

# iglidur®

Polymer plain bearings



# ...plastics



# Application examples: iglidur®

## Improve technology ... Reduce cost.

For years the igus® motto has been "plastics for longer life®". By this we mean the production of innovative plastic products which reduce maintenance work, achieve technical improvements, at the same time as reducing costs and increasing service life, everything delivered immediately from stock. Our references from the practice show the proven employment from iglidur® plain bearings in a wide variety of applications.

### Rollercoaster

Here iglidur® Z plain bearings led to significant reduction of the costs. This was achieved by eliminating the maintenance work completely during the season. With iglidur® Z plain

bearings it is not necessary to check or relubricate the units and shafts. Also it was possible to reduce the weight. (Six Flags Theme Park)



### Surgical light

The motor-powered swivelling LED wings are adjusted with the aid of pre-loaded iglidur® JVFM bearings. Lubrication and maintenance-free. (Trumpf iLED Medical Systems Inc.)



### Washing chain bearings

Reduction of the drive power for bottle washing machines by using iglidur® under the most difficult conditions in a 2–3% caustic soda and temperature of +80°C. (Krones AG)



### Hay spreader

Main reasons for iglidur® plain bearings: The special design to complement the centrifugal arm results in a significant reduction of manufacturing costs. It is also maintenance-free and has high wear resistance. (Fella Werke GmbH & Co. KG)



### Tool changer chain

Main reasons for iglidur® plain bearings: enormous cost advantages in comparison to standard metallic rolled bearings as well as low coefficient of friction also with soft shaft materials. (Deckel Maho Seebach GmbH)



### Axle bearing

The edge load is usually a deciding factor for or against the use of plain bearings. iglidur® G plain bearings solve this, also giving high wear resistance, low costs, resistance to corrosion and dirt. (Zunhammer GmbH Gülletechnik)



### Bag forming, filling and sealing machine

The continuous operating temperature in the bonding arms frequently reach +160°C and higher. These requirements are met by iglidur® Z plain bearings which also offer particularly high resistance to wear. (Affeldt Verpackungsmaschinen GmbH)



## iglidur® plain bearings made from tribo-plastics: all-rounder

### Materials for general purpose



The classic all-rounder:  
iglidur® G  
► Page 81



Even more universal:  
iglidur® G1  
► Page 97



The robust all-rounder according to ISO 2795:  
iglidur® M250  
► Page 107



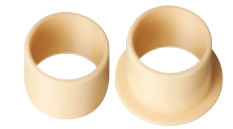
Specialist for pivoting, rolling applications and more:  
iglidur® P210  
► Page 117



For series production:  
iglidur® P230  
► Page 125



The cost-effective outdoor all-rounder:  
iglidur® P  
► Page 131



Versatile and cost-effective:  
iglidur® K  
► Page 141



Low-cost material for high-volume production:  
iglidur® GLW  
► Page 149

## iglidur® plain bearings made from tribo-plastics:

### Materials for long service life



The versatile endurance runner:  
iglidur® J  
► Page 159



The classic endurance runner up to 30MPa:  
iglidur® W300  
► Page 171



## endurance runner



Specialist for pivoting and pulsating loads:  
iglidur® J3  
► Page 183



Proven long-life material in black  
iglidur® J3B  
► Page 191



High dimensional stability at high temperatures:  
iglidur® J350  
► Page 199



Ideal for plastic shafts:  
iglidur® J260  
► Page 207

## iglidur® plain bearings made from tribo-plastics: endurance runner



Endurance runner up to +180°C:  
iglidur® W360  
► Page 215



For fast rotating applications:  
iglidur® L250  
► Page 223



For high rotational speeds:  
iglidur® L350  
► Page 231



For extreme rotational speeds:  
iglidur® L500  
► Page 239



Low-cost:  
iglidur® R  
► Page 247



Low-cost with silicone:  
iglidur® D  
► Page 255



Specialist for aluminium shafts:  
iglidur® J200  
► Page 261



Ideal for pivoting movement:  
iglidur® E7  
► Page 267

## iglidur® plain bearings made from tribo-plastics: high temperature

### Materials for use at high temperatures



The chemical and temperature specialist:  
iglidur® X  
► Page 279



Extremely long service life under extreme conditions:  
iglidur® Z  
► Page 289



The high temperature specialists up to +250°C:  
iglidur® X6  
► Page 299



For soft shafts and high temperatures:  
iglidur® V400  
► Page 307



All-rounder for steam sterilisation:  
iglidur® HSD350  
► Page 315



For hot liquids:  
iglidur® UW500  
► Page 323

## iglidur® plain bearings made from tribo-plastics: high media resistance

### Materials with good media resistance



Endurance runner with high media resistance:  
iglidur® H1  
► Page 333



Extremely long service life under water:  
iglidur® H370  
► Page 341



The classic with high resistance to media and temperature:  
iglidur® H  
► Page 351



High temperature endurance runner:  
iglidur® C500  
► Page 359



The low cost specialist for chemicals and temperatures:  
iglidur® H2  
► Page 367

## iglidur® plain bearings made from tribo-plastics: for contact with food

### Materials for contact with food



The universal bearing for contact with food:

iglidur® A181

► Page 377



The endurance runner at higher temperatures in the food

sector: iglidur® A350

► Page 385



The media and temperature specialist in the food

sector: iglidur® A500

► Page 393



The all-rounder for food:

iglidur® A180

► Page 401



The "food-classic" for low speeds:

iglidur® A200

► Page 409



Food bearing with high media resistance

up to +90°C: iglidur® A160

► Page 419



Suitable for contact with drinking water:

iglidur® UW160

► Page 427



For the tobacco industry:

iglidur® T220

► Page 435

## iglidur® plain bearings made from tribo-plastics: for high loads

### Materials for heavy-duty applications



The durable heavy-duty bearing:

iglidur® Q2

► Page 445



Cost-effective heavy-duty bearing:

iglidur® Q2E

► Page 453



The peak of stability:

iglidur® Q

► Page 459



Heavy-duty on soft shafts:

iglidur® Q290

► Page 467



The heavy-duty bearing up to 200MPa static and 140MPa dynamic:

iglidur® TX1

► Page 473

## iglidur® plain bearings made from tribo-plastics: specialists

### Materials for special application areas



Electrically conductive:

iglidur® F

► Page 485



The ESD-compatible all-rounder:

iglidur® F2

► Page 493



The automotive standard:

iglidur® H4

► Page 501



For fast rotation under water:

iglidur® UW

► Page 509



For continuous direct sunlight:

iglidur® J UV

► Page 517



The biopolymer:

iglidur® N54

► Page 525



Low-cost all-rounder for fire protection:

iglidur® G V0

► Page 533

## iglidur® plain bearings made from tribo-plastics: specialists



Versatile and cost-effective:

iglidur® J2

► Page 541



The first antibacterial iglidur® plain bearing:

iglidur® AB

► Page 549



Complies with DIN EN 45545 HL3, R22/R23:

iglidur® RW370

► Page 557



The variable one:

iglidur® B

► Page 565



Free from PTFE and silicone:

iglidur® C

► Page 571



iglidur®	G	G1	M250	P210	P230	P	K	GLW	
Installation tolerances	E10	E10	D11	E10	E10	E10	E10	E10	
Descriptive technical specifications									
Wear resistance at +23°C	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>
Wear resistance at +90°C	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>
Wear resistance at +150°C	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>
Low coefficient of friction	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>
Low moisture absorption	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>
Wear resistance under water	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>
High media resistance	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Resistant to edge pressures	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Resistant to impacts/shock	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Resistant to dirt	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>
For high loads (> 60MPa)	<div><div></div></div>	<div><div></div></div>						<div><div></div></div>	
Electrically conductive									
Approvals and standards									
Dimensions in accordance with DIN	ISO 3547	ISO 3547	ISO 2795	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	
FDA-compliant									
EU10/2011-compliant									
Fire class in accordance with UL-94	HB	HB	V-2	HB	HB	HB	HB	HB	
Mould test DIN EN ISO 846	<div><div></div></div>	<div><div></div></div>							
Fogging DIN 75201-B	<div><div></div></div>		<div><div></div></div>	<div><div></div></div>				<div><div></div></div>	
Availabilities / variants									
Type S, sleeve	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	
Type F, with flange	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	
Type T, thrust washer	<div><div></div></div>		<div><div></div></div>						
Bar stock, round material			<div><div></div></div>	<div><div></div></div>				<div><div></div></div>	
Bar stock, plate									
Bar stock, tube									
Machined parts made from bar stock			<div><div></div></div>	<div><div></div></div>					
tribo-tape liner									
Page	81	97	107	117	125	131	141	149	

J	W300	J3	J3B	J350	J260	W360	L250	L350	L500	R	D
E10	E10	E10	E10	F10	E10	E10	E10	F10	F10	E10	E10
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<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div>&lt;</div>										



iglidur®	J200	E7	X	Z	X6	V400	HSD350
Installation tolerances	E10	E10	F10	F10	F10	F10	F10
Descriptive technical specifications							
Wear resistance at +23°C	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Wear resistance at +90°C	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Wear resistance at +150°C	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Low coefficient of friction	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Low moisture absorption	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Wear resistance under water	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
High media resistance	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Resistant to edge pressures	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Resistant to impacts/shock	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Resistant to dirt	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
For high loads (> 60MPa)			●	●	●		
Electrically conductive			●		●		
Approvals and standards							
Dimensions in accordance with DIN		ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547
FDA-compliant							
EU10/2011-compliant							
Fire class in accordance with UL-94	HB	HB	V-0	V-0	V-0	V-0	V-0
Mould test DIN EN ISO 846			●				
Fogging DIN 75201-B							
Availabilities / variants							
Type S, sleeve		●	●	●	●	●	●
Type F, with flange		●	●	●	●	●	●
Type T, thrust washer			●	●			
Bar stock, round material	●	●	●				●
Bar stock, plate							
Bar stock, tube							
Machined parts made from bar stock	●		●				●
tribo-tape liner						●	
Page	261	267	279	289	299	307	315

UW500	H1	H370	H	C500	H2	A181	A350	A500	A180	A200	A160
F10	F10	F10	F10	F10	F10	E10	F10	F10	E10	D11	E10
<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
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●	●	●	●	●	●		●	●			
●		●									
ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547		ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 2795	ISO 3547
						●	●	●	●	●	●
						●	●	●	●	●	●
V-0	V-0	V-0	V-0	V-0	V-0	HB	V-0	V-1	HB	V-2	HB
	●										
●	●	●	●	●		●	●	●	●	●	●
●	●	●	●	●		●	●	●	●	●	●
	●		●	●		●	●	●	●		●
							●				
	●		●	●		●	●	●	●		●
											●
323	333	341	351	359	367	377	385	393	401	409	419











## iglidur® plain bearings | Technical properties – quick selection















iglidur®	UW160	T220	Q2	Q2E	Q	Q290
Installation tolerances	E10	E10	E10	E10	E10	D11
Descriptive technical specifications						
Wear resistance at +23°C	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Wear resistance at +90°C	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Wear resistance at +150°C	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Low coefficient of friction	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Low moisture absorption	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Wear resistance under water	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
High media resistance	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Resistant to edge pressures	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Resistant to impacts/shock	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
Resistant to dirt	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
For high loads (> 60MPa)						
Electrically conductive						
Approvals and standards						
Dimensions in accordance with DIN	ISO 3547		ISO 3547		ISO 3547	ISO 3547
FDA-compliant						
EU10/2011-compliant						
Fire class in accordance with UL-94	HB	HB	HB	HB	HB	HB
Mould test DIN EN ISO 846						
Fogging DIN 75201-B						
Availabilities / variants						
Type S, sleeve						
Type F, with flange						
Type T, thrust washer						
Bar stock, round material						
Bar stock, plate						
Bar stock, tube						
Machined parts made from bar stock						
tribo-tape liner						
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F	F2	H4	UW	J UV	N54	G V0	J2	AB	RW370	B	C
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iglidur® plain bearings | Material properties













iglidur®	Unit	G	G1	M250	P210	P230	P	K	GLW
General properties									
Density	[g/cm³]	1.46	1.58	1.14	1.40	1.57	1.58	1.52	1.36
Colour									
Max. moisture absorption at +23°C and 50% relative humidity	[% weight]	0.7	0.2	1.4	0.3	0.1	0.2	0.1	1.3
Max. total moisture absorption	[% weight]	4.0	1.7	7.6	0.5	0.3	0.4	0.6	5.5
Coefficient of sliding friction, dynamic against steel	[μ]	0.08–0.15	0.08–0.15	0.18–0.40	0.07–0.19	0.06–0.21	0.06–0.21	0.06–0.21	0.10–0.24
pv value, max. (dry)	[MPa·m/s]	0.42	0.60	0.12	0.4	0.30	0.39	0.3	0.3
Mechanical properties									
Flexural modulus	[MPa]	7,800	11,486	2,700	2,500	6,532	5,300	3,500	7,700
Flexural strength at +20°C	[MPa]	210	178	112	70	173	120	80	235
Compressive strength	[MPa]	78	115	52	50	101	66	60	74
Max. permissible surface pressure at +20°C	[MPa]	80	91	20	50	60	50	50	80
Shore D hardness		81	81	79	75	80	75	72	78
Physical and thermal properties									
Max. continuous operating temperature	[°C]	+130	+180	+80	+100	+110	+130	+170	+100
Max. short-term operating temperature	[°C]	+220	+220	+170	+160	+180	+200	+240	+160
Min. operating temperature	[°C]	–40	–40	–40	–40	–30	–40	–40	–40
Thermal conductivity	[W/m · K]	0.24	0.46	0.24	0.25	0.34	0.25	0.25	0.24
Coefficient of thermal expansion at +23°C	[K <sup>-1</sup> · 10 <sup>-5</sup> ]	9	3.5	10	8	5	4	3	17
Electrical properties									
Specific contact resistance	[Ωcm]	> 10 <sup>13</sup>	> 10 <sup>9</sup>	> 10 <sup>13</sup>	> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>13</sup>	> 10 <sup>12</sup>	> 10 <sup>11</sup>
Surface resistance	[Ω]	> 10 <sup>11</sup>	> 10 <sup>11</sup>	> 10 <sup>11</sup>	> 10 <sup>11</sup>	> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>11</sup>
Page		81	97	107	117	125	131	141	149

J	W300	J3	J3B	J350	J260	W360	L250	L350	L500	R	D	J200	E7
1.49	1.24	1.42	1.42	1.44	1.35	1.34	1.5	1.54	1.53	1.39	1.4	1.72	1.05
													
0.3	1.3	0.3	0.3	0.3	0.2	0.2	0.7	0.4	0.1	0.2	0.3	0.2	0.1
1.3	6.5	1.3	1.3	1.6	0.4	1.6	3.9	1.4	0.3	1.1	1.1	0.7	0.1
0.06–0.18	0.08–0.23	0.06–0.20	0.09–0.23	0.10–0.20	0.06–0.20	0.07–0.21	0.08–0.19	0.15–0.20	0.19–0.26	0.09–0.25	0.08–0.26	0.11–0.17	0.08–0.17
0.34	0.23	0.5	0.5	0.45	0.35	0.35	0.4	3.0	4.0	0.27	0.27	0.3	0.22
2,400	3,500	2,700	2,895	2,000	2,200	3,829	1,950	15,882	12,015	1,950	2,000	2,800	1,477
73	125	70	65	55	60	119	67	210	201	70	72	58	22
60	61	60	n.s.	60	50	n.s.	47	210	70	68	70	43	18
35	60	45	44	60	40	75	45	59	70	23	23	23	18
74	77	73	76	80	77	n.s.	68	80	81	77	78	70	61
+90	+90	+90	+90	+180	+120	+180	+90	+180	+250	+90	+90	+90	+70
+120	+180	+120	+110	+220	+140	+200	+180	+210	+315	+110	+110	+120	+90
–50	–40	–50	–50	–100	–100	–40	–40	–100	–100	–50	–50	–50	–50
0.25	0.24	0.25	0.30	0.24	0.24	0.24	0.24	0.61	0.45	0.25	0.25	0.24	0.24
10	9	13	12.7	7	13	6	10	7	6	11	11	8	25
> 10 <sup>13</sup>	> 10 <sup>13</sup>	> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>13</sup>	> 10 <sup>12</sup>	> 10 <sup>13</sup>	> 10 <sup>10</sup>	> 10 <sup>5</sup>	> 10 <sup>10</sup>	> 10 <sup>12</sup>	> 10 <sup>14</sup>	> 10 <sup>8</sup>	> 10 <sup>9</sup>
> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>10</sup>	> 10 <sup>10</sup>	> 10 <sup>12</sup>	> 10 <sup>11</sup>	> 10 <sup>5</sup>	> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>14</sup>	> 10 <sup>8</sup>	> 10 <sup>9</sup>
159	171	183	191	199	207	215	223	231	239	247	255	261	267








iglidur® plain bearings | Material properties













iglidur®	Unit	X	Z	X6	V400	HSD350	UW500
General properties							
Density	[g/cm³]	1.44	1.4	1.53	1.51	1.39	1.49
Colour							
Max. moisture absorption at +23°C and 50% relative humidity	[% weight]	0.1	0.3	0.1	0.1	0.6	0.1
Max. total moisture absorption	[% weight]	0.5	1.1	0.5	0.2	1.2	0.5
Coefficient of sliding friction, dynamic against steel	[μ]	0.09–0.27	0.06–0.14	0.09–0.25	0.15–0.20	0.07–0.23	0.20–0.36
pv value, max. (dry)	[MPa·m/s]	1.32	0.84	1.35	0.5	0.3	0.35
Mechanical properties							
Flexural modulus	[MPa]	8,100	2,400	16,000	4,500	2,150	16,000
Flexural strength at +20°C	[MPa]	170	95	290	95	67	260
Compressive strength	[MPa]	100	65	190	47	44	140
Max. permissible surface pressure at +20°C	[MPa]	150	150	150	45	30	140
Shore D hardness		85	81	89	74	77	86
Physical and thermal properties							
Max. continuous operating temperature	[°C]	+250	+250	+250	+200	+180	+250
Max. short-term operating temperature	[°C]	+315	+310	+315	+240	+210	+300
Min. operating temperature	[°C]	–100	–100	–100	–50	–40	–100
Thermal conductivity	[W/m·K]	0.60	0.62	0.55	0.24	0.24	0.6
Coefficient of thermal expansion at +23°C	[K <sup>-1</sup> ·10 <sup>-6</sup> ]	5	4	1.1	3	7	4
Electrical properties							
Specific contact resistance	[Ωcm]	< 10 <sup>5</sup>	> 10 <sup>11</sup>	< 10 <sup>5</sup>	> 10 <sup>12</sup>	> 10 <sup>13</sup>	< 10 <sup>9</sup>
Surface resistance	[Ω]	< 10 <sup>3</sup>	> 10 <sup>11</sup>	< 10 <sup>3</sup>	> 10 <sup>12</sup>	> 10 <sup>14</sup>	< 10 <sup>9</sup>
Page		279	289	299	307	315	323

H1	H370	H	C500	H2	A181	A350	A500	A180	A200	A160	UW160	T220
1.53	1.66	1.71	1.37	1.72	1.38	1.42	1.28	1.46	1.14	1.00	1.04	1.28
												
0.1	0.1	0.1	0.3	0.1	0.2	0.6	0.3	0.2	1.5	0.1	0.1	0.3
0.3	0.1	0.3	0.5	0.2	1.3	1.9	0.5	1.3	7.6	0.1	0.1	0.5
0.06–0.20	0.07–0.17	0.07–0.20	0.07–0.19	0.07–0.30	0.10–0.21	0.10–0.20	0.26–0.41	0.05–0.23	0.10–0.40	0.09–0.19	0.17–0.31	0.20–0.32
0.80	0.74	1.37	0.7	0.58	0.31	0.40	0.28	0.31	0.09	0.25	0.22	0.28
2,800	11,100	12,500	3,300	10,300	1,913	2,000	3,600	2,300	2,500	1,151	1,349	1,800
55	135	175	100	210	48	110	140	88	116	19	22	65
78	79	81	110	109	60	78	118	78	54	37	32	55
80	75	90	80	110	31	60	120	28	18	15	15	40
77	82	87	80	88	76	76	83	76	81	60	60	76
+200	+200	+200	+250	+200	+90	+180	+250	+90	+80	+90	+90	+100
+240	+240	+240	+300	+240	+110	+210	+300	+110	+170	+100	+100	+160
–40	–40	–40	–100	–40	–50	–100	–100	–50	–40	–50	–50	–40
0.24	0.5	0.6	0.24	0.24	0.25	0.24	0.24	0.25	0.24	0.30	0.50	0.24
6	5	4	9	4	11	8	9	11	10	11	18	11
> 10 <sup>12</sup>	< 10 <sup>5</sup>	< 10 <sup>5</sup>	> 10 <sup>14</sup>	> 10 <sup>15</sup>	> 10 <sup>12</sup>	> 10 <sup>11</sup>	> 10 <sup>14</sup>	> 10 <sup>12</sup>	> 10 <sup>13</sup>	> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>10</sup>
> 10 <sup>11</sup>	< 10 <sup>5</sup>	< 10 <sup>2</sup>	> 10 <sup>13</sup>	> 10 <sup>14</sup>	> 10 <sup>12</sup>	> 10 <sup>11</sup>	> 10 <sup>13</sup>	> 10 <sup>11</sup>	> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>10</sup>
333	341	351	359	367	377	385	393	401	409	419	427	435



iglidur® plain bearings | Material properties

iglidur®	Unit	Q2	Q2E	Q	Q290	TX1
General properties						
Density	[g/cm³]	1.46	1.46 – 1.69	1.4	1.27	2.1
Colour						
Max. moisture absorption at +23°C and 50% relative humidity	[% weight]	1.1	1.5	0.9	3.0	n.s.
Max. total moisture absorption	[% weight]	4.6	5.0	4.9	9.3	0.1
Coefficient of sliding friction, dynamic against steel	[μ]	0.22 – 0.42	0.22 – 0.42	0.05 – 0.15	0.14 – 0.26	0.09 – 0.37
pv value, max. (dry)	[MPa · m/s]	0.7	0.7	0.55	0.70	0.89
Mechanical properties						
Flexural modulus	[MPa]	8,370	n.s.	4,500	3,074	12,000
Flexural strength at +20°C	[MPa]	240	235	120	97	55
Compressive strength	[MPa]	130	n.s.	89	68	220
Max. permissible surface pressure at +20°C	[MPa]	120	135	100	55	200
Shore D hardness		80	80	83	80	n.s.
Physical and thermal properties						
Max. continuous operating temperature	[°C]	+130	+100	+135	+140	+120
Max. short-term operating temperature	[°C]	+200	+140	+155	+180	+170
Min. operating temperature	[°C]	–40	–30	–40	–40	–60
Thermal conductivity	[W/m · K]	0.24	n.s.	0.23	0.24	0.24
Coefficient of thermal expansion at +23°C	[K <sup>-1</sup> · 10 <sup>-5</sup> ]	8	n.s.	5	7	3
Electrical properties						
Specific contact resistance	[Ωcm]	> 10 <sup>13</sup>	> 10 <sup>12</sup>	> 10 <sup>15</sup>	> 10 <sup>12</sup>	> 10 <sup>11</sup>
Surface resistance	[Ω]	> 10 <sup>11</sup>	> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>13</sup>
Page		445	453	459	467	473

F	F2	H4	UW	J UV	N54	G V0	J2	AB	RW370	B	C
1.25	1.52	1.79	1.52	1.49	1.13	1.53	1.44	1.11	1.34	1.15	1.1
											
1.8	0.2	0.1	0.2	0.3	1.6	0.7	0.2	0.8	0.25	1.0	1.0
8.4	0.4	0.2	0.8	1.3	3.6	4.0	1.3	1.6	1.2	6.3	6.9
0.10 – 0.39	0.16 – 0.22	0.08 – 0.25	0.15 – 0.35	0.08 – 0.19	0.15 – 0.23	0.07 – 0.20	0.11 – 0.27	0.18 – 0.31	0.13 – 0.17	0.18 – 0.28	0.17 – 0.25
0.34	0.31	0.70	0.11	0.30	0.5	0.5	0.23	0.25	1.2	0.15	0.10
11,600	7,418	7,500	9,600	2,400	1,800	7,900	3,605	1,850	2,997	1,800	1,900
260	93	120	90	72	70	140	101	50	100	55	60
98	61	50	70	n.s.	30	100	77	40	129	20	30
105	47	65	40	35	36	75	46	25	75	40	40
84	72	80	78	74	74	80	n.s.	70	80	69	72
+140	+120	+200	+90	+90	+80	+130	+90	+70	+170	+100	+90
+180	+165	+240	+110	+120	+120	+210	+110	+140	+190	+130	+130
–40	–40	–40	–50	–50	–40	–40	–50	–40	–50	–40	–40
0.65	0.61	0.24	0.6	0.3	0.24	0.25	0.25	0.24	0.22	0.24	0.24
12	5	5	6	10	9	9	7	10	5	12	15
< 10 <sup>3</sup>	< 10 <sup>9</sup>	> 10 <sup>13</sup>	< 10 <sup>5</sup>	> 10 <sup>13</sup>	> 10 <sup>13</sup>	> 10 <sup>12</sup>	> 10 <sup>13</sup>	> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>10</sup>	> 10 <sup>10</sup>
< 10 <sup>2</sup>	< 10 <sup>9</sup>	> 10 <sup>12</sup>	< 10 <sup>5</sup>	> 10 <sup>13</sup>	> 10 <sup>11</sup>	> 10 <sup>11</sup>	> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>9</sup>	> 10 <sup>9</sup>
485	493	501	509	517	525	533	541	549	557	565	571





### Proven.

Since 1983, igus® has been manufacturing plain bearings from specifically developed iglidur® high-performance plastics. Over 50 different polymer compounds have been developed and tested since then. In order to make the selection of the best material for wear-resistant parts in various environments as easy and safe as possible, igus® tests these materials in over 15,000 application-oriented test series per year. The collected findings flow into unique online selection tools and the know-how of our global network of iglidur® application consultants.

### Predictable.

Plain bearings are wear-resistant parts. And wear-resistant parts wear out. But when? When is the wear limit reached and when does the plain bearing have to be replaced? The iglidur® expert system answers this question. Based on more than 15,000 wear tests per year, the iglidur®

expert system offers designers the possibility of not only determining the iglidur® plain bearing with the best price-performance ratio within a few minutes, but also to get an exact report on the predicted service life in the application. Easy. Online calculation available.

### Performance.

Since 1983, iglidur® plain bearings have successfully established themselves in various applications all over the world. They are not only cost-effective but also maintenance-free, lubrication-free and versatile. They are suitable for large or small volume production, in the automotive sector, in special machine construction, underwater applications or for the food and packaging industry. More than 200,000 customers worldwide successfully use iglidur® plain bearings and thereby reduce the costs and increase the service life of their bearing points.



Picture 01: igus® test lab: 15,000 tribological tests (friction and wear) in 300 test set-ups in the industry's largest laboratory (3,800m²). View inside bearing laboratory in Cologne

### Properties and design

#### iglidur® plain bearings made from high-performance polymers

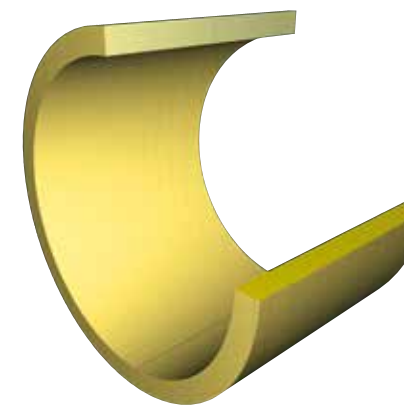
Wear-resistant tribo-polymers improved by precise additions of strengthening materials and solid lubricants, tested thousands of times and proven millions of times – that is iglidur®. igus® engineers develop and test more than 267 new plastic compounds every year. The finely tuned combination of plastic matrix, strengthening components and solid lubricants in every single tribo-polymer results in an individual properties profile in each case. In more than 15,000 individual tests a year on over 200 test rigs in the igus® test laboratory, all materials are thoroughly tested. The findings go into a unique knowledge database on the tribology of maintenance-free plastic plain bearings. This database enables us to select the ideal iglidur® plain bearing for our customers depending on the application and to calculate its anticipated service life. If necessary, it is also possible to develop an application-specific material, exactly adapted to the thermal, mechanical and tribological requirements, which goes beyond the existing iglidur® product range. In addition, freely accessible and user-friendly online tools enable every user to select his personal plain bearing from the iglidur® product range. Whether iglidur® product finder or iglidur® service life calculation, piston ring or bar stock configurator: with a few clicks and application-related information a suitable bearing is quickly found.

► [www.igus.eu/online-tools](http://www.igus.eu/online-tools)

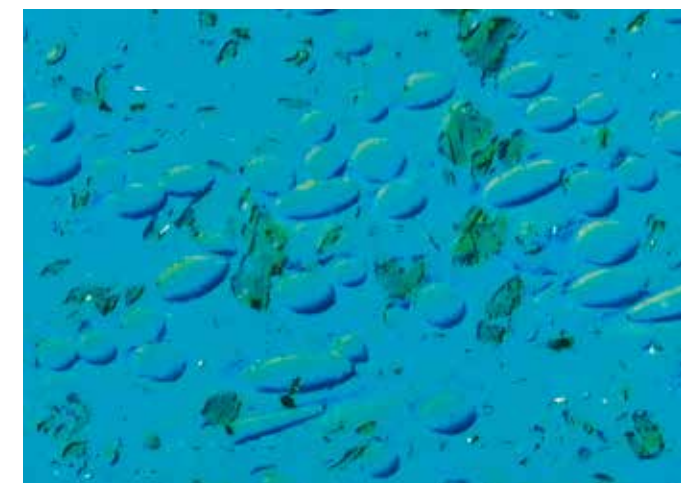
#### General properties of iglidur® plain bearings

- Lubrication-free
- Corrosion-resistant
- Good media resistance
- High compressive strength
- High mechanical dampening
- Low coefficient of friction
- Maintenance-free
- High resistance to contamination
- Lightweight
- High wear resistance
- Excellent price-performance ratio

Over and above the general properties, each iglidur® bearing material possesses a series of special properties and strengths, which make it specially suitable for certain applications and requirements. You can find a comprehensive description of the materials in the respective chapters before the dimensions tables.



