,130	12,0	18,0	9	1,00
A290FM-1214-12	12,0	+0,050 +0,160	14,0	20,0	12	1,00
A290FM-1517-17	15,0	+0,050 +0,160	17,0	23,0	17	1,00
A290FM-1618-17	16,0	+0,050 +0,160	18,0	24,0	17	1,00
A290FM-2023-21	20,0	+0,065 +0,195	23,0	30,0	21	1,50
A290FM-2528-21	25,0	+0,065 +0,195	28,0	35,0	21	1,50
A290FM-3034-26	30,0	+0,065 +0,195	34,0	42,0	26	2,00
A290FM-3539-26	35,0	+0,080 +0,240	39,0	47,0	26	2,00
A290FM-4044-40	40,0	+0,080 +0,240	44,0	52,0	40	2,00
A290FM-5055-40	50,0	+0,080 +0,240	55,0	63,0	40	2,00

*after pressfit. Testing methods ▶ page 1.32/1.33

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