

iglidur® T220

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



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



When to use it?

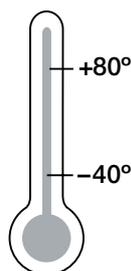
- When my bearings need to be free of substances that are not permitted for applications in the tobacco industry



When not to use it?

- When high compression strength occurs
 - ▶ **iglidur® Z, page 299**
- When a cost-effective universal bearing is required
 - ▶ **iglidur® G, page 61**
 - ▶ **iglidur® M250, page 107**
- If highest wear resistance and low pressure load is necessary
 - ▶ **iglidur® J, page 89**
- If the bearing should be free merely from PTFE and silicon
 - ▶ **iglidur® C, page 493**
 - ▶ **iglidur® R, page 249**

Temperature



Product range

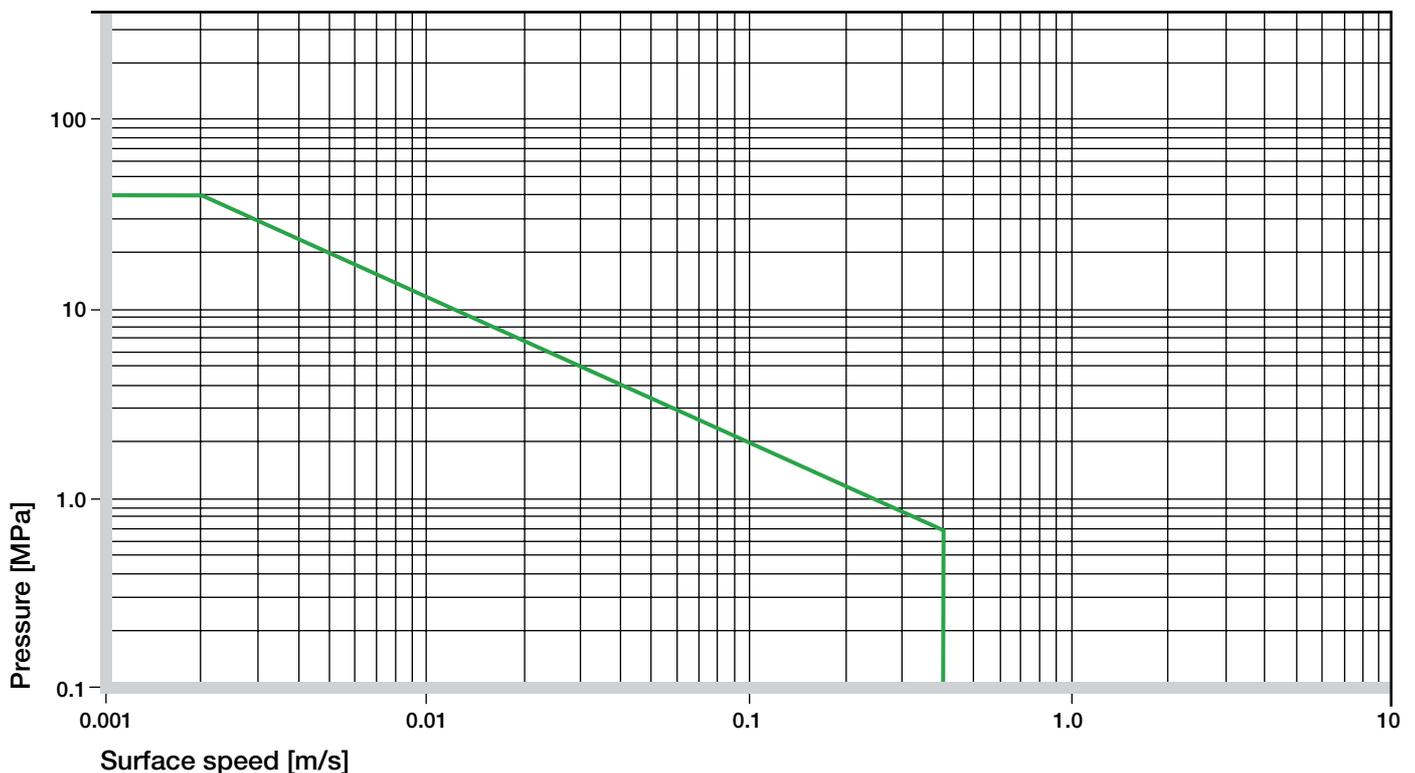
on request



Material data			
General properties	Unit	iglidur® T220	Testing method
Density	g/cm ³	1.28	
Colour		white	
Max. moisture absorption at +23 °C/50 % r. h.	% weight	0.3	DIN 53495
Max. moisture 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	
Max. ambient temperature, short term ¹⁾	°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	11	DIN 53752
Electrical properties			
Specific volume resistance	Ωcm	> 10 ¹⁰	DIN IEC 93
Surface resistance	Ω	> 10 ¹⁰	DIN 53482