Picture 02: Injection-moulded iglidur® plain bearings are homogeneously structured. Base polymer, bonding materials and solid lubricants mutually complement each other.



Picture 03: Base polymers with fibres and solid lubricants, magnified 200 times, dyed



## Properties and design

### The traditional solution

Hard shells with soft coating. Every lubricated bearing works according to this principle, and also a number of maintenance-free bearings that are equipped with special sliding layers. However, this soft sliding layer is not strong enough. For high loads, edge pressure or oscillations, it is easily removed.

### Base polymers and technical fibres

The radial pressure with which the bearings are loaded is received by the polymer material. In the contact area, this material provides a support to the shaft. The polymer base material ensures that the lubricants do not receive a surface pressure that is too high. The base material is also reinforced by technical fibres or filling materials. These additional materials stabilise the bearing especially in cases of continuous load.

### Incorporated self-lubrication

The solid lubricants are, as microscopic particles, embedded in millions of tiny chambers of the material. From these chambers, the plain bearings release tiny amounts of solid lubricants during movement. This is adequate to sufficiently lubricate the immediate surrounding area. The lubricants help to reduce the iglidur® bearing's coefficient of friction. They are not indispensable for the bearing's function, but have a supporting effect. Since they are embedded in the tiny chambers, they cannot be forced out. They are always there as soon as the bearing or the shaft is set in motion.



Picture 04: Polymer granulate; basis compound of the lubrication-free and predictable iglidur® plain bearings

### The iglidur® solution: the self-lubricating effect

The high-performance polymers of the iglidur® plain bearings consist of:

- Base polymer
- Fibres and filling material
- Solid lubricants

These components are **not applied in layers**, but instead are mixed together homogeneously. The advantage of this design is clear when the requirements on the bearings surface are studied:

1. The coefficient of friction, which is determined especially by the surface of the bearing, should be as low as possible.
2. The surface cannot be removed by forces that act on the bearing.
3. The wearing force acts especially on the surface of the bearing, for this the bearing must be capable of high resistance.

One universal material, which can fulfil all these tasks equally well, unfortunately does not exist yet. That is why iglidur® plain bearings work differently. Different components of the iglidur® materials give the bearings their properties:

- The **base polymers** are responsible for the resistance to wear.
- **Fibres and filling materials** reinforce the bearing so that high forces or edge loads are possible.
- **Solid lubricants** lubricate the bearing independently and prevent friction of the system.

## Load

The load of a plain bearing is expressed by the surface pressure (p) in MPa (corresponding to N/mm²). For this purpose, the radial load is determined on the projected surface of the bearing.

Radial bearing:

$$p = \frac{F}{d1 \cdot b1}$$

Thrust bearing:

$$p = \frac{F}{(d2^2 - d1^2) \cdot \frac{\pi}{4}}$$

In these equations:

**F** load in [N]

**d1** bearing inner diameter in [mm]

**b1** bearing length in [mm]

**d2** outer diameter of the bearing in [mm]

### Max. recommended surface pressure

A comparative value of the iglidur® material is the maximum recommended static surface pressure [MPa] at +20°C. The values of the individual iglidur® plain bearings differ greatly on this point. The value [p] indicates the pressure limit of a plain bearing. The plain bearing can carry this pressure permanently without damage. The given value applies to static operation; only very slow speeds up to 0.01m/s are tolerated under this pressure. Higher pressures than those indicated are possible if the duration of the load is short.

► Material properties, page 56

### Load and temperature

Diagram 02 and 03 show the maximum recommended static surface pressure of the iglidur® plain bearing as a function of temperature. With increasing temperature, this value decreases continuously. Take advantage of the opportunity presented by the predictability of the iglidur® plain bearing to record these effects in advance, or determine the effective temperatures in the test.

### Pressure and speed

With decreasing radial load on the plain bearing, the permissible surface speed increases. The product of the pressure [p] and speed [v], the so-called pv value, can be understood as a measurement for the frictional heat of the bearing. This relationship is shown by the pv graph that is the first in the respective chapter for each iglidur® material.

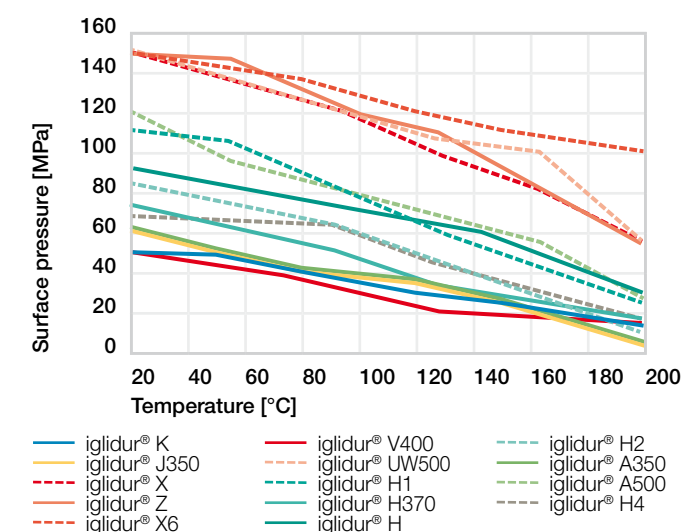
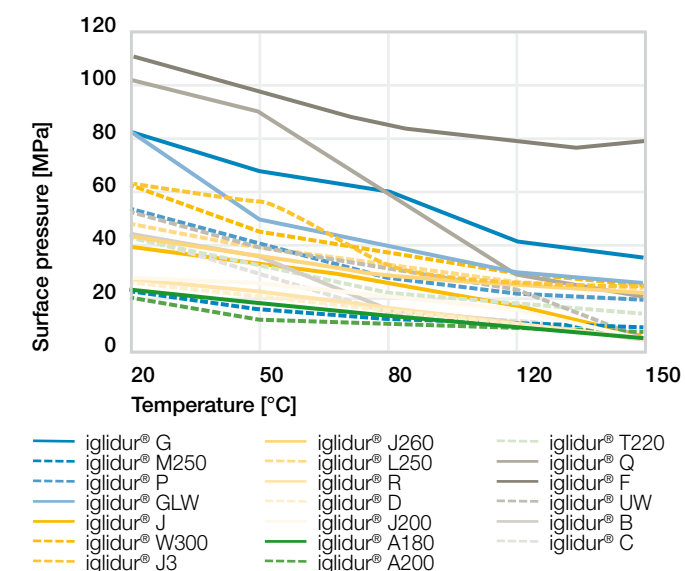


Diagram 02–03: Maximum recommended surface pressure as a function of temperature

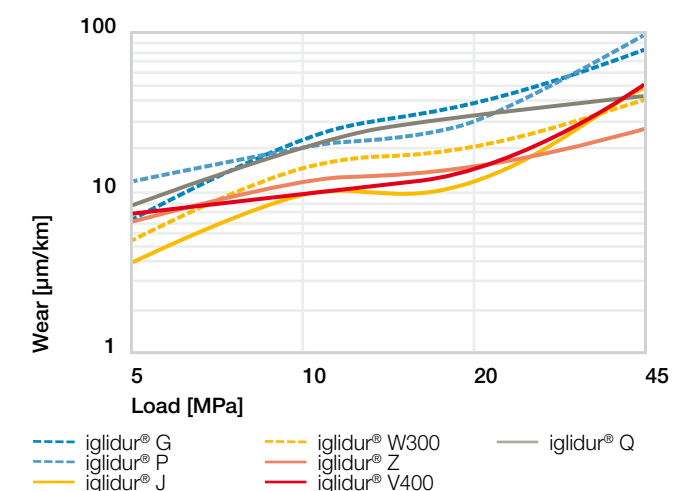


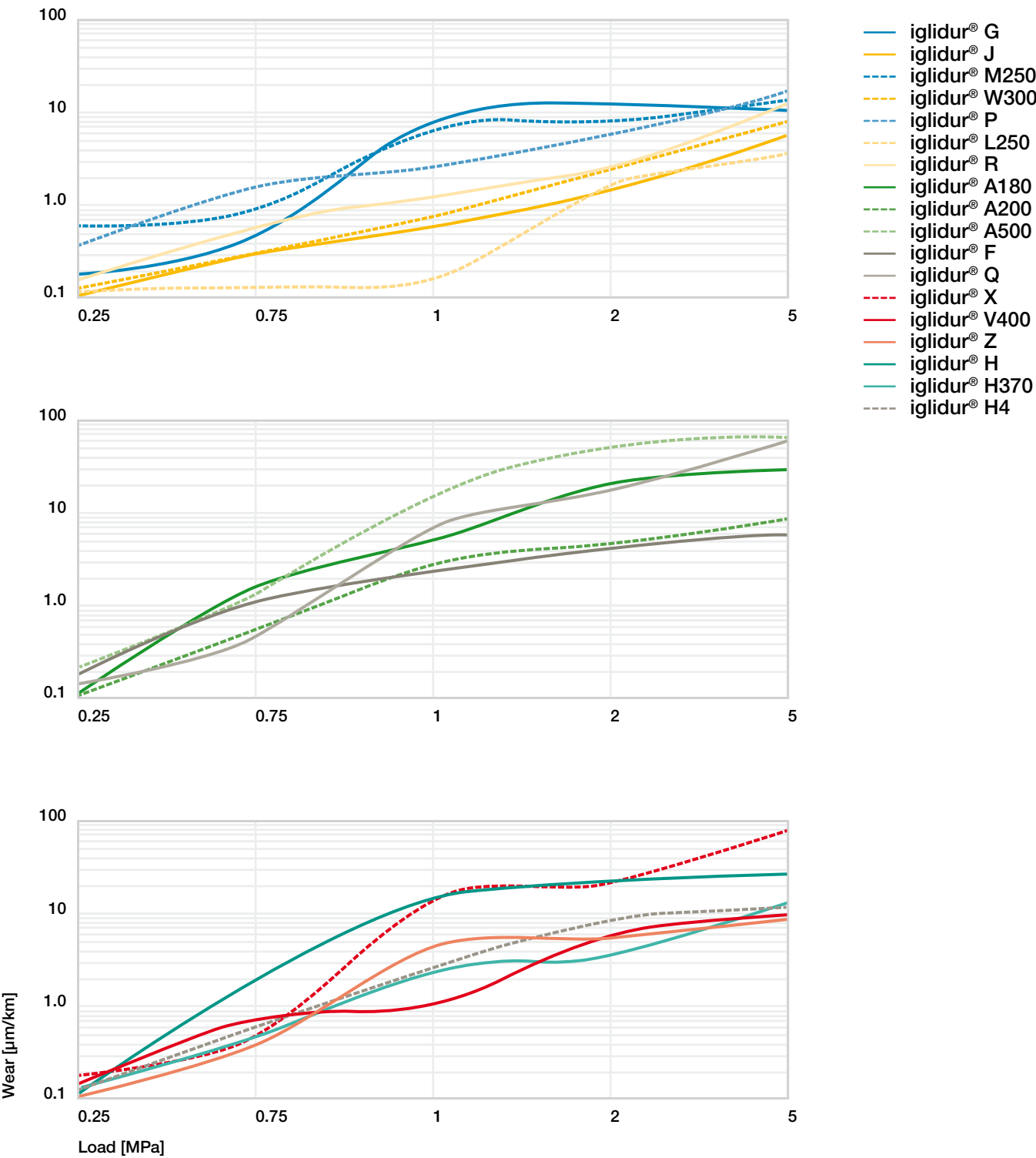
Diagram 04: Wear of iglidur® plain bearings under medium and high pressures



Pressure and wear

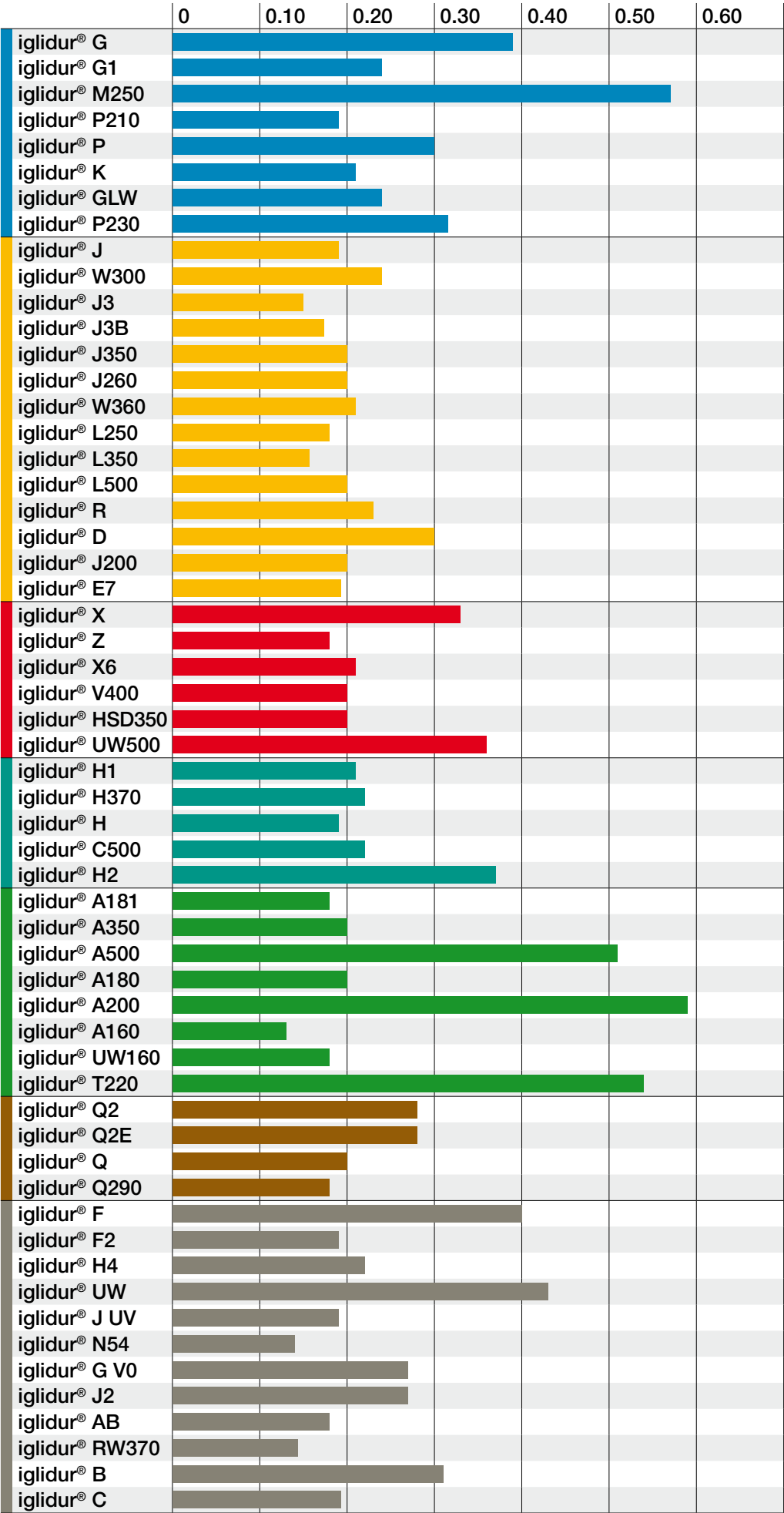
The load of the plain bearing has an effect on the wear of the bearing. The following diagrams show the wear behaviour of the iglidur® bearing materials. It is easily recognised that for

each pressure, there is an optimal plain bearing available. The wear is shown as a wear rate in [µm/km].



Diagrams 05–07: Wear of iglidur® plain bearings under low pressures

Pressure and coefficient of friction



With increasing load, the coefficient of friction of the plain bearing typically decreases. In this context, shaft materials and the surface finish are also significant.

► Coefficient of friction, page 47

Diagram 08: Coefficient of friction of iglidur® materials with Cf53 shaft, rotating

Surface Speed

The peripheral speed is always significant in plain bearings. The absolute speed is not crucial, but the relative speed between the shaft and the bearing. The surface speed is expressed in meters per second [m/s] and calculated from the speed n [rpm] with the following formula.  
With varying speeds for example with pivoting movements, the value needed is the average surface speed v (see above formula).

Rotational movement: 
$$v = \frac{n \cdot d1 \cdot \pi}{60 \cdot 1,000} \left[ \frac{m}{s} \right]$$

Pivoting movement: 
$$v = d1 \cdot \pi \cdot \frac{2 \cdot \beta}{360} \cdot \frac{f}{1,000} \left[ \frac{m}{s} \right]$$

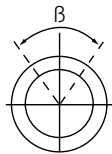
In these equations:

d1 = Shaft diameter [mm]

f = Frequency per second

β = Angle of motion per cycle [°]

n = rpm



Permissible surface speeds

iglidur® plain bearings were primarily developed for low to average surface speeds in continuous operation. Table 01 shows the permissible surface speed of iglidur® plain

bearings for rotating, pivoting, and linear movements. These surface speeds are limit values assuming minimal pressure loading of the bearing. In practice, these limit values are rarely reached due to an inverse relationship between load and speed. Each pressure increase leads unavoidably to a reduction of the permissible surface speeds and vice versa. The speed limit is determined by the thermal properties of the bearing. This is also the reason why different surface speeds can occur for the different movement types. For linear movements, more heat can be dissipated via the shaft, since the bearing uses a longer surface area on the shaft.

Surface speed and wear

Considerations regarding the permissible surface speeds should also include the wear resistance of the plain bearing. High surface speeds automatically bring correspondingly high wear rates with them. With higher surface speed, not only the wear rate rises but also the absolute wear.

Surface speed and coefficient of friction

In practice the coefficient of friction of plain bearings is a result of the surface speed. High surface speeds have a higher coefficient of friction than low surface speeds. Diagram 08 shows this relationship by using the example of a steel shaft (Cf53) with a load of 0.7MPa.

Material	Rotating		Oscillating		Linear	
	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term
iglidur® G	1.0	2.0	0.7	1.4	4.0	5.0
iglidur® G1	1.3	2.5	1.0	1.8	5.0	6.0
iglidur® M250	0.8	2.0	0.6	1.4	2.5	5.0
iglidur® P210	1.0	2.0	0.7	1.4	3.0	4.0
iglidur® P	1.0	2.0	0.7	1.4	3.0	4.0
iglidur® K	1.0	2.0	0.7	1.4	3.0	4.0
iglidur® GLW	0.8	1.0	0.6	0.7	2.5	3.0
iglidur® P230	1.0	2.0	0.7	1.4	3.0	4.0
iglidur® J	1.5	3.0	1.1	2.1	8.0	10.0
iglidur® W300	1.0	2.5	0.7	1.8	4.0	6.0
iglidur® J3	1.5	3.0	1.1	2.1	8.0	10.0
iglidur® J3B	1.5	3.0	1.1	2.1	8.0	10.0
iglidur® J350	1.3	3.0	1.0	2.3	4.0	8.0
iglidur® J260	1.0	2.0	0.7	1.4	3.0	4.0
iglidur® W360	1.2	2.7	0.9	2.0	3.0	5.0
iglidur® L250	1.0	1.5	0.7	1.1	2.0	3.0
iglidur® L350	3.0	4.0	1.5	3.0	4.0	6.0
iglidur® L500	3.0	4.0	1.5	3.0	5.0	8.0
iglidur® R	0.8	1.2	0.6	1.0	3.5	5.0
iglidur® D	1.5	3.0	1.1	2.1	8.0	10.0
iglidur® J200	1.0	1.5	0.7	1.1	10.0	15.0
iglidur® E7	0.5	0.8	0.4	0.6	2.0	3.0
iglidur® X	1.5	3.5	1.1	2.5	5.0	10.0
iglidur® Z	1.5	3.5	1.1	2.5	5.0	6.0
iglidur® X6	1.5	3.5	1.1	2.5	5.4	10.0
iglidur® V400	0.9	1.3	0.6	0.9	2.0	3.0
iglidur® UW500	0.8	1.5	0.6	1.1	2.0	3.0
iglidur® H1	2.0	2.5	1.0	1.5	5.0	7.0
iglidur® H370	1.2	1.5	0.8	1.1	4.0	5.0
iglidur® H	1.0	1.5	0.7	1.1	3.0	4.0
iglidur® C500	0.9	1.1	0.7	1.0	2.4	2.8
iglidur® H2	0.9	1.0	0.6	0.7	2.5	3.0
iglidur® A181	0.8	1.2	0.6	1.0	3.5	5.0
iglidur® A350	1.0	1.2	0.8	0.9	2.5	3.0
iglidur® A500	0.6	1.0	0.4	0.7	1.0	2.0
iglidur® A180	0.8	1.2	0.6	1.0	3.5	5.0
iglidur® A200	0.8	1.5	0.6	1.1	2.0	3.0
iglidur® A160	0.5	0.7	0.4	0.6	2.0	3.0
iglidur® UW160	0.3	0.5	0.3	0.4	1.0	2.5
iglidur® T220	0.4	1.0	0.3	0.7	1.0	2.0
iglidur® Q2	1.0	2.0	0.7	1.4	4.0	5.0
iglidur® Q2E	1.0	2.0	0.7	1.4	4.0	5.0
iglidur® Q	1.0	2.0	0.7	1.4	5.0	6.0
iglidur® Q290	0.8	2.0	0.6	1.4	1.0	2.0
iglidur® TX1	0.4	0.9	0.2	0.5	1.0	2.0
iglidur® F	0.8	1.5	0.6	1.1	3.0	5.0
iglidur® F2	0.8	1.4	0.7	1.1	3.0	5.0
iglidur® H4	1.0	1.5	0.7	1.1	1.0	2.0
iglidur® UW	0.5	1.5	0.4	1.1	2.0	3.0
iglidur® J UV	1.5	2.2	1.1	1.7	8.0	12.0
iglidur® N54	0.8	1.5	0.6	1.1	1.0	2.0
iglidur® G V0	1.0	2.0	0.7	1.4	4.0	5.0
iglidur® J2	0.8	1.9	0.7	1.1	3.0	5.0
iglidur® AB	0.7	1.0	0.5	0.7	1.0	1.8
iglidur® B	0.7	1.0	0.5	0.7	2.0	3.0
iglidur® C	1.0	1.5	0.7	1.1	2.0	3.0

Table 01: Surface speeds of iglidur® plain bearings in m/s; long and short-term

pv value and coefficient of friction

For plain bearings, the product is given a new value depending on the pressure [p] and the surface speed [v]. The **pv value** can be considered a measure of the frictional heat and can be used as an analytical tool to answer questions concerning the proper application of a plain bearing. For this purpose the actual **pv value** is compared with a permitted **pv value** calculable for the height. The permitted **pv value** depends on the shaft material, the ambient temperature and the service time.

Correction factor

The permissible **pv value** can be increased in practical operation if the bearing temperature never reaches the maximum limit because of the short operating time. Tests have shown that this is true for operating times below 10 minutes. It is known that a longer dwell time makes a greater contribution to re-cooling. An important qualifier here is the ratio of the operating time and dwell times. The different curves of diagram 09 represent different ratios (3 x means that the dwell time is three times longer than the operating time).

Lubrication

Although iglidur® plain bearings are designed for dry operation, they are quite compatible with standard oils and greases. A single lubrication during the installation improves the start-up behaviour and the coefficient of friction, thus reducing the frictional heat. Due to this effect, the permissible loads for plain bearings can be increased by lubrication. Table 02 shows the correction factors for **pv value** using lubrication.

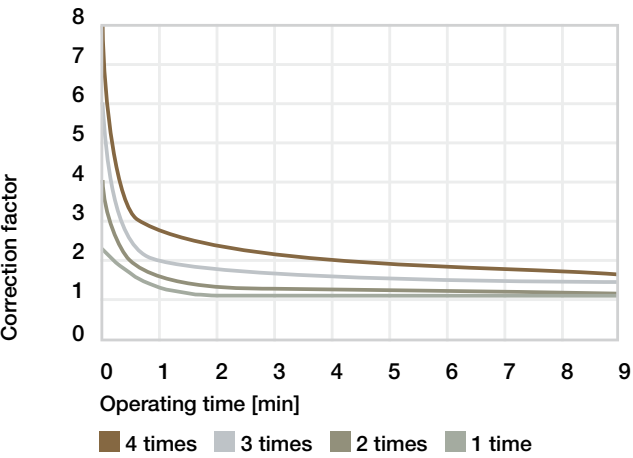


Diagram 09: Correction factor for p · v

Lubrication	Correction factor
Dry operation	1.0
During installation	1.3
Continuous, grease	2.0
Continuous, water	4.0
Continuous, oil	5.0

Table 02: Correction of the tolerated pv value by means of lubrication

Material	Thermal conductivity [W/m · k]
Steel	46
Aluminium	204
Grey cast iron	58
304 stainless steel	16
Ceramics	1.4
Plastic	0.24

Table 03: Heat conductivity values of shaft or housing materials

Coefficient of friction

iglidur® plain bearings are self-lubricating with the addition of solid lubricants. The solid lubricants lower the coefficient of friction of the plain bearings and thus increase the wear resistance. The coefficient of friction  $\mu$  is proportional to the normal force and describes which force is needed to move a body in relation to another.

Depending on whether an application is starting from a stationary position or the movement is in progress and needs to be maintained, a distinction is made between a static coefficient of friction and a dynamic coefficient of friction.

Coefficient of friction and surfaces

Shown here is the relationship between coefficient of friction and surface finish of shaft materials. It is clearly shown that the amount of friction is composed of different factors. If the shaft is too rough, abrasion levels play an important role. Small areas of unevenness that can interlock with each other must be worn off the surface. When the surfaces are too smooth, however, higher adhesion results, i.e. the surfaces stick to each other. Higher forces are necessary to overcome the adhesion, which results from an increased coefficient of friction. Stick-slip can be the result of a large difference between static and dynamic friction and of a higher adhesive tendency of mating surfaces. Stick-slip also occurs due to intermittent running behaviour and can result in loud squeaking. Over and over again, it is observed that these noises do not occur or can be eliminated with rough shafts. Thus for applications that have a great potential for stick-slip – slow movements, large resonance of the housing – attention must be paid to the optimal surface finish of the shafts.

pv value

$$pv_{perm.} = \left( \frac{[K1 \cdot \pi \cdot \lambda k \cdot \Delta T]}{\mu \cdot s} + \frac{[K2 \cdot \pi \cdot \lambda s \cdot \Delta T]}{\mu \cdot b1 \cdot 2} \right) \cdot 10^{-3}$$

In these equations:

<b>K1, K2</b>	=	Constant for heat dissipation (K1 = 0.5, K2 = 0.042)
<b>s</b>	=	Bearing wall thickness mm
<b>b1</b>	=	Bearing length mm
<b>μ</b>	=	Coefficient of friction
<b>λs</b>	=	Thermal conductivity of the shaft
<b>λk</b>	=	Thermal conductivity of the bearing
<b>ΔT</b>	=	(T <sub>a</sub> - T <sub>u</sub> )
<b>T<sub>u</sub></b>	=	Ambient temperature [°C]
<b>T<sub>a</sub></b>	=	Max. application temperature [°C]



Picture 05: Better products for less – a key element is the industry's largest test lab. 3,800m² lab, more than 12,000 tests and 2 billion test strokes per year.



Temperatures

The temperature resistance of high-performance polymer plain bearings is usually underestimated. Data is often found in the literature about the continuous operating temperature. The continuous operating temperature is the highest temperature, which the plastic can withstand for a period of time without a reduction in the tensile strength of the material above or below a prespecified value. This standardised test however yields only a less relevant characteristic value, as bearings are almost always subjected to a load. The application temperatures of the materials are more revealing.

