



iglidur® T220

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# iglidur® T220 – For the Tobacco Industry



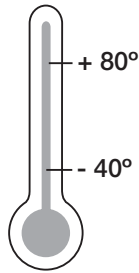
Free of unwanted components as requested by  
 main manufacturers of tobacco products

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iglidur® T220

Product range  
on request

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igus® GmbH  
51147 Cologne

Price index



## For the Tobacco Industry



**When to use iglidur® T220  
plain bearings:**

- When bearings need to be free of substances that are not permitted for applications in the tobacco industry



**When not to use iglidur® T220  
plain bearings:**

- When a cost-effective universal bearing is required
  - ▶ iglidur® G (chapter 2), M250 (chapter 4)
- if highest wear resistance and low pressure load is necessary
  - ▶ iglidur® J (chapter 3)
- If the bearing should be free merely from PTFE and silicon
  - ▶ iglidur® C (chapter 24), R (chapter 19)

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**Material Table**

General Properties	Unit	iglidur® T220	Testing Method
Density	g/cm <sup>3</sup>	1,28	
Colour		White	
Max. moisture absorption at 23°C / 50% r.F.	% weight	0,3	DIN 53495
Max. moisture absorption	% weight	0,5	
Coefficient of sliding friction, dynamic against steel	μ	0,20 - 0,32	
p x v value, max. (dry)	MPa x m/s	0,28	

**Mechanical Properties**

Modulus of elasticity	MPa	1.800	DIN 53457
Tensile strength 20°C	MPa	65	DIN 53452
Compressive strength	MPa	55	
Max. recommended surface pressure (20°C)	MPa	45	
Shore D hardness		76	DIN 53505

**Physical and Thermal Properties**

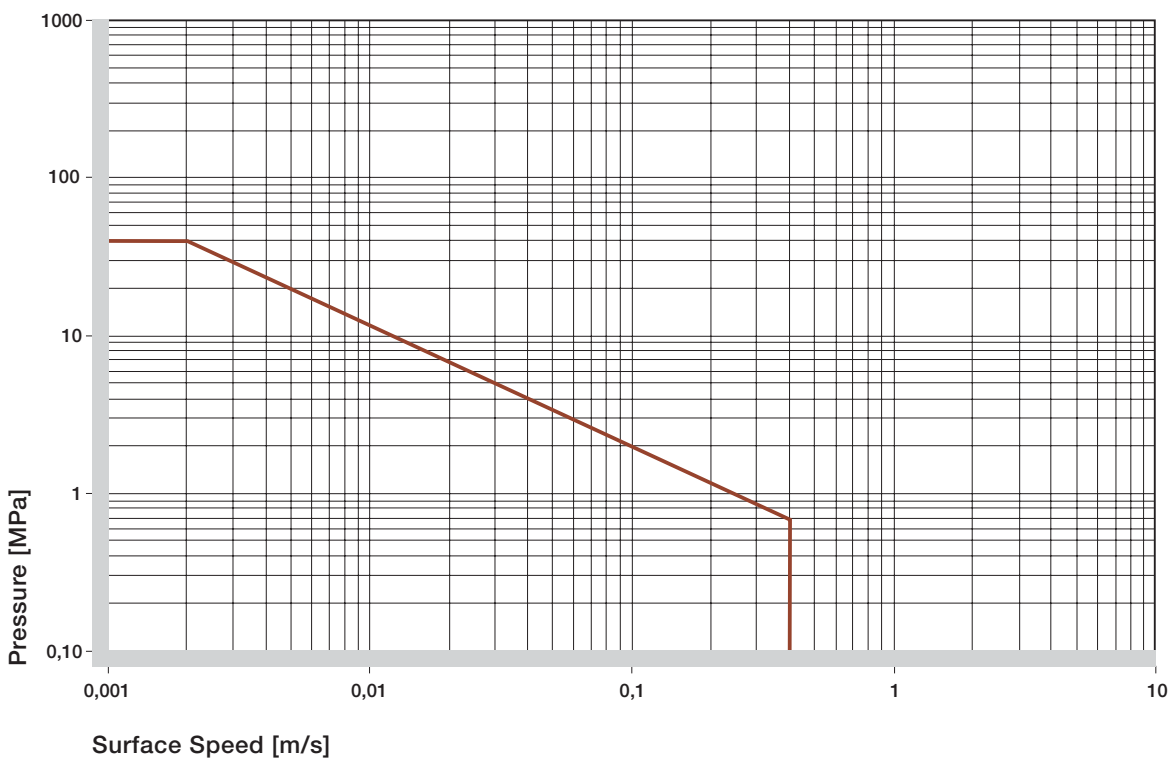
Max. long term application temperature	°C	100	
Max. short term application temperature	°C	160	
Max. ambient temperature, short term <sup>1)</sup>	°C	170	
Min. application temperature	°C	-40	
Thermal conductivity	W/m x K	0,24	ASTM C 177
Coefficient of thermal expansion (at 23°C)	K <sup>-1</sup> x 10 <sup>-5</sup>	11	DIN 53753

