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.

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)

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)

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

New

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

New

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

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

Materials for long service life

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

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

Endurance runner with high dimensional stability at high temperature: iglidur® J350
▶ Page 191

Ideal for plastic shafts: iglidur® J260
▶ Page 199

Endurance runner up to +180°C: iglidur® W360
▶ Page 207

iglidur® plain bearings made from tribo-plastics: Endurance runner

For fast rotating applications: iglidur® L250
▶ Page 215

For high rotational speeds: iglidur® L350
▶ Page 223

For extreme rotational speeds: iglidur® L500
▶ Page 231

Low-cost: iglidur® R
▶ Page 239

Low-cost with silicone: iglidur® D
▶ Page 247

Specialist for aluminium shafts: iglidur® J200
▶ Page 253

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

Materials for use at high temperatures

The chemical and temperature specialist: iglidur® X
▶ Page 263

Extremely long service life under extreme conditions: iglidur® Z
▶ Page 273

The high temperature specialists up to +250°C: iglidur® X6
▶ Page 283

For soft shafts and high temperatures: iglidur® V400
▶ Page 291

New

All-rounder for steam sterilisation: iglidur® HSD350
▶ Page 299

For hot liquids: iglidur® UW500
▶ Page 307

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

Materials with good media resistance

Endurance runner with high media resistance: iglidur® H1
▶ Page 317

Extremely long service life under water: iglidur® H370
▶ Page 325

The classic with high resistance to media and temperature: iglidur® H
▶ Page 335

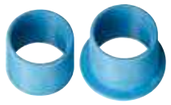
High temperature endurance runner: iglidur® C500
▶ Page 343

The Low cost specialist for chemicals and temperatures: iglidur® H2
▶ Page 351

iglidur® plain bearings | Product overview

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 361

The endurance runner at higher temperatures in the food sector: iglidur® A350
▶ Page 369

The media and temperature specialist in the food sector: iglidur® A500
▶ Page 377

The all-rounder for food: iglidur® A180
▶ Page 385

The "food-classic" for low speeds: iglidur® A200
▶ Page 393

Food bearing with high media resistance up to +90°C: iglidur® A160
▶ Page 403

The robust one with with high abrasions resistance: iglidur® A290
▶ Page 411

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

Suitable for contact with drinking water: iglidur® UW160
▶ Page 419

For the tobacco industry: iglidur® T220
▶ Page 427

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

Materials for heavy-duty applications

The durable heavy-duty bearing: iglidur® Q2
▶ Page 437

The peak of stability: iglidur® Q
▶ Page 445

Heavy-duty on soft shafts: iglidur® Q290
▶ Page 453

The heavy-duty bearing up to 200MPa static and 140MPa dynamic: iglidur® TX1
▶ Page 459

iglidur® plain bearings made from tribo-plastics: specialists

Materials for special application areas

Electrically conductive: iglidur® F
▶ Page 471

The ESD-compatible all-rounder: iglidur® F2
▶ Page 479

The automotive standard: iglidur® H4
▶ Page 487

For fast rotation under water: iglidur® UW
▶ Page 495

The biopolymer: iglidur® N54
▶ Page 503

Low-cost all-rounder for fire protection: iglidur® G V0
▶ Page 511

Versatile and cost-effective: iglidur® J2
▶ Page 519

iglidur® plain bearings made from tribo-plastics: specialists

The first antibacterial iglidur® plain bearing: iglidur® AB
▶ Page 527

New

Complies with DIN EN 45545 HL3, R22/R23: iglidur® RW370
▶ Page 535

The flexible one: iglidur® B
▶ Page 543

Free from PTFE and silicone: iglidur® C
▶ Page 549

iglidur® plain bearings | Technical properties – quick selection

iglidur®	G	G1	M250	P210	P230	P	K	GLW	J	W300	J3	J350	J260	W360	L250	L350	L500	R	D	J200
Installation tolerances	E10	E10	D11	E10	E10	E10	E10	E10	E10	E10	E10	F10	E10	E10	E10	F10	F10	E10	E10	E10
Descriptive technical specifications																				
Wear resistance at +23°C																				
Wear resistance at +90°C																				
Wear resistance at +150°C																				
Low coefficient of friction																				
Low moisture absorption																				
Wear resistance under water																				
High media resistance																				
Resistant to edge pressures																				
Resistant to impacts/shock																				
Resistant to dirt																				
For high loads (> 60MPa)	●	●						●				●		●						
Corrosion-free	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
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	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547		
RoHS-II 2011/65/EU	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
FDA-compliant																				
EU10/2011-compliant																				
Fire class in accordance with UL-94	HB	HB	V-2	HB	HB	HB	HB	HB	HB	HB	HB	V-0	V-2	HB	HB	V-0	V-0	HB	HB	HB
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																				
Injection-moulded special parts	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
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iglidur® plain bearings | Technical properties – quick selection

iglidur®	X	Z	X6	V400	HSD350	UW500	H1	H370	H	C500	H2	A181	A350	A500	A180	A200	A160	A290
Installation tolerances	F10	F10	F10	F10	F10	F10	F10	F10	F10	F10	F10	E10	F10	F10	E10	D11	E10	D11
Descriptive technical specifications																		
Wear resistance at +23°C																		
Wear resistance at +90°C																		
Wear resistance at +150°C																		
Low coefficient of friction																		
Low moisture absorption																		
Wear resistance under water																		
High media resistance																		
Resistant to edge pressures																		
Resistant to impacts/shock																		
Resistant to dirt																		
For high loads (> 60MPa)	●	●	●			●	●	●	●	●	●		●	●				
Corrosion-free	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Electrically conductive	●		●			●		●										
Approvals and standards																		
Dimensions in accordance with DIN	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547		ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 2795	ISO 3547	ISO 3547
RoHS-II 2011/65/EU	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
FDA-compliant												●	●	●	●	●	●	
EU10/2011-compliant												●	●	●	●	●	●	
Fire class in accordance with UL-94	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	HB	V-0	V-1	HB	V-2	HB	HB
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				●													●	
Injection-moulded special parts	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
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iglidur® plain bearings | Technical properties – quick selection

iglidur®	UW160	T220	Q2	Q	Q290	
Installation tolerances	E10	E10	E10	E10	D11	
Descriptive technical specifications						
Wear resistance at +23°C						
Wear resistance at +90°C						
Wear resistance at +150°C						
Low coefficient of friction						
Low moisture absorption						
Wear resistance under water						
High media resistance						
Resistant to edge pressures						
Resistant to impacts/shock						
Resistant to dirt						
For high loads (> 60MPa)			●	●	●	
Corrosion-free	●	●	●	●	●	
Electrically conductive						
Approvals and standards						
Dimensions in accordance with DIN	ISO 3547		ISO 3547	ISO 3547	ISO 3547	
RoHS-II 2011/65/EU	●	●	●	●	●	
FDA-compliant		●				
EU10/2011-compliant						
Fire class in accordance with UL-94	HB	HB	HB	HB	HB	
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						
Injection-moulded special parts	●	●	●	●	●	
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F	F2	H4	UW	N54	G V0	J2	AB	RW370	B	C
D11	E10	F10	E10	E10	E10	E10	E10	F10	D11	D11
●	●	●			●			●		
●	●	●	●	●	●	●	●	●	●	●
●	●									
ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	
●	●	●	●	●	●	●	●	●	●	●
HB	HB	V-0	HB	HB	V-0	HB	HB	V-0	HB	HB
●	●	●	●	●	●		●	●		
●	●	●	●	●	●		●	●		
	●					●	●	●		
	●					●	●	●		
●	●	●	●	●	●	●	●	●	●	●
471	479	487	495	503	511	519	527	535	543	549

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	[$K^{-1} \cdot 10^{-5}$]	9	3.5	10	8	5	4	3	17
Electrical properties									
Specific contact resistance	[Ωcm]	> 10^{13}	> 10^{9}	> 10^{13}	> 10^{12}	> 10^{12}	> 10^{13}	> 10^{12}	> 10^{11}
Surface resistance	[Ω]	> 10^{11}	> 10^{11}	> 10^{11}	> 10^{11}	> 10^{12}	> 10^{12}	> 10^{12}	> 10^{11}
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J	W300	J3	J350	J260	W360	L250	L350	L500	R	D	J200
1.49	1.24	1.42	1.44	1.35	1.34	1.5	1.54	1.53	1.39	1.4	1.72
0.3	1.3	0.3	0.3	0.2	0.2	0.7	0.4	0.1	0.2	0.3	0.2
1.3	6.5	1.3	1.6	0.4	1.6	3.9	1.4	0.3	1.1	1.1	0.7
0.06–0.18	0.08–0.23	0.06–0.20	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
0.34	0.23	0.5	0.45	0.35	0.35	0.4	3.0	4.0	0.27	0.27	0.3
2,400	3,500	2,700	2,000	2,200	3,829	1,950	15,882	12,015	1,950	2,000	2,800
73	125	70	55	60	119	67	210	201	70	72	58
60	61	60	60	50	n.s.	47	210	70	68	70	43
35	60	45	60	40	75	45	59	70	23	23	23
74	77	73	80	77	n.s.	68	80	81	77	78	70
+90	+90	+90	+180	+120	+180	+90	+180	+250	+90	+90	+90
+120	+180	+120	+220	+140	+200	+180	+210	+315	+110	+110	+120
–50	–40	–50	–100	–100	–40	–40	–100	–100	–50	–50	–50
0.25	0.24	0.25	0.24	0.24	0.24	0.24	0.61	0.45	0.25	0.25	0.24
10	9	13	7	13	6	10	7	6	11	11	8
> 10^{13}	> 10^{13}	> 10^{12}	> 10^{13}	> 10^{12}	> 10^{13}	> 10^{10}	> 10^{5}	> 10^{10}	> 10^{12}	> 10^{14}	> 10^{8}
> 10^{12}	> 10^{12}	> 10^{12}	> 10^{10}	> 10^{10}	> 10^{12}	> 10^{11}	> 10^{5}	> 10^{12}	> 10^{12}	> 10^{14}	> 10^{8}
159	**171**	**183**	**191**	**199**	**207**	**215**	**223**	**231**	**239**	**247**	**253**