Application temperatures

The minimum application temperature is the temperature below which the material is so rigid and hard that it becomes too brittle for standard applications. The maximum continuous application temperature is the temperature which the material can endure without the properties changing considerably. The maximum, short-term application temperature is the temperature above which the material becomes so soft, that it can only withstand small external loads. "Short term" is defined as a period of a few minutes. If the plain bearings are moved axially or axial forces occur, there is more opportunity for the bearing to lose press-fit. In these cases, axial securing of the bearing is necessary in

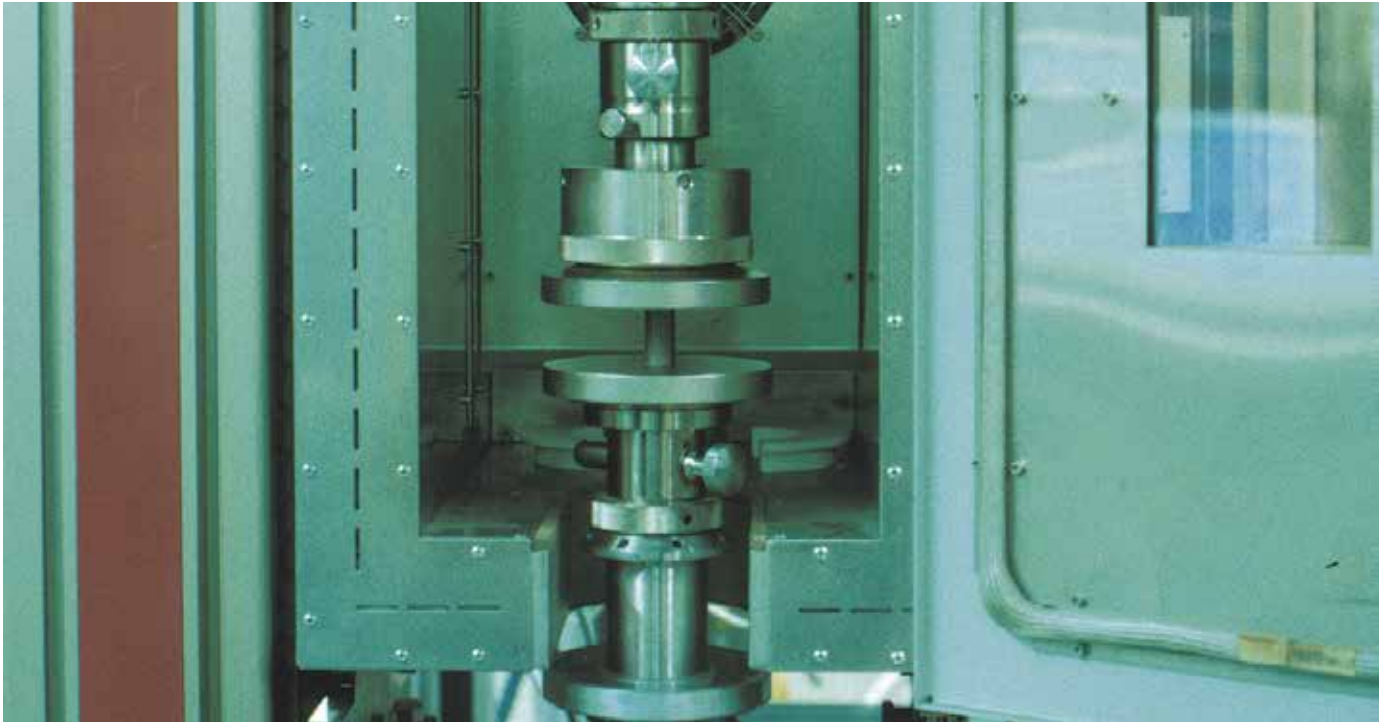
addition to the press-fit. The table 04 shows the temperature at which additional securing of the iglidur® plain bearing is required, even under low axial loads. The greater the forces, the more reasons to engage such a fastening.

Temperature and load

The diagrams 02 and 03 (► Page 41) show the maximum recommended surface pressure [p] of the iglidur® plain bearings as a function of temperature. With increasing temperature, this value decreases continuously. With plain bearings it is important to note that, due to the friction, the bearing temperature may be higher than the ambient temperature.

Coefficient of thermal expansion

The thermal expansion of polymers is approximately 10 to 20 times higher than metals. In contrast to metal, this expansion is non-linear in plastics. The coefficient of thermal expansion of the iglidur® plain bearing is a significant reason for the bearing clearance. At the given application clearance, seizing of the bearing to the shaft does not occur at high temperatures. The coefficient of thermal expansion of iglidur® plain bearings was examined for significant temperature ranges and the results are given in the individual materials tables, at the start of each chapter.



Picture 06: Material tests are possible up to +250°C

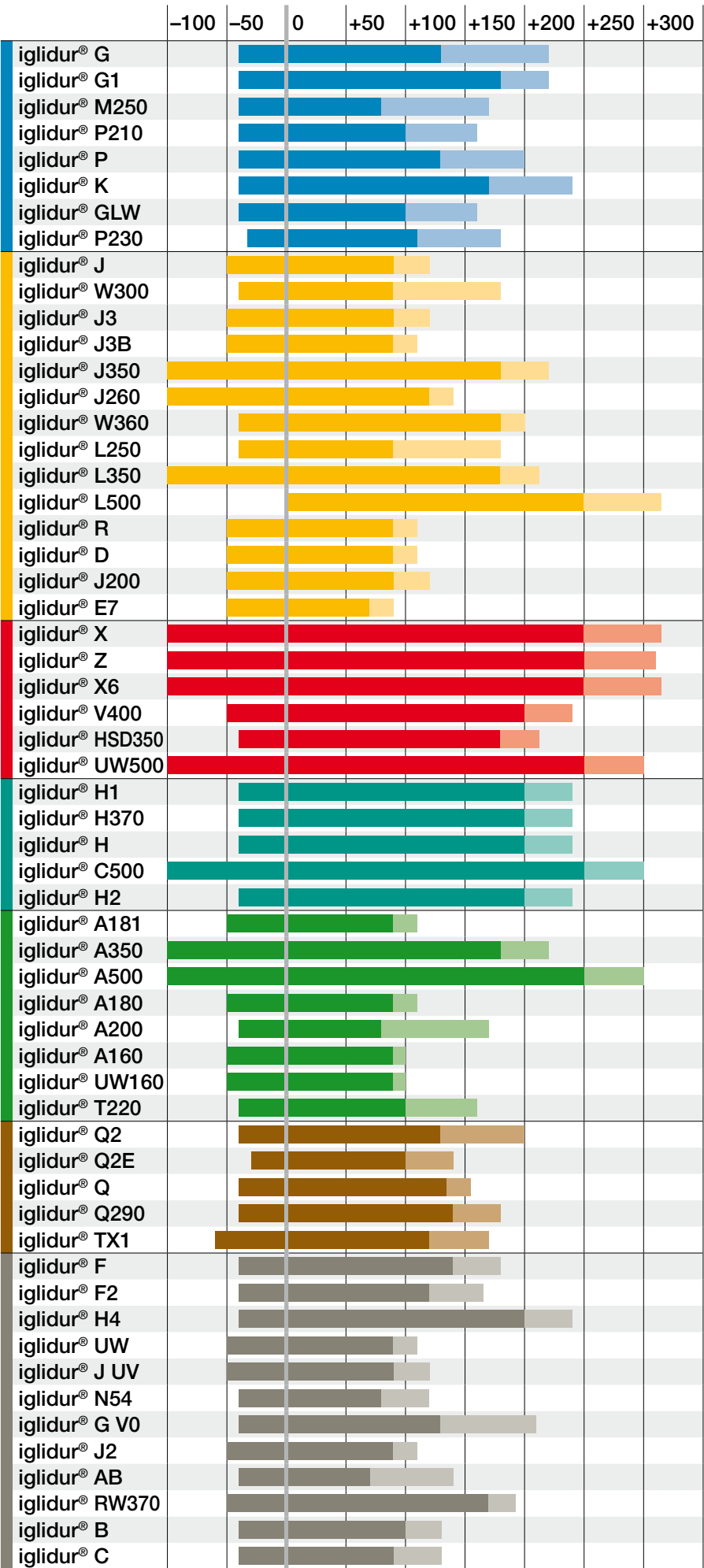


Diagram 10: Comparison of the continuous and short-term upper application temperature limits [°C]

Material	Temperature [°C]
iglidur® G	+80
iglidur® G1	+120
iglidur® M250	+60
iglidur® P210	+50
iglidur® P	+90
iglidur® K	+70
iglidur® GLW	+80
iglidur® P230	+100
iglidur® J	+60
iglidur® W300	+60
iglidur® J3	+60
iglidur® J3B	+60
iglidur® J350	+140
iglidur® J260	+80
iglidur® W360	+90
iglidur® L250	+55
iglidur® L350	+140
iglidur® L500	+135
iglidur® R	+50
iglidur® D	+50
iglidur® J200	+60
iglidur® E7	+30
iglidur® X	+135
iglidur® Z	+145
iglidur® X6	+165
iglidur® V400	+100
iglidur® HSD350	+130
iglidur® UW500	+150
iglidur® H1	+80
iglidur® H370	+100
iglidur® H	+120
iglidur® C500	+130
iglidur® H2	+110
iglidur® A181	+60
iglidur® A350	+140
iglidur® A500	+130
iglidur® A180	+60
iglidur® A200	+50
iglidur® A160	+60
iglidur® UW160	+70
iglidur® T220	+50
iglidur® Q2	+70
iglidur® Q2E	+75
iglidur® Q	+50
iglidur® Q290	+80
iglidur® TX1	+100
iglidur® F	+105
iglidur® F2	+70
iglidur® H4	+110
iglidur® UW	+80
iglidur® J UV	+60
iglidur® N54	+60
iglidur® G V0	+100
iglidur® J2	+60
iglidur® AB	+50
iglidur® RW370	+120
iglidur® B	+50
iglidur® C	+40

Table 04: Temperature at which additional securing of the iglidur® plain bearing is required



## Wear resistance

The wear of components depends on many different factors, therefore it is difficult to make general statements about the wear behaviour. In many experiments and tests, the measurement of the wear is a primary factor. In testing, it has become clear what variances are possible between different material pairings. For given loads and surface speeds, the wear resistance can easily vary by a factor of 10 between material pairings that run well together.

► Shaft materials, page 52

### Wear under load

Different loads greatly influence the bearing wear. Among the iglidur® plain bearings, certain materials are optimised for low loads, while others are suitable for use with high or extremely high loads.

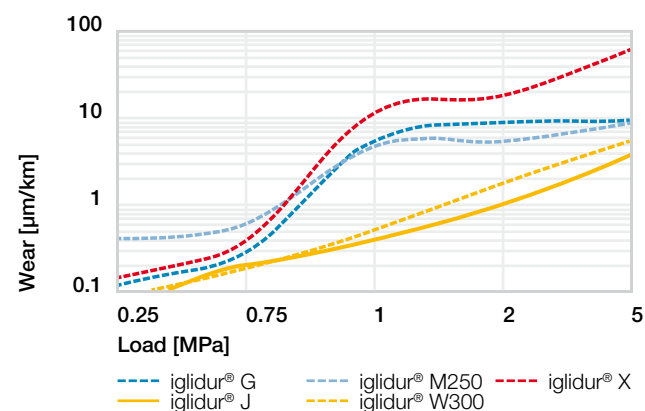


Diagram 11: Wear of iglidur® plain bearings under low pressures, Cf53 shaft,  $v = 0.1\text{m/s}$

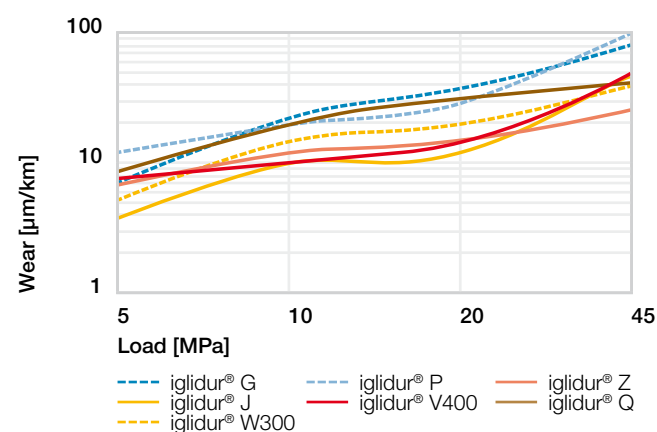


Diagram 12: Wear of iglidur® plain bearings at medium and high pressures, shaft: Cf53,  $v = 0.1\text{m/s}$

### Wear and temperature

Within wide temperature ranges, the wear resistance of the iglidur® plain bearings shows little change. In the maximum temperature range, however, the temperature increases and the wear of the plain bearing increases. One particular exception is represented by iglidur® X. The wear resistance of iglidur® X greatly increases as temperature increases and reaches the optimum wear resistance at a temperature of  $+160^{\circ}\text{C}$ . Then resistance decreases again, gradually.

### Wear during abrasive dirt accumulation

Special wear problems frequently occur if abrasive dirt particles get into the bearing. iglidur® plain bearings can clearly improve the operating time of machines and systems in these situations. The high wear resistance of the materials and the dry operation result in the highest service life. As no oil or grease is on the bearing, dirt particles cannot adhere or penetrate as easily into the bearing. Most debris simply falls away from the bearing thus limiting potential damage. If however, a hard particle penetrates into the bearing area, then an iglidur® plain bearing can absorb this particle. The foreign body becomes embedded in the wall of the plain bearing. Up to a certain point, operation can be maintained at optimal levels even when there is extreme dirt accumulation.

However, it is not just hard particles that can damage bearing surfaces and shafts. Soft dirt particles such as for example, textile or paper fibres, are frequently the cause for increased wear. In this instance, the dry operation capability and the dust resistance of the iglidur® plain bearings go into action. In the past, this helped save costs in many applications.

### Wear and surfaces

Shaft surfaces are important for the wear of bearing systems. Similar to the considerations for the coefficient of friction, a shaft can be too rough in regard to the bearing wear, but it can also be too smooth. A shaft that is too rough acts like a file and during movement separates small particles from the bearing surface. For shafts that are too smooth, however, higher wear can also occur. An extreme increase in friction results due to adhesion. The forces that act on the mating surface can be so large that material blow-outs occur.

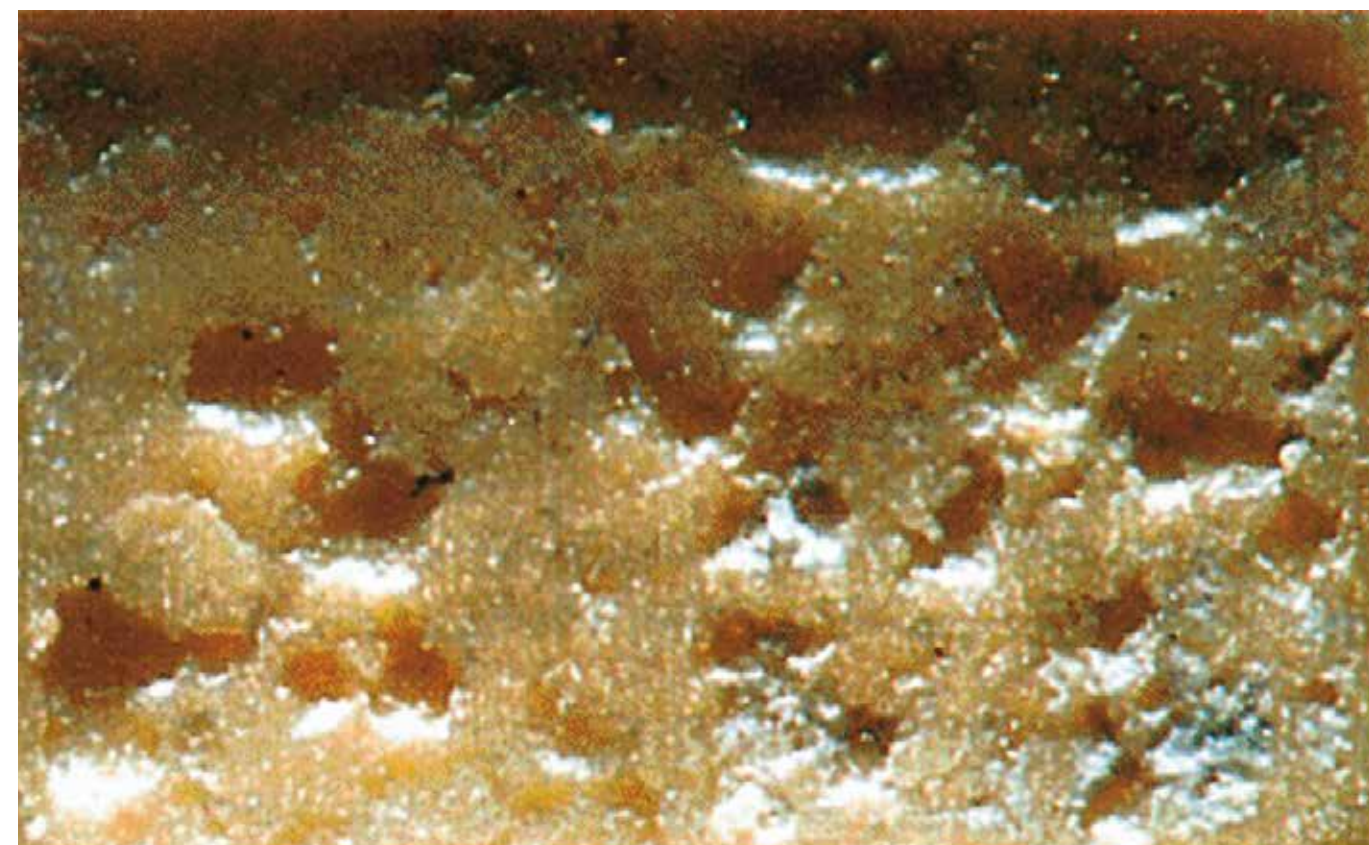
It is significant to note that wear by erosion is non-linear, random and cannot be accurately predicted.



Picture 07: High wear resistance: plain bearing in permanent contact with sand



Picture 8: Wear experiments with aluminium shafts



Picture 9: Erosion damage due to shafts that are too smooth

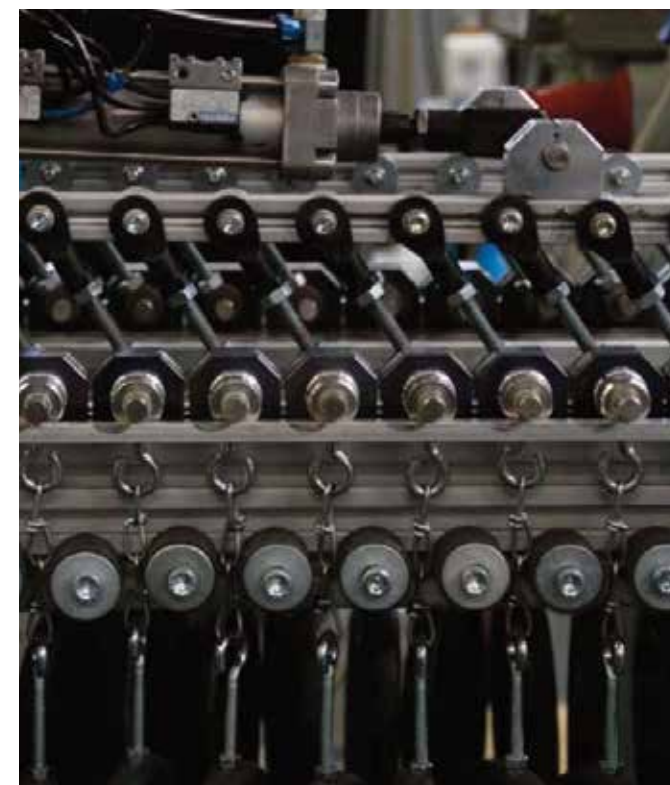


## Wear and shaft materials

The shaft is, apart from the plain bearing itself, the most important parameter in a bearing system. It is in direct contact with the bearing, and like the bearing, it is affected by relative motion. The shaft will wear in any case. Modern bearing systems however are designed in a way that the wear of the shafts is so small that it cannot be detected with traditional methods of measurement technology. Shafts can be distinguished and classified according to their hardness and according to the surface finish.

- Coefficient of friction, **page 47**
- Wear resistance, **page 50**

The hardness of the shaft also plays an important role. When the shafts are less hard, the shaft is worn smooth during the break-in phase. Abrasive points are worn off and the surface is rebuilt. For some materials, this effect has positive influences, and the wear resistance of the polymer bearing increases. In the following graphs, the most common shaft materials are listed and the iglidur® materials that are best suited are compared. For easier comparison, the scaling of the wear axis is the same in all graphs.



Picture 10: Pivoting wear test rig for testing the wear in pivoting movements at low loads



Picture 11: Pivoting wear test rig for testing the wear in pivoting movements at medium loads

The low wear results of the systems with hard-chromed shafts are especially impressive. This very hard, but also smooth shaft gives excellent results on the wear behaviour with many bearing combinations. The wear of many iglidur® plain bearings is lower on this shaft than on any other shaft material tested. However, it should be pointed out that because of the low surface roughness, the danger of stick-slip on hard-chromed shafts is especially high. With high-grade steel, a similarly good result is obtained. Cf53 standard shafts give very good results, too. With other shaft materials, the wear results vary considerably. For example, in tests with 304 stainless steel shafts at low loads, extremely positive results can be found with the right bearing material. It must be said on the other side, that no other shaft material shows a bigger variation of wear results with different bearing materials. Therefore, the choice of the most suitable bearing material is particularly important with the shaft materials 304 stainless steel and HR carbon steel. The test results give only a sample of the existing data. All of the results shown were made with same loads and speeds.

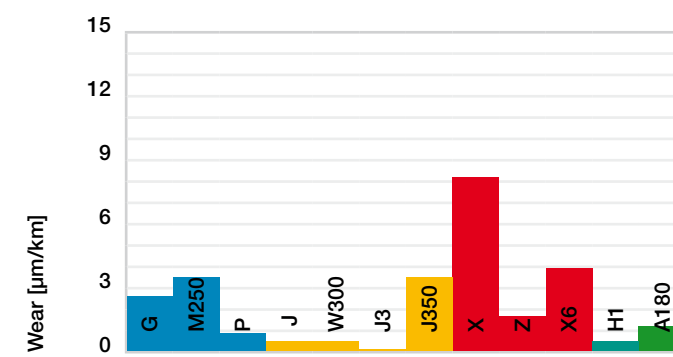


Diagram 13: Wear with Cf53 shaft,  $p = 1 \text{ MPa}$ ,  $v = 0.30 \text{ m/s}$ ,  $R_a = 0.20 \mu\text{m}$

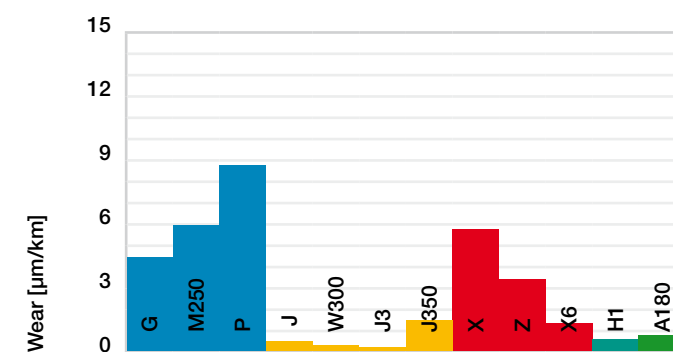


Diagram 14: Wear with 304 stainless steel shaft,  $p = 1 \text{ MPa}$ ,  $v = 0.30 \text{ m/s}$ ,  $R_a = 0.20 \mu\text{m}$

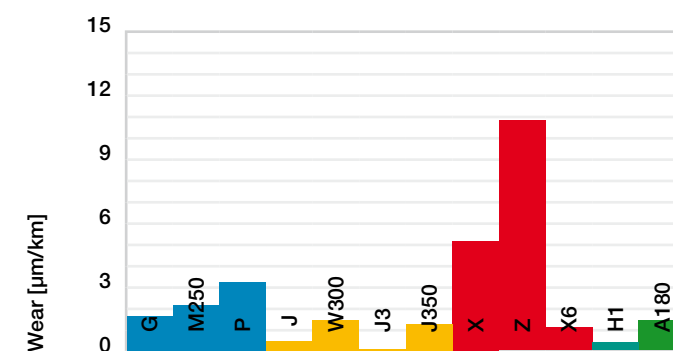


Diagram 15: Wear with HR carbon steel shaft,  $p = 1 \text{ MPa}$ ,  $v = 0.30 \text{ m/s}$ ,  $R_a = 0.20 \mu\text{m}$

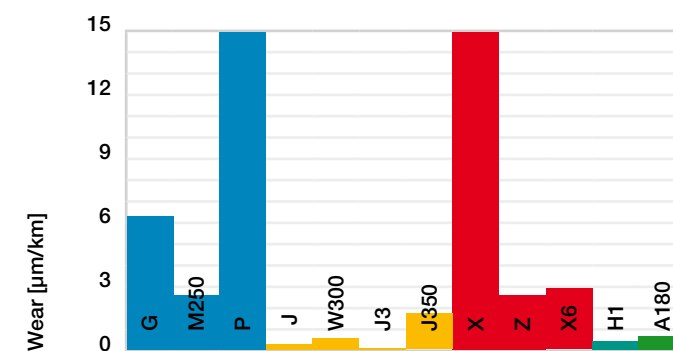


Diagram 16: Wear with Cf53 hard-chromed shaft,  $p = 1 \text{ MPa}$ ,  $v = 0.30 \text{ m/s}$ ,  $R_a = 0.20 \mu\text{m}$

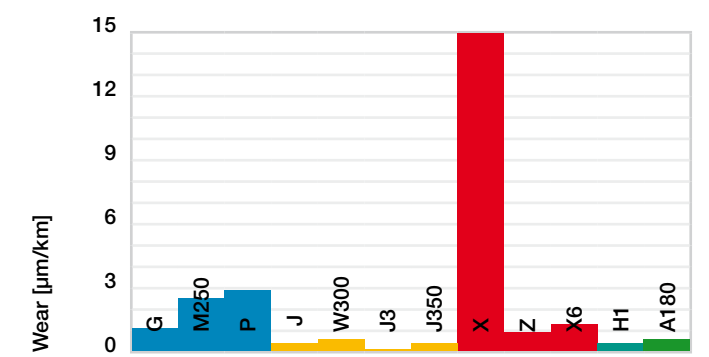


Diagram 17: Wear with hard-anodised aluminium shaft,  $p = 1 \text{ MPa}$ ,  $v = 0.30 \text{ m/s}$ ,  $R_a = 0.20 \mu\text{m}$

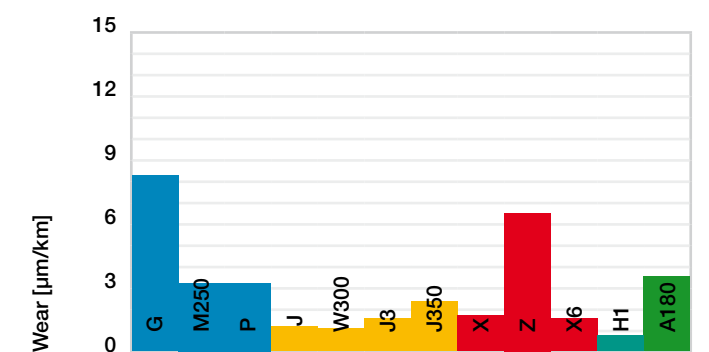


Diagram 18: Wear with free cutting steel shaft,  $p = 1 \text{ MPa}$ ,  $v = 0.30 \text{ m/s}$ ,  $R_a = 0.20 \mu\text{m}$

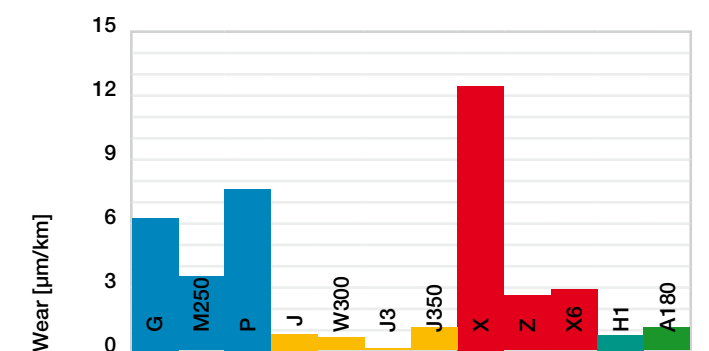


Diagram 19: Wear with high grade steel shaft,  $p = 1 \text{ MPa}$ ,  $v = 0.30 \text{ m/s}$ ,  $R_a = 0.20 \mu\text{m}$



Chemical resistance

iglidur® plain bearings can come into contact with many chemicals during their use. This contact can lead to changes of the structural properties. The behaviour of plastics towards a certain chemical is dependent on the temperature, the length of exposure, and the type and amount of the mechanical stress. If iglidur® plain bearings are resistant to a chemical, they can be used in these media. Sometimes, the surrounding media can even take on the role of a lubricant. Therefore plain bearings may also be used lubricated. However, in dirty environments, a traditional lubricant can decrease the wear resistance when compared to dry operation. The following overview demonstrates this. You'll find a detailed list of chemical resistances in the rear of the catalogue.

► Chemical table, **page 1636**

Applications in the food industry

The iglidur® product range with specially developed bearing materials is prepared for the special requirements in machines and equipment for the food industry. The materials of the iglidur® A series and of iglidur® T220 are made according to the requirements of the American Food and Drugs Administration (FDA) for the repeated contact with food.

Table 05 (right):  
Chemical resistance of iglidur® materials  
+ Resistant  
0 Conditionally resistant  
– Not resistant  
All data given at room temperature [+20°C]

Material	Hydro-carbons	Greases, oils, without additives	Weak acids	Weak alkaline
iglidur® G	+	+	0 to –	+
iglidur® G1	+	+	0 to –	+
iglidur® M250	+	+	0 to –	+
iglidur® P210	–	–	0	–
iglidur® P	–	+	0	–
iglidur® K	+	+	0 to –	+
iglidur® GLW	+	+	0 to –	+
iglidur® P230	+	+	+	+
iglidur® J	+	+	0 to –	+
iglidur® W300	+	+	0 to –	+
iglidur® J3	+	+	0 to –	+
iglidur® J3B	+	+	0 to –	+
iglidur® J350	+ up to 0	+	+	+
iglidur® J260	+	0 to –	–	+ up to 0
iglidur® W360	+	+	0 to –	+
iglidur® L250	+	+	0 to –	+
iglidur® L350	+ up to 0	+	+	+
iglidur® L500	+	+	+	+
iglidur® R	+	+	0 to –	+
iglidur® D	+	+	0 to –	+
iglidur® J200	+	+	0 to –	+
iglidur® E7	+	+	0 to –	+
iglidur® X	+	+	+	+
iglidur® Z	+	+	+	+
iglidur® X6	+	+	+	+
iglidur® V400	+	+	+	+
iglidur® HSD350	+	+	+	+
iglidur® UW500	+	+	+	+
iglidur® H1	+	+	+ up to 0	+
iglidur® H370	+	+	+ up to 0	+
iglidur® H	+	+	+ up to 0	+
iglidur® C500	+	+	+	+
iglidur® H2	+	+	+ up to 0	+
iglidur® A181	+	+	0 to –	+
iglidur® A350	+ up to 0	+	+	+
iglidur® A500	+	+	+	+
iglidur® A180	+	+	0 to –	+
iglidur® A200	+	+	0 to –	+
iglidur® A160	+	+	+	+
iglidur® UW160	+	+	+	+
iglidur® T220	–	+	0	–
iglidur® Q2	+	+	0 to –	+
iglidur® Q2E	+	+	0 to –	+
iglidur® Q	+	+	0 to –	+
iglidur® Q290	+	+	0 to –	+
iglidur® TX1	+	+	+	+
iglidur® F	+	+	0 to –	+
iglidur® F2	–	+	0	–
iglidur® H4	+	+	+ up to 0	+
iglidur® UW	+	+	0 to –	+
iglidur® J UV	+	+	0 to –	+
iglidur® N54	+	+	0 to –	+
iglidur® G V0	+	+	0 to –	+
iglidur® J2	+	+	0 to –	+
iglidur® AB	+	+	0 to –	+
iglidur® RW370	–	+	+	+
iglidur® B	–	–	0 to –	–
iglidur® C	+	+	0 to –	+

Resistance to weathering

Radioactive radiation

A comparison of the resistance to radioactive radiation is shown in table 07. iglidur® X, UW500, and Z are by far the most resistant materials.