**Electrical Properties**

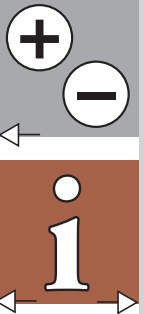
Specific volume resistance	Ω x cm	> 10 <sup>10</sup>	DIN IEC 93
Surface resistance	Ω	> 10 <sup>10</sup>	DIN 53482

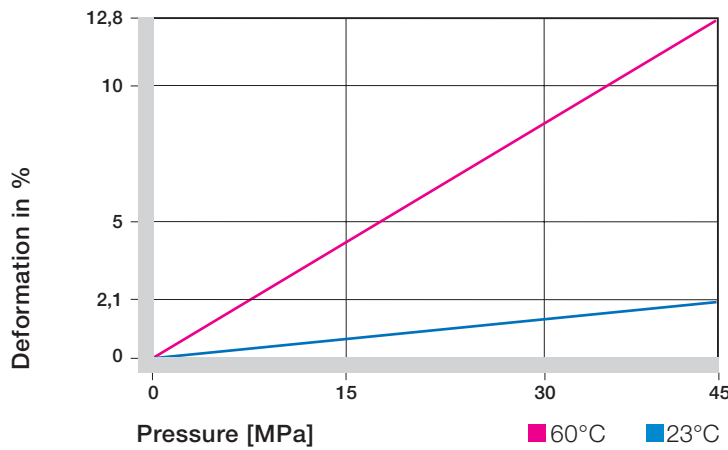
<sup>1)</sup> Without additional load; no sliding movement; relaxation possible

**Table 29.1: Material Data**



**Graph 29.1: Permissible p x v values for iglidur® T220 with a wall thickness of 1 mm running dry against a steel shaft at 20°C, mounted in a steel housing**





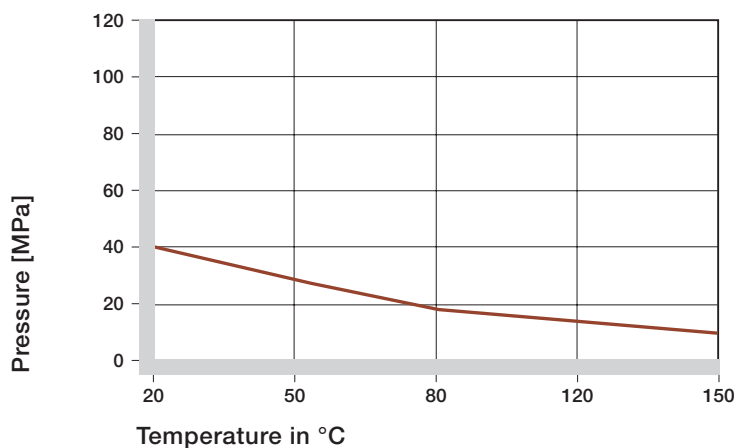
Graph 29.2: Deformation under pressure and temperature

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

Table 29.2: Maximum surface speeds

igidur® T220	Application Temperature
Minimum	- 40 °C
Max. long term	+ 100 °C
Max. short term	+ 160 °C

Table 29.3: Temperature limits for iglidur® T220



Graph 29.3: Recommended maximum surface pressure of iglidur® T220 as a function of temperature

igidur® T220 is a special material for the use in the tobacco processing industry. It meets the requirements of the tobacco industry (engineering database). The material is free of undesirable or prohibited ingredients, as required by well-known manufacturers of tobacco products according to the situation in 2004.