iglidur® plain bearings | Material properties

iglidur®	Unit	X	Z	X6	V400	HSD350	UW500	H1	H370	H	C500	H2	A181	A350	A500	A180	A200	A160	A290
General properties																			
Density	**[g/cm³]**	1.44	1.4	1.53	1.51	1.39	1.49	1.53	1.66	1.71	1.37	1.72	1.38	1.42	1.28	1.46	1.14	1.00	1.41
Colour																			
Max. moisture absorption at +23°C and 50% relative humidity	**[% weight]**	0.1	0.3	0.1	0.1	0.6	0.1	0.1	0.1	0.1	0.3	0.1	0.2	0.6	0.3	0.2	1.5	0.1	1.7
Max. total moisture absorption	**[% weight]**	0.5	1.1	0.5	0.2	1.2	0.5	0.3	0.1	0.3	0.5	0.2	1.3	1.9	0.5	1.3	7.6	0.1	7.3
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	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	0.13–0.40
pv value, max. (dry)	**[MPa·m/s]**	1.32	0.84	1.35	0.5	0.3	0.35	0.80	0.74	1.37	0.7	0.58	0.31	0.40	0.28	0.31	0.09	0.25	0.23
Mechanical properties																			
Flexural modulus	**[MPa]**	8,100	2,400	16,000	4,500	2,150	16,000	2,800	11,100	12,500	3,300	10,300	1,913	2,000	3,600	2,300	2,500	1,151	8,800
Flexural strength at +20°C	**[MPa]**	170	95	290	95	67	260	55	135	175	100	210	48	110	140	88	116	19	250
Compressive strength	**[MPa]**	100	65	190	47	44	140	78	79	81	110	109	60	78	118	78	54	37	91
Max. permissible surface pressure at +20°C	**[MPa]**	150	150	150	45	30	140	80	75	90	80	110	31	60	120	28	18	15	70
Shore D hardness		85	81	89	74	77	86	77	82	87	80	88	76	76	83	76	81	60	88
Physical and thermal properties																			
Max. continuous operating temperature	**[°C]**	+250	+250	+250	+200	+180	+250	+200	+200	+200	+250	+200	+90	+180	+250	+90	+80	+90	+140
Max. short-term operating temperature	**[°C]**	+315	+310	+315	+240	+210	+300	+240	+240	+240	+300	+240	+110	+210	+300	+110	+170	+100	+180
Min. operating temperature	**[°C]**	–100	–100	–100	–50	–40	–100	–40	–40	–40	–100	–40	–50	–100	–100	–50	–40	–50	–40
Thermal conductivity	**[W/m · K]**	0.60	0.62	0.55	0.24	0.24	0.6	0.24	0.5	0.6	0.24	0.24	0.25	0.24	0.24	0.25	0.24	0.30	0.24
Coefficient of thermal expansion at +23°C	**[$K^{-1} \cdot 10^{-5}$]**	5	4	1.1	3	7	4	6	5	4	9	4	11	8	9	11	10	11	7
Electrical properties																			
Specific contact resistance	**[Ωcm]**	$< 10^5$	$> 10^{11}$	$< 10^5$	$> 10^{12}$	$> 10^{13}$	$< 10^9$	$> 10^{12}$	$< 10^5$	$< 10^5$	$> 10^{14}$	$> 10^{15}$	$> 10^{12}$	$> 10^{11}$	$> 10^{14}$	$> 10^{12}$	$> 10^{13}$	$> 10^{12}$	$> 10^{11}$
Surface resistance	**[Ω]**	$< 10^3$	$> 10^{11}$	$< 10^3$	$> 10^{12}$	$> 10^{14}$	$< 10^9$	$> 10^{11}$	$< 10^5$	$< 10^2$	$> 10^{13}$	$> 10^{14}$	$> 10^{12}$	$> 10^{11}$	$> 10^{13}$	$> 10^{11}$	$> 10^{12}$	$> 10^{12}$	$> 10^{11}$
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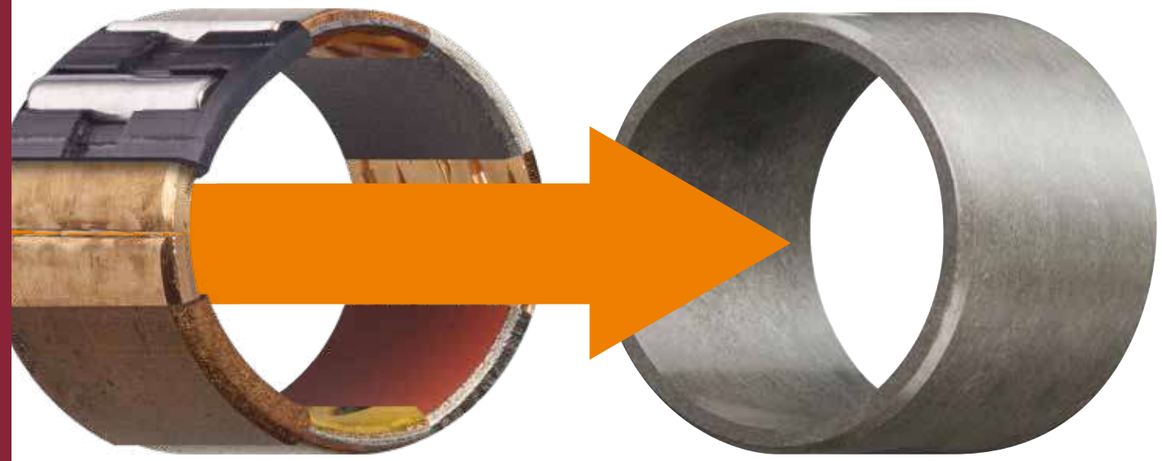
iglidur® plain bearings | Material properties

iglidur®	Unit	UW160	T220	Q2	Q	Q290	TX1	F	F2	H4	UW	N54	G V0	J2	AB	RW370	B	C
General properties																		
Density	**[g/cm³]**	1.04	1.28	1.46	1.4	1.27	2.1	1.25	1.52	1.79	1.52	1.13	1.53	1.44	1.11	1.34	1.15	1.1
Colour																		
Max. moisture absorption at +23°C and 50% relative humidity	**[% weight]**	0.1	0.3	1.1	0.9	3.0	n.s.	1.8	0.2	0.1	0.2	1.6	0.7	0.2	0.8	0.25	1.0	1.0
Max. total moisture absorption	**[% weight]**	0.1	0.5	4.6	4.9	9.3	0.1	8.4	0.4	0.2	0.8	3.6	4.0	1.3	1.6	1.2	6.3	6.9
Coefficient of sliding friction, dynamic against steel	**[µ]**	0.17–0.31	0.20–0.32	0.22–0.42	0.05–0.15	0.14–0.26	0.09–0.37	0.10–0.39	0.16–0.22	0.08–0.25	0.15–0.35	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
pv value, max. (dry)	**[MPa·m/s]**	0.22	0.28	0.7	0.55	0.70	0.89	0.34	0.31	0.70	0.11	0.5	0.5	0.23	0.25	1.2	0.15	0.10
Mechanical properties																		
Flexural modulus	**[MPa]**	1,349	1,800	8,370	4,500	3,074	12,000	11,600	7,418	7,500	9,600	1,800	7,900	3,605	1,850	2,997	1,800	1,900
Flexural strength at +20°C	**[MPa]**	22	65	240	120	97	55	260	93	120	90	70	140	101	50	100	55	60
Compressive strength	**[MPa]**	32	55	130	89	68	220	98	61	50	70	30	100	77	40	129	20	30
Max. permissible surface pressure at +20°C	**[MPa]**	15	40	120	100	55	200	105	47	65	40	36	75	46	25	75	40	40
Shore D hardness		60	76	80	83	80	n.s.	84	72	80	78	74	80	n.s.	70	80	69	72
Physical and thermal properties																		
Max. continuous operating temperature	**[°C]**	+90	+100	+130	+135	+140	+120	+140	+120	+200	+90	+80	+130	+90	+70	+170	+100	+90
Max. short-term operating temperature	**[°C]**	+100	+160	+200	+155	+180	+170	+180	+165	+240	+110	+120	+210	+110	+140	+190	+130	+130
Min. operating temperature	**[°C]**	–50	–40	–40	–40	–40	–60	–40	–40	–40	–50	–40	–40	–50	–40	–50	–40	–40
Thermal conductivity	**[W/m · K]**	0.50	0.24	0.24	0.23	0.24	0.24	0.65	0.61	0.24	0.6	0.24	0.25	0.25	0.24	0.22	0.24	0.24
Coefficient of thermal expansion at +23°C	**[$K^{-1} \cdot 10^{-5}$]**	18	11	8	5	7	3	12	5	5	6	9	9	7	10	5	12	15
Electrical properties																		
Specific contact resistance	**[Ωcm]**	> 10^{12}	> 10^{10}	> 10^{13}	> 10^{15}	> 10^{12}	> 10^{11}	< 10^{3}	< 10^{9}	> 10^{13}	< 10^{5}	> 10^{13}	> 10^{12}	> 10^{13}	> 10^{12}	> 10^{12}	> 10^{10}	> 10^{10}
Surface resistance	**[Ω]**	> 10^{12}	> 10^{10}	> 10^{11}	> 10^{12}	> 10^{12}	> 10^{13}	< 10^{2}	< 10^{9}	> 10^{12}	< 10^{5}	> 10^{11}	> 10^{11}	> 10^{12}	> 10^{12}	> 10^{12}	> 10^{9}	> 10^{9}
Page		419	427	437	445	453	459	471	479	487	495	503	511	519	527	535	543	549

dry-tech® bearing technology | Lubrication-free made easy

Change now and save up to 40%



dry-tech®: Enhance technology without lubrication – reduce cost by using tribo-polymers

igus® dry-tech® bearings offer an alternative to lubricated plain, linear and rolling element bearings. igus® develops tribo-polymers for continuous dry operation. By avoiding lubrication, dry-tech® bearing technology attains superior service life: from -100°C up to +250°C at continuous exposure, from cleanrooms to extreme dirt, from vacuum to extreme humidity. Reduce cost with igus® dry-tech® plain bearings. A direct product comparison shows that you can reduce your current costs for bearing components by as much as 50%.