Resistance to weathering

Plain bearings can be exposed to constant weathering when they are used outside. The UV resistance is an important measure that states whether a material is affected by UV radiation. The effects can extend from slight changes in colour to brittleness of the material. A comparison of the materials to each other is shown in table 08. The results show that iglidur® plain bearings are suitable for outside use. Only for a few iglidur® materials are any changes expected.

Vacuum

iglidur® plain bearings can be used in a vacuum to a limited extent. Only a small amount of outgassing takes place. In most iglidur® plain bearings, the outgassing does not change the material properties. Generally, materials with low moisture absorption are recommended.

Electrical properties

In the product range of the maintenance-free, self-lubricating iglidur® plain bearings, there are both insulating as well as electrically conductive materials. The electrical properties are given in detail in the individual material descriptions. Table 07 compares the surface resistance of "conductive" iglidur® plain bearings. The iglidur® plain bearings not mentioned here are usually electrically insulating. Please observe that for some materials the properties can be changed by the absorption of moisture. In experiments, it

Material iglidur®	Resistance to weathering	Material iglidur®	Resistance to weathering
G	4	L250	3
G1	n.s.	L350	n.s.
M250	2	L500	5
P210	5	R	4
P	5	D	5
K	4	J200	4
GLW	4	E7	5
P230	n.s.	X	5
J	4	Z	5
W300	3	X6	5
J3	4	V400	5
J3B	n.s.	HSD350	5
J350	5	UW500	5
J260	5	H1	5
W360	4	H370	5

Table 08: UV resistance of iglidur® plain bearings, 1 low resistance, 5 highest resistance

Determination of bending specifications according to DIN EN ISO 178 after weathering with double stroke 4 of ASTM G154. Two alternating statuses (total time: 2,000hrs). Status 1: Irradiation with UVA-340, irradiance 1.55W/m²/nm and 70°C for 8hrs. Status 2: no irradiation, condensation at 50°C for 4hrs.

should be tested whether the required properties are also stable when the conditions are changing.

Material	Radiation resistance
X, Z, UW500, A160	1 · 10 <sup>5</sup> Gy
X6, A500	2 · 10 <sup>5</sup> Gy
M250, J3, A200, N54	1 · 10 <sup>4</sup> Gy
L250	3 · 10 <sup>4</sup> Gy
V400, C	2 · 10 <sup>4</sup> Gy
P, K	5 · 10 <sup>2</sup> Gy
G, G1, J, W300, P210, P230, J260, J200, R, D, C500, A180, UW160, T220, F, F2, Q, Q2, UW, G V0, J2, B, GLW, L500, Q290, AB, J UV, Q2E, E7, J3B	3 · 10 <sup>2</sup> Gy
J350, H, H1, H370, H2, H4, A181, A350, W360, TX1	2 · 10 <sup>2</sup> Gy

Table 06: Comparison of the radiation resistance of iglidur® plain bearings

Material	Surface resistance [Ω]
iglidur® X	< 10 <sup>3</sup>
iglidur® X6	< 10 <sup>5</sup>
iglidur® UW500	< 10 <sup>9</sup>
iglidur® H	< 10 <sup>2</sup>
iglidur® H370	< 10 <sup>5</sup>
iglidur® F	< 10 <sup>2</sup>
iglidur® F2	< 10 <sup>9</sup>
iglidur® UW	< 10 <sup>5</sup>

Table 07: Electrical properties of conductive iglidur® plain bearings

Material iglidur®	Resistance to weathering	Material iglidur®	Resistance to weathering
H	5	TX1	n.s.
C500	4	F	3
H2	5	F2	4
A181	4	H4	5
A350	5	UW	3
A500	2	J UV	5
A180	1	N54	4
A200	1	G V0	4
A160	5	J2	3
UW160	5	AB	3
T220	4	RW370	5
Q2	5	B	3
Q2E	n.s.	C	3
Q	4		
Q290	1		

Fitting instructions

iglidur® plain bearings are press-fit bearings. The inner diameter adjusts only after press-fit in the proper housing hole with a recommended (H7) tolerance. The press-fit excess dimension can be up to 2% of the inner diameter. This ensures the secure press-fitting of the bearing. Axial or radial movement in the housing are also prevented this way. The hole in the housing should be produced with the recommended tolerance (H7) for all bearings and be smooth, flat and chamfered at between 20 and 30 degrees. The bearing should be press-fitted using a flat press. The use of centring or calibrating pins can cause damage to the bearings and bring a greater amount of clearance.

Adhesion

It is not usually necessary to use an adhesive to fit the bearing. If a bearing is likely to lose its firm fit on account of high temperatures, a more temperature-resistant plain bearing should be used. If, however, there are plans to secure the bearings with adhesive, it will be necessary to perform suitable tests in each case. It is not possible to simply transfer the successful results seen in other applications.

Machining


iglidur® plain bearings are delivered ready-to-fit. The extensive product line makes it possible to use a standard dimension in most cases. If for some reason, a subsequent machining of the plain bearing is necessary, the adjacent table shows the machining standard values. The subsequent machining of the sliding surfaces is to be avoided if possible. Higher wear rate is most often the result. An exception is iglidur® M250 which is suitable for subsequent machining. In other iglidur® plain bearings, disadvantages of a sliding surface machining can be counteracted by lubrication during installation.

Process	Turning	Drilling	Milling
Tool material	Stainless steel	Stainless steel	Stainless steel
Feed [mm]	0.1...0.5	0.1...0.5	to 0.5
Clearance angle	5...15	10...12	3
Rake angle	0...10	3...5	
Cutting speed [m/min]	200...500	50...100	to 1,000


Table 09: Guidelines for machining



Picture 12: The bearing should be press-fitted using a flat press

**Press-fitting plain bearings made easy**

iglidur® plain bearings are press-fit bearings, which are dimensionally oversized and pressed into a housing with H7 tolerance. This is not always done in an assembly line using suitable tools. The igus® assembly aid flexibly and reliably accepts plain bearings for shaft diameters from 13–50mm (PT-1350) and 6–20mm (PT-0620) and even permits assembly using a hammer – simple and fast.



PT-1350

PT-0620

Tolerances and measurement system

The installation dimensions and tolerances of the iglidur® plain bearings are a function of the material and wall thicknesses. For each material, the moisture absorption and the thermal expansion are imperative. Plain bearings with low moisture absorption can be designed with a minimal amount of bearing clearance. For wall thickness, the rule is: the thicker the bearings are, the larger the tolerances must be. Thus, different tolerance classes exist for iglidur® plain bearings. Within these tolerances, iglidur® plain bearings can operate in the permissible temperature range and in humidity conditions up to 70% according to the installation recommendations. Should higher air moisture levels be present, or the bearing is used under water, we provide advice with regard to applications, in order to help you use your bearings correctly.

Testing methods

iglidur® plain bearings are press-fit bearings for housings with a H7 standard hole. This press-fitting of the bearing fixes the bearing in the housing, and the inner diameter of the plain bearing is also formed upon press-fit. The bearing size test is performed when the bearing is installed in a hole with the minimum specified dimension; both using a 3 point probe and a plug gauge:

- The "Go-Side" of the plug gauge, pressed into the hole, must pass easily through the bearing
- With the 3 point probe, the inner diameter of the bearing must lie within the prescribed tolerance on the measurement plane (diagram 20)

Troubleshooting

In spite of careful manufacturing and assembly of the bearings, differences and questions regarding the recommended installation dimensions and tolerances can result. For this reason, we have compiled a list of the most frequent reasons for differences. In many cases, with this troubleshooter, the reasons for the differences can be found quickly:

- The hole is not chamfered correctly, so the bearing material is removed upon press-fitting
- A centring pin was used which expanded the inside diameter of the bearing during press-fit
- The hole does not meet the recommended housing hole specifications (usually H7)
- The housing is made out of a soft material that was expanded by the bearing installation
- The shaft is not within recommended tolerances
- The measuring doesn't take place within the measuring lines



Picture 13: Measurement of the inner diameter of a press-fit plain bearing

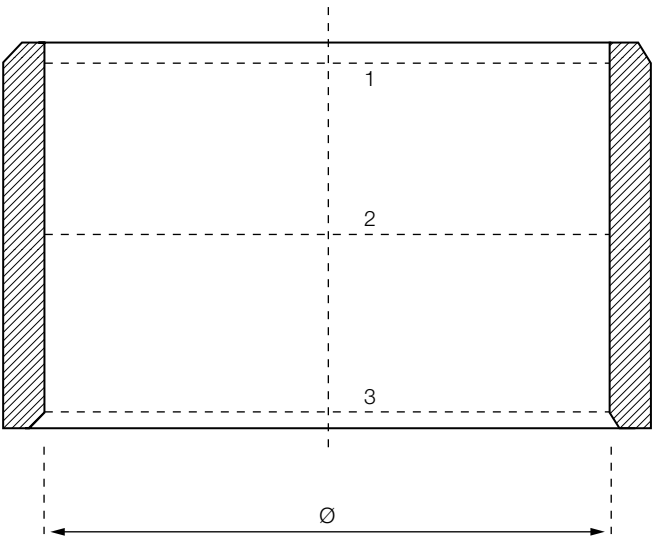


Diagram 20: Positions of the measurement lines

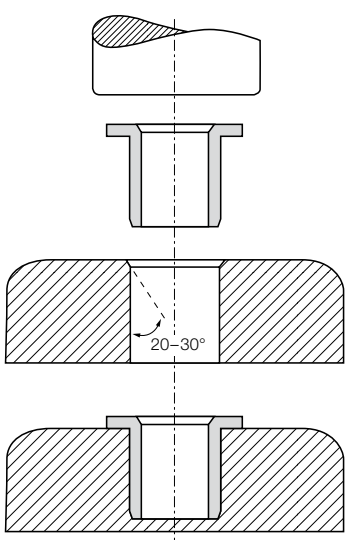


Diagram 21: Press-fit of the bearing (section view)



Tolerances

Installation tolerances

iglidur® 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, in standard cases the inner diameter automatically adjusts to the correct tolerances. For particular dimensions the tolerance differs depending on the wall thickness.

ISO tolerances for iglidur® plain bearings [mm]

Diameter d1	Housing H7	Shaft h9	Tolerances according to ISO 3547-1			
	E10	E11	F10	D11		
up to 3	+0.000 +0.010	-0.025 +0.000	+0.014 +0.054	+0.014 +0.074	+0.006 +0.046	+0.020 +0.080
> 3 to 6	+0.000 +0.012	-0.030 +0.000	+0.020 +0.068	+0.020 +0.095	+0.010 +0.058	+0.030 +0.105
> 6 to 10	+0.000 +0.015	-0.036 +0.000	+0.025 +0.083	+0.025 +0.115	+0.013 +0.071	+0.040 +0.130
> 10 to 18	+0.000 +0.018	-0.043 +0.000	+0.032 +0.102	+0.032 +0.142	+0.016 +0.086	+0.050 +0.160
> 18 to 30	+0.000 +0.021	-0.052 +0.000	+0.040 +0.124	+0.040 +0.170	+0.020 +0.104	+0.065 +0.195
> 30 to 50	+0.000 +0.025	-0.062 +0.000	+0.050 +0.150	+0.050 +0.210	+0.025 +0.125	+0.080 +0.240
> 50 to 80	+0.000 +0.030	-0.074 +0.000	+0.060 +0.180	+0.060 +0.250	+0.030 +0.150	+0.100 +0.290
> 80 to 120	+0.000 +0.035	-0.087 +0.000	+0.072 +0.212	+0.072 +0.292	+0.036 +0.176	+0.120 +0.340
>120 to 180	+0.000 +0.040	-0.100 +0.000	+0.085 +0.245	+0.085 +0.335	+0.043 +0.203	+0.145 +0.395

Material	E10	E11	F10	D11
iglidur® G	●			
iglidur® G1			●	
iglidur® M250				●
iglidur® P210	●			
iglidur® P	●			
iglidur® K	●			
iglidur® GLW	●			
iglidur® P230	●			
iglidur® J	●			
iglidur® W300	●			
iglidur® J3	●			
iglidur® J3B	●			
iglidur® J350			●	
iglidur® J260	●			
iglidur® W360	●			
iglidur® L250	●			
iglidur® L350			●	
iglidur® L500			●	
iglidur® R	●			
iglidur® D	●			
iglidur® J200	●			
iglidur® E7	●			
iglidur® X		●		
iglidur® Z		●		
iglidur® X6		●		
iglidur® V400		●		
iglidur® HSD350		●		
iglidur® UW500		●		
iglidur® H1		●		

Material	E10	E11	F10	D11
iglidur® H370				●
iglidur® H				●
iglidur® C500				●
iglidur® H2				●
iglidur® A181	●			
iglidur® A350			●	
iglidur® A500			●	
iglidur® A180	●			
iglidur® A200				●
iglidur® A160	●			
iglidur® UW160	●			
iglidur® T220	●			
iglidur® Q2	●			
iglidur® Q2E		●		
iglidur® Q	●			
iglidur® Q290	●			
iglidur® F				●
iglidur® F2	●			
iglidur® H4			●	
iglidur® UW	●			
iglidur® J UV	●			
iglidur® N54	●			
iglidur® G V0	●			
iglidur® J2	●			
iglidur® AB	●			
iglidur® RW370			●	
iglidur® B				●
iglidur® C				●

Table 10: Tolerances of iglidur® plain bearing materials



igus® formulas

Surface pressure

Radial bearing:
$$p = \frac{F}{d1 \cdot b1}$$

Thrust bearing:
$$p = \frac{F}{(d2^2 - d1^2) \cdot \frac{\pi}{4}}$$

Surface speed

Rotational movement:

$$v = \frac{n \cdot d1 \cdot \pi}{60 \cdot 1.000} \left[ \frac{m}{s} \right]$$

Pivoting movement:

$$v = d1 \cdot \pi \cdot \frac{2 \cdot \beta}{360} \cdot \frac{f}{1.000} \left[ \frac{m}{s} \right]$$

pv value

$$pv_{perm.} = \left( \frac{[K1 \cdot \pi \cdot \lambda k \cdot \Delta T]}{\mu \cdot s} + \frac{[K2 \cdot \pi \cdot \lambda s \cdot \Delta T]}{\mu \cdot b1 \cdot 2} \right) \cdot 10^{-3}$$

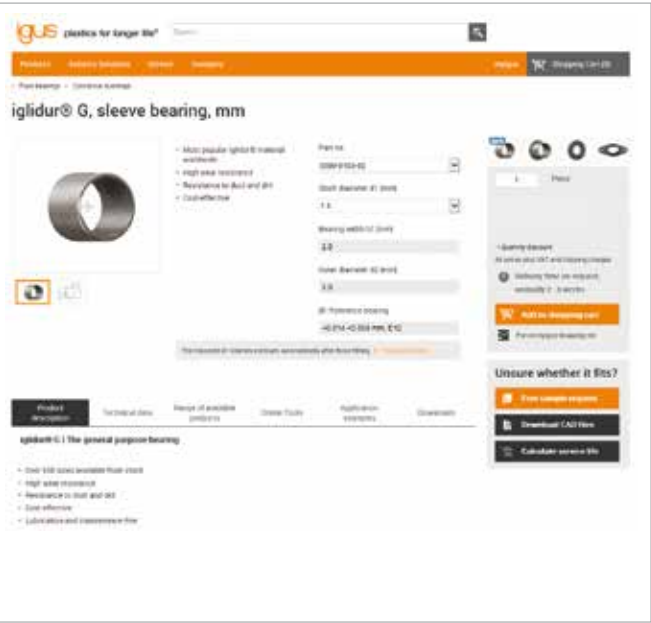
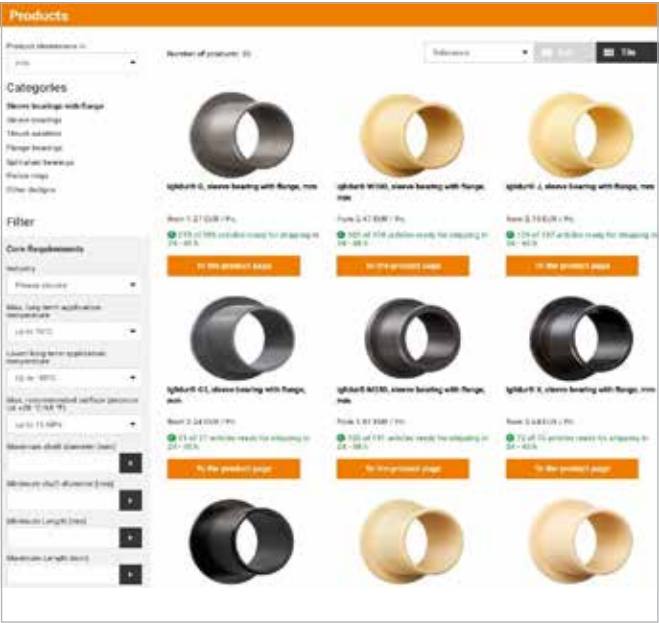
Friction force

$$F_R = \mu \cdot F$$

Short cuts and formulae for polymer plain bearings

<b>F</b>	=	Load	[N]
<b>F<sub>R</sub></b>	=	Friction force	[N]
<b>d1</b>	=	Inner diameter of the bearing	[mm]
<b>b1</b>	=	Bearing length	[mm]
<b>d2</b>	=	Outer diameter of the bearing	[mm]
<b>p</b>	=	Surface pressure	[N/mm²]
<b>v</b>	=	Surface Speed	[m/s]
<b>n</b>	=	Revolutions per minute	
<b>β</b>	=	Angle	[°]
<b>f</b>	=	Frequency in Hertz	
<b>K1, K2</b>	=	Constant for heat dissipation (K1 = 0.5 K2 = 0.042)	[N]
<b>s</b>	=	Bearing wall thickness	[mm]
<b>μ</b>	=	Coefficient of friction	
<b>λs</b>	=	Thermal conductivity of the shaft	
<b>λk</b>	=	Thermal conductivity of the bearing	
<b>ΔT</b>	=	(T <sub>a</sub> - T <sub>u</sub> )	
<b>T<sub>u</sub></b>	=	Ambient temperature	[°C]
<b>T<sub>a</sub></b>	=	Max. application temperature	[°C]

Quicklinks



Quicklinks for more information and additional features. Visit directly your chosen product online, e.g. ► [www.igus.no/G](http://www.igus.no/G) and you'll find more details, 3D CAD files, DXF files, PDF downloads, application examples and many more for your chosen igus® product.







**iglidur<sup>®</sup> improves!**  
Proven. Predictable. Performance.

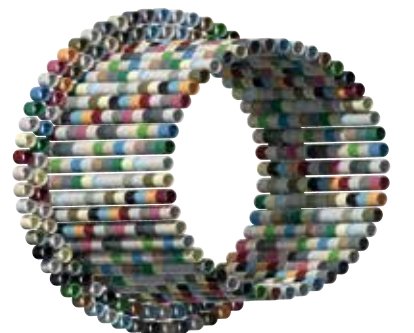
**iglidur<sup>®</sup> standards:  
more than 1,900 parts from stock**

Choice of 17 standard iglidur<sup>®</sup> materials

For shaft sizes up to 50mm according to  
ISO 3547-1

Lubrication and maintenance-free

Service life can be calculated online



## iglidur® plain bearings made from tribo-plastics: all-rounder

### Materials for general purpose



The classic all-rounder:  
iglidur® G  
► Page 81



Even more universal:  
iglidur® G1  
► Page 97



The robust all-rounder according to ISO 2795:  
iglidur® M250  
► Page 107



Specialist for pivoting, rolling applications and more:  
iglidur® P210  
► Page 117



The cost-effective outdoor all-rounder:  
iglidur® P  
► Page 131



## iglidur® plain bearings made from tribo-plastics: endurance runner

### Materials for long service life



The versatile endurance runner:  
iglidur® J  
► Page 159



The classic endurance runner up to 30MPa:  
iglidur® W300  
► Page 171



Specialist for pivoting and pulsating loads:  
iglidur® J3  
► Page 183



High dimensional stability at high temperatures:  
iglidur® J350  
► Page 199



## iglidur® plain bearings made from tribo-plastics: high temperature

### Materials for use at high temperatures



The chemical and temperature specialist:  
iglidur® X  
► Page 279



Extremely long service life under extreme conditions:  
iglidur® Z  
► Page 289



## iglidur® plain bearings made from tribo-plastics: high media resistance

### Materials with good media resistance



Endurance runner with high media resistance:  
iglidur® H1  
► Page 333



Extremely long service life under water:  
iglidur® H370  
► Page 341



## iglidur® plain bearings made from tribo-plastics: for contact with food

### Materials for contact with food



The universal bearing for contact with food:  
iglidur® A181  
► Page 377



The endurance runner at higher temperatures in the food sector:  
iglidur® A350  
► Page 385



The media and temperature specialist in the food sector:  
iglidur® A500  
► Page 393



## iglidur® plain bearings made from tribo-plastics: for high loads

### Materials for heavy-duty applications










The durable heavy-duty bearing:  
iglidur® Q2  
► Page 445













The most suitable bearing for any application

The iglidur® standard product range now features standardisation for the main materials with the most common standard dimensions (up to a 50mm shaft diameter) - with or without flange. This means that the standard catalogue range offers more than 1,900 dimensions. Finding, calculating and ordering the most suitable plain bearing for your application that is guaranteed to work has never been easier; for (virtually) any application from high-temperature to salt water, from food to automotive.

- Lubrication and maintenance-free
- Service life can be calculated online
- No minimum order quantities, no surcharges
- No minimum order quantity
- More than 1,900 dimensions

	Temperature [°C] <sup>123)</sup>	Surface pressure [MPa] <sup>124)</sup>	Coefficient of friction [μ] <sup>125)</sup>	Wear [μm/km] <sup>125)</sup>	Price index
 <b>iglidur® G – the classic all-rounder</b> Excellent price-performance ratio ► Page 81	130	80	0.22	1.75	
 <b>iglidur® G1 – more universal</b> The advanced development of iglidur® G ► Page 97	180	91	0.21	1.88	
 <b>iglidur® M250 – the robust all-rounder according to ISO 2795</b> Excellent vibration dampening ► Page 107	80	20	0.56	2.10	
 <b>iglidur® P210 – specialist for pivoting, rolling applications and more</b> Good coefficient of friction and wear on almost every shaft ► Page 117	100	50	0.17	0.38	
 <b>iglidur® P – the cost-effective outdoor all-rounder</b> No moisture absorption even with high ambient humidity ► Page 131	130	50	0.24	1.8	
 <b>iglidur® J – the versatile endurance runner</b> High wear resistance on (almost) all shafts, very low coefficient of friction ► Page 159	90	35	0.16	0.29	
 <b>iglidur® W300 – the classic endurance runner up to 30MPa</b> Excellent wear resistance on (virtually) all shafts ► Page 171	90	60	0.18	0.33	






	Temperature [°C] <sup>123)</sup>	Surface pressure [MPa] <sup>124)</sup>	Coefficient of friction [μ] <sup>125)</sup>	Wear [μm/km] <sup>125)</sup>	Price index
 <b>iglidur® J3 – the new endurance runner: specialist for pivoting and pulsating loads</b> Up to 10MPa up to three times more wear-resistant than iglidur® J ► Page 183	90	45	0.13	0.07	
 <b>iglidur® J350 – endurance runner with high dimensional stability at high temperature</b> Can be used with many kinds of shafts and loads ► Page 199	180	60	0.16	1.14	
 <b>iglidur® X – the chemical and temperature specialist</b> Up to 150MPa static ► Page 279	250	150	0.31	6.30	
 <b>iglidur® Z – extremely long service life under extreme conditions</b> Resistant to wear and impact even at high loads and temperatures ► Page 289	250	150	0.18	1.00	
 <b>iglidur® H1 – endurance runner with high media resistance</b> Excellent coefficient of friction and wear ► Page 333	200	80	0.17	0.29	
 <b>iglidur® H370 – extremely long service life under water</b> High media resistance ► Page 341	200	75	0.17	1.20	
 <b>iglidur® A181 – the universal bearing for food contact</b> FDA and EU10/2011-compliant ► Page 377	90	31	0.18	0.48	
 <b>iglidur® A350 – the endurance runner at higher temperatures in the food sector</b> FDA and EU10/2011-compliant, extremely wear-resistant ► Page 385	180	60	0.17	1.79	
 <b>iglidur® A500 – the media and temperature specialist in the food sector; FDA and EU10/2011-compliant; extremely wear-resistant for high temperatures</b> ► Page 393	250	120	0.36	4.10	
 <b>iglidur® Q2 – the durable heavy-duty bearing</b> Combined wear resistance and compressive strength at high loads ► Page 445	130	120	0.17	1.50	













<sup>123)</sup> Max. long-term application temperature; <sup>124)</sup> Max. permissible surface pressure at +20°C; <sup>125)</sup> Best combination for p = 1MPa, v = 0.3m/s, rotating

<sup>123)</sup> Max. long-term application temperature; <sup>124)</sup> Max. permissible surface pressure at +20°C; <sup>125)</sup> Best combination for p = 1MPa, v = 0.3m/s, rotating

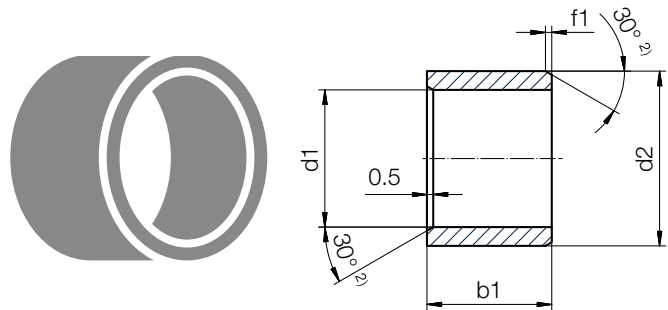


J	W300	J3	J350	X	Z	H1	H370	A181	A350	A500	Q2
E10	E10	E10	F10	F10	F10	F10	F10	E10	F10	F10	E10
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iglidur®	Unit	G	G1	M250	P210	P
General properties						
Density	[g/cm³]	1.46	1.58	1.14	1.40	1.58
Colour						
Max. moisture absorption at +23°C and 50% relative humidity	[% weight]	0.7	0.2	1.4	0.3	0.2
Max. total moisture absorption	[% weight]	4.0	1.7	7.6	0.5	0.4
Coefficient of sliding friction, dynamic, against steel	[μ]	0.08–0.15	0.08–0.15	0.18–0.40	0.07–0.19	0.06–0.21
pv value, max. (dry)	[MPa·m/s]	0.42	0.60	0.12	0.4	0.39
Mechanical properties						
Flexural modulus	[MPa]	7,800	11,486	2,700	2,500	5,300
Flexural strength at +20°C	[MPa]	210	178	112	70	120
Compressive strength	[MPa]	78	115	52	50	66
Max. permissible surface pressure at +20°C	[MPa]	80	91	20	50	50
Shore D hardness		81	81	79	75	75
Physical and thermal properties						
Max. continuous operating temperature	[°C]	+130	+180	+80	+100	+130
Max. short-term operating temperature	[°C]	+220	+220	+170	+160	+200
Min. operating temperature	[°C]	–40	–40	–40	–40	–40
Thermal conductivity	[W/m·K]	0.24	0.46	0.24	0.25	0.25
Coefficient of thermal expansion at +23°C	[K <sup>-1</sup> ·10 <sup>-5</sup> ]	9	3.5	10	8	4
Electrical properties						
Specific contact resistance	[Ωcm]	> 10 <sup>13</sup>	> 10 <sup>9</sup>	> 10 <sup>13</sup>	> 10 <sup>12</sup>	> 10 <sup>13</sup>
Surface resistance	[Ω]	> 10 <sup>11</sup>	> 10 <sup>11</sup>	> 10 <sup>11</sup>	> 10 <sup>11</sup>	> 10 <sup>12</sup>