## Surface Pressure

igidur® T220 plain bearings can be loaded to the permissible limit of 45 MPa.

The load, however, has an impact on the wear of the bearings. The permissible load is further limited by increasing temperatures.

Graph 29.2

► Surface Pressure, page 1.18

## Permissible Surface Speeds

The maximum speed of iglidur® T220 plain bearings in continuous rotation is 0.4 m/s. The frictional heat generated define the permissible speeds. From this also follows that higher speeds can be achieved in intermittent duty or in linear operations.

► Surface Speed, page 1.20

► p x v value, page 1.22

## Temperatures

The plain bearings of iglidur® T220 can be continuously used up to 100°C. Temporarily, temperatures up to 160°C are permissible. The elasticity of the bearings depends on the temperature. 60°C already results in a clear increase in elasticity. Usually iglidur® T220 bearings will need to be mechanically secured in the housing when being used at temperatures over 60 degrees. Please contact us if you have questions concerning the plain bearings and their use.

Graph 29.3

► Application Temperatures, page 1.23

## Friction and Wear

This material was developed in strict compliance with the specific requirements of the tobacco processing industry. This eliminated the use of friction reducing additives, which means that the friction and wear values of iglidur® T220 plain bearings fall well behind those of the better iglidur materials.

- ☑ Graphs 29.4 to 29.6
- ▶ Coefficients of Friction and Surfaces, page 1.25
- ▶ Wear Resistance, page 1.26

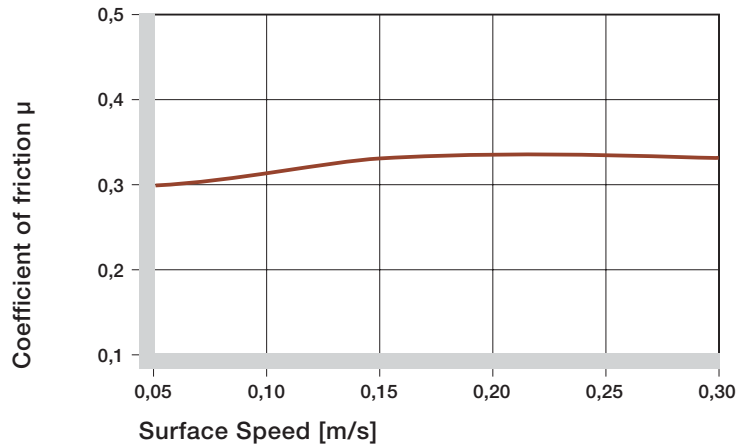
## Shaft Materials

Graphs 29.7 and 29.8 show the results of the tests concerning the wear resistance with different shaft materials. If recommendations are observed, the service life of a bearing application can be considerably improved. Graph 29.9 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.

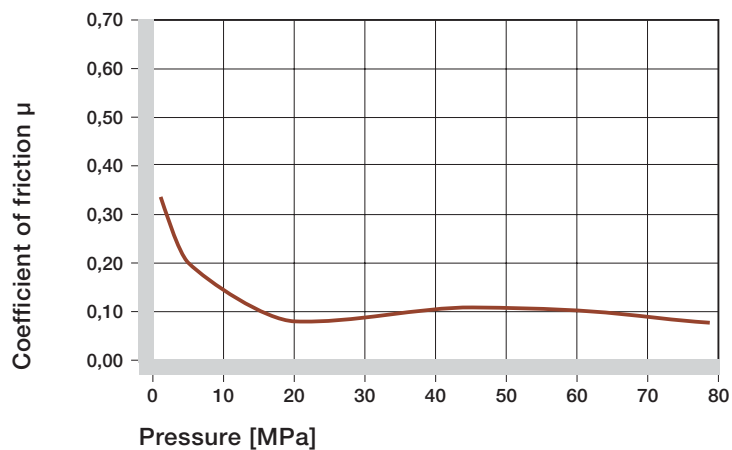
- ☑ Graphs 29.7 to 29.9
- ▶ Shaft Materials, pages 1.28