¹⁾ Without additional load; no sliding movement; relaxation possible

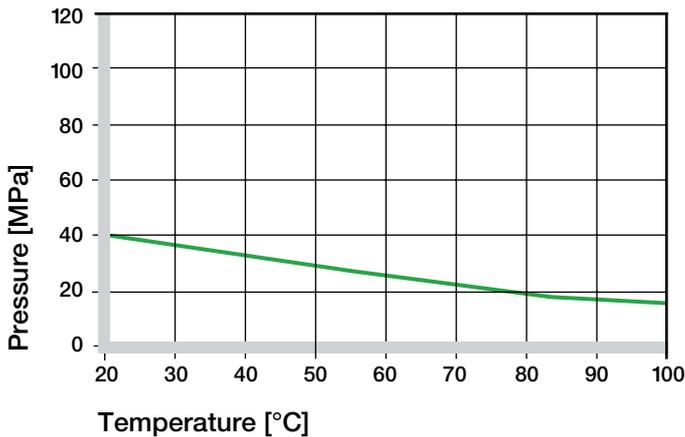
Table 01: Material data



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

Mechanical Properties

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

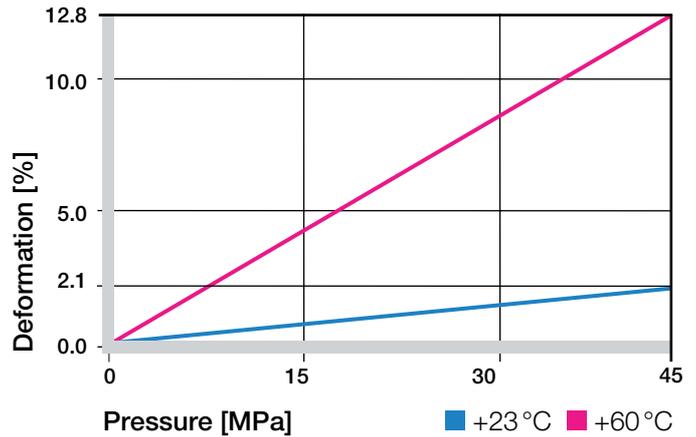


Graph 02: Recommended maximum surface pressure as a function of temperature (40 MPa at +20 °C)

iglidur® T220 is a special material for application 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.

iglidur® T220 bearings can be stressed up to the permitted limit of 45 MPa. However, the level of the load has an influence on the bearing's wear. The permitted load is limited by higher temperatures. (Graph 02).

► Surface Pressure, [page 43](#)



Graph 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 in intermittent service or in linear movements, higher speeds can be attained.

► Surface Speed, [page 45](#)

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

Table 02: Maximum running speed

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 +50 °C.

► Application Temperatures, [page 46](#)