J	W300	J3	J350	X	Z	H1	H370	A181	A350	A500	Q2
1.49	1.24	1.42	1.44	1.44	1.4	1.53	1.66	1.38	1.42	1.28	1.46
											
0.3	1.3	0.3	0.3	0.1	0.3	0.1	0.1	0.2	0.6	0.3	1.1
1.3	6.5	1.3	1.6	0.5	1.1	0.3	0.1	1.3	1.9	0.5	4.6
0.06–0.18	0.08–0.23	0.06–0.20	0.10–0.20	0.09–0.27	0.06–0.14	0.06–0.20	0.07–0.17	0.10–0.21	0.10–0.20	0.26–0.41	0.22–0.42
0.34	0.23	0.5	0.45	1.32	0.84	0.80	0.74	0.31	0.40	0.28	0.7
2,400	3,500	2,700	2,000	8,100	2,400	2,800	11,100	1,913	2,000	3,600	8,370
73	125	70	55	170	95	55	135	48	110	140	240
60	61	60	60	100	65	78	79	60	78	118	130
35	60	45	60	150	150	80	75	31	60	120	120
74	77	73	80	85	81	77	82	76	76	83	80
+90	+90	+90	+180	+250	+250	+200	+200	+90	+180	+250	+130
+120	+180	+120	+220	+315	+310	+240	+240	+110	+210	+300	+200
–50	–40	–50	–100	–100	–100	–40	–40	–50	–100	–100	–40
0.25	0.24	0.25	0.24	0.60	0.62	0.24	0.5	0.25	0.24	0.24	0.24
10	9	13	7	5	4	6	5	11	8	9	8
> 1013	> 1013	> 10 <sup>12</sup>	> 10 <sup>13</sup>	< 10 <sup>5</sup>	> 10 <sup>11</sup>	> 10 <sup>12</sup>	< 10 <sup>5</sup>	> 10 <sup>12</sup>	> 10 <sup>11</sup>	> 10 <sup>14</sup>	> 10 <sup>13</sup>
> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>12</sup>	> 10 <sup>10</sup>	< 10 <sup>3</sup>	> 10 <sup>11</sup>	> 10 <sup>11</sup>	< 10 <sup>5</sup>	> 10 <sup>12</sup>	> 10 <sup>11</sup>	> 10 <sup>13</sup>	> 10 <sup>11</sup>





<sup>2)</sup> Thickness < 0.6mm: chamfer = 20°

Chamfer in relation to d1

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



Order key

Type	Dimensions [mm]
------	-----------------

☐ S M-04 05-04

iglidur® material	Form S	Metric	Inner Ø d1	Outer Ø d2	Total length b1
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Choose the suitable material and dimensions for your application



Dimensions according to ISO 3547-1

With the exception of iglidur® M250: ISO 2795



Imperial dimensions available

► From page 1550

Dimensions [mm]

d1 <sup>126)</sup>	d2	b1	Part No.
4	5.5	4	<input type="checkbox"/> SM-0405-04
4	5.5	6	<input type="checkbox"/> SM-0405-06
5	7	5	<input type="checkbox"/> SM-0507-05
5	7	10	<input type="checkbox"/> SM-0507-10
6	8	6	<input type="checkbox"/> SM-0608-06
6	8	8	<input type="checkbox"/> SM-0608-08
6	8	10	<input type="checkbox"/> SM-0608-10
8	10	8	<input type="checkbox"/> SM-0810-08
8	10	10	<input type="checkbox"/> SM-0810-10
8	10	12	<input type="checkbox"/> SM-0810-12
10	12	8	<input type="checkbox"/> SM-1012-08
10	12	10	<input type="checkbox"/> SM-1012-10
10	12	12	<input type="checkbox"/> SM-1012-12
10	12	15	<input type="checkbox"/> SM-1012-15
10	12	20	<input type="checkbox"/> SM-1012-20
12	14	10	<input type="checkbox"/> SM-1214-10
12	14	12	<input type="checkbox"/> SM-1214-12
12	14	15	<input type="checkbox"/> SM-1214-15
12	14	20	<input type="checkbox"/> SM-1214-20
13	15	10	<input type="checkbox"/> SM-1315-10

d1 <sup>126)</sup>	d2	b1	Part No.
13	15	20	<input type="checkbox"/> SM-1315-20
14	16	15	<input type="checkbox"/> SM-1416-15
14	16	20	<input type="checkbox"/> SM-1416-20
14	16	25	<input type="checkbox"/> SM-1416-25
15	17	15	<input type="checkbox"/> SM-1517-15
15	17	20	<input type="checkbox"/> SM-1517-20
15	17	25	<input type="checkbox"/> SM-1517-25
16	18	15	<input type="checkbox"/> SM-1618-15
16	18	20	<input type="checkbox"/> SM-1618-20
16	18	25	<input type="checkbox"/> SM-1618-25
18	20	15	<input type="checkbox"/> SM-1820-15
18	20	20	<input type="checkbox"/> SM-1820-20
18	20	25	<input type="checkbox"/> SM-1820-25
20	23	10	<input type="checkbox"/> SM-2023-10
20	23	15	<input type="checkbox"/> SM-2023-15
20	23	20	<input type="checkbox"/> SM-2023-20
20	23	25	<input type="checkbox"/> SM-2023-25
20	23	30	<input type="checkbox"/> SM-2023-30
22	25	15	<input type="checkbox"/> SM-2225-15
22	25	20	<input type="checkbox"/> SM-2225-20

<sup>126)</sup> After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the tolerances (more information in material specific chapters)

Absolute flexibility: all iglidur® standard sizes available from stock

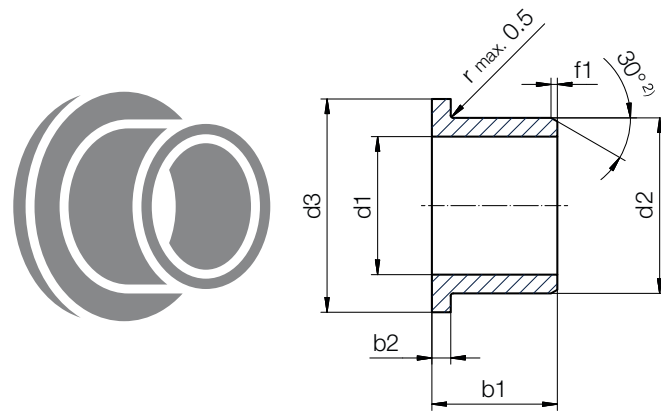
<b>G</b>	The classic all-rounder
<b>G1</b>	More universal
<b>M(250)</b>	The robust all-rounder according to ISO 2795
<b>P210</b>	Specialist for pivoting, rolling applications and more
<b>P</b>	The cost-effective outdoor all-rounder
<b>J</b>	The versatile endurance runner
<b>W(300)</b>	The classic endurance runner up to 30MPa
<b>J3</b>	The new endurance runner: specialist for pivoting and pulsating loads
<b>J350</b>	Endurance runner with high dimensional stability at high temperature
<b>X</b>	The chemical and temperature specialist
<b>Z</b>	Extremely long service life under extreme conditions
<b>H1</b>	Endurance runner with high media resistance
<b>H370</b>	Extremely long service life under water
<b>A181</b>	The universal bearing for food contact
<b>A350</b>	The endurance runner at higher temperatures in the food sector
<b>A500</b>	The media and temperature specialist in the food sector
<b>Q2</b>	The durable heavy-duty bearing

Dimensions [mm]

d1 <sup>126)</sup>	d2	b1	Part No.
22	25	25	<input type="checkbox"/> SM-2225-25
22	25	30	<input type="checkbox"/> SM-2225-30
24	27	15	<input type="checkbox"/> SM-2427-15
24	27	20	<input type="checkbox"/> SM-2427-20
24	27	25	<input type="checkbox"/> SM-2427-25
24	27	30	<input type="checkbox"/> SM-2427-30
25	28	15	<input type="checkbox"/> SM-2528-15
25	28	20	<input type="checkbox"/> SM-2528-20
25	28	25	<input type="checkbox"/> SM-2528-25
25	28	30	<input type="checkbox"/> SM-2528-30
28	32	20	<input type="checkbox"/> SM-2832-20
28	32	25	<input type="checkbox"/> SM-2832-25
28	32	30	<input type="checkbox"/> SM-2832-30
30	34	20	<input type="checkbox"/> SM-3034-20
30	34	25	<input type="checkbox"/> SM-3034-25
30	34	30	<input type="checkbox"/> SM-3034-30
30	34	40	<input type="checkbox"/> SM-3034-40
32	36	20	<input type="checkbox"/> SM-3236-20
32	36	30	<input type="checkbox"/> SM-3236-30
32	36	40	<input type="checkbox"/> SM-3236-40

d1 <sup>126)</sup>	d2	b1	Part No.
35	39	20	<input type="checkbox"/> SM-3539-20
35	39	30	<input type="checkbox"/> SM-3539-30
35	39	40	<input type="checkbox"/> SM-3539-40
35	39	50	<input type="checkbox"/> SM-3539-50
40	44	20	<input type="checkbox"/> SM-4044-20
40	44	30	<input type="checkbox"/> SM-4044-30
40	44	40	<input type="checkbox"/> SM-4044-40
40	44	50	<input type="checkbox"/> SM-4044-50
45	50	20	<input type="checkbox"/> SM-4550-20
45	50	30	<input type="checkbox"/> SM-4550-30
45	50	40	<input type="checkbox"/> SM-4550-40
45	50	50	<input type="checkbox"/> SM-4550-50
50	55	20	<input type="checkbox"/> SM-5055-20
50	55	30	<input type="checkbox"/> SM-5055-30
50	55	40	<input type="checkbox"/> SM-5055-40
50	55	50	<input type="checkbox"/> SM-5055-50
50	55	60	<input type="checkbox"/> SM-5055-60

<sup>126)</sup> After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the tolerances (more information in material specific chapters)



Order key

Type Dimensions [mm]

F M-06 08-04

iglidur® material

Form F

Metric

Inner Ø d1

Outer Ø d2

Total length b1

2) Thickness < 0.6mm: chamfer = 20°

Chamfer in relation to d1

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

Choose the suitable material and dimensions for your application

Dimensions according to ISO 3547-1  
With the exception of iglidur® M250: ISO 2795

Imperial dimensions available  
► From page 1552

Dimensions [mm]

d1 <sup>126)</sup>	d2	d3 d13	b1 h13	b2 h13	Part No.
6	8	12	4	1	FM-0608-04
6	8	12	8	1	FM-0608-08
8	10	15	5.5	1	FM-0810-05
8	10	15	7.5	1	FM-0810-07
8	10	15	9.5	1	FM-0810-09
10	12	18	7	1	FM-1012-07
10	12	18	9	1	FM-1012-09
10	12	18	12	1	FM-1012-12
10	12	18	17	1	FM-1012-17
12	14	20	7	1	FM-1214-07
12	14	20	9	1	FM-1214-09
12	14	20	12	1	FM-1214-12
12	14	20	17	1	FM-1214-17
14	16	22	12	1	FM-1416-12
14	16	22	17	1	FM-1416-17
15	17	23	9	1	FM-1517-09
15	17	23	12	1	FM-1517-12
15	17	23	17	1	FM-1517-17

<sup>126)</sup> After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the tolerances (more information in material specific chapters)

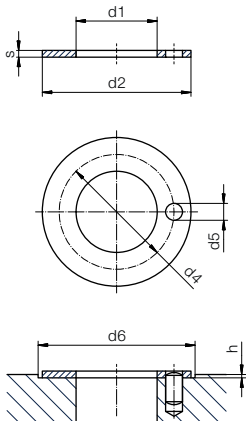
G	The classic all-rounder
G1	More universal
M(250)	The robust all-rounder according to ISO 2795
P210	Specialist for pivoting, rolling applications and more
P	The cost-effective outdoor all-rounder
J	The versatile endurance runner
W(300)	The classic endurance runner up to 30MPa
J3	The new endurance runner: specialist for pivoting and pulsating loads
J350	Endurance runner with high dimensional stability at high temperature
X	The chemical and temperature specialist
Z	Extremely long service life under extreme conditions
H1	Endurance runner with high media resistance
H370	Extremely long service life under water
A181	The universal bearing for food contact
A350	The endurance runner at higher temperatures in the food sector
A500	The media and temperature specialist in the food sector
Q2	The durable heavy-duty bearing

Dimensions [mm]

d1 <sup>126)</sup>	d2	d3 d13	b1 h13	b2 h13	Part No.
16	18	24	12	1	FM-1618-12
16	18	24	17	1	FM-1618-17
18	20	26	12	1	FM-1820-12
18	20	26	17	1	FM-1820-17
18	20	26	22	1	FM-1820-22
20	23	30	11.5	1.5	FM-2023-11
20	23	30	16.5	1.5	FM-2023-16
20	23	30	21.5	1.5	FM-2023-21
25	28	35	11.5	1.5	FM-2528-11
25	28	35	16.5	1.5	FM-2528-16
25	28	35	21.5	1.5	FM-2528-21
30	34	42	16	2	FM-3034-16
30	34	42	26	2	FM-3034-26
35	39	47	16	2	FM-3539-16
35	39	47	26	2	FM-3539-26
40	44	52	30	2	FM-4044-30
40	44	52	40	2	FM-4044-40
45	50	58	50	2	FM-4550-50

<sup>126)</sup> After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the tolerances (more information in material specific chapters)





Order key

Type	Dimensions [mm]
------	-----------------

☐ T M-06 20-015

iglidur® material	Form T	Metric	Inner Ø d1	Outer Ø d2	Total length b1
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Choose the suitable material and dimensions for your application



Dimensions according to ISO 3547-1 and special dimensions



Imperial dimensions available

Dimensions [mm]

d1	d2	s	d4	d5	h	d6	Part No.
+0.25	-0.25	-0.05	-0.12 +0.12	+0.375 +0.125	+0.2 -0.2	+0.12	
6.0	20.0	1.5	13.0	1.5	1.0	20.0	<input type="checkbox"/> TM-0620-015
8.0	18.0	1.5	13.0	1.5	1.0	18.0	<input type="checkbox"/> TM-0818-015
10.0	18.0	1.0	4)	4)	0.7	18.0	<input type="checkbox"/> TM-1018-010
12.0	24.0	1.5	18.0	1.5	1.0	24.0	<input type="checkbox"/> TM-1224-015
14.0	26.0	1.5	20.0	2.0	1.0	26.0	<input type="checkbox"/> TM-1426-015
15.0	24.0	1.5	19.5	1.5	1.0	24.0	<input type="checkbox"/> TM-1524-015
16.0	30.0	1.5	22.0	2.0	1.0	30.0	<input type="checkbox"/> TM-1630-015
18.0	32.0	1.5	25.0	2.0	1.0	32.0	<input type="checkbox"/> TM-1832-015
20.0	36.0	1.5	28.0	3.0	1.0	36.0	<input type="checkbox"/> TM-2036-015
22.0	38.0	1.5	30.0	3.0	1.0	38.0	<input type="checkbox"/> TM-2238-015

4) Design without fixing hole

<input type="checkbox"/> G	The classic all-rounder
<input type="checkbox"/> W(300)	The classic endurance runner up to 30MPa
<input type="checkbox"/> X	The chemical and temperature specialist

Dimensions [mm]

d1	d2	s	d4	d5	h	d6	Part No.
+0.25	-0.25	-0.05	-0.12 +0.12	+0.375 +0.125	+0.2 -0.2	+0.12	
24.0	42.0	1.5	33.0	3.0	1.0	42.0	<input type="checkbox"/> TM-2442-015
26.0	44.0	1.5	35.0	3.0	1.0	44.0	<input type="checkbox"/> TM-2644-015
28.0	48.0	1.5	38.0	4.0	1.0	48.0	<input type="checkbox"/> TM-2848-015
32.0	54.0	1.5	43.0	4.0	1.0	54.0	<input type="checkbox"/> TM-3254-015
38.0	62.0	1.5	50.0	4.0	1.0	62.0	<input type="checkbox"/> TM-3862-015
42.0	66.0	1.5	54.0	4.0	1.0	66.0	<input type="checkbox"/> TM-4266-015
48.0	74.0	2.0	61.0	4.0	1.5	74.0	<input type="checkbox"/> TM-4874-020
52.0	78.0	2.0	65.0	4.0	1.5	78.0	<input type="checkbox"/> TM-5278-020
62.0	90.0	2.0	76.0	4.0	1.5	90.0	<input type="checkbox"/> TM-6290-020

4) Design without fixing hole

iglidur®  
More products



...plastics

## iglidur® piston rings and clip bearings



An alternative to PTFE tape:  
Piston rings  
► Page 581



Easy to install, security with the double flange design:  
Clip bearings  
► Page 585



Easy to install due to split design:  
Split bearings  
► Page 592



With anti-rotation feature  
► Page 593

## iglidur® piston rings and clip bearings



Press in and fold down:  
Flanged bearings  
► Page 594



Press and plug:  
Double flange bearings  
► Page 595



Join and snap into place:  
Special solution  
Clip On  
► Page 596

## iglidur® solutions for special applications



For precise conveying:  
iglidur® knife edge rollers  
► Page 597



Secured by screws:  
iglidur® two hole flange bearings  
► Page 603



Two hole flanged bearing with preload: iglidur® two hole flange bearings  
► Page 606



Zero clearance:  
Clearance-free pre-loaded plain bearings  
► Page 607

## iglidur® solutions for special applications



Cushion and dampen:  
Disc springs polysorb  
► Page 611



For all shaft surfaces and materials:  
iglidur® PEP  
► Page 615



Position and seal:  
Lip seal bearings  
► Page 619

## igus® Service



Quick and individual:  
Customised special parts – speedimold  
► Page 623

## iglidur® piston rings

Easy installation

Cost-effective

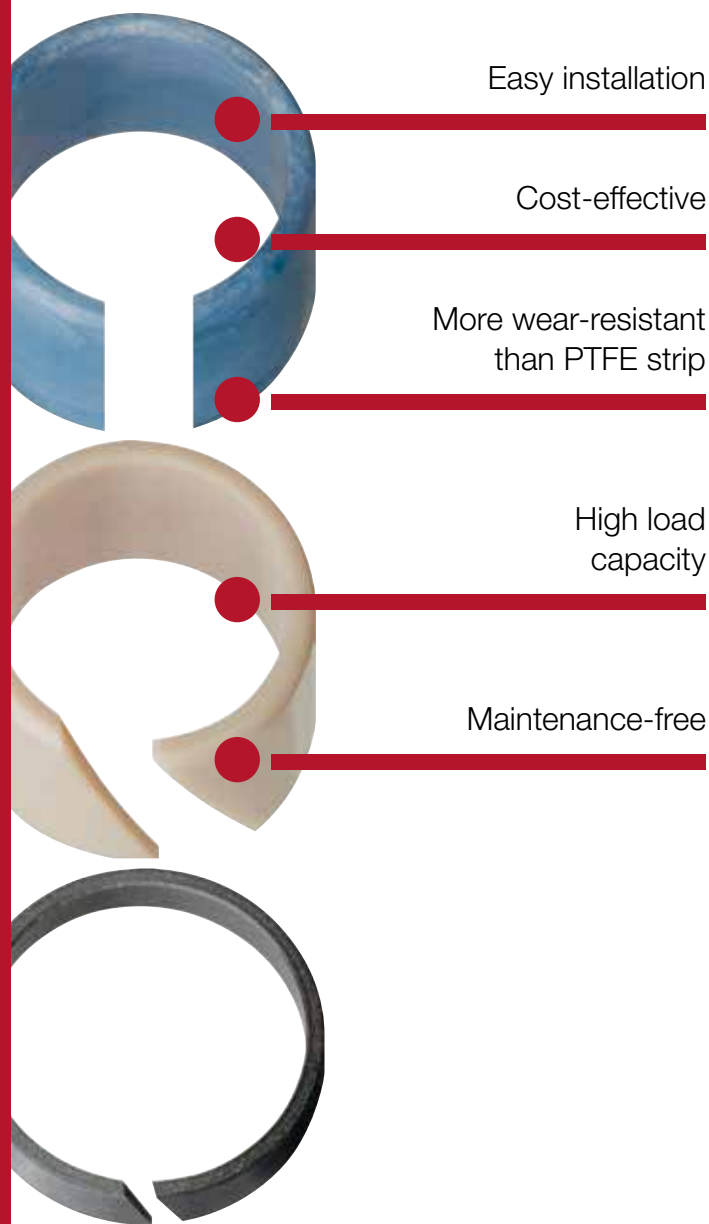
More wear-resistant than PTFE strips

High load capacity

Standard range from stock







## iglidur® piston rings

Why complicate things if you do not need to? Some things can actually be very easy: Replace complex stamped PTFE strips with a single clip-on ring, for example in cylinders, control valves and fittings. In addition to the standard iglidur® J range, it is also possible to configure your required piston ring from the entire iglidur® bearing range.



### When to use it?

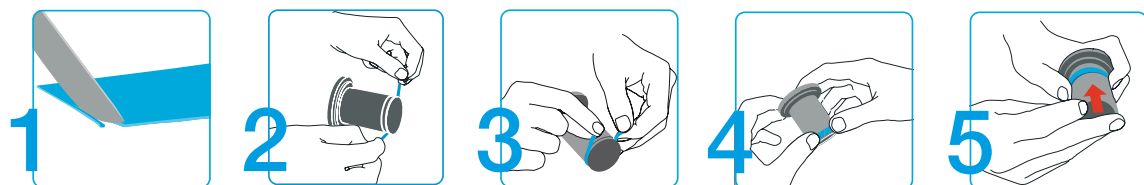
- When piston rings with excellent wear properties are required
- When simple assembly is of great importance
- When high edge loads occur
- When tailor-made solutions based on iglidur® materials are required



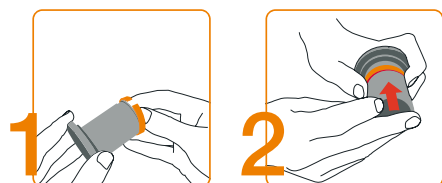
### When not to use it?

- When the piston rings should also act as a seal
- When different diameters should be covered by one part

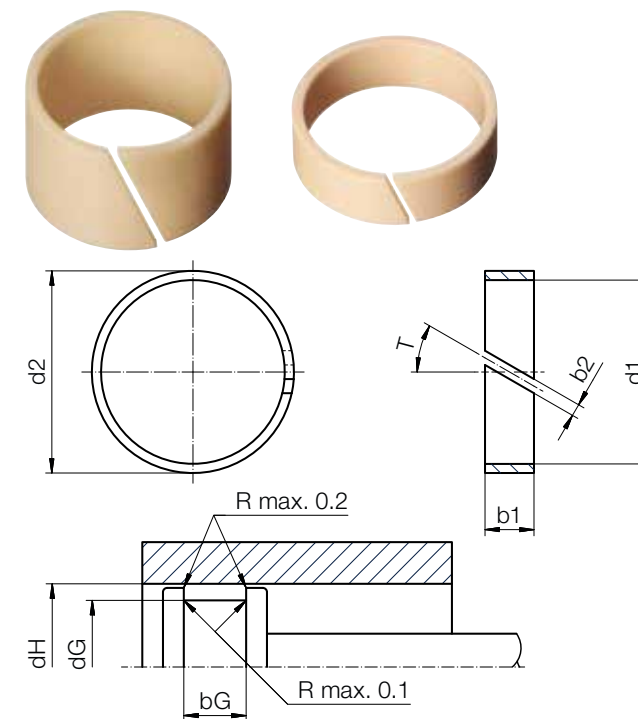
### Alternative solutions:



### With iglidur®:



iglidur® J is our all-round material when it comes to an outstanding running performance and low coefficient of friction on the broadest range of shafts. The flexibility of iglidur® J enables the typical assembly expected with piston rings using the push over/clip on method. Good media resistance rounds off the range of properties.



### Installation recommendation for piston

Dimensions [mm]	dG (h tolerance)	dH (H tolerance)	bG
Nominal size	dG = d1	dH = d2	bG = b1 +0.2

### Dimensions [mm]

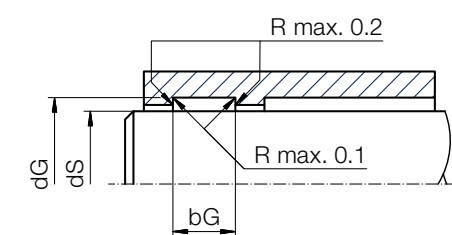
d1	d2	b1 h13	b2 ±0.5	T [°]	Part No.
6	8	6	1.0	0	JPRM-0608-06
8	10	10	1.0	0	JPRM-0810-10
10	12	5.4	2.5	20	JPRM-1012-054 <sup>167)</sup>
12	14	5.4	2.5	20	JPRM-1214-054
13	15	5.4	2.5	20	JPRM-1315-054
14	16	5.4	2.5	20	JPRM-1416-054
14	16	10	1.0	20	JPRM-1416-10
16	18	5.4	2.5	20	JPRM-1618-054 <sup>167)</sup>
17	22	5.4	2.5	25	JPRM-1722-054
20	23	5.4	2.5	20	JPRM-2023-054
25	28	5.4	2.5	20	JPRM-2528-054
28	32	10	1.0	20	JPRM-2832-10
28	32	20	1.0	20	JPRM-2832-20
28	33	5.4	2.5	25	JPRM-2833-054
30	34	5.4	2.5	20	JPRM-3034-054
35	39	5.4	2.5	20	JPRM-3539-054
35	40	5.4	2.5	25	JPRM-3540-054

<sup>167)</sup> Straight slot



### Order key

Type	Dimensions [mm]
J PR M-06 08-06	
iglidur® material	Piston ring
Metric	Inner Ø
	Outer Ø
	Length



### Installation recommendation for housing

Dimensions [mm]	dS (h tolerance)	dG (H tolerance)	bG
Nominal size	dS = d1	dG = d2	bG = b1 +0.2

d1	d2	b1 h13	b2 ±0.5	T [°]	Part No.
40	44	5.4	2.5	20	JPRM-4044-054
45	50	5.4	2.5	20	JPRM-4550-054
45	50	10	2.0	0	JPRM-4550-10
50	55	5.4	2.5	20	JPRM-5055-054
50	55	10	2.0	0	JPRM-5055-10
58	63	9.5 (-0.22)	2.5	25	JPRM-5863-095
60	65	5.4	2.5	20	JPRM-6065-054
70	75	5.4	2.5	20	JPRM-7075-054



More Information about iglidur® material and technical data

iglidur® J ► Page 159



Max. +90°C  
Min. -50°C



Ø 6–70mm  
More dimensions upon request

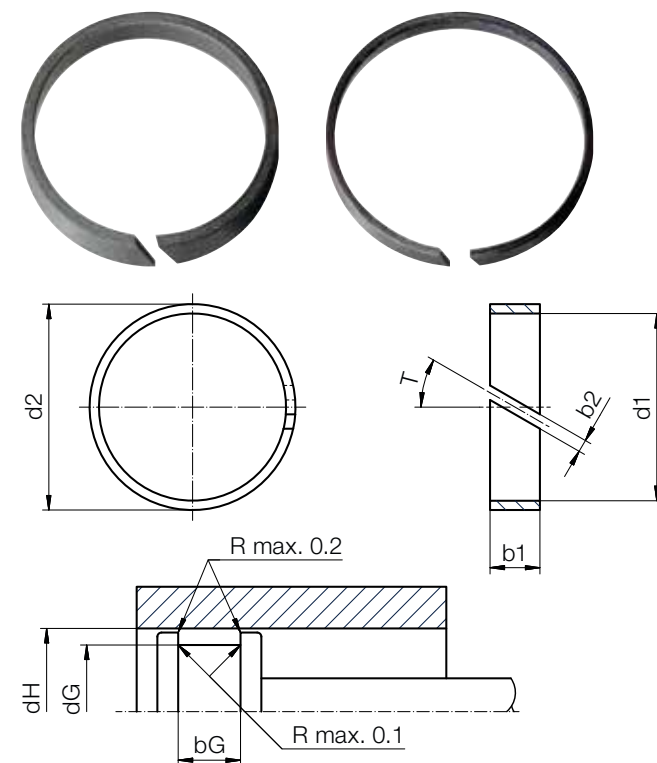


Available from stock  
Detailed information about delivery time online.

## Custom-made piston rings

In addition to the stock range of iglidur® J piston rings, you can also select your required piston ring on the basis of the entire iglidur® bearing range.

Use the entire iglidur® plain bearing range and choose the material best suited to your application. Your piston ring will be delivered within 10 days – to your requirements.



### Installation recommendation for piston

Dimensions [mm]	dG (h tolerance)	dH (H tolerance)	bG
Nominal size	dG = d1	dH = d2	bG = b1 + 0.2

- ! Our material recommendations for special requirements:
- iglidur® A181: FDA-compliant ► Page 401
  - iglidur® J350: > +90°C ► Page 199
  - iglidur® H1: Temperatures up to +200°C ► Page 333

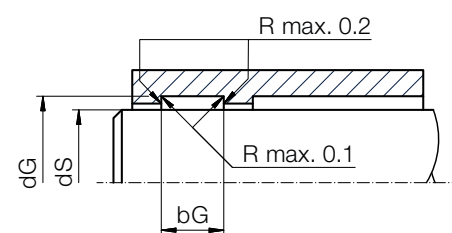
i In addition to mechanical processing of existing iglidur® plain bearings to piston rings, we also develop custom-made piston ring solutions for your volume requirements. Talk to us! We will support you with your design and create an appropriate proposal.