iglidur® T220	Dry	Grease	Oil	Water
C.o.f. [μ]	0,2 - 0,32	0,09	0,04	0,04

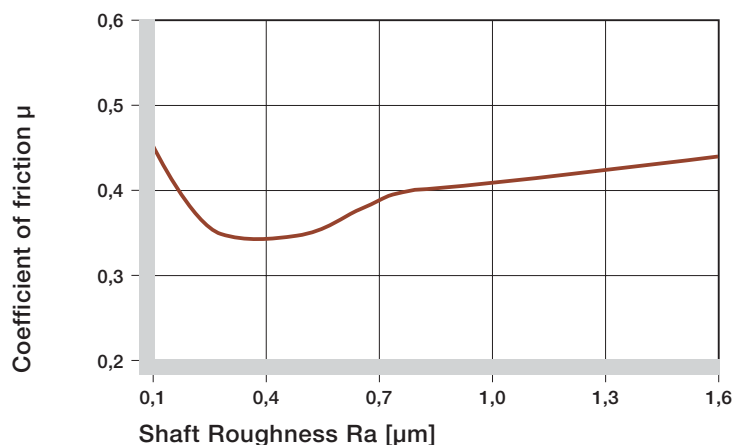
**Table 29.4: Coefficient of friction of iglidur® T220 against steel (Ra = 1 μm, 50 HRC)**



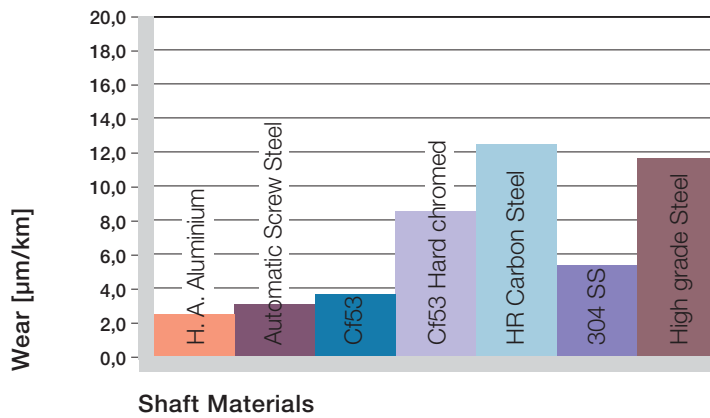
**Graph 29.4: Coefficients of friction of iglidur® T220 as a function of the surface speed, p = 0.75 MPa**



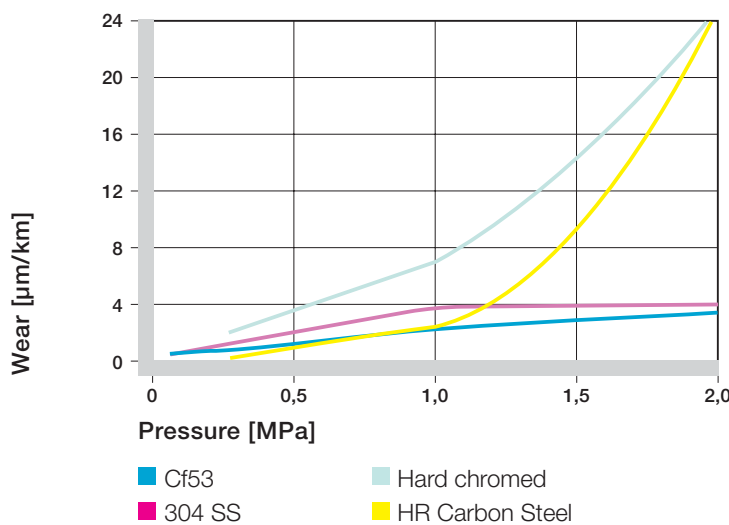
**Graph 29.5: Coefficients of friction of iglidur® T220 as a function of pressure, v = 0.01 m/s**



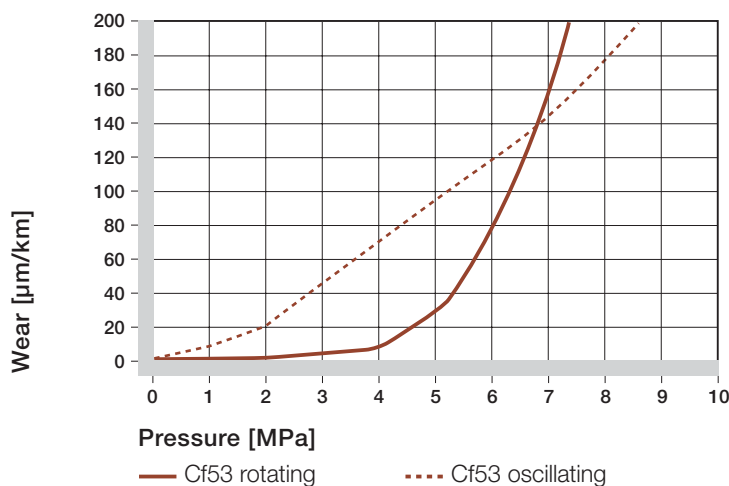
**Graph 29.6: Coefficients of friction of iglidur® T220 as a function of the shaft surface (Cf53 hardened and ground steel)**