Tested thousands of times. Proven millions of times.

Applications with high cycle rates, speeds and accelerations in demanding environmental conditions require tested and reliable systems for all igus® products. igus® constantly conducts tests in its in-house laboratory under real-world conditions. Every year, more than 12,000 tests are conducted on plain bearings and over 4,100 tests on e-chains® and cables. The findings go into a unique knowledge database on the tribology of maintenance-free plastic plain bearings. Our laboratory is also at your disposal. If we don't have data for your type of application, we can conduct a test representative of your requirements.

Picture 01: igus® test lab: 12,000 tribological tests (friction and wear) in 300 test set-ups in the industry's largest laboratory (2,750m²). View inside bearing laboratory in Cologne

iglidur® | High-performance polymers

Properties and design

iglidur® plain bearings made from high-performance polymers

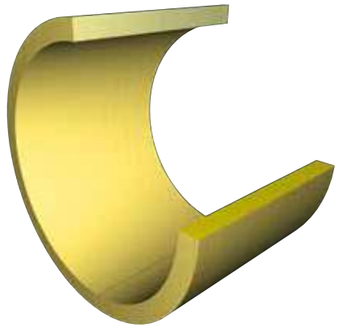
Wear-resistant tribo-polymers improved by precise additions of strengthening materials and solid lubricants, tested thousands of times and proven millions of times - that is iglidur®. igus® engineers develop and test more than 267 new plastic compounds every year. The finely tuned combination of plastic matrix, strengthening components and solid lubricants in every single tribo-polymer results in an individual properties profile in each case. In more than 12,000 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

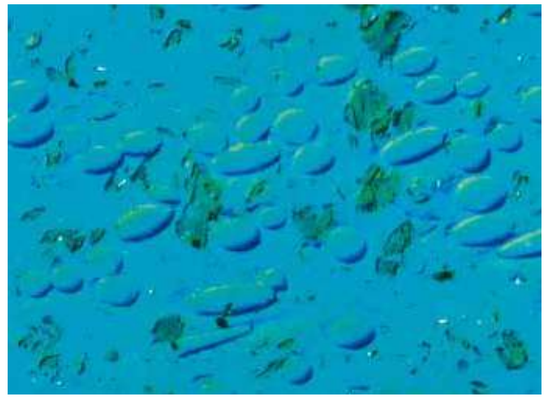
General properties of iglidur® plain bearings

- 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.

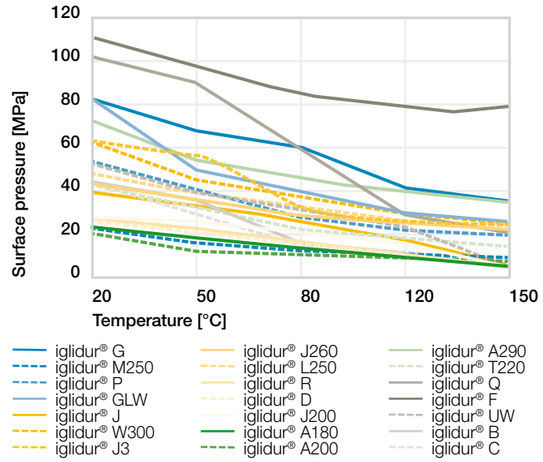
▶ Material properties, **page 56**

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.



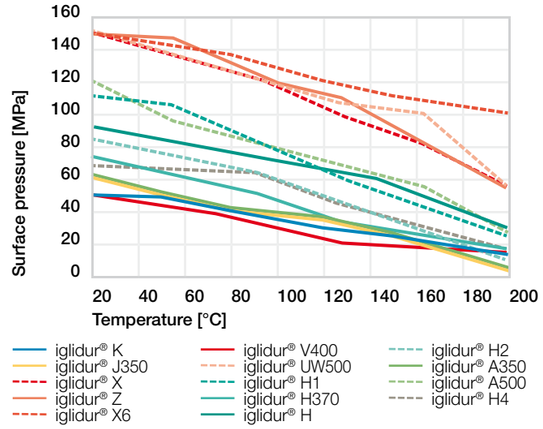


Diagram 02–03: Maximum recommended surface pressure as a function of temperature

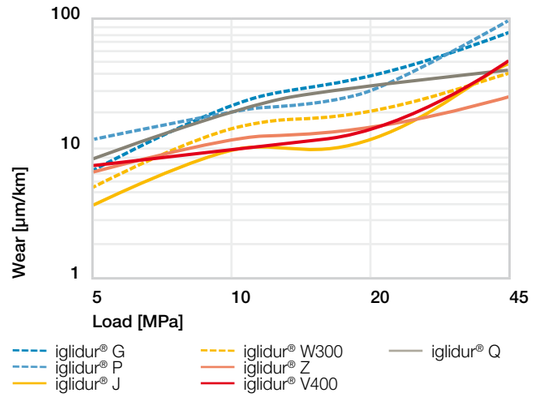
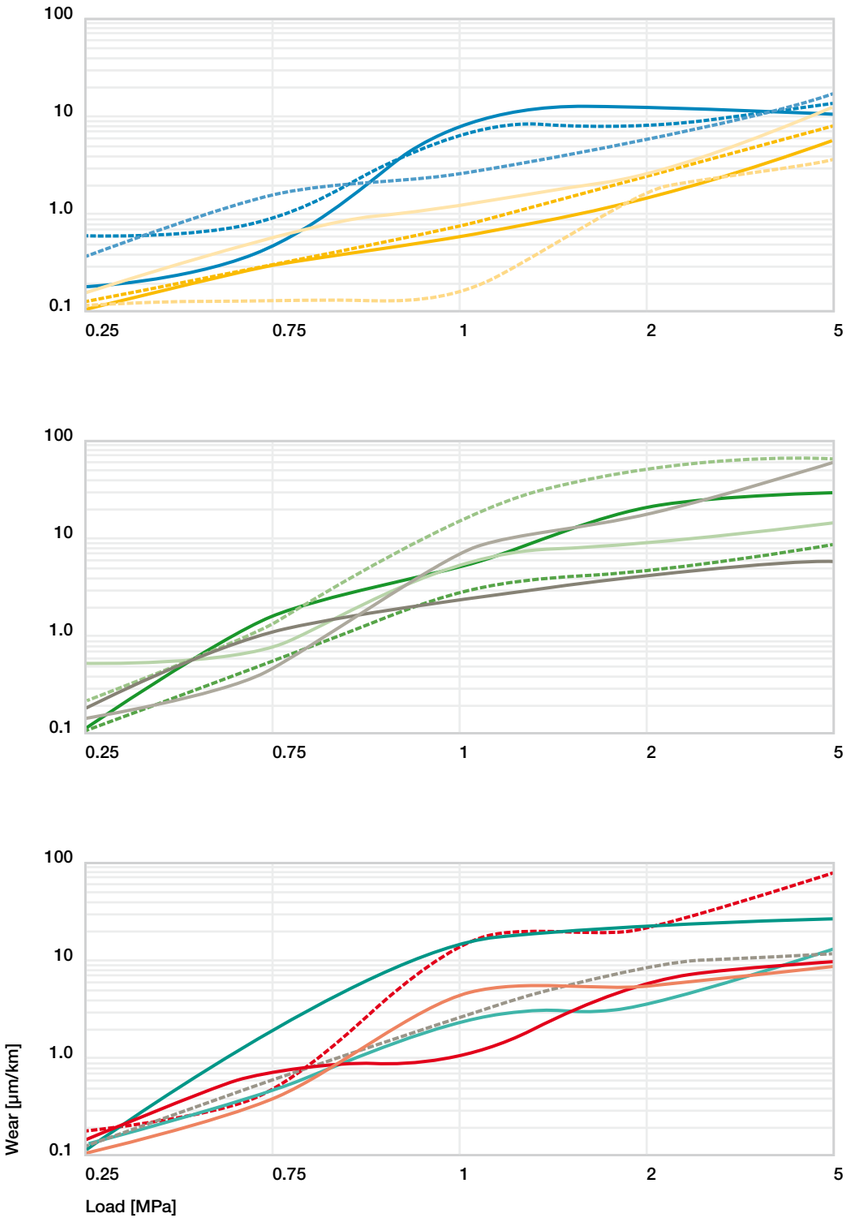