### Order key

Type	Dimensions [mm]
------	-----------------

□ PR M-□□-□

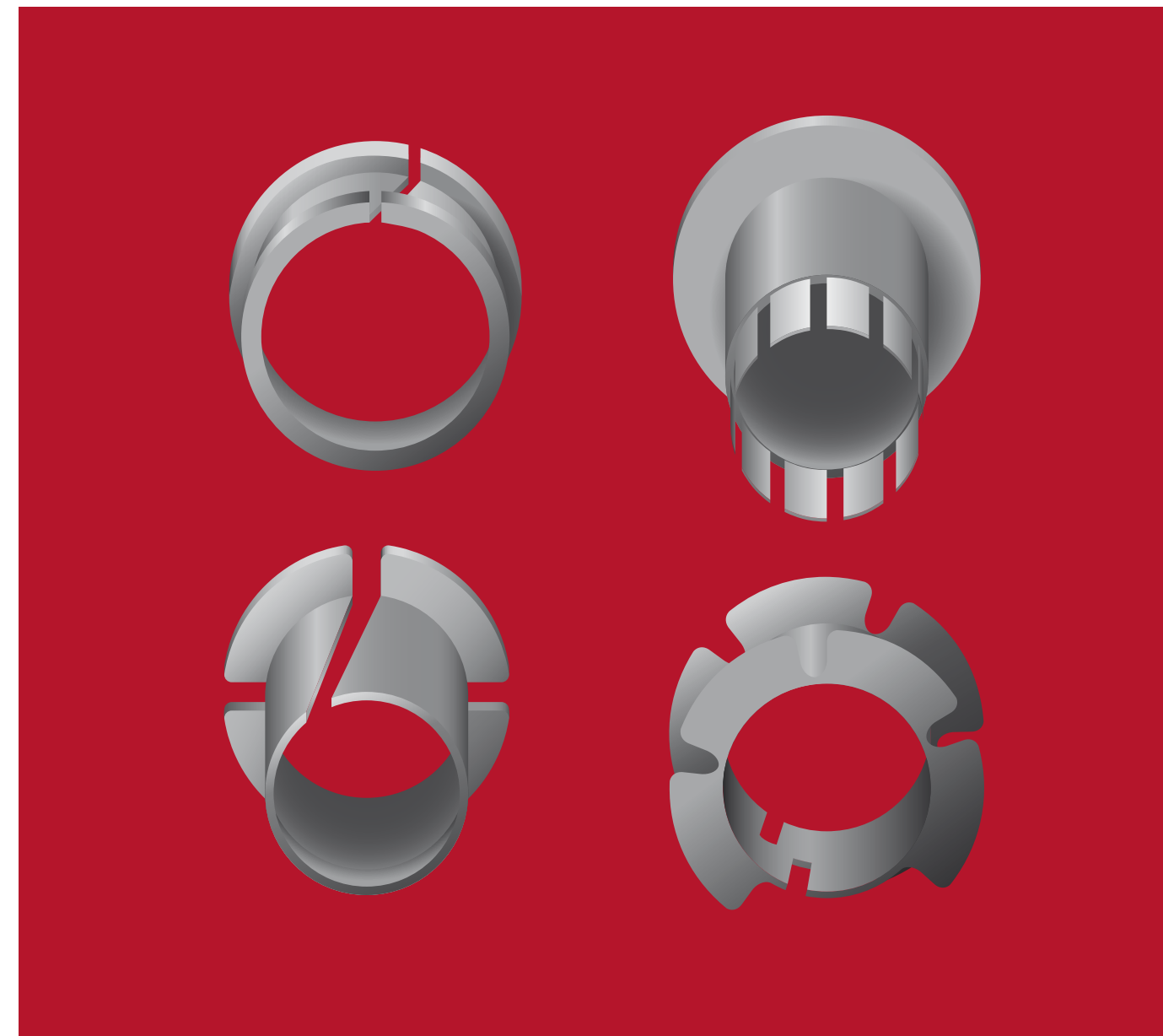
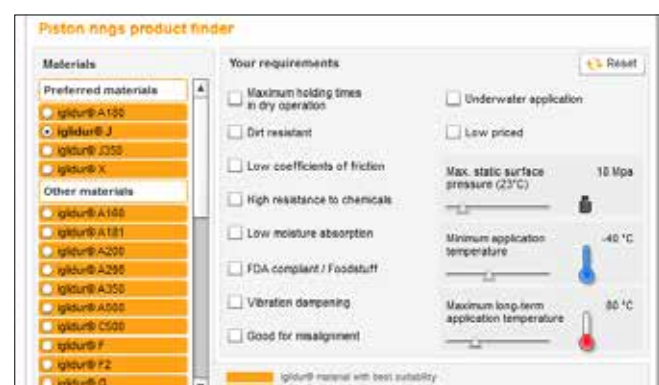
iglidur® required material	Piston ring	Metric	Required inner Ø	Required outer Ø	Required length
----------------------------	-------------	--------	------------------	------------------	-----------------



### Installation recommendation for housing

Dimensions [mm]	dS (h tolerance)	dG (H tolerance)	bG
Nominal size	dS = d1	dG = d2	bG = b1 + 0.2

🔍 iglidur® piston rings product finder  
Material selection and individual dimensions made easy. With just a few clicks, the piston ring finder can find the optimum iglidur® material and select the appropriate dimensions from the standard catalogue range in order to define a piston ring in a customised width.  
► [www.igus.no/pistonring-finder](http://www.igus.no/pistonring-finder)



## iglidur® – clip bearings

Easy installation

Abrasion-resistant

Predictable service life

Custom versions possible

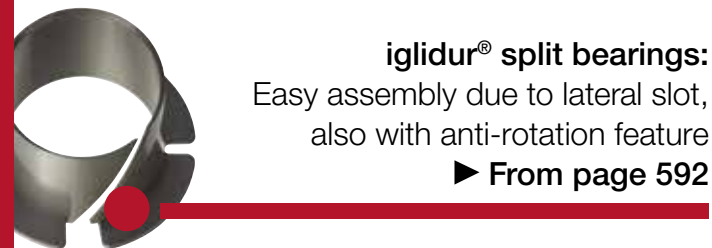
Lubrication and maintenance-free

Standard range from stock





**iglidur® clip bearings:**  
Captive with double flange  
► From page 590



**iglidur® split bearings:**  
Easy assembly due to lateral slot,  
also with anti-rotation feature  
► From page 592



**iglidur® flanged bearings:**  
Press in and fold down  
► From page 594



**iglidur® double flange bearings:**  
Press and plug  
► From page 595



**Special solution**  
**iglidur® Clip On:**  
Join and snap into place  
► From page 596

## iglidur® clip bearings for fitting shafts


iglidur® clip bearings are designed specifically for fitting shafts through sheet metal. For this reason, the bearings have flanges located on both ends. The plain bearings are secured in the sheet metal plate on both sides after fitting.

The clip bearings have an angled slot which allows them to be fitted from one side. After fitting, the bearing expands and forms a lining for the hole in the metal plate. The shaft prevents the clip bearing from falling out the housing. Even during linear movement, the plain bearing cannot slide out.


- Lateral slot for easy installation
- Lubrication and maintenance-free
- Good adaptability to punched holes
- Abrasion-resistant
- Quiet
- For rotating and linear movements

### Typical application areas

- Automotive industry
- Mechanical engineering
- Jig construction

 **Available from stock**  
Detailed information about delivery time online.

 **Max. +80°C**  
**Min. -40°C**

 **Material: iglidur® M250**  
**6 types**  
**Ø 3–25mm**  
More dimensions upon request

 **Imperial dimensions available**  
► From page 1603



### iglidur® clip bearings

- Easy to fit due to clip-on feature
  - Increased security with the double flange design
  - Abrasion-resistant
- From page 590



### iglidur® flanged bearings

- Easy installation
  - Press-fit
  - Axial load on both sides
  - Compensation of tolerances of the sheet metal
- From page 594



### Special solution iglidur® Clip On

- The disc is snapped onto the flanged bearing with undercuts
  - Compensation of axial clearance
  - Captive pre-assembly possible
  - Combination of conductive and non-conductive materials
- From page 596



### iglidur® split bearings (clips2)

- Easy to fit
  - Tolerance compensation with angled slot
  - Low bearing clearance, high precision
- From page 592



### iglidur® double flange bearings

- Easy to fit due to clip-on feature
  - Large flange surfaces
  - Two identical large flange surfaces
- From page 595





This cutting mechanism is used in the beverage industry. All used components meet the requirement of freedom from lubrication with low weight and low cost.



By using wear-resistant iglidur® clip bearings, the lowering mechanism for radiator mascots on luxury cars could be improved.



Rattle-free positioning of seat systems with iglidur® clip bearings, e.g. inner/tilt and seat height adjustment.



Easy-to-clean and cost-effective iglidur® flanged bearings and clip bearings are used in a honeycomb.



The guide rod in this pharmacy printer has been attached using igus® clip bearings.

General properties

The clip bearings have an angled slot which allows the bearings to be fitted from one side. After fitting, the bearing expands and forms a lining for the hole in the metal plate. The shaft prevents the clip bearing from falling out the housing. Even during linear movement, the bearing cannot slide out. iglidur® clip bearings are made from wear-resistant material iglidur® M250. iglidur® M250 is a plain bearing material with strong wear resistance at average loads. The plain bearings are self-lubricating and can be used dry. If required the plain bearings can also be lubricated. The material iglidur® M250 is resistant to all common lubricants.

Mechanical properties

The permissible static surface pressure of iglidur® M250 at room temperature is 20MPa. Due to the possibility of high tolerances in the housing hole, the clip bearing has a high compressive strength even for punched holes. For bearing surfaces that are very small, the vibration dampening properties and the resistance to edge pressure are especially important.

► iglidur® M250, Page 107

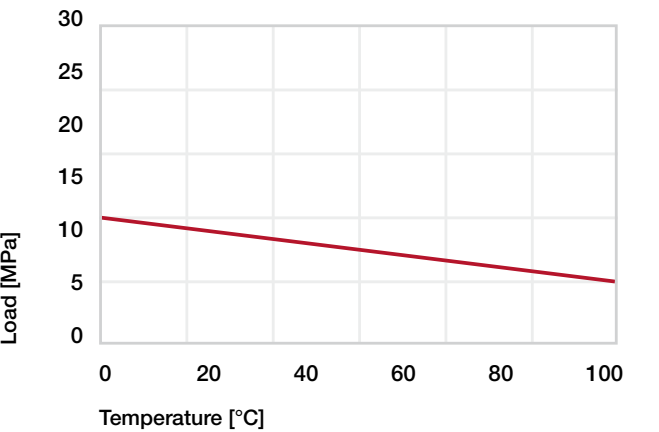


Diagram 01: Maximum recommended surface pressure as a function of temperature (20MPa at +20°C)

Permissible surface speeds

Clip bearings are extremely wear-resistant in slow rotating, oscillating, and linear movements. The maximum surface speeds for the different movements are the same as for the material iglidur® M250 (table 01). With lubrication the permissible surface speeds can be increased.

► Surface speed, page 44

m/s	Rotating	Oscillating	Linear
Long-term	0.8	0.6	2.5
Short-term	2	1.4	5

Table 01: Maximum surface speeds

Temperatures

For operating temperatures up to +80°C iglidur® clip bearings display high wear resistance. Even in the cold, the plain bearings remain elastic and abrasion-resistant.

► Application temperatures, page 49

iglidur® M250	Application temperature
Minimum	−40°C
Max. long-term	+80°C
Maximum, short-term	+170°C

Table 02: Temperature limits

Assembly

For installation, the plain bearings are pressed together on the side with the large flange. The angled slot makes the bearing spiral shaped so that it can be placed easily into the metal plate. The slot also compensates for expansions of the circumference. In this way, a tight clearance is possible with the clip bearings. The bearing clearance is dimensioned in such a way that in a housing hole with a nominal diameter, a shaft made with the same nominal diameter turns easily. The clip bearings should be fitted into a housing with a "H" class tolerance, up to H13. The clip bearing can also rotate within the housing hole.

Diameter d1 [mm]	Shaft h9 [mm]	Tolerances D11 [mm]	Housing H7 [mm]
up to 3	0−0.025	+0.020 +0.080	0 +0.010
> 3 to 6	0−0.030	+0.030 +0.105	0 +0.012
> 6 to 10	0−0.036	+0.040 +0.130	0 +0.015
> 10 to 18	0−0.043	+0.050 +0.160	0 +0.018
> 18 to 30	0−0.052	+0.065 +0.195	0 +0.021
> 30 to 50	0−0.062	+0.080 +0.240	0 +0.025
> 50 to 80	0−0.074	+0.100 +0.290	0 +0.030

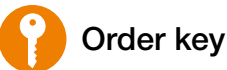
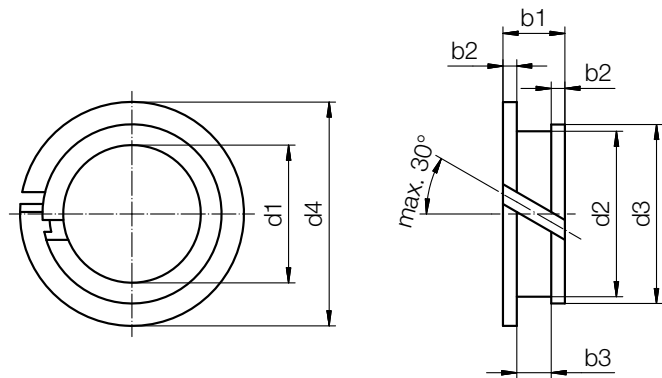
Table 03: Important tolerances for plain bearings according to ISO 3547-1 after press-fit

iglidur® clip bearings | Product range

Clip bearings for sheet metals – captive with double flange



Image exemplary



Order key

Type	Dimensions [mm]
------	-----------------

M C M-03-02

iglidur® material	Design	Metric	Inner Ø d1	Metal sheet thickness b3
-------------------	--------	--------	------------	--------------------------

**i** Material:  
iglidur® M250 ► Page 107

**inch** Imperial dimensions available  
► From page 1603

Dimensions [mm]

d1	d2	d3	d4	b1	b2	b3	Part No.
D11 <sup>7)</sup>				+0.20	-0.10		
3	4.2	4.8	6.0	3.2	0.6	2.0	MCM-03-02
3	4.2	4.8	6.0	4.2	0.6	3.0	MCM-03-03
4	5.2	5.9	7.0	3.2	0.6	2.0	MCM-04-02
4	5.2	5.9	7.0	4.2	0.6	3.0	MCM-04-03
5	6.2	6.8	8.0	3.2	0.6	2.0	MCM-05-02
5	6.2	6.8	8.0	4.2	0.6	3.0	MCM-05-03
6	7.2	7.8	11.0	2.7	0.6	1.5	MCM-06-015
6	7.2	7.8	11.0	3.2	0.6	2.0	MCM-06-02
6	7.2	7.8	11.0	4.2	0.6	3.0	MCM-06-03
6	7.2	7.8	11.0	5.2	0.6	4.0	MCM-06-04
7	9.0	9.8	13.0	4.6	0.8	3.0	MCM-07-03
8	9.6	10.4	13.0	3.6	0.8	2.0	MCM-08-02
8	9.6	10.4	13.0	4.6	0.8	3.0	MCM-08-03
8	9.6	13.0	10.4	5.6	0.8	4.0	MCM-08-04
9	10.6	11.4	14.0	3.6	0.8	2.0	MCM-09-02
10	11.6	12.4	15.0	3.6	0.8	2.0	MCM-10-02
10	11.6	12.4	15.0	4.1	0.8	2.5	MCM-10-025
10	11.6	12.4	15.0	4.6	0.8	3.0	MCM-10-03

d1	d2	d3	d4	b1	b2	b3	Part No.
D11 <sup>7)</sup>				+0.20	-0.10		
10	11.6	12.4	15	5.6	0.8	4.0	MCM-10-04
10	11.6	12.4	15	9.6	0.8	8.0	MCM-10-08
12	13.6	14.4	17	3.4	0.8	1.8	MCM-12-018
12	13.6	14.4	17	3.6	0.8	2.0	MCM-12-02
12	13.6	14.4	17	4.35	0.8	2.75	MCM-12-025
12	13.6	14.4	17	4.6	0.8	3.0	MCM-12-03
12	13.6	14.4	17	5.1	0.8	3.5	MCM-12-035
12	13.6	14.4	17	5.6	0.8	4.0	MCM-12-04
12	13.6	14.4	17	6.4	0.8	4.8	MCM-12-045
14	15.6	16.4	19	4.6	0.8	3.0	MCM-14-03
16	17.6	18.4	21	3.6	0.8	2.0	MCM-16-02
16	17.6	18.4	21	4.6	0.8	3.0	MCM-16-03
18	20.0	21.0	23	4.0	0.8	2.4	MCM-18-02
18	20.0	21.0	23	5.0	1.0	3.0	MCM-18-03
20	22.0	23.0	25	5.0	1.0	3.0	MCM-20-03
25	27.0	28.0	30	5.0	1.0	3.0	MCM-25-03
25	27.0	28.0	30	8.0	1.0	6.0	MCM-25-06

<sup>7)</sup> d1 value is measured with a plug gauge after fitting into a reference housing d2 (+0.005). Please see D11 tolerances table ►Page 589

iglidur® clip bearings | Product range **New**

Low coefficient of friction and wear



These clip bearings are made of wear-resistant iglidur® high-performance polymers and are designed specifically for fitting shafts through sheet metal. With this specific clip bearing design, a locating spigot is utilised to enable fitting into less precise holes and housings. The new iglidur® K230 material offers a lower moisture absorption and even more flexibility compared to the iglidur® M250 clip bearings.

- Lubrication and maintenance-free
- Low moisture absorption
- Temperature resistance
- Chemical resistance
- Corrosion resistance

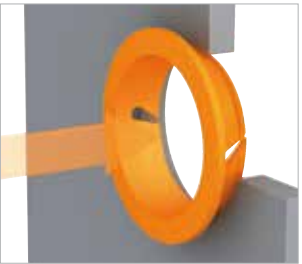
**i** Material:  
iglidur® K230 ► Page 1653



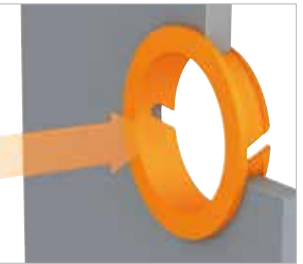
Fitting:



Simple axial press in



Axial safety through the second flange



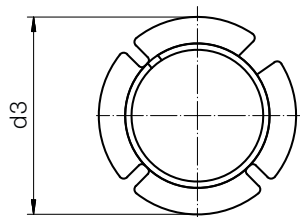
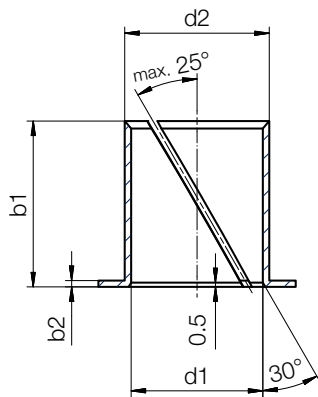
Easy installation via clip on mechanism

iglidur® clip bearings | Product range

Split bearings (clips2) – easy assembly



Image exemplary



r = max. 0.5mm

Dimensions [mm]

d1	d1 tolerance <sup>7)</sup>	d2 <sup>9)</sup>	d3 ±0.40	b1 −0.40	b2 −0.13	Part No.
4	+0.025 +0.075	5.2	7.0	4.0	0.6	MYM-04-04
5	+0.025 +0.075	6.2	8.0	5.0	0.6	MYM-05-05
6	+0.025 +0.075	7.2	9.5	6.0	0.6	MYM-06-06
8	+0.025 +0.075	9.6	12.0	8.0	0.8	MYM-08-08
10	+0.025 +0.075	11.6	15.0	10.0	0.8	MYM-10-10
12	+0.025 +0.075	13.6	18.0	12.0	0.8	MYM-12-12
14	+0.025 +0.075	15.6	21.0	14.0	0.8	MYM-14-14
16	+0.025 +0.075	17.6	24.0	16.0	0.8	MYM-16-16
20	+0.025 +0.075	21.6	30.0	16.0	0.8	MYM-20-16
20	+0.025 +0.075	21.6	30.0	20.0	0.8	MYM-20-20
25	+0.025 +0.075	27.4	37.5	25.0	1.2	MYM-25-25

<sup>7)</sup> d1 value is measured with a plug gauge after fitting into a reference housing d2 (+0.005)

<sup>9)</sup> Recommended housing hole tolerance: H9



Order key

Type	Dimensions [mm]			
M Y M-04-04				
iglidur® material	Design	Metric	Inner Ø d1	Total length b1



Material:  
iglidur® M250 ► Page 107  
With anti-rotation feature ► Page 593



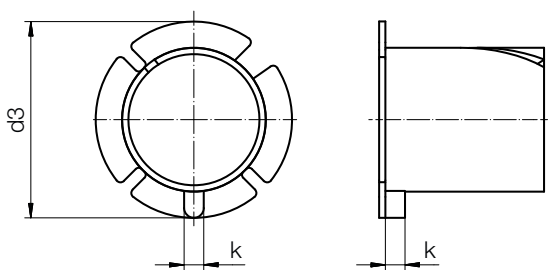
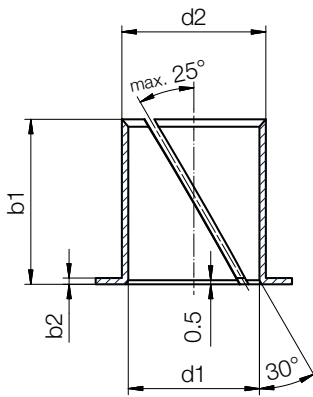
Imperial dimensions available  
► From page 1604

iglidur® clip bearings | Product range

Split bearings with anti-rotation feature



Image exemplary



Dimensions [mm]

d1	d1 tolerance <sup>8)</sup>	d2 <sup>9)</sup>	d3 ±0.40	b1 −0.40	b2 −0.13	k	Part No.
4	+0.025 +0.075	5.20	7.00	4.00	0.60	1.0	MYM-04-04-K
5	+0.025 +0.075	6.20	8.00	5.00	0.60	1.0	MYM-05-05-K
6	+0.025 +0.075	7.20	9.50	6.00	0.60	1.5	MYM-06-06-K
10	+0.025 +0.075	11.60	15.00	10.00	0.80	2.0	MYM-10-10-K
14	+0.025 +0.075	15.60	21.00	14.00	0.80	3.0	MYM-14-14-K

<sup>8)</sup> d1 value is measured with a plug gauge after fitting into a reference housing d2 (+0.005)

<sup>9)</sup> Recommended housing hole tolerance: H9



Order key

Type	Dimensions [mm]	Option
M Y M- 04 - 04 - K		
iglidur® material	Design	Metric
Inner Ø d1	Total length b1	Anti-rotation feature



Material:  
iglidur® M250 ► Page 107



Imperial dimensions available  
► From page 1604



iglidur® clip bearings | Product range

Flanged bearings – press in and fold down



Order key

Type	Dimensions [mm]				
M K M-1012-10					
iglidur® material	Design	Metric	Inner Ø d1	Outer Ø d2	Metal sheet thickness



Material:  
iglidur® M250 ► Page 107

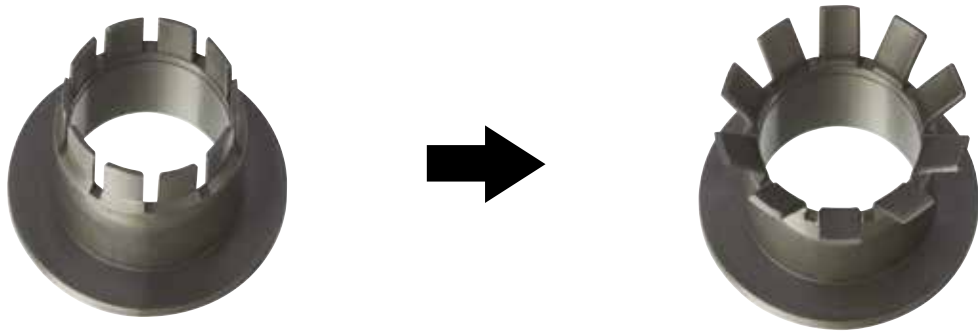
Sample dimension [mm]

d1	d1 tolerance <sup>3)</sup> E10	d2	d3 d13	b1 h13	b2 h13	b3 +0.1/+0.7	s ±0.1	Part No.
10	+0.025 +0.083	12	18	14	1	10	0.4	MKM-1012-10

<sup>3)</sup> After press-fit. Testing methods ► Page 57



Fitting:



Press in, fold down, ready: captive, axial load on both sides



Please contact us if you need a custom-made double flange bearing for your application. We will help you with your design and create an appropriate proposal, drawing on the experience that we have with a large number of custom bearing solutions.

iglidur® clip bearings | Product range

Double flange bearings – press and plug

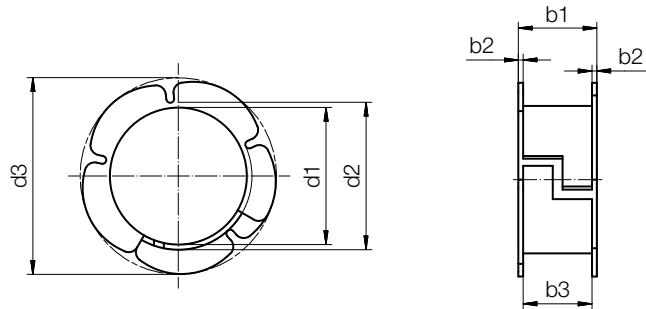


Order key

Type	Dimensions [mm]				
M D M-1213-06					
iglidur® material	Design	Metric	Inner Ø d1	Outer Ø d2	Metal sheet thickness



Material:  
iglidur® M250 ► Page 107



Sample dimension [mm]

d1	d1 tolerance <sup>8)</sup>	d2	d3	b1	b2	b3	Part No.
12	+0.050 +0.160	13	16.5	7	0.5	6.0	MDM-1213-06

<sup>8)</sup> d1 value is measured with a plug gauge after fitting into a reference housing d2 (+0.005)



Fitting:



Please contact us if you need a custom-made double flange bearing for your application. We will help you with your design and create an appropriate proposal, drawing on the experience that we have with a large number of custom bearing solutions.



### The solution for all applications in stamped sheet metal retainers

iglidur® Clip On are frequently used in seat and convertible top systems and multi-joint hinges. iglidur® Clip On bearings facilitate captive assembly even in punched sheet metal/steering arms with limited fine blanking content.

- Compensation of axial clearance
- Captive pre-assembly possible
- Electrically conductive materials are available
- Pressure-resistant materials up to 80MPa

The Clip On bearings can also be produced from electrically conductive iglidur® RN89, thus permitting e-coating.



Material:

iglidur® M250 ► Page 107

iglidur® RN89 ► Page 1657



### Fitting:

The disc is clipped onto the flange bushing with undercuts.



Please contact us if you need this special solution for your application. We will help you with your design and create an appropriate proposal, drawing on the experience that we have with a large number of custom bearing solutions.

## iglidur® knife edge rollers

100% lubrication-free

Low drive power

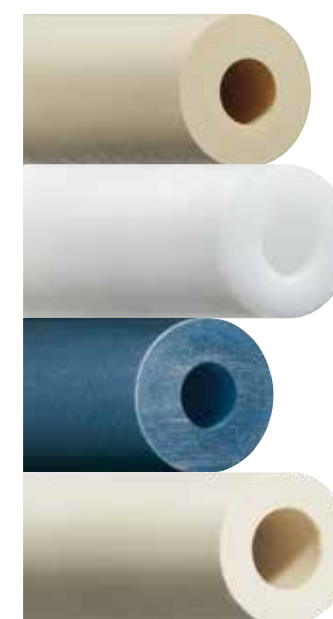
Tight deflection radii

Long service life of the belt

Cost-effective

Long service life

Standard range from stock



iglidur® P210: Universal

Tight deflection radii

iglidur® A180: FDA-compliant up to +90°C

Long service life

iglidur® A350: FDA-compliant up to +180°C

Low driving power

iglidur® H1:  
For higher  
transport speeds

## iglidur® knife edge rollers

igus® has developed its own knife-edge rollers to deflect conveyor belts in materials handling applications. The iglidur® solution is characterised by tight deflection radii and a low level of required drive power.



### When to use it?

- When a lubrication-free conveyor belt is required
- When a precise guiding is required
- When a cost-effective and lightweight solution is required



### When not to use it?

- When high speeds occur
- When high forces are applied on the belts
- When a static knife edge is required



### Available from stock

Detailed information about delivery time online.