Graph 29.7: Wear of iglidur® T220, rotating applications with different shaft materials,  $p = 0.75 \text{ MPa}$ ,  $v = 0.5 \text{ m/s}$



Graph 29.8: Wear of iglidur® T220 with different shaft materials in rotational applications



Graph 29.9: Wear for rotating and oscillating applications as a function of the pressure (Cf53 hardened and ground steel shaft)

## Installation Tolerances

igidur® T220 plain bearings are standard bearings for shafts with h tolerance (h9 recommended at least).

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 of the bearings is automatically adjusted to an E10 tolerance.

► Testing Methods, page 1.32/1.33

## Chemical Resistance

igidur® T220 plain bearings are resistant to strongly diluted alkalines and very weak acids. The moisture absorption of iglidur® T220 plain bearings is approximately 0.3% in standard atmosphere. 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.

☒ Graph 29.10

► Chemical Table, page 70.1

## Radiation Resistance

Plain bearings of iglidur® T220 are radiation resistant up to a radiation intensity of  $3 \times 10^2 \text{ Gy}$ .

### UV Resistance

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

### Vacuum

Applications in a vacuum are only possible to a limited extent. Only dehumidified bearings of iglidur® T220 should be tested in a vacuum.

### Electrical Properties

Plain bearings of iglidur® T220 are electrically insulating

### Availability

iglidur® T220 plain bearings are manufactured to special order.

Diameter d1 [mm]	Shaft h9 [mm]	iglidur® T220 E10 [mm]
up to 3	0 - 0,025	+0,014 + 0,054
> 3 to 6	0 - 0,030	+0,020 + 0,068
> 6 to 10	0 - 0,036	+0,025 + 0,083
> 10 to 18	0 - 0,043	+0,032 + 0,102
> 18 to 30	0 - 0,052	+0,040 + 0,124
> 30 to 50	0 - 0,062	+0,050 + 0,150

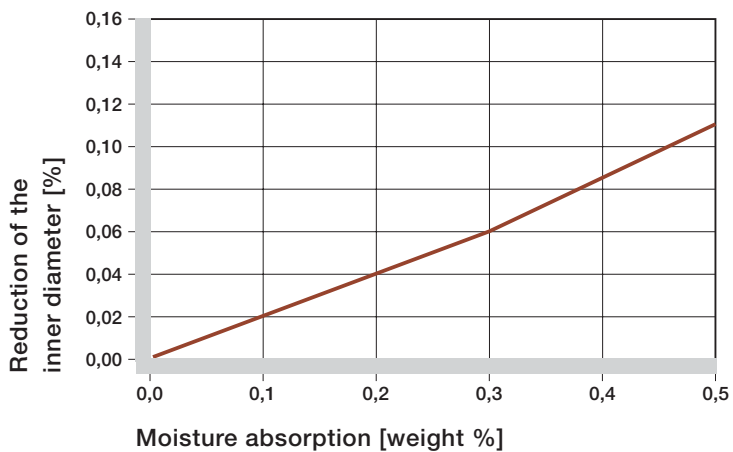
**Table 29.5: Essential tolerances for iglidur® T220 plain bearings according to ISO 3547-1 after pressfit**

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

**Table 29.6: Chemical resistance of iglidur® T220 – detailed list, page 70.1**

+ resistant 0 conditionally resistant - not resistant

All data given at room temperature [20°C]



**Graph 29.10: Effect of moisture absorption on iglidur® T220 plain bearings**

iglidur® T220	
Specific volume resistance	> 10 <sup>10</sup> Ωcm
Surface resistance	> 10 <sup>10</sup> Ω

**Table 29.7: Electrical properties of iglidur® T220**

iglidur® T220

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