Diagram 04: Wear of iglidur® plain bearings under medium and high pressures

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**

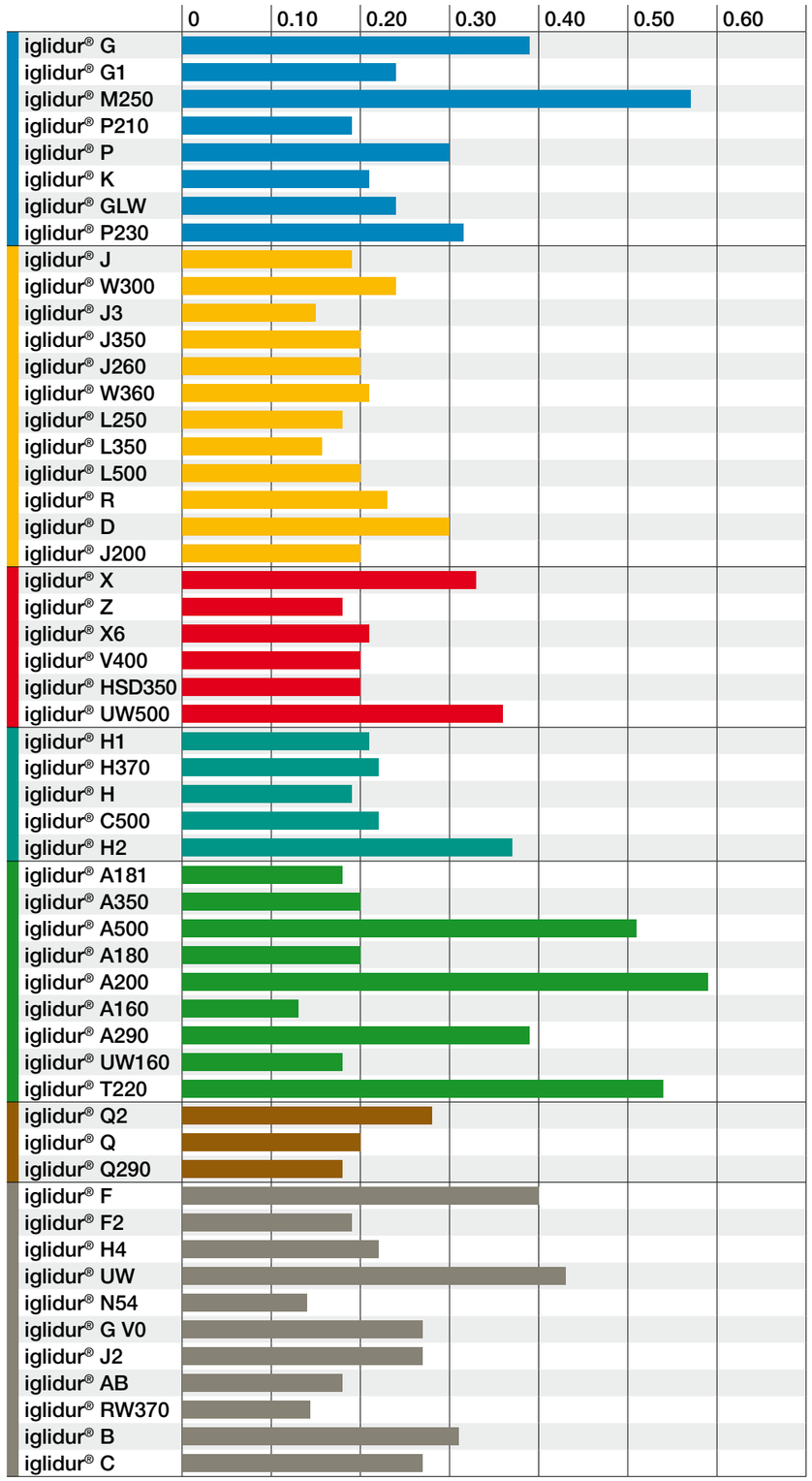


Diagram 08: Coefficient of friction of iglidur® materials with Cf53 shaft, rotating

Surface Speed

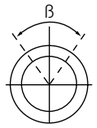
The peripheral speed is always significant in plain bearings. The absolute speed is not crucial, but the relative speed between the shaft and the bearing. The surface speed is expressed in meters per second [m/s] and calculated from the speed n [rpm] with the following formula.
With varying speeds for 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**
- ***ß*** **= 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® 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® 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® A290	1.0	2.0	0.7	1.4	3.0	4.0
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® 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® 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.

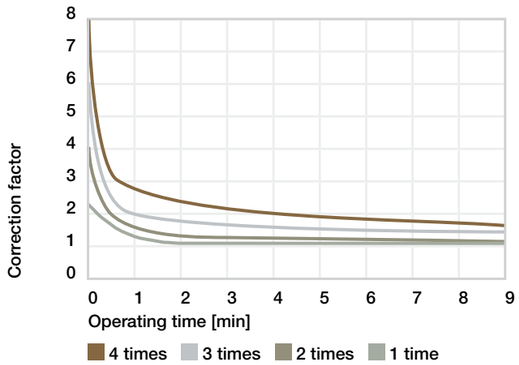


Diagram 09: Correction factor for p · v

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 μ 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:

K1, K2	=	Constant for heat dissipation (K1 = 0.5, K2 = 0.042)
s	=	Bearing wall thickness mm
b1	=	Bearing length mm
μ	=	Coefficient of friction
λs	=	Thermal conductivity of the shaft
λk	=	Thermal conductivity of the bearing
ΔT	=	$(T_a - T_u)$
T_u	=	Ambient temperature [°C]
T_a	=	max. Application Temperature [°C]

Picture 05: Better products for less - a key element is the industry's largest test lab. 2,750m² 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.

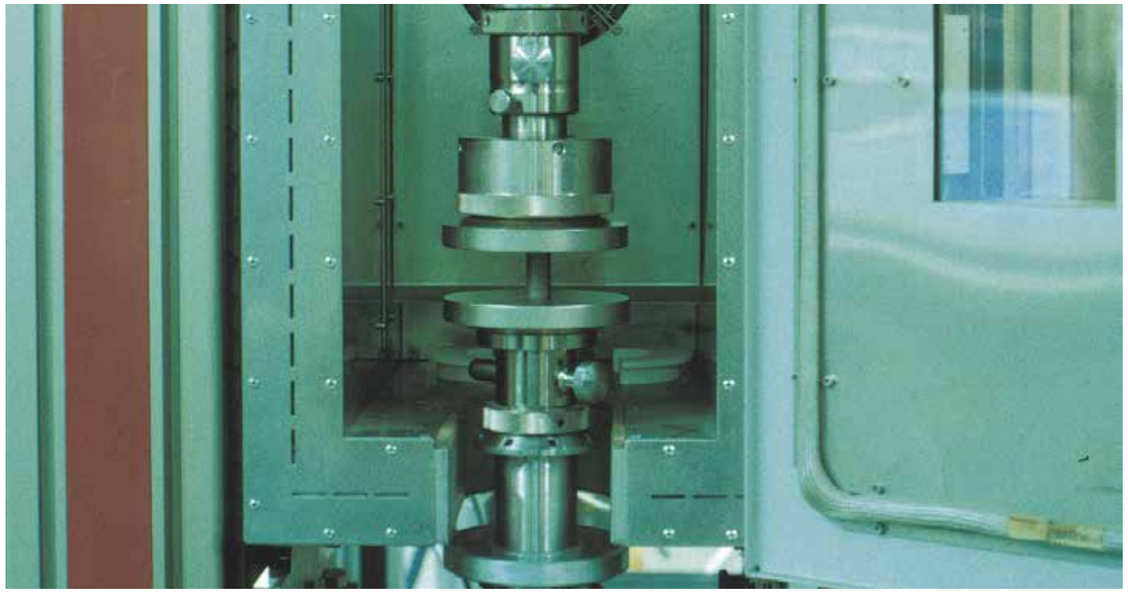
If the plain bearings are moved axially or axial forces occur, there is more opportunity for the bearing to lose press-fit. In these cases, axial securing of the bearing is necessary in addition to the press-fit. The table 04 shows the temperature at which additional securing of the iglidur® plain bearing 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

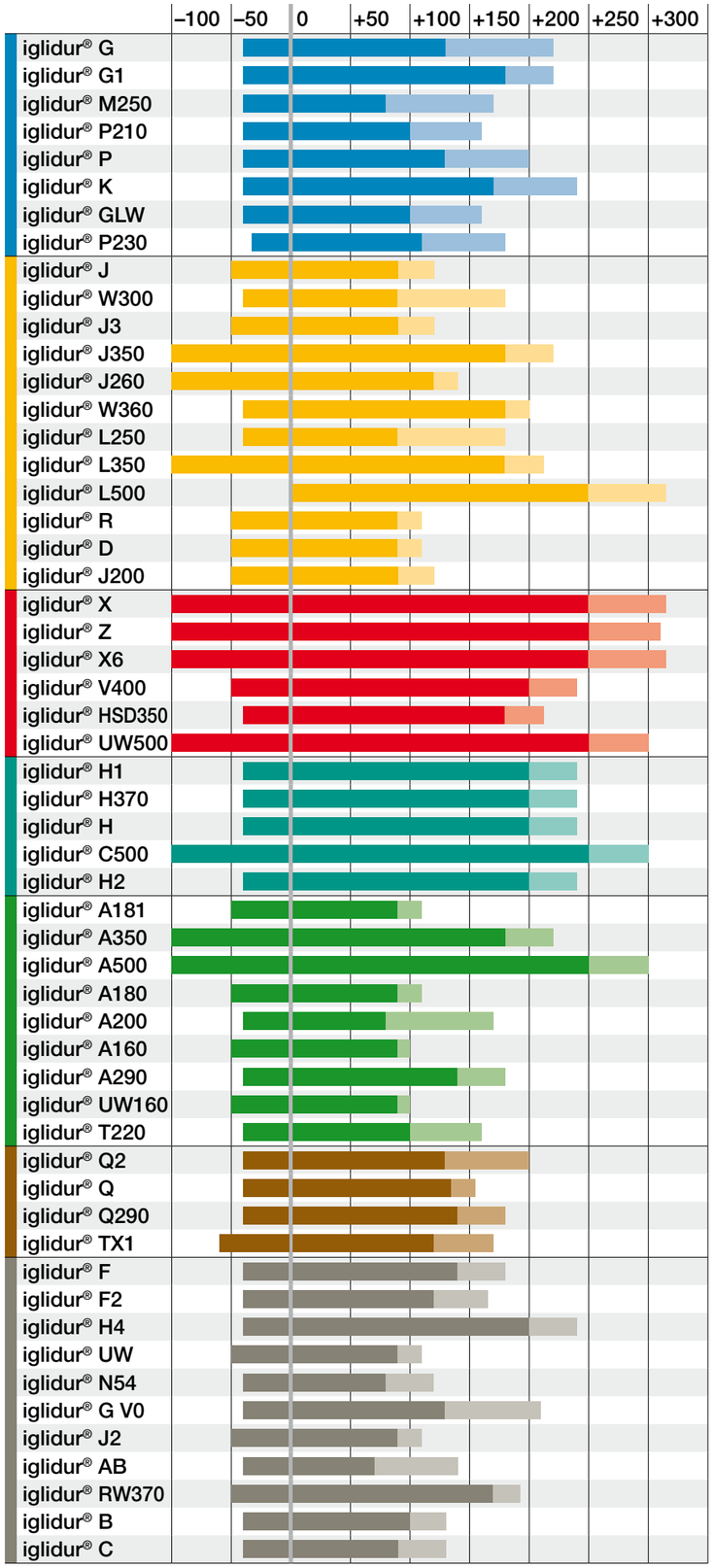


Diagram 10: Comparison of the continuous and short-term upper application temperature limits [°C]

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® 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® 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® A290	+110
iglidur® UW160	+70
iglidur® T220	+50
iglidur® Q2	+70
iglidur® Q	+50
iglidur® Q290	+80
iglidur® TX1	+100
iglidur® F	+105
iglidur® F2	+70
iglidur® H4	+110
iglidur® UW	+80
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.