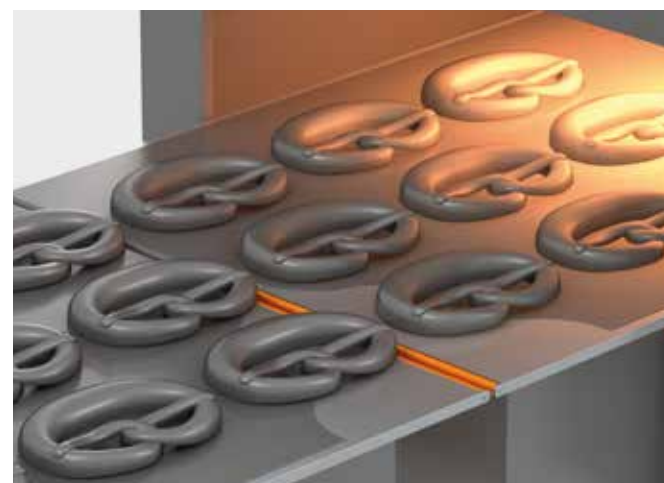
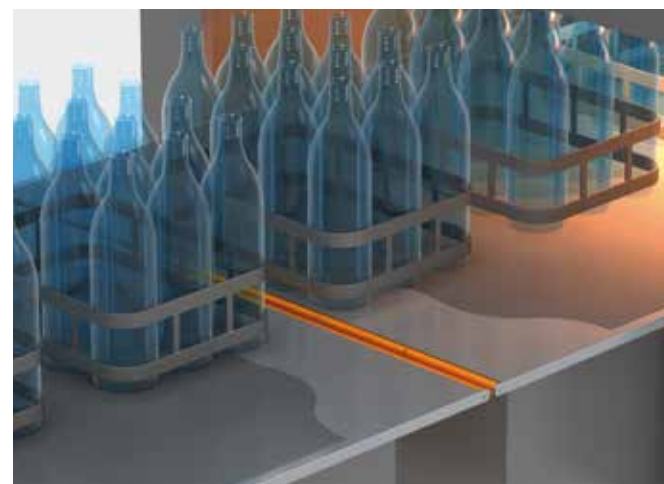
### Depending on material:

iglidur® P210: -40°C up to +100°C  
iglidur® A180: -50°C up to +90°C  
iglidur® A350: -100°C up to +180°C  
iglidur® H1: -40°C up to +200°C



4 materials  
Ø 9–20mm

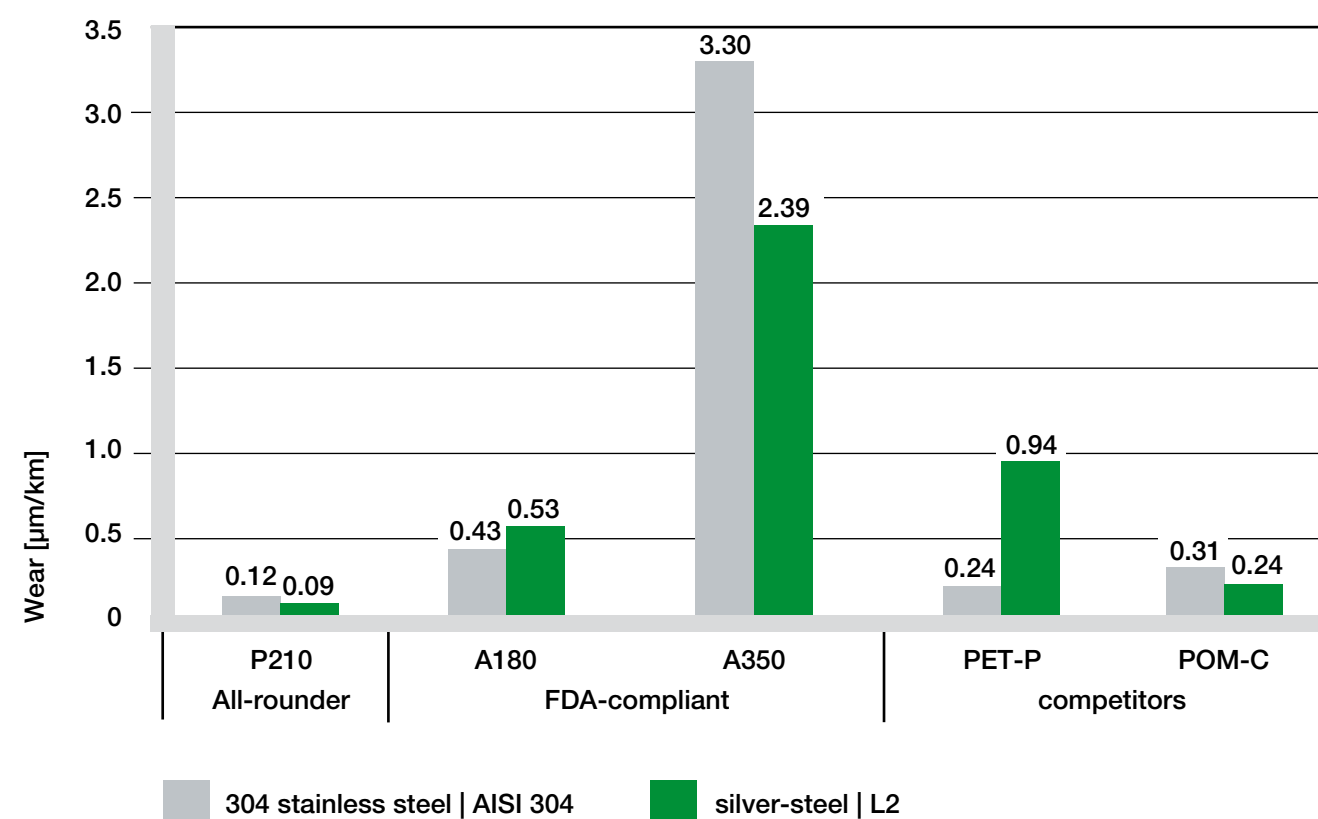
More dimensions upon request



## Material properties

General properties	Unit	iglidur® P210	iglidur® A180	iglidur® A350	iglidur® H1	Testing method
Density	g/cm³	1.40	1.46	1.42	1.53	
Colour		yellow	white	blue	cream	
Max. moisture absorption at +23°C/50% r. h.	% weight	0.3	0.2	0.6	0.1	DIN 53495
Max. total moisture absorption	% weight	0.5	1.3	1.9	0.3	
Coefficient of sliding friction, dynamic, against steel	μ	0.07–0.19	0.05–0.23	0.1–0.2	0.06–0.20	
pv value, max. (dry)	MPa · m/s	0.4	0.31	0.4	0.8	
Mechanical properties						
Flexural modulus	MPa	2,500	2,300	2,000	2,800	DIN 53457
Flexural strength at +20°C	MPa	70	88	110	55	DIN 53452
Compressive strength	MPa	50	78	78	78	
Max. recommended surface pressure (+20°C)	MPa	50	28	60	80	
Shore D hardness		75	76	76	77	DIN 53505
Physical and thermal properties						
Max. continuous application temperature	°C	+100	+90	+180	+200	
Max. short-term application temperature	°C	+160	+110	+210	+240	
Min. continuous application temperature	°C	-40	-50	-100	-40	
Thermal conductivity	W/m · K	0.25	0.25	0.24	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	K⁻¹ · 10⁻⁵	8	11	8	6	DIN 53752
Electrical properties						
Specific contact resistance	Ωcm	> 10¹²	> 10¹²	> 10¹¹	> 10¹²	DIN IEC 93
Surface resistance	Ω	> 10¹¹	> 10¹¹	> 10¹¹	> 10¹¹	DIN 53482

Table 01: Material properties table







Order key

Type	Dimensions [mm]					
P210 RL M-03 09-50						
iglidur® material	Roller	Metric	Inner Ø d1	Outer Ø d2	Total length b1	Options:
						iglidur® material
						P210: iglidur® P210
						A180: iglidur® A180
						A350: iglidur® A350
						H1: iglidur® H1

Knife edge rollers made from iglidur® P210 – universal, up to +100°C

d1 +0.1 [mm]	d2 <sup>147)</sup> ±0.1 [mm]	b1 –0.3 [mm]	Part No.
3.1	9.0	50.0	P210RLM-0309-50
4.1	9.0	50.0	P210RLM-0409-50
5.1	11.0	70.0	P210RLM-0511-70
5.1	14.0	70.0	P210RLM-0514-70
6.1	12.0	70.0	P210RLM-0612-70
6.1	14.0	70.0	P210RLM-0614-70
8.1	12.0	70.0	P210RLM-0812-70
8.1	14.0	70.0	P210RLM-0814-70
8.1	16.0	77.0	P210RLM-0816-77
8.1	18.0	70.0	P210RLM-0818-70
10.1	20.0	70.0	P210RLM-1020-70

Knife edge rollers made from iglidur® A180 – FDA-compliant, up to +90°C

d1 +0.1 [mm]	d2 <sup>147)</sup> ±0.1 [mm]	b1 –0.3 [mm]	Part No.
3.1	9.0	50.0	A180RLM-0309-50
4.1	9.0	50.0	A180RLM-0409-50
5.1	11.0	70.0	A180RLM-0511-70
5.1	14.0	70.0	A180RLM-0514-70
6.1	12.0	70.0	A180RLM-0612-70
6.1	14.0	70.0	A180RLM-0614-70
8.1	12.0	70.0	A180RLM-0812-70
8.1	14.0	70.0	A180RLM-0814-70
8.1	18.0	70.0	A180RLM-0818-70
10.1	20.0	70.0	A180RLM-1020-70

<sup>147)</sup> Measured with gauge

Knife edge rollers made from iglidur® A350 – FDA-compliant, up to +180°C

d1 +0.1 [mm]	d2 <sup>147)</sup> ±0.1 [mm]	b1 –0.3 [mm]	Part No.
3.1	9.0	50.0	A350RLM-0309-50
6.1	12.0	70.0	A350RLM-0612-70
6.1	14.0	70.0	A350RLM-0614-70
8.1	18.0	70.0	A350RLM-0818-70

Knife edge rollers made from iglidur® H1 for higher transport speeds, up to +200°C

d1 +0.1 [mm]	d2 <sup>147)</sup> ±0.1 [mm]	b1 –0.3 [mm]	Part No.
3.1	9.0	50.0	H1RLM-0309-50
4.1	9.0	50.0	H1RLM-0409-50
5.1	11.0	70.0	H1RLM-0511-70
6.1	12.0	70.0	H1RLM-0612-70
6.1	14.0	70.0	H1RLM-0614-70
8.1	12.0	70.0	H1RLM-0812-70
8.1	14.0	70.0	H1RLM-0814-70

<sup>147)</sup> Measured with gauge



## iglidur® two hole flange bearings

Very good wear resistance

Maintenance-free dry operation

Lightweight

Standard range from stock





**iglidur® G:**  
Standard material for all-round applications



**iglidur® J:**  
Material for low wear



**iglidur® X:**  
Material for high temperature applications



**iglidur® A180:**  
Material for use in the food sector



**iglidur® J:**  
Two hole flanged bearing with preload

# iglidur® – maintenance-free two hole flange bearings

With this design it is possible to use iglidur® high performance plain bearings in locations where recommended housing hole tolerances are not possible. Due to the design of the bearing, high loads are possible although there is a minimal precision requirement of the housing.

- Very good wear resistance
- Lightweight
- Lubrication-free

## Assembly

For low radial loads, it is sufficient to mount iglidur® two hole flange bearings on one surface simply with two bolts. For higher radial loads, it is advisable to support the iglidur® two hole flange bearing in a housing or boss. For this hole, large tolerances are permitted, since it serves only as additional support for the iglidur® two hole flange bearing. In order to achieve higher radial loads in the bearings, the iglidur® two hole flange bearing can be press-fit into a recommended housing hole with H7 tolerances. The additional bolts ensure the fit of the bearing in the housing.

**Material properties:**  
**iglidur® G** ▶ Page 81  
**iglidur® J** ▶ Page 159  
**iglidur® X** ▶ Page 279  
**iglidur® A180** ▶ Page 401

**Ø 10–35mm**  
More dimensions upon request



Type	Size [mm]
------	-----------

## G FL -10

iglidur® material

Two hole flange bearings

Inner Ø

Options:  
iglidur® material  
**G:** iglidur® G  
**J:** iglidur® J  
**X:** iglidur® X  
**A180:** iglidur® A180

## Dimensions [mm]

d1	d1 tolerance <sup>3)</sup>	d2 <sup>13)</sup>	d3	d4	d5	d6	d7	b1	b2	b3	R (±0.2)	Part No.
10	+0.025 +0.083	12	30	14	15	4.5	22	6	2	1	4	<b>GFL-10</b>
12	+0.032 +0.102	14	36	16	18	4.5	26	6	2	1	4.5	<b>GFL-12</b>
14	+0.032 +0.102	16	42	18	21	5.5	30	6	2	1	5	<b>GFL-14</b>
16	+0.032 +0.102	18	48	20	24	5.5	34	6	2	1	5.5	<b>GFL-16</b>
18	+0.032 +0.102	20	54	22	27	6.5	39	6	2	1	7	<b>GFL-18</b>
20	+0.040 +0.124	23	60	26	30	6.5	44	10	3	2	7	<b>GFL-20</b>
25	+0.040 +0.124	28	75	30	35	6.5	55	10	3	2	8.5	<b>GFL-25</b>
30	+0.040 +0.124	34	90	36	40	8.5	66	10	3	2	10	<b>GFL-30</b>
35	+0.050 +0.150	39	95	41	55	8.5	77	10	3	2	12	<b>GFL-35</b>
10	+0.025 +0.083	12	30	14	15	4.5	22	6	2	1	4	<b>JFL-10</b>
12	+0.032 +0.102	14	36	16	18	4.5	26	6	2	1	4.5	<b>JFL-12</b>
14	+0.032 +0.102	16	42	18	21	5.5	30	6	2	1	5	<b>JFL-14</b>
16	+0.032 +0.102	18	48	20	24	5.5	34	6	2	1	5.5	<b>JFL-16</b>
20	+0.040 +0.124	23	60	26	30	6.5	44	10	3	2	7	<b>JFL-20</b>
25	+0.040 +0.124	28	75	30	35	6.5	55	10	3	2	8.5	<b>JFL-25</b>
30	+0.040 +0.124	34	90	36	40	8.5	66	10	3	2	10	<b>JFL-30</b>
35	+0.050 +0.150	39	95	41	55	8.5	77	10	3	2	12	<b>JFL-35</b>
10	+0.013 +0.071	12	30	14	15	4.5	22	6	2	1	4	<b>XFL-10</b>
12	+0.016 +0.086	14	36	16	18	4.5	26	6	2	1	4.5	<b>XFL-12</b>
14	+0.016 +0.086	16	42	18	21	5.5	30	6	2	1	5	<b>XFL-14</b>
16	+0.016 +0.086	18	48	20	24	5.5	34	6	2	1	5.5	<b>XFL-16</b>
20	+0.020 +0.104	23	60	26	30	6.5	44	10	3	2	7	<b>XFL-20</b>
25	+0.020 +0.104	28	75	30	35	6.5	55	10	3	2	8.5	<b>XFL-25</b>
30	+0.020 +0.104	34	90	36	40	8.5	66	10	3	2	10	<b>XFL-30</b>
35	+0.025 +0.125	39	95	41	55	8.5	77	10	3	2	12	<b>XFL-35</b>
10	+0.025 +0.083	12	30	14	15	4.5	22	6	2	1	4	<b>A180FL-10</b>
12	+0.032 +0.102	14	36	16	18	4.5	26	6	2	1	4.5	<b>A180FL-12</b>
16	+0.032 +0.102	18	48	20	24	5.5	34	6	2	1	5.5	<b>A180FL-16</b>
20	+0.040 +0.124	23	60	26	30	6.5	44	10	3	2	7	<b>A180FL-20</b>
25	+0.040 +0.124	28	75	30	35	6.5	55	10	3	2	8.5	<b>A180FL-25</b>
30	+0.040 +0.124	34	90	36	40	8.5	66	10	3	2	10	<b>A180FL-30</b>
35	+0.050 +0.150	39	95	41	55	8.5	77	10	3	2	12	<b>A180FL-35</b>

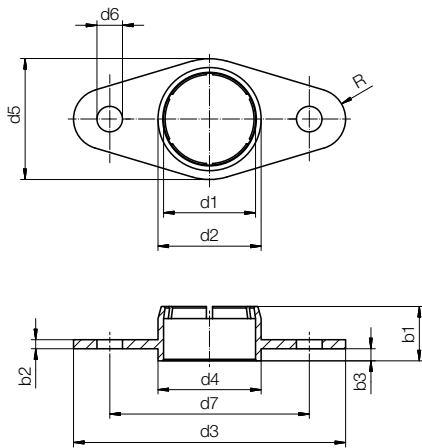
<sup>3)</sup> After press-fit. Testing methods ▶ Page 57 <sup>13)</sup> Press-fit in H7 tolerance housing hole



iglidur® two hole flange bearings | Advantages **New**  
Two hole flanged bearing with preload



- Corrosion resistance
- Self-lubricating due to incorporated solid lubricants
- Long service life thanks to high-performance polymers



Order key

Type

Size [mm]

**J V FL -10**

iglidur® material

Pre-loaded

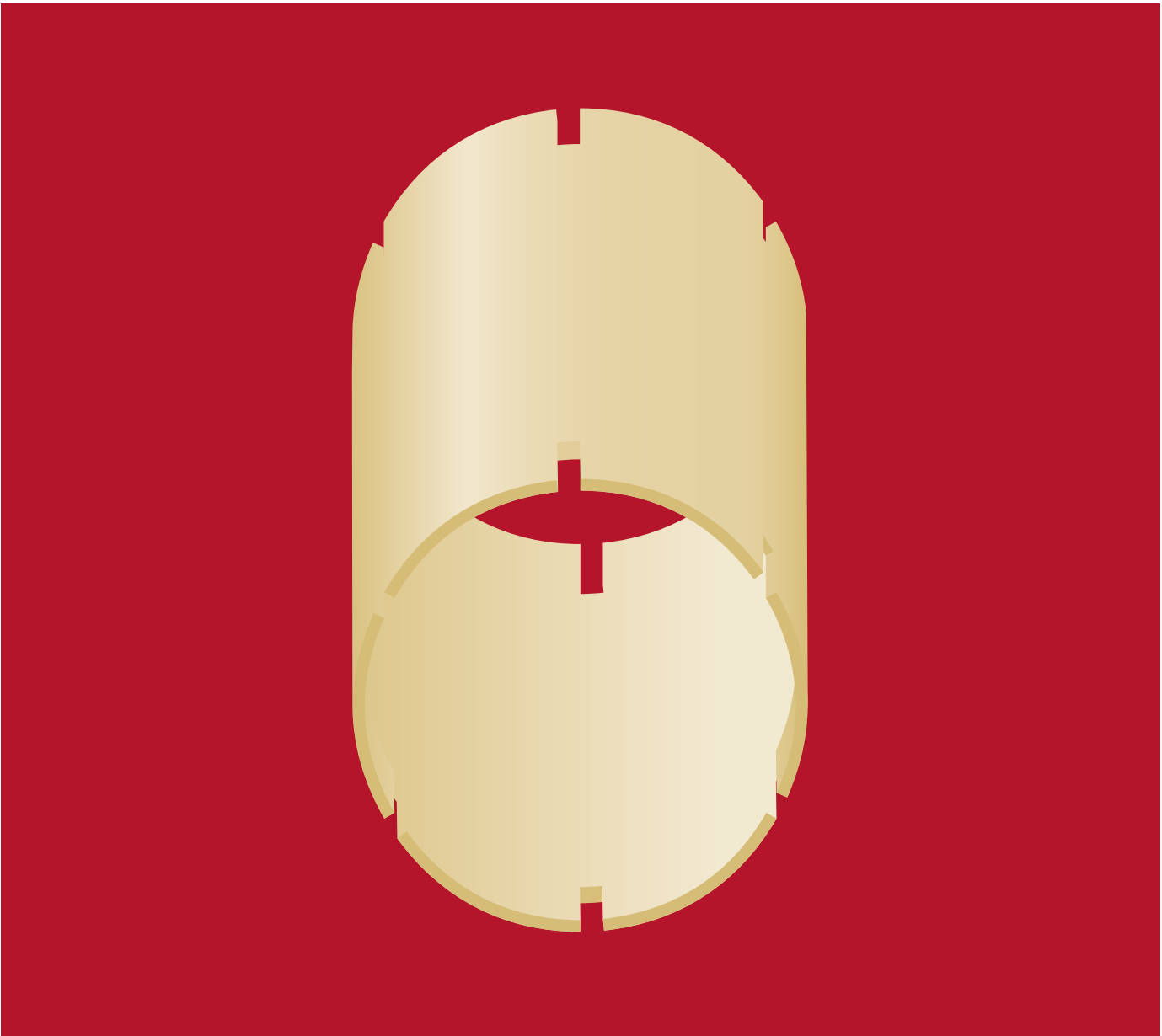
Two hole flange  
bearings

Inner Ø

iglidur® material  
iglidur® J

Dimensions [mm]

d1	d1 tolerance	d2	d3	d4	d5	d6	d7	b1	b2	b3	R (±0.2)	Part No.
10	+0.025 +0.083	12	30	14	15	4.5	22	6	2	1	4.0	JVFL-10
12	+0.032 +0.102	14	36	16	18	4.5	26	6	2	1	4.5	JVFL-12
16	+0.032 +0.102	18	48	20	24	5.5	34	6	2	1	5.5	JVFL-16
20	+0.040 +0.124	23	60	26	30	6.5	44	10	3	2	7.0	JVFL-20



iglidur® clearance-free pre-loaded  
plain bearings

Radial and axial pre-load

Clearance-free in unloaded condition

Material: iglidur® J

Maintenance-free and predictable service life



Clearance-free and  
pre-loaded bearings

Clearance-free in  
unloaded condition

Maintenance-free and  
predictable service life

## iglidur® clearance-free pre-loaded plain bearings

iglidur® JVSM and JVFM plain bearings are clearance-free in unloaded condition due to the axial and/or radial pre-load. The iglidur® J material possesses extremely low coefficient of friction in dry operation and a very low stick-slip effect. Ideal for "antivibration mounting" of pedal box bearings, etc.



### When to use it?

- When a radial and/or axial pre-load of plain bearings is required
- When a rattle-free bearing in the unloaded state is required
- When you need a clearance-free feel



### When not to use it?

- When a plain bearing solution with reduced clearance is needed  
► Please contact us
- When the pre-load has to withstand high radial forces
- When total zero clearance feature is required at high loads



**2 types**  
**Ø 6–20mm**

More dimensions upon request



**Imperial dimensions available**  
**► From page 1605**



**Available from stock**

Detailed information about delivery time online.



**Material:**  
**iglidur® J ► Page 159**

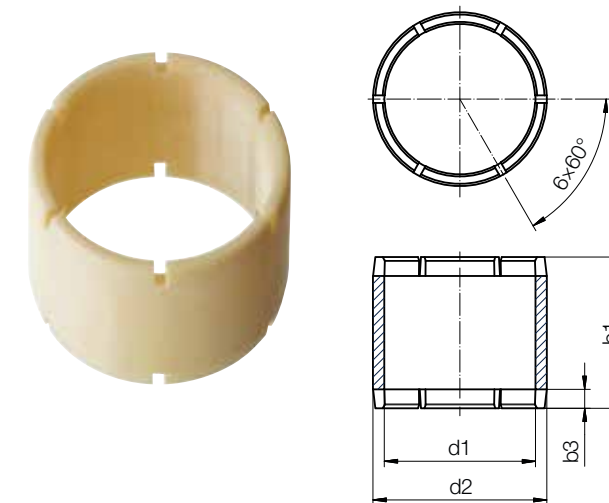


**Max. +90°C**  
**Min. –50°C**



**Order key**

Type	Dimensions
<b>J V S M-06 08-06</b>	
iglidur® material	Options:
Pre-loaded	Form:
Form S	S: sleeve
Metric	F: with flange
Inner Ø d1 [mm]	
Outer Ø d2 [mm]	
Length b1 [mm]	

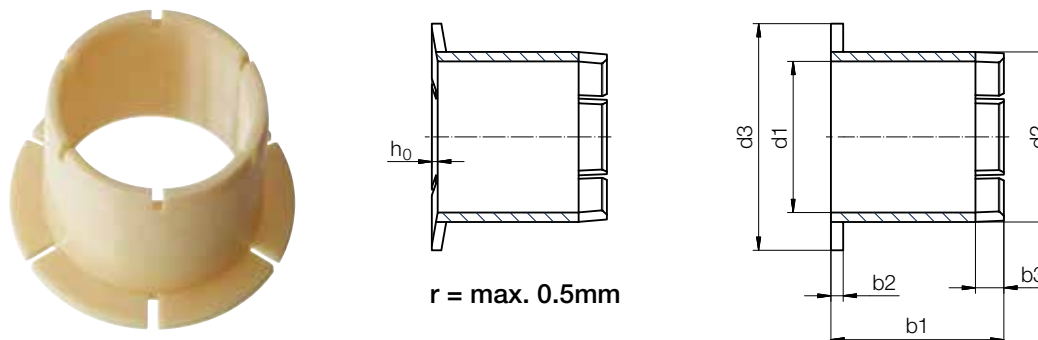


### Dimensions [mm]

d1	d1 tolerance <sup>14)</sup> E10	d2	b1 h13	b3	Part No.
6.0	+0.020 +0.068	8.0	6.0	2.0	<b>JVSM-0608-06</b>
8.0	+0.025 +0.083	10.0	8.0	2.0	<b>JVSM-0810-08</b>
10.0	+0.025 +0.083	12.0	10.0	2.0	<b>JVSM-1012-10</b>
12.0	+0.032 +0.102	14.0	12.0	2.0	<b>JVSM-1214-12</b>
14.0	+0.032 +0.102	16.0	14.0	2.0	<b>JVSM-1416-14</b>
15.0	+0.032 +0.102	17.0	15.0	2.5	<b>JVSM-1517-15</b>
18.0	+0.032 +0.102	20.0	18.0	2.5	<b>JVSM-1820-18</b>
20.0	+0.040 +0.124	23.0	20.0	2.5	<b>JVSM-2023-20</b>

<sup>14)</sup> d1 measured after press-fit in housing hole. d2 H7 within the measurement plane

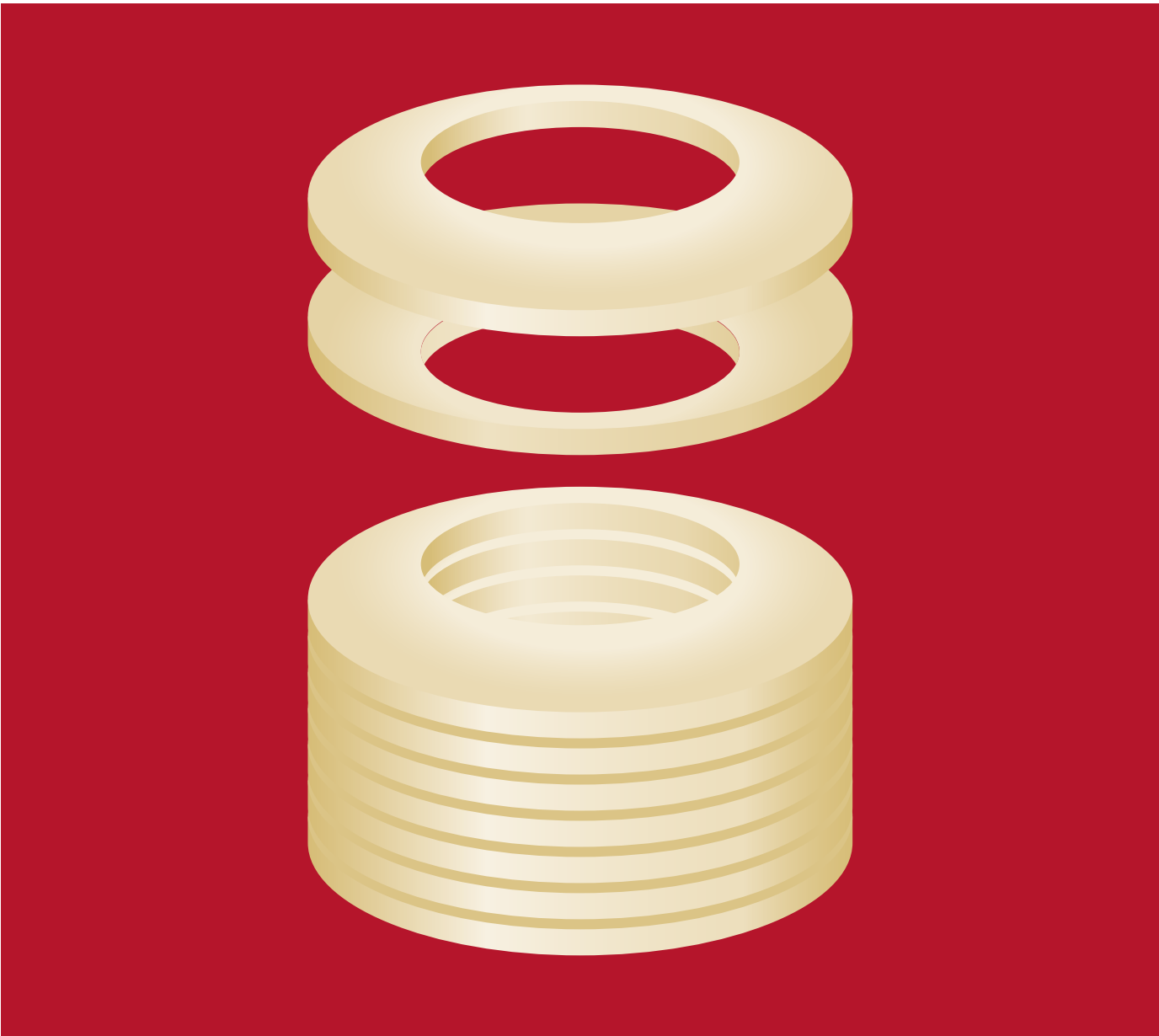
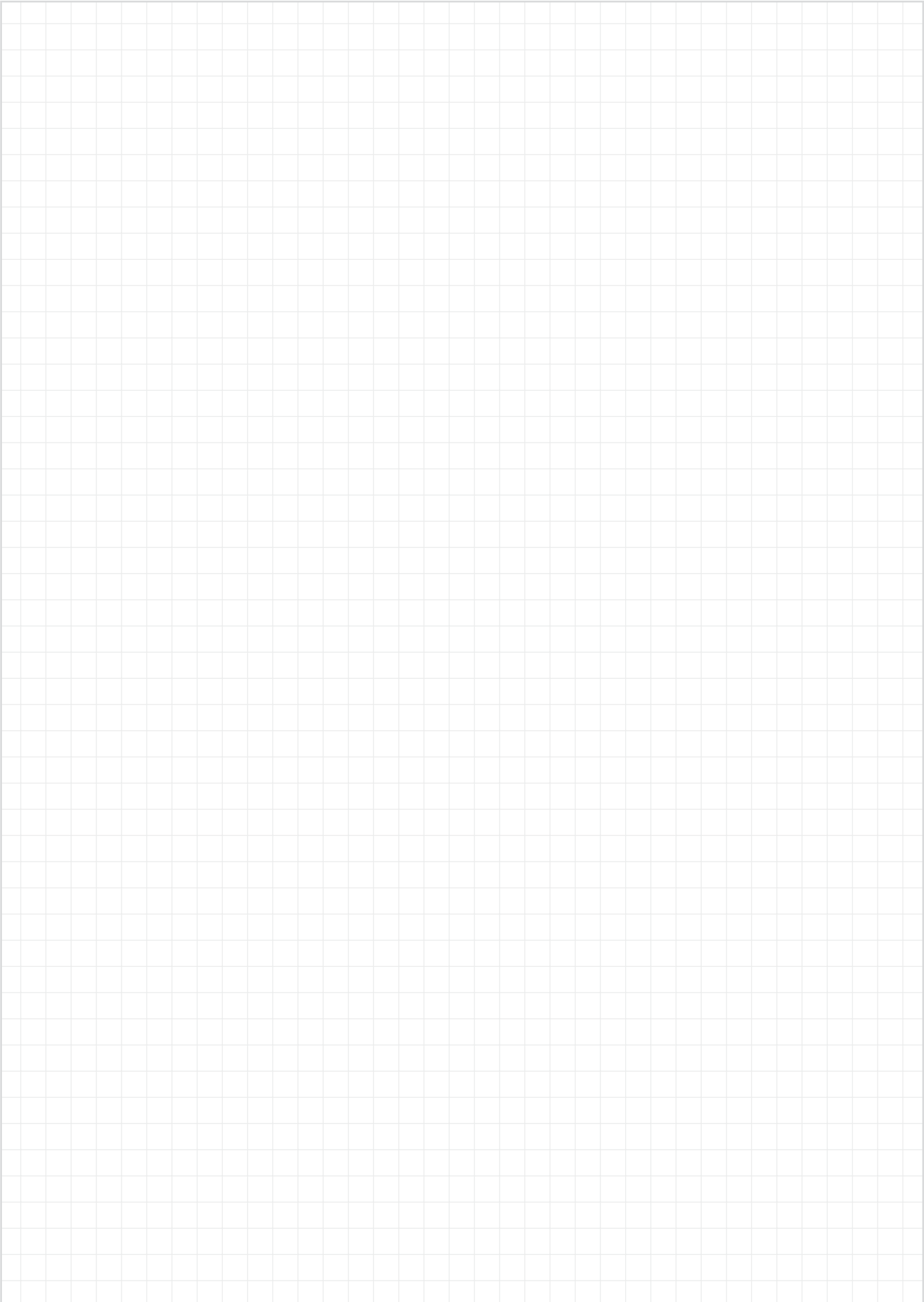
## Clearance-free, pre-loaded flanged bearings



### Dimensions [mm]

d1	d1 tolerance <sup>14)</sup> E10	d2	d3	b1 h13	b2	b3	h <sub>0</sub> ±0.1	Part No.
8	+0.025 +0.083	10	15	10	1.0	2.0	0.44	<b>JVFM-0810-10</b>
10	+0.025 +0.083	12	18	10	1.0	2.0	0.53	<b>JVFM-1012-10</b>
12	+0.032 +0.102	14	20	12	1.0	2.0	0.53	<b>JVFM-1214-12</b>
14	+0.032 +0.102	16	22	12	1.0	2.0	0.53	<b>JVFM-1416-12</b>
15	+0.032 +0.102	17	23	15	1.0	2.5	0.53	<b>JVFM-1517-15</b>
18	+0.032 +0.102	20	26	11	1.0	2.5	0.53	<b>JVFM-1820-11</b>
18	+0.032 +0.102	20	26	18	1.0	2.5	0.53	<b>JVFM-1820-18</b>
20	+0.040 +0.124	23	30	20	1.5	2.5	0.62	<b>JVFM-2023-20</b>

<sup>14)</sup> d1 measured after press-fit in housing hole. d2 H7 within the measurement plane



**polysorb  
disc springs**

Compensation for axial clearances and  
manufacturing tolerances

Vibration dampening

Noise dampening

Corrosion-free

Lightweight

Electrical and thermal insulation

Standard range from stock





polysorb disc springs

Disc springs are discs that can be axially loaded, which are concave in the axial direction. Disc springs require less space than other spring types and are especially suitable for designs that do not require a high spring length.