iglidur® T220	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

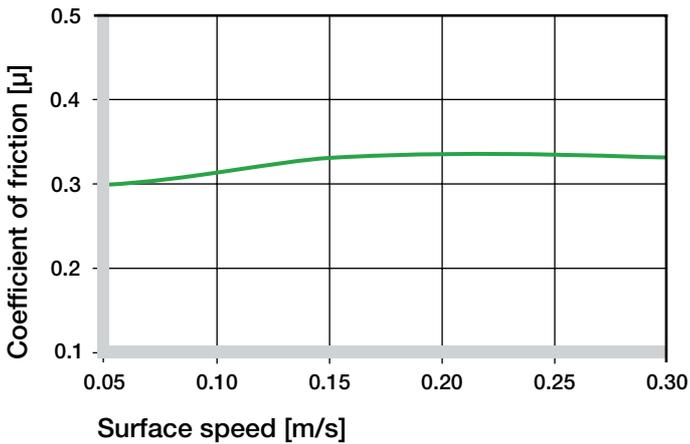
iglidur® T220 | Technical Data

Friction and Wear

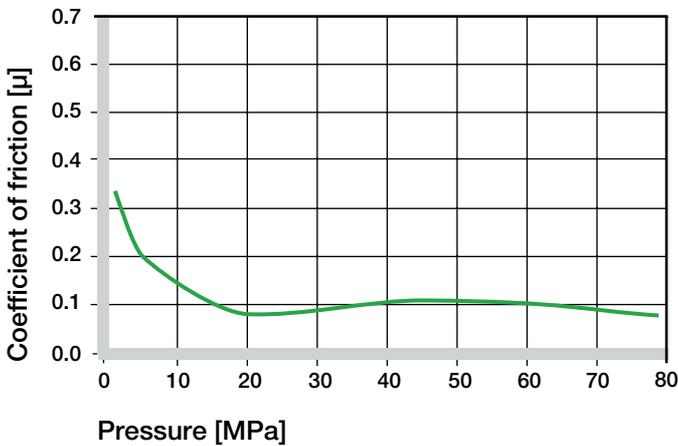
This material was developed in strict compliance with the specific requirements of the tobacco processing industry. This eliminated the use of friction reducing additives, which means that the friction and wear values of iglidur® T220 plain bearings fall well behind those of the better iglidur materials.

► Coefficients of Friction and Surfaces, **page 48**

► Wear Resistance, **page 49**



Graph 04: Coefficient of friction as a function of the running speed, $p = 0.75 \text{ MPa}$



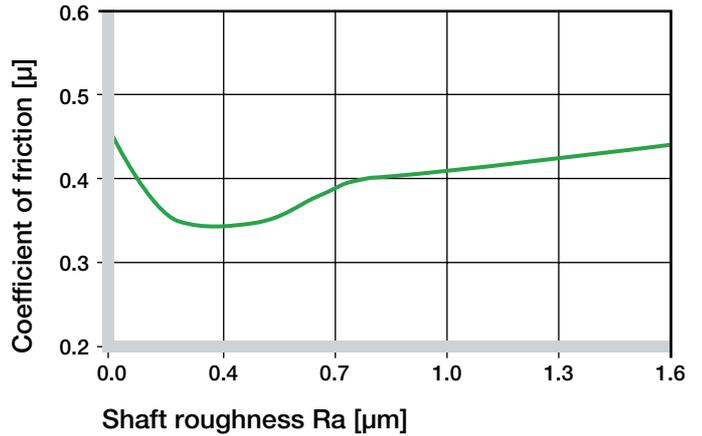
Graph 05: Coefficient of friction as a function of the pressure, $v = 0.01 \text{ m/s}$

Shaft Materials

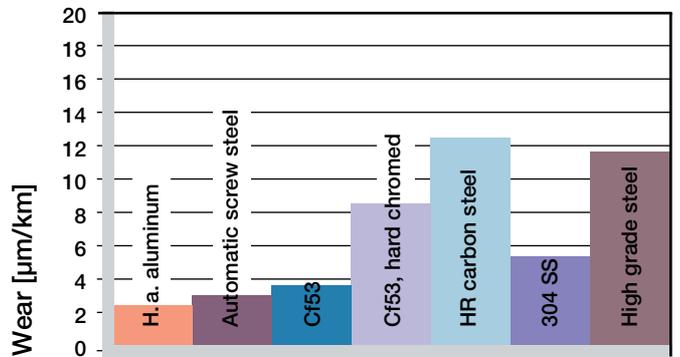
Graphs 06 to 09 show the test results of iglidur® T220 bearings running against various shaft materials.

Graph 09 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.