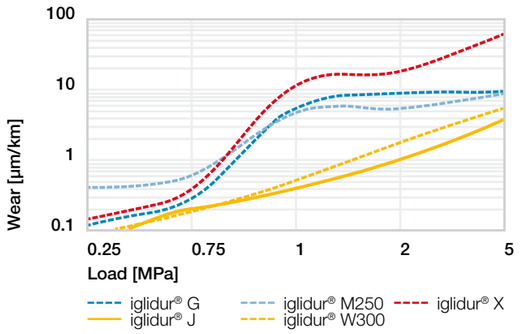


Diagram 11: Wear of iglidur® plain bearings under low pressures, Cf53 shaft, v = 0.1m/s

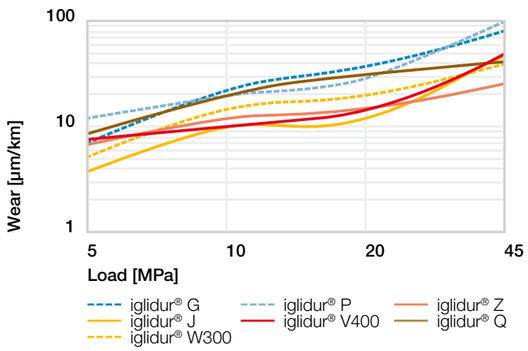


Diagram 12: Wear of iglidur® plain bearings at medium and high pressures, shaft: Cf53, v = 0.1m/s

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°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 bearings 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.

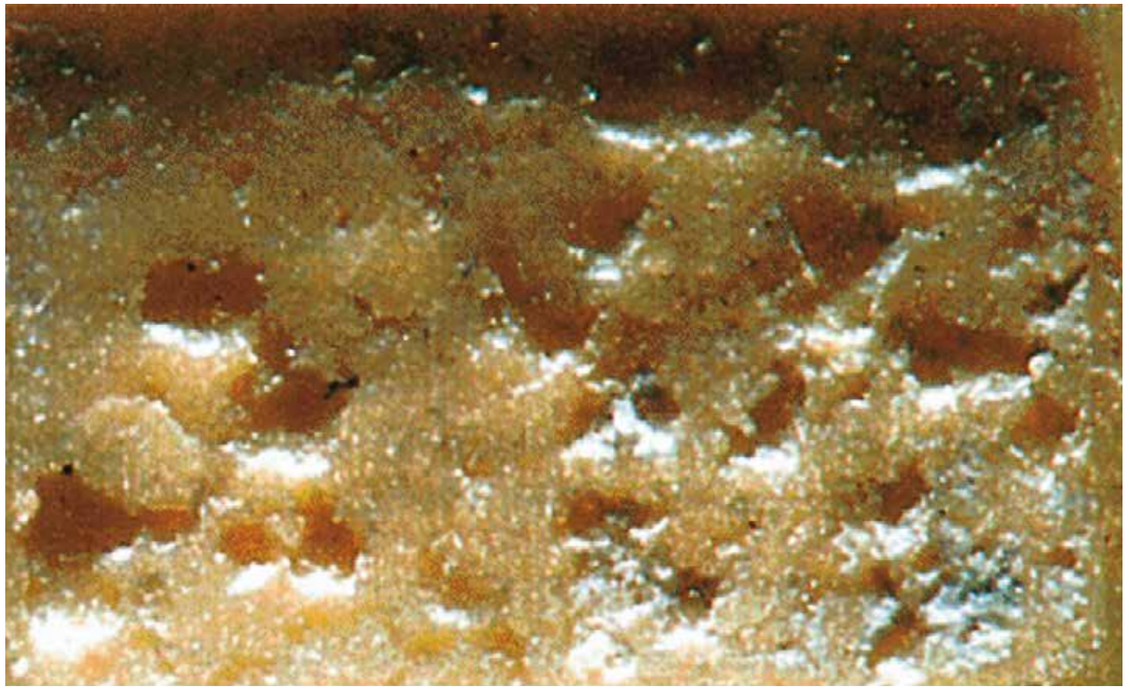
Wear and surfaces

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.

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.

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

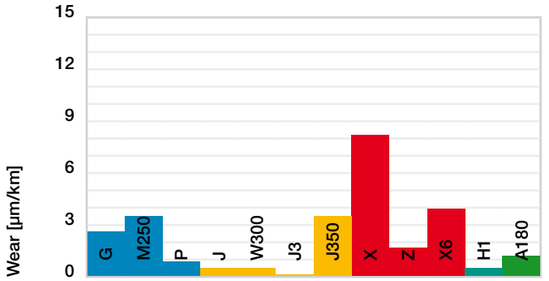


Diagram 13: Wear with Cf53 shaft, p = 1MPa, v = 0.30m/s, Ra = 0.20µm

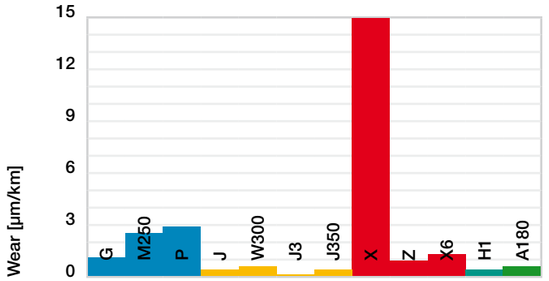


Diagram 17: Wear with hard-anodised aluminium shaft, p = 1MPa, v = 0.30m/s, Ra = 0.20µm

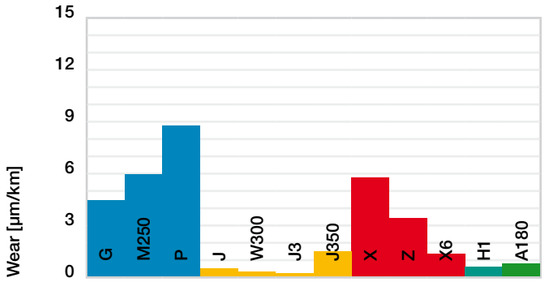


Diagram 14: Wear with 304 stainless steel shaft, p = 1MPa, v = 0.30m/s, Ra = 0.20µm

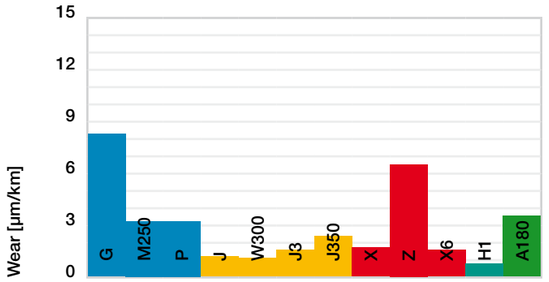


Diagram 18: Wear with free cutting steel shaft, p = 1MPa, v = 0.30m/s, Ra = 0.20µm

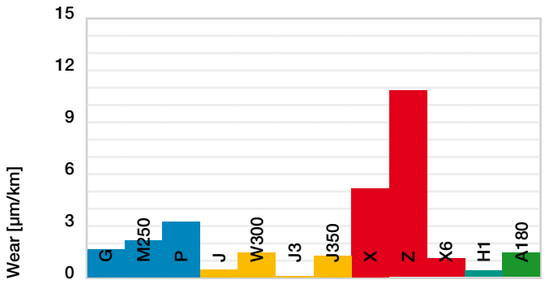


Diagram 15: Wear with HR carbon steel shaft, p = 1MPa, v = 0.30m/s, Ra = 0.20µm

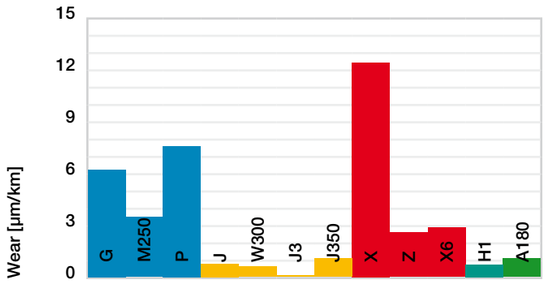


Diagram 19: Wear with high grade steel shaft, p = 1MPa,v = 0.30m/s, Ra = 0.20µm

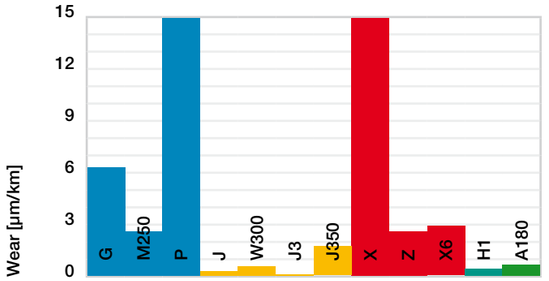


Diagram 16: Wear with Cf53 hard-chromed shaft, p = 1MPa, v = 0.30m/s, Ra = 0.20µm

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 1542**

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 (except for iglidur® A290) and of iglidur® T220 are made according to the requirements of the American Food and Drugs Administration (FDA) for the repeated contact with food.

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® 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® 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® A290	+	+	0 to –	+
iglidur® UW160	+	+	+	+
iglidur® T220	–	+	0	–
iglidur® Q2	+	+	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® 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 –	+

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

UV resistance

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.