When to use it?

- When an application requires disc spring characteristics which are only possible in metal at a considerable expense (slot design)
- For compensation of axial clearances and manufacturing tolerances
- For vibration dampening
- For noise reduction
- When a non-magnetic material is required
- For electrical and thermal insulation



When not to use it?

- When constant spring forces are necessary over a wide temperature range
- When high spring forces are required

iglidur® J: Standard material for many applications

Compensation of axial clearance and manufacturing tolerances

Vibration dampening

iglidur® A500: High temperature material

Lightweight



Available upon request

Detailed information about delivery time online.



Material properties:

iglidur® J ▶ Page 159

iglidur® A500 ▶ Page 393



Depending on material:

iglidur® J: -50°C up to +90°C

iglidur® A500: -100°C up to +250°C



1 type, 2 materials

Ø 5–20mm

More dimensions upon request

General properties

The spring deflection of the disc spring is relatively small. Therefore a number of disc springs are combined in practice. Disc springs that are alternately stacked increase the spring length proportionally to the amount of springs. In order to increase the force, the disc springs can be parallel stacked to form a spring packet.

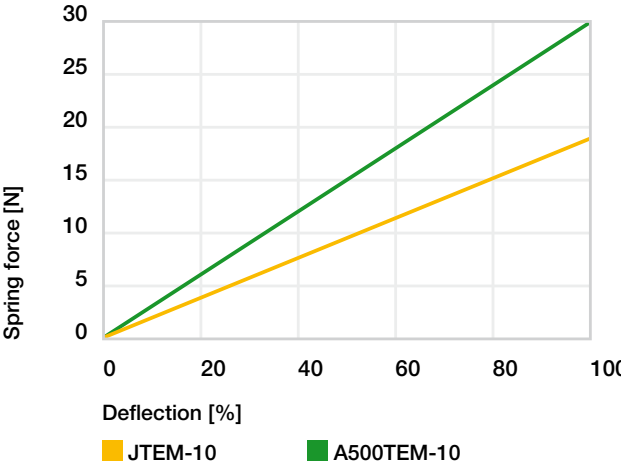


Diagram 01: Spring force [N] as a function of percental deflection measured with size 10

The force deformation curves of polysorb disc springs are approximately linear.

Additional properties

Chemical resistance

polysorb disc springs are resistant to a variety of chemicals. iglidur® A500 has a higher resistance than iglidur® J.

Chemicals	Resistance	
	iglidur® J	iglidur® A500
Alcohols	+	+
Hydrocarbons	+	+
Greases, oils without additives	+	+
Fuels	+	+
Diluted acids	0 to –	+
Strong acids	–	+
Diluted alkalines	+	+
Strong alkalines	+ up to 0	+

+ resistant 0 conditionally resistant – not resistant

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

Table 01: Chemical resistance

Moisture absorption

The low moisture absorption permits the use in wet or moist environments.

polysorb disc springs absorb moisture and in the process the mechanical properties change. However, in the worst application case – a long-term use in water – polysorb disc springs still have a high spring force.

iglidur®	Standard environment 20°C/50% r. h.	Saturated in water
J	18	15
A500	24	23

Table 02: Spring force [N] as a function of the absorbed moisture

Increased temperatures

Increased temperatures reduce the rigidity of polymers. polysorb disc springs made from iglidur® J (JTEM-10) still have a maximum spring force of 8N at the maximum permissible temperature of +90°C. The spring force against ambient temperature is shown in diagram 02.

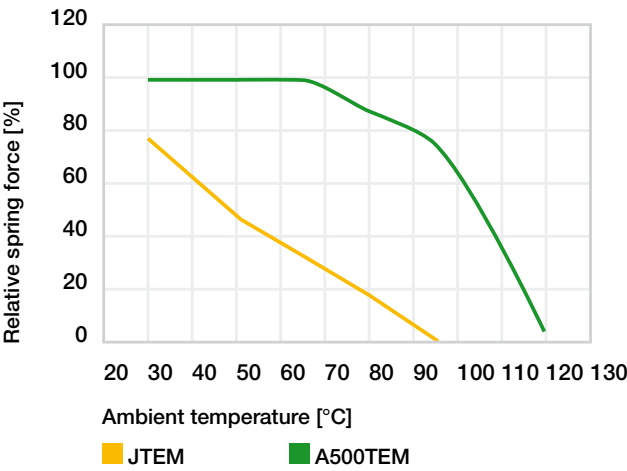


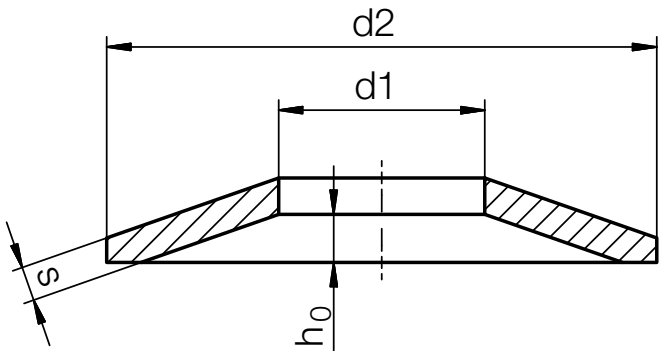
Diagram 02: Effect of ambient temperature on the spring force



iglidur® J



iglidur® A500



Dimensions based on DIN 2093



Order key

Type

Dimensions [mm]

☐ T E M -05

iglidur® material

Thrust washer style

"Elastic spring"

Metric

Inner Ø d1

Options:

**iglidur® J**

for low wear

**iglidur® A500**

for high temperature

applications requiring

FDA-compliance



Material:

iglidur® J ▶ Page 159

iglidur® A500 ▶ Page 393

Dimensions [mm]

d1	d2	s	h <sub>0</sub>	Standard values: Spring lengths and forces		Weight	Part No. <sup>15)</sup>
				F <sub>1.0</sub> iglidur® J	F <sub>1.0</sub> iglidur® A500		
				[N]	[N]	[g]	
5.2	10.0	0.5	0.25	5	8	0.04	<input type="checkbox"/> TEM-05
6.2	12.5	0.7	0.30	10	15	0.11	<input type="checkbox"/> TEM-06
8.2	16.0	0.9	0.35	16	24	0.20	<input type="checkbox"/> TEM-08
10.2	20.0	1.1	0.45	24	35	0.33	<input type="checkbox"/> TEM-10
12.2	25.0	1.5	0.55	45	70	0.85	<input type="checkbox"/> TEM-12
16.3	31.5	1.75	0.70	65	85	1.44	<input type="checkbox"/> TEM-16
20.4	40.0	2.25	0.90	130	150	3.10	<input type="checkbox"/> TEM-20

The standard values for the spring lengths and forces are rounded mean values.

<sup>15)</sup> Material: iglidur® J: JTEM, standard

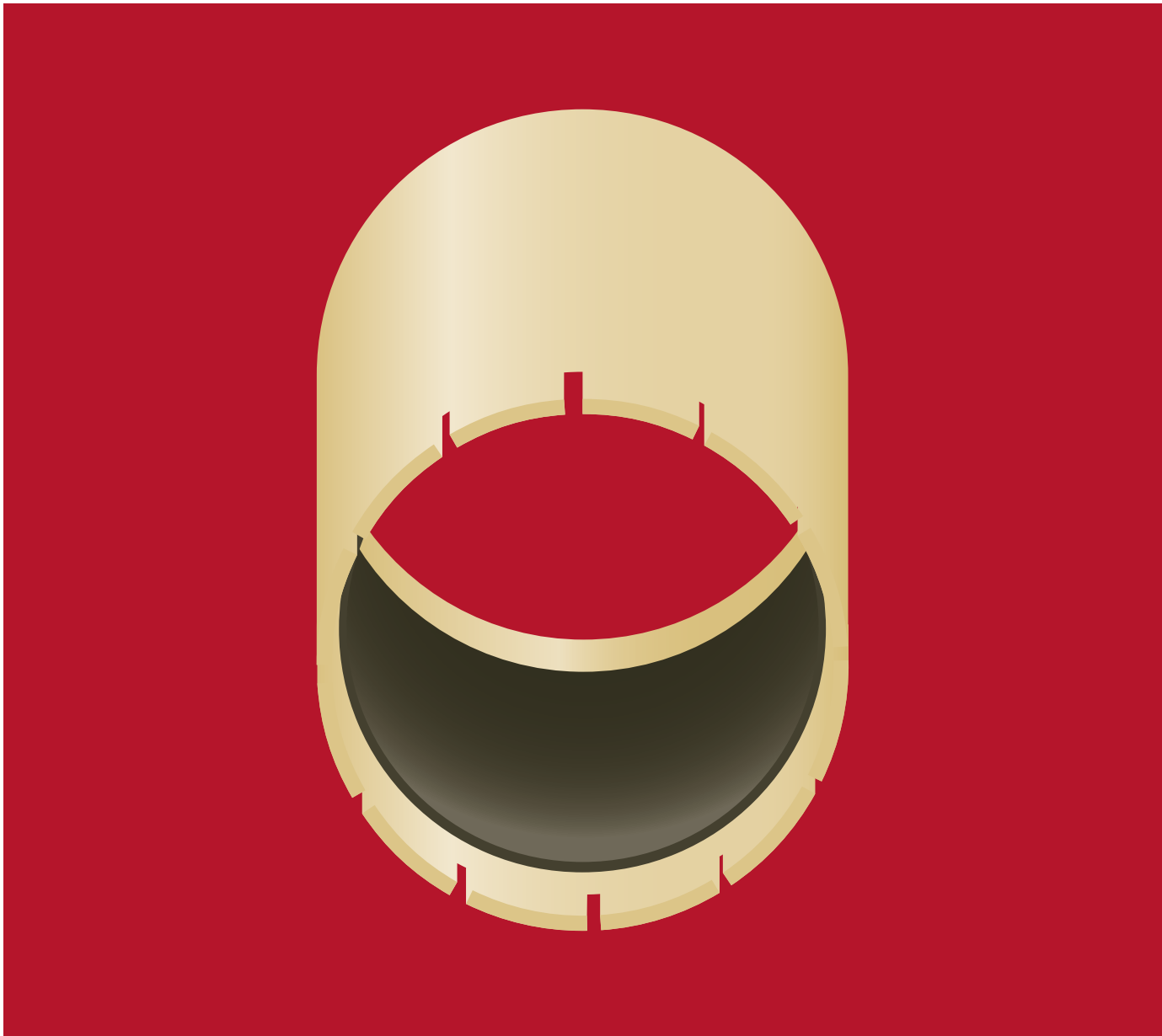
iglidur® A500: A500TEM, high temperature and chemical resistance

Symbols and units:

F = Force [N]

h<sub>0</sub> = Maximum spring displacement [mm]

F<sub>1.0</sub> = Spring force 100% displacement [N]



# iglidur® PEP multi-component bearings

Can be used with any shaft material

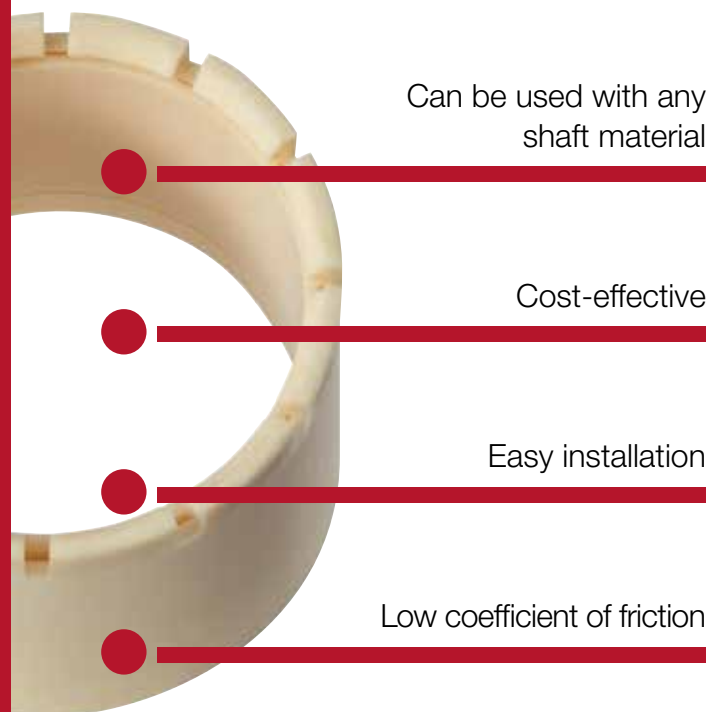
Cost-effective

Easy installation

Low coefficient of friction

Standard range from stock





## iglidur® PEP multi-component bearings

In standard plain bearing solutions, the shaft has a critical part to play, as important as the bearing itself. With the iglidur® PEP bearings, igus® is forging new trail with this enclosed and maintenance-free plain bearing design.



### When to use it?

- When a cost-effective plastic plain bearing system is required
- When independence from the shaft material and shaft surface is required
- For the protection of expensive and sensitive shafts



### When not to use it?

- For high surface speeds
  - ▶ iglidur® J, page 159
- At high loads
  - ▶ iglidur® G, page 81
  - ▶ iglidur® Q, page 459
- At high temperatures
  - ▶ iglidur® V400, page 307
  - ▶ iglidur® X, page 279
  - ▶ iglidur® Z, page 289
- When low clearance bearings are required
  - ▶ iglidur® P, page 131
  - ▶ iglidur® X, page 279



1 type  
Ø 6–20mm

More dimensions upon request



Imperial dimensions available  
▶ From page 1605



Available from stock

Detailed information about delivery time online.



Material:  
iglidur® J ▶ Page 159



Max. +90°C  
Min. –50°C

### General properties

Maintenance-free plain bearings are generally described as being able to slide on the shaft without any additional coating and/or lubrication. It is evident that shaft materials are as important as the plain bearing itself. igus® is forging a new path with a plain bearing that is self-contained and maintenance-free.

iglidur® PEP is an innovative design for lubrication-free plastic plain bearing systems with an inner and outer ring. The special feature; the sliding surface is the inner ring, and for the first, time shaft materials and shaft surfaces are not a concern. Even threads, rust and scratches do not affect the performance or reliability. With the control over the sliding surface and through considerable testing, the long-term behaviour of the bearing system can be predicted precisely. Similar to ball bearings, the inner ring turns with the shaft in the plastic PEP plain bearing. Relative movements of the shaft with respect to the bearing are eliminated. This protects the shaft surface from wear and saves costs. An additional benefit; even the most sensitive or unusual materials can be used as the rotating shaft with this polymer plain bearing. Due to the bearing materials used, the PEP plastic bearing is totally corrosion-free.

### Wear resistance

For loads up to 5N/mm² the wear test results are compelling. Here PEP plastic bearings obtain values that are comparable to most wear-resistant metal-backed bearing systems. This is a very positive result, when you consider the reduced costs compared with the required shaft surface finish which is demanded by traditional bearings. The consistently low coefficient of friction is also an advantage to the user. Since the running surfaces are fixed, the tribological data can be calculated. The coefficient of friction of the lubrication-free PEP bearings is no longer based on the shaft materials or surface properties. If necessary, the coefficient of friction can be reduced further with a small amount of lubricant.

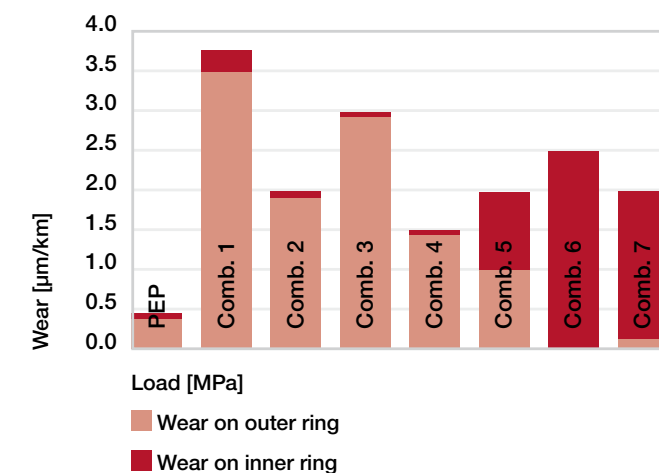


Diagram 01: Wear experiments of different material combinations,  $p = 0.75\text{MPa}$ ,  $v = 0.3\text{m/s}$

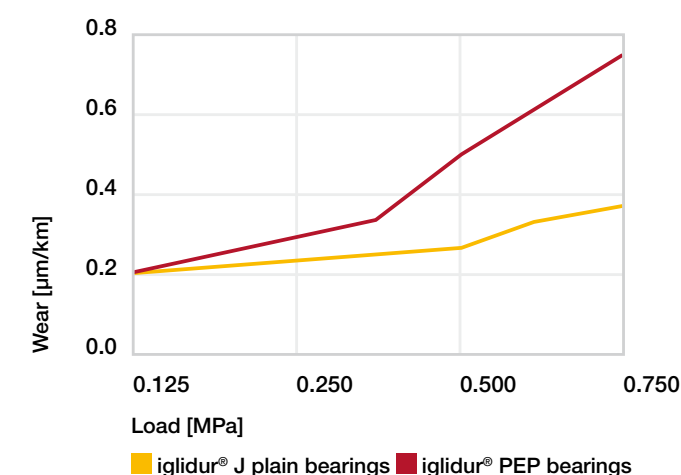


Diagram 02: Wear of iglidur® PEP bearings as a function of the load,  $v = 0.3\text{m/s}$

### Assembly

The installation of the PEP plain bearing could not be easier or faster. The bearings are manufactured to be press-fitted into a recommended housing hole of H7 tolerance. Then, the shaft is inserted and fits tightly onto the inner ring. The inner bearing is clipped into the outer ring. This design makes it possible to pull the shaft out without removing the inner ring.



iglidur® PEP | Product range  
Sleeve bearings (form S)



Order key

Type

Dimensions [mm]

PEP S M-0610-10

iglidur® type	Form S	Metric	Inner Ø d1	Outer Ø d2	Total length b1
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Material:  
iglidur® J ► Page 159



Imperial dimensions available  
► From page 1605

Dimensions [mm]

d1	d2	b1	Part No.
6	10	10	PEPSM-0610-10
8	12	12	PEPSM-0812-12
10	14	12	PEPSM-1014-12
12	16	15	PEPSM-1216-15
16	20	20	PEPSM-1620-20
20	23	20	PEPSM-2023-20



iglidur® lip seal bearings

Polymer bearing with integrated radial shaft seal

Seals against the shaft

Reduced space requirement and easy,  
fast installation

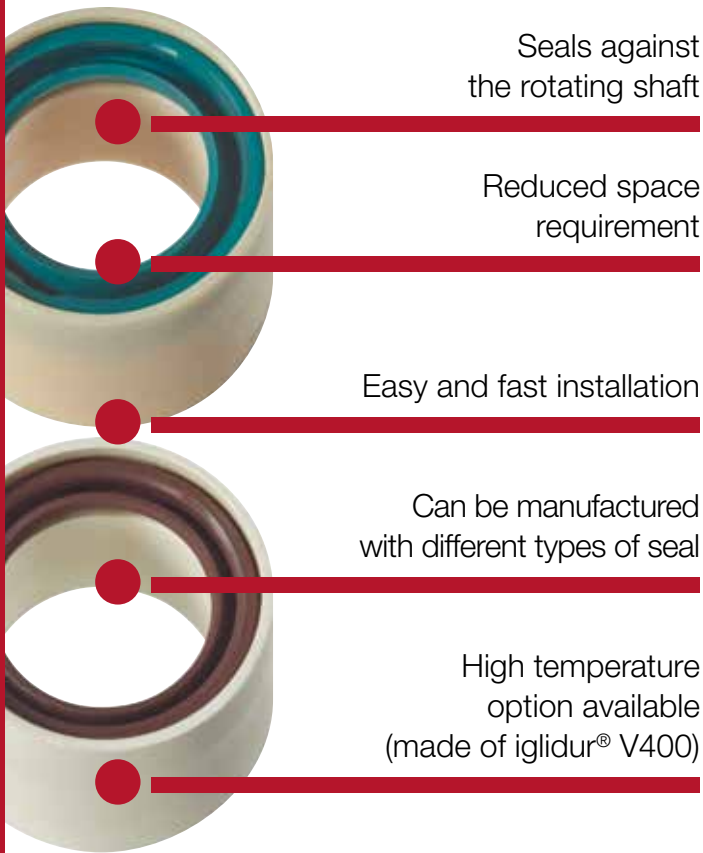
Can be manufactured with different types of seal

High temperature option available (VDSM)



# iglidur® lip seal bearings | Advantages

Position and seal: plastic bearing with clip-on shaft seal



## iglidur® lip seal bearings

Easy and quick to fit polymer plain bearing made of iglidur® J (JD<sub>SM</sub>) or iglidur® V400 (VD<sub>SM</sub>) with an integrated rotary lip seal, which protects against dust, dirt, and all depressurised liquids.



### When to use it?

- When the penetration of dirt and water spray should be prevented
- When only a small installation space is available in the axial direction
- When an existing seal should be integrated in a plain bearing



### When not to use it?

- When pressurised media should be sealed
- When a permanent tensioned seal is required



### Available upon request

Detailed information about delivery time online.



### Material properties:

iglidur® J ► Page 159  
iglidur® V400 ► Page 307



### Depending on material:

iglidur® J: -50°C up to +90°C  
iglidur® V400: -50°C up to +200°C



1 type, 2 materials  
Ø 10mm

More dimensions upon request

# iglidur® lip seal bearings | Product range

Lip seal sleeve bearings (form S)

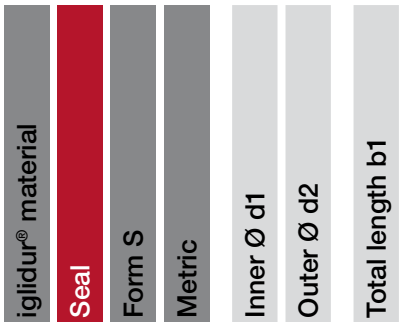


### Order key

Type

Dimensions [mm]

□ D S M-1015-14



### Material:

iglidur® J ► Page 159  
iglidur® V400 ► Page 307

### Dimensions [mm]

d1	d1 tolerance <sup>3)</sup>	d2	b1	b3	f	Part No.
E11		Ø	h13			
10	+0.025 +0.135	15	14	10	1	JD <sub>SM</sub> -1015-14
10	+0.025 +0.135	15	14	10	1	VD <sub>SM</sub> -1015-14

<sup>3)</sup> After press-fit. Testing methods ► Page 57



Please contact us if you want to combine your seal with an iglidur® plain bearing.  
We will support you with the design, will check the integration and create an appropriate proposal.



## speedimold – custom-made parts manufactured by injection moulding

Cost-effective prototypes and series production

Original iglidur® tribo materials

Tailored to your application

Delivery time from 3 days

For quantities ranging from a few hundred to  
several million





## Customised & cost-effective: Your plastic plain bearing in the required design, material and quantity



*"Show me the plastic part that gives you a problem. I'll provide you with a solution!"*

With this idea, Günter Blase founded igus® over 50 years ago, and it still holds true today: hence, customer-specific series solutions are part of our daily work just like catalogue parts.

### Your igus® plastic plain bearings:

- Lubrication and maintenance-free
  - Cost-effective
  - Customised parts from 3 days delivery time
  - Service life predictable in advance
  - From 1 piece to several million pieces:  
Always the appropriate manufacturing process
  - All iglidur® materials possible
  - New development of specific materials possible
  - Joint dimensioning and design coordination
- [www.igus.no/specialbearings](http://www.igus.no/specialbearings)

### Custom manufactured

With speedimold, there are two different methods: first, custom-made plastic parts can be produced with 3D-printed injection moulds and second, with the aid of machined aluminium tools.

In the 3D printing process, users can choose their custom-made part from over 50 different iglidur® tribological materials optimised for friction and wear. The material of the 3D-printed mould is tailored to withstand the high temperatures and pressure prevailing in injection moulding.

You can produce from just one piece up to 500 parts, prototypes or small batches from a 3D-printed injection mould.

For batches between 200 and 2,000 pieces, the injection moulded part can also be produced with an aluminium tool. This lean manufacturing method also saves the user time and money here: aluminium tools are also lower cost and faster to produce than steel moulds, as no lengthy hardening is required.

## In 3 steps to your individual plain bearing

### 1. Submit an enquiry

Fill in the form with some basic information: quantity and requirement, such as food contact, dirt resistance, low wear etc. and upload the CAD files, for example.

After one of our specialists has contacted you for a consultation, you will receive a quotation.

### 2. We produce your required component

Upon order, igus® starts with the production process.

### 3. Your receive your product

Your required component is ready to ship and delivered quickly.

Submit an enquiry:

► [www.igus.no/specialbearings-enquiry](http://www.igus.no/specialbearings-enquiry)

**Individual & cost-effective: Your plastic bearing with the desired shape, in the desired quantity and made of the desired material**

You did not find what you were looking for in our range of standard products? No problem! With catalogue parts, customised series solutions are part of our service. We have many different ways of manufacturing exactly the parts you need. We will be happy to advise you regarding the most efficient manufacturing method and recommend the perfect iglidur® material for your individual case.

**Serial production efficient, flexible, scalable**

After entering your CAD data, we will contact you within just a few days to make you an interactive offer in the manufacturing method appropriate for your component. Serial production by our in-house injection moulding department is also possible.

**Individual components with no minimum order quantity**

Each method used to manufacture individual customised solutions has its specific advantages and disadvantages. From 3D printing to manufacturing from steel tools, our engineers will help you choose the best manufacturing method for your application.

**Prototypes and test samples for your application**

Prototypes and test samples enable you to test the fit and function of the component you want to make. On the basis of the test results, we can choose the best manufacturing method for your application or make corrections in regard to the design of the material or the shape.