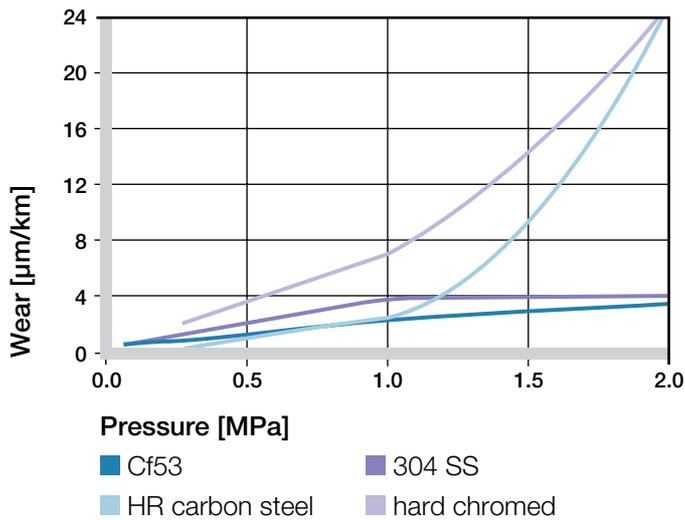
► Shaft Materials, **page 51**



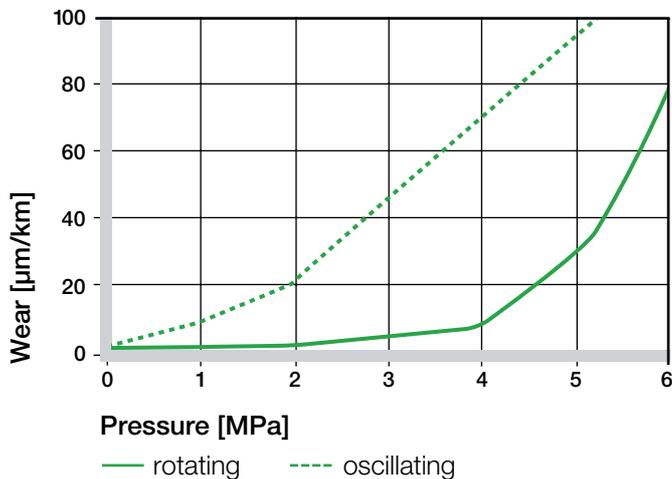
Graph 06: Coefficient of friction as a function of the shaft surface (Cf53 hardened and ground steel)



Graph 07: Wear, rotating with different shaft materials, pressure $p = 0.75 \text{ MPa}$, $v = 0.5 \text{ m/s}$



Graph 08: Wear with different shaft materials in rotational operation, as a function of the pressure



Graph 09: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the pressure

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)

Additional Properties

Chemical Resistance

iglidur® T220 plain bearings are resistant to strongly diluted alkalines and very weak acids.

► Chemical Table, page 974

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 of iglidur® T220 are radiation resistant up to a radiation intensity of $3 \cdot 10^2$ 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

iglidur® T220 plain bearings are electrically insulating.

Volume resistance	> 10^{10} Ω cm
Surface resistance	> 10^{10} Ω

iglidur® T220 | Technical Data

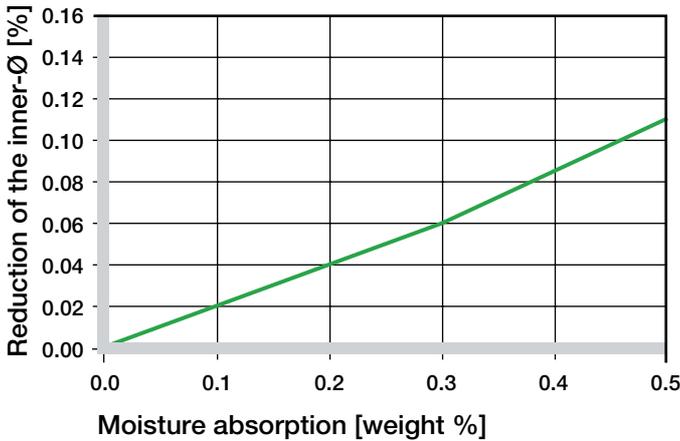
Moisture Absorption

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.

Maximum moisture absorption

At +23°C/50% r.h.	0.3% weight
Max. moisture absorption	0.5% weight

Table 06: Moisture absorption



Graph 10: Effect of moisture absorption on plain bearings

Installation Tolerances

iglidur® T220 bearings are standard bearings for shafts with h-tolerance (recommended minimum h9). After the installation in a housing bore with H7 tolerance, the inner diameter of the bearing automatically adjusts to the E10 tolerance.

► Testing Methods, page 55

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

Product Range

iglidur® T220 plain bearings are manufactured to special order.