UV resistance

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

Material	Radiation resistance
X, Z, UW500, A160	$1 \cdot 10^5$ Gy
X6, A500	$2 \cdot 10^5$ Gy
M250, J3, A200, N54	$1 \cdot 10^4$ Gy
L250	$3 \cdot 10^4$ Gy
V400, C	$2 \cdot 10^4$ Gy
P, K	$5 \cdot 10^2$ Gy
G, G1, J, W300, P210, P230, J260, J200, R, D, C500, A180, A290, UW160, T220, F, F2, Q, Q2, UW, G V0, J2, B, GLW, L500, Q290, AB	$3 \cdot 10^2$ Gy
J350, H, H1, H370, H2, H4, A181, A350, W360, TX1	$2 \cdot 10^2$ Gy

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

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

Table 07: Electrical properties of conductive iglidur® plain bearings

Material	UV resistance
iglidur® G	5
iglidur® G1	4
iglidur® M250	4
iglidur® P210	3
iglidur® P	5
iglidur® K	4
iglidur® GLW	5
iglidur® P230	3
iglidur® J	3
iglidur® W300	3
iglidur® J3	3
iglidur® J350	2
iglidur® J260	1
iglidur® W360	3

Material	UV resistance
iglidur® L250	3
iglidur® L350	5
iglidur® L500	5
iglidur® R	4
iglidur® D	4
iglidur® J200	4
iglidur® X	5
iglidur® Z	3
iglidur® X6	5
iglidur® V400	3
iglidur® HSD350	3
iglidur® UW500	5
iglidur® H1	2
iglidur® H370	5

Material	UV resistance
iglidur® H	2
iglidur® C500	4
iglidur® H2	1
iglidur® A181	3
iglidur® A350	4
iglidur® A500	3
iglidur® A180	3
iglidur® A200	4
iglidur® A160	4
iglidur® A290	4
iglidur® UW160	4
iglidur® T220	2
iglidur® Q2	5
iglidur® Q	2

Material	UV resistance
iglidur® Q290	4
iglidur® F	5
iglidur® F2	3
iglidur® H4	1
iglidur® UW	3
iglidur® N54	4
iglidur® G V0	3
iglidur® J2	2
iglidur® AB	2
iglidur® RW370	3
iglidur® B	1
iglidur® C	1

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

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.

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

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

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

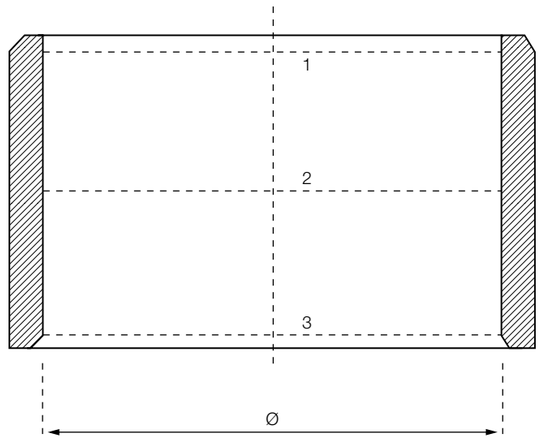


Diagram 20: Positions of the measurement lines

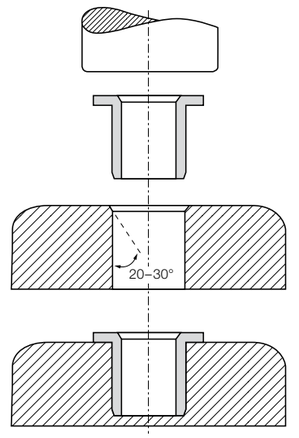


Diagram 21: Press-fit of the bearing (section view)

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	F10	D11
up to 3	+0.000 +0.010	–0.025 +0.000	+0.014 +0.054	+0.006 +0.046	+0.020 +0.080
> 3 to 6	+0.000 +0.012	–0.030 +0.000	+0.020 +0.068	+0.010 +0.058	+0.030 +0.105
> 6 to 10	+0.000 +0.015	–0.036 +0.000	+0.025 +0.083	+0.013 +0.071	+0.040 +0.130
> 10 to 18	+0.000 +0.018	–0.043 +0.000	+0.032 +0.102	+0.016 +0.086	+0.050 +0.160
> 18 to 30	+0.000 +0.021	–0.052 +0.000	+0.040 +0.124	+0.020 +0.104	+0.065 +0.195
> 30 to 50	+0.000 +0.025	–0.062 +0.000	+0.050 +0.150	+0.025 +0.125	+0.080 +0.240
> 50 to 80	+0.000 +0.030	–0.074 +0.000	+0.060 +0.180	+0.030 +0.150	+0.100 +0.290
> 80 to 120	+0.000 +0.035	–0.087 +0.000	+0.072 +0.212	+0.036 +0.176	+0.120 +0.340
>120 to 180	+0.000 +0.040	–0.100 +0.000	+0.085 +0.245	+0.043 +0.203	+0.145 +0.395

Material	E10	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® J350		●	
iglidur® J260	●		
iglidur® W360	●		
iglidur® L250	●		
iglidur® L350		●	
iglidur® L500		●	
iglidur® R	●		
iglidur® D	●		
iglidur® J200	●		
iglidur® X		●	
iglidur® Z		●	
iglidur® X6		●	
iglidur® V400		●	
iglidur® HSD350		●	
iglidur® UW500		●	
iglidur® H1		●	
iglidur® H370		●	

Material	E10	F10	D11
iglidur® H		●	
iglidur® C500		●	
iglidur® H2		●	
iglidur® A181	●		
iglidur® A350		●	
iglidur® A500		●	
iglidur® A180	●		
iglidur® A200			●
iglidur® A160	●		
iglidur® A290			●
iglidur® UW160	●		
iglidur® T220	●		
iglidur® Q2	●		
iglidur® Q	●		
iglidur® Q290	●		
iglidur® TX1	●		
iglidur® F			●
iglidur® F2	●		
iglidur® H4		●	
iglidur® UW	●		
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

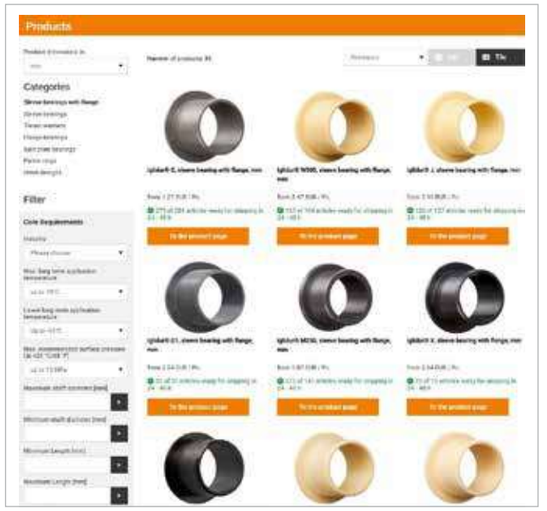
$$pv_{perm.} = \left(\frac{[K1 \cdot \pi \cdot \lambda k \cdot \Delta T]}{\mu \cdot s} + \frac{[K2 \cdot \pi \cdot \lambda s \cdot \Delta T]}{\mu \cdot b1 \cdot 2}\right) \cdot 10^{-3}$$

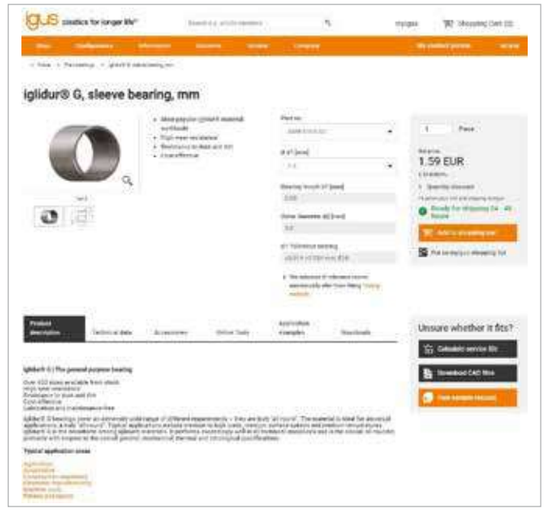
Friction force

$$F_R = \mu \cdot F$$

Short cuts and formulae for polymer plain bearings			
F	=	Load	[N]
F_R	=	Friction force	[N]
$d1$	=	Inner diameter of the bearing	[mm]
$b1$	=	Bearing length	[mm]
$d2$	=	Outer diameter of the bearing	[mm]
p	=	Surface pressure	[N/mm²]
v	=	Surface Speed	[m/s]
n	=	Revolutions per minute	
β	=	Angle	[°]
f	=	Frequency in Hertz	
$K1, K2$	=	Constant for heat dissipation (K1 = 0.5 K2 = 0.042)	[N]
s	=	Bearing wall thickness	[mm]
μ	=	Coefficient of friction	
λs	=	Thermal conductivity of the shaft	
λk	=	Thermal conductivity of the bearing	
ΔT	=	$(T_a - T_u)$	
T_u	=	Ambient temperature	[°C]
T_a	=	Max. application temperature	[°C]

Quicklinks





Quicklinks for more information and additional features. Visit directly your chosen product online, e.g. ▶ www.igus.eu/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® standards: more than 1,900 parts from stock

- Choice of 17 standard iglidur® materials
- For shaft sizes up to 50mm according to ISO 3547-1
- Lubrication and maintenance-free
- Service life can be calculated online

iglidur® standards | Materials overview

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

Materials for general purpose

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

New

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

Endurance runner with high dimensional stability at high temperature: iglidur® J350
▶ Page 191

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

Materials for use at high temperatures

The chemical and temperature specialist: iglidur® X
▶ Page 263

Extremely long service life under extreme conditions: iglidur® Z
▶ Page 273

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

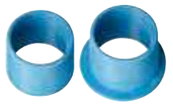
Materials with good media resistance

Endurance runner with high media resistance: iglidur® H1
▶ Page 317

Extremely long service life under water: iglidur® H370
▶ Page 325

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 361

The endurance runner at higher temperatures in the food sector: iglidur® A350
▶ Page 369

The media and temperature specialist in the food sector: iglidur® A500
▶ Page 377

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

Materials for heavy-duty applications

The durable heavy-duty bearing: iglidur® Q2
▶ Page 437

iglidur® standard product range | Materials overview

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

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

	Temperature [°C] [123]	Surface pressure [MPa] [124]	Coefficient of friction [µ] [125]	Wear [µm/km] [125]	Price index
iglidur® J3 – the new endurance runner: specialist for pivoting and pulsating loads Up to 10MPa up to three times more wear-resistant than iglidur® J ▶ Page 183	90	45	0.13	0.07	
iglidur® J350 – endurance runner with high dimensional stability at high temperature Can be used with many kinds of shafts and loads ▶ Page 191	180	60	0.16	1.14	
iglidur® X – the chemical and temperature specialist Up to 150MPa static ▶ Page 263	250	150	0.31	6.30	
iglidur® Z – extremely long service life under extreme conditions Resistant to wear and impact even at high loads and temperatures ▶ Page 273	250	150	0.18	1.00	
iglidur® H1 – endurance runner with high media resistance Excellent coefficient of friction and wear ▶ Page 317	200	80	0.17	0.29	
iglidur® H370 – extremely long service life under water High media resistance ▶ Page 325	200	75	0.17	1.20	
iglidur® A181 – the universal bearing for food contact FDA and EU10/2011-compliant ▶ Page 361	90	31	0.18	0.48	
iglidur® A350 – the endurance runner at higher temperatures in the food sector FDA and EU10/2011-compliant, extremely wear-resistant ▶ Page 369	180	60	0.17	1.79	
iglidur® A500 – the media and temperature specialist in the food sector; FDA and EU10/2011-compliant; extremely wear-resistant for high temperatures ▶ Page 377	250	120	0.36	4.10	
iglidur® Q2 – the durable heavy-duty bearing Combined wear resistance and compressive strength at high loads ▶ Page 437	130	120	0.17	1.50	

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

iglidur® standards | Technical properties – quick selection

iglidur® standard product range

iglidur®	G	G1	M250	P210	P	J	W300	J3	J350	X	Z	H1	H370	A181	A350	A500	Q2
Installation tolerances	E10	E10	D11	E10	E10	E10	E10	E10	F10	F10	F10	F10	F10	E10	F10	F10	E10
Descriptive technical specifications																	
Wear resistance at +23°C																	
Wear resistance at +90°C																	
Wear resistance at +150°C																	
Low coefficient of friction																	
Low moisture absorption																	
Wear resistance under water																	
High media resistance																	
Resistant to edge pressures																	
Resistant to impacts/shock																	
Resistant to dirt																	
For high loads (> 60MPa)	●	●							●	●	●	●	●		●	●	●
Corrosion-free	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
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	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547	ISO 3547
RoHS-II 2011/65/EU	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
FDA-compliant EU10/2011-compliant														●	●	●	
Fire class in accordance with UL-94	HB	HB	V-2	HB	HB	HB	HB	HB	V-0	V-0	V-0	V-0	V-0	HB	V-0	V-1	HB
Availabilities / variants																	
Type S, sleeve	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Type F, with flange	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Type T, thrust washer	●		●			●	●			●	●						
Bar stock, round bar / tube			●	●		●	●	●	●	●		●		●	●		
Bar stock, plate						●									●		
Machined made from bar stock			●	●		●	●	●	●	●		●		●	●		
Injection-moulded special parts	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

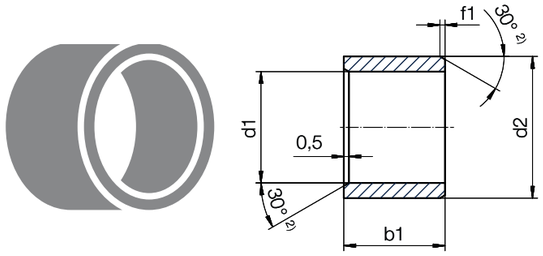
iglidur® standards | Material properties table

iglidur® standard product range

iglidur®	Unit	G	G1	M250	P210	P	J	W300	J3	J350	X	Z	H1	H370	A181	A350	A500	Q2
General properties																		
Density	[g/cm³]	1.46	1.58	1.14	1.40	1.58	1.49	1.24	1.42	1.44	1.44	1.4	1.53	1.66	1.38	1.42	1.28	1.46
Colour																		
Max. moisture absorption at +23°C and 50% relative humidity	[% weight]	0.7	0.2	1.4	0.3	0.2	0.3	1.3	0.3	0.3	0.1	0.3	0.1	0.1	0.2	0.6	0.3	1.1
Max. total moisture absorption	[% weight]	4.0	1.7	7.6	0.5	0.4	1.3	6.5	1.3	1.6	0.5	1.1	0.3	0.1	1.3	1.9	0.5	4.6
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	0.06–0.18	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
pv value, max. (dry)	[MPa·m/s]	0.42	0.60	0.12	0.4	0.39	0.34	0.23	0.5	0.45	1.32	0.84	0.80	0.74	0.31	0.40	0.28	0.7
Mechanical properties																		
Flexural modulus	[MPa]	7,800	11,486	2,700	2,500	5,300	2,400	3,500	2,700	2,000	8,100	2,400	2,800	11,100	1,913	2,000	3,600	8,370
Flexural strength at +20°C	[MPa]	210	178	112	70	120	73	125	70	55	170	95	55	135	48	110	140	240
Compressive strength	[MPa]	78	115	52	50	66	60	61	60	60	100	65	78	79	60	78	118	130
Max. permissible surface pressure at +20°C	[MPa]	80	91	20	50	50	35	60	45	60	150	150	80	75	31	60	120	120
Shore D hardness		81	81	79	75	75	74	77	73	80	85	81	77	82	76	76	83	80
Physical and thermal properties																		
Max. continuous operating temperature	[°C]	+130	+180	+80	+100	+130	+90	+90	+90	+180	+250	+250	+200	+200	+90	+180	+250	+130
Max. short-term operating temperature	[°C]	+220	+220	+170	+160	+200	+120	+180	+120	+220	+315	+310	+240	+240	+110	+210	+300	+200
Min. operating temperature	[°C]	–40	–40	–40	–40	–40	–50	–40	–50	–100	–100	–100	–40	–40	–50	–100	–100	–40
Thermal conductivity	[W/m · K]	0.24	0.46	0.24	0.25	0.25	0.25	0.24	0.25	0.24	0.60	0.62	0.24	0.5	0.25	0.24	0.24	0.24
Coefficient of thermal expansion at +23°C	[$K^{-1} \cdot 10^{-5}$]	9	3.5	10	8	4	10	9	13	7	5	4	6	5	11	8	9	8
Electrical properties																		
Specific contact resistance	[Ωcm]	> 10^{13}	> 10^{9}	> 10^{13}	> 10^{12}	> 10^{13}	> 10^{13}	> 10^{13}	> 10^{12}	> 10^{13}	< 10^{5}	> 10^{11}	> 10^{12}	< 10^{5}	> 10^{12}	> 10^{11}	> 10^{14}	> 10^{13}
Surface resistance	[Ω]	> 10^{11}	> 10^{11}	> 10^{11}	> 10^{11}	> 10^{12}	> 10^{12}	> 10^{12}	> 10^{12}	> 10^{10}	< 10^{3}	> 10^{11}	> 10^{11}	< 10^{5}	> 10^{12}	> 10^{11}	> 10^{13}	> 10^{11}

iglidur® standards | Product range

Sleeve bearings (form S)



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

Order key

Type	Dimensions [mm]					
☐ S	M	-04	05	-04		
iglidur® material	Form S	Metric	Inner Ø d1	Outer Ø d2	Total length b1	

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 1456

Dimensions [mm]

d1[126]	d2	b1	Part No.
4	5,5	4	☐SM-0405-04
4	5,5	6	☐SM-0405-06
5	7	5	☐SM-0507-05
5	7	10	☐SM-0507-10
6	8	6	☐SM-0608-06
6	8	8	☐SM-0608-08
6	8	10	☐SM-0608-10
8	10	8	☐SM-0810-08
8	10	10	☐SM-0810-10
8	10	12	☐SM-0810-12
10	12	8	☐SM-1012-08
10	12	10	☐SM-1012-10
10	12	12	☐SM-1012-12
10	12	15	☐SM-1012-15
10	12	20	☐SM-1012-20
12	14	10	☐SM-1214-10
12	14	12	☐SM-1214-12
12	14	15	☐SM-1214-15
12	14	20	☐SM-1214-20
13	15	10	☐SM-1315-10

d1[126]	d2	b1	Part No.
13	15	20	☐SM-1315-20
14	16	15	☐SM-1416-15
14	16	20	☐SM-1416-20
14	16	25	☐SM-1416-25
15	17	15	☐SM-1517-15
15	17	20	☐SM-1517-20
15	17	25	☐SM-1517-25
16	18	15	☐SM-1618-15
16	18	20	☐SM-1618-20
16	18	25	☐SM-1618-25
18	20	15	☐SM-1820-15
18	20	20	☐SM-1820-20
18	20	25	☐SM-1820-25
20	23	10	☐SM-2023-10
20	23	15	☐SM-2023-15
20	23	20	☐SM-2023-20
20	23	25	☐SM-2023-25
20	23	30	☐SM-2023-30
22	25	15	☐SM-2225-15
22	25	20	☐SM-2225-20

126) 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)

iglidur® standards | Product range

Absolute flexibility: all iglidur® standard sizes available from stock

G	The classic all-rounder
G1	The new standard
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]

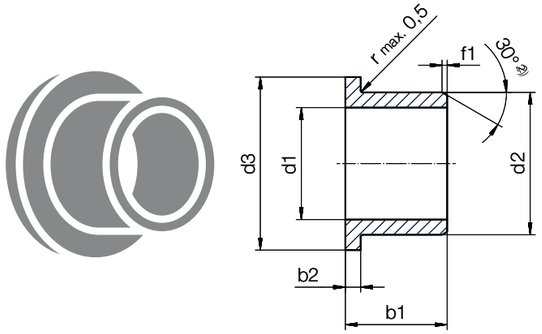
d1[126]	d2	b1	Part No.
22	25	25	☐SM-2225-25
22	25	30	☐SM-2225-30
24	27	15	☐SM-2427-15
24	27	20	☐SM-2427-20
24	27	25	☐SM-2427-25
24	27	30	☐SM-2427-30
25	28	15	☐SM-2528-15
25	28	20	☐SM-2528-20
25	28	25	☐SM-2528-25
25	28	30	☐SM-2528-30
28	32	20	☐SM-2832-20
28	32	25	☐SM-2832-25
28	32	30	☐SM-2832-30
30	34	20	☐SM-3034-20
30	34	25	☐SM-3034-25
30	34	30	☐SM-3034-30
30	34	40	☐SM-3034-40
32	36	20	☐SM-3236-20
32	36	30	☐SM-3236-30
32	36	40	☐SM-3236-40

d1[126]	d2	b1	Part No.
35	39	20	☐SM-3539-20
35	39	30	☐SM-3539-30
35	39	40	☐SM-3539-40
35	39	50	☐SM-3539-50
40	44	20	☐SM-4044-20
40	44	30	☐SM-4044-30
40	44	40	☐SM-4044-40
40	44	50	☐SM-4044-50
45	50	20	☐SM-4550-20
45	50	30	☐SM-4550-30
45	50	40	☐SM-4550-40
45	50	50	☐SM-4550-50
50	55	20	☐SM-5055-20
50	55	30	☐SM-5055-30
50	55	40	☐SM-5055-40
50	55	50	☐SM-5055-50
50	55	60	☐SM-5055-60

126) 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)

iglidur® standards | Product range

Flanged bearing (form F)



2) Thickness < 0.6mm: chamfer = 20°

Chamfer in relation to d1

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

Order key

Type	Dimensions [mm]				
☐ F	M	-0608	-04		
iglidur® material	Form F	Metric	Inner Ø d1	Outer Ø d2	Total length b1

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 1458

iglidur® standards | Product range

Absolute flexibility: all iglidur® standard sizes available from stock

G	The classic all-rounder
G1	The new standard
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[126)]	d2	d3 d13	b1 h13	b2 −0.14	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

126) 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)

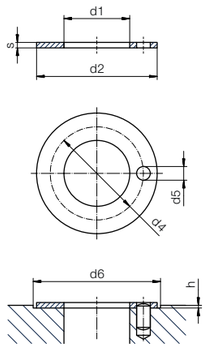
Dimensions [mm]

d1[126)]	d2	d3 d13	b1 h13	b2 −0.14	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

126) 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)

iglidur® standards | Product range

Thrust washer (form T)



Dimensions according to ISO 3547-1 and special dimensions

Imperial dimensions available

Order key

Type	Dimensions [mm]				
☐ T	M	-06	20	-015	
iglidur® material	Form T	Metric	Inner Ø d1	Outer Ø d2	Total length b1

G	The classic all-rounder
W(300)	The classic endurance runner up to 30MPa
X	The chemical and temperature specialist

Choose the suitable material and dimensions for your application

Dimensions [mm]

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

[4] Design without fixing hole

_TM

iglidur® standards | Product range

Absolute flexibility: all iglidur® standard sizes available from stock

Dimensions [mm]

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

[4] Design without fixing hole

Materials for general purpose

Materials for general purpose

The iglidur® materials summarised in this group have a universal use under normal conditions (temperature, media, etc.). iglidur® G is the decathlete among iglidur® materials. It performs exceedingly well in almost all technical disciplines. With reduced moisture absorption and improved wear and temperature behaviour for many applications, iglidur® G1 represents an advanced development of this classic. The iglidur® GLW is specially suitable for solutions in large batches. iglidur® P and iglidur® K have a similar potential as iglidur® G paired with significantly reduced moisture absorption, which is advantageous for use in wet environments.

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

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

iglidur® G:
The classic all-rounder

Temperature [°C] [123]	+130	– +
Surface pressure [MPa] [124]	80	– +
Coefficient of friction [µ] [125]	0.22	– +
Wear [µm/km] [125]	1.75	– +
Price index		– +

iglidur® G1:
More universal

Temperature [°C] [123]	+180	– +
Surface pressure [MPa] [124]	91	– +
Coefficient of friction [µ] [125]	0.11	– +
Wear [µm/km] [125]	0.76	– +
Price index		– +

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

Temperature [°C] [123]	+80	– +
Surface pressure [MPa] [124]	20	– +
Coefficient of friction [µ] [125]	0.56	– +
Wear [µm/km] [125]	2.10	– +
Price index		– +

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

Temperature [°C] [123]	+100	– +
Surface pressure [MPa] [124]	50	– +
Coefficient of friction [µ] [125]	0.17	– +
Wear [µm/km] [125]	0.38	– +
Price index		– +

[123] Max. long-term application temperature [124] Max. recommended surface pressure at +20°C [125] Best combination for p = 1MPa, v = 0.3m/s, rotating

iglidur® P230:
The low-cost all-rounder

Temperature [°C] [123]	+110	– +
Surface pressure [MPa] [124]	60	– +
Coefficient of friction [µ] [125]	0.13	– +
Wear [µm/km] [125]	1.53	– +
Price index		– +

iglidur® P:
The cost-effective outdoor all-rounder

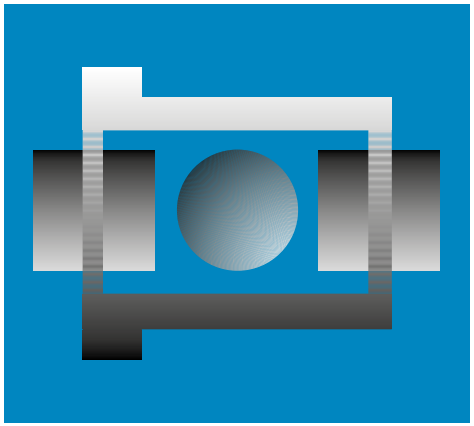
Temperature [°C] [123]	+130	– +
Surface pressure [MPa] [124]	50	– +
Coefficient of friction [µ] [125]	0.24	– +
Wear [µm/km] [125]	1.80	– +
Price index		– +

iglidur® K:
Versatile and cost-effective

Temperature [°C] [123]	+170	– +
Surface pressure [MPa] [124]	50	– +
Coefficient of friction [µ] [125]	0.16	– +
Wear [µm/km] [125]	0.60	– +
Price index		– +

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

Temperature [°C] [123]	+100	– +
Surface pressure [MPa] [124]	80	– +
Coefficient of friction [µ] [125]	0.23	– +
Wear [µm/km] [125]	8.30	– +



The classic all-rounder

Excellent price-performance ratio

iglidur® G

When to use it?

- When an economical all-round performance bearing is required
- For low to medium speeds
- When the bearing needs to run on different shaft materials
- For pivoting and rotational movements

When not to use?

- When mechanical reaming of the bore is necessary
  iglidur® M250
- When lowest wear is required
  iglidur® W300
- When universal chemical resistance is required
  iglidur® X
- When continuous operating temperatures are higher than +130°C
  iglidur® H, iglidur® X, iglidur® H370
- For underwater applications
  iglidur® H370

Bearing technology | Plain bearings | iglidur® G

Ø
1.5 –
195.0mm

Also available as:

Bar stock, round bar:
Page 629

Bar stock, plate:
Page 651

tribo-tape liner:
Page 657

Piston rings:
Page 562

Two hole flange bearing:
Page 557

Moulded special parts:
Page 602

igubal® spherical balls:
Page 783

The classic all-rounder:
Excellent price-performance ratio

iglidur® G plain bearings cover an extremely wide range of different requirements – they are truly „all-round“. The material is ideal for universal applications, a truly „all-round“. Typical applications include medium to high loads, medium surface speeds and medium temperatures.

- Over 650 sizes available from stock
- High wear resistance
- Resistant to dirt
- Cost-effective
- Lubrication-free
- Maintenance-free

Typical application areas

- Agricultural machines
- Construction machinery industry
- Sports and leisure
- Automotive industry
- Mechatronics
- Machine building

Descriptive technical specifications			
Wear resistance at +23°C	–	■■■□□	+
Wear resistance at +90°C	–	■■■□□	+
Wear resistance at +150°C	–	■■□□□	+
Low coefficient of friction	–	■■■■□	+
Low moisture absorption	–	■■■□□	+
Wear resistance under water	–	■□□□□	+
High media resistance	–	■■■□□	+
Resistant to edge pressures	–	■■■■□	+
Suitable for shock and impact loads	–	■■■■□	+
Resistant to dirt	–	■■■■■	+

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

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

iglidur® G
+130°C
80MPa

Technical data

General properties			Testing method
Density	g/cm³	1.46	
Colour		matt grey	
Max. moisture absorption at +23°C and 50 % r.h.	% weight	0.7	DIN 53495
Max. moisture absorption	% weight	4.0	
Coefficient of friction, dynamic, against steel	μ	0.08 – 0.15	
pv value, max. (dry)	MPa · m/s	0.42	
Mechanical properties			
Flexural modulus	MPa	7,800	DIN 53457
Flexural strength at +20°C	MPa	210	DIN 53452
Compressive strength	MPa	78	
Max. recommended surface pressure (+20°C)	MPa	80	
Shore D hardness		81	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+130	
Max. application temperature short-term	°C	+220	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	9	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{13}$	DIN IEC 93
Surface resistance	Ω	$> 10^{11}$	DIN 53482

Table 01: Material properties table

–40°C up to +130°C

80MPa

HB

RoHS-II

ISO 3547-1

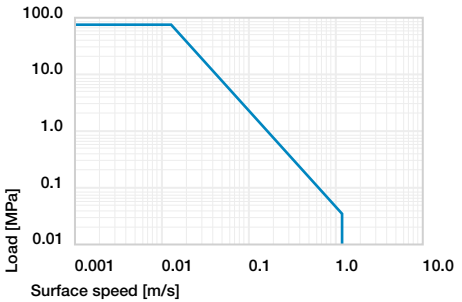


Diagram 01: Permissible pv values for iglidur® G plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® G plain bearings is approximately 0.7% weight. The saturation limit in water is 4.0% weight. This must be taken into account for these types of applications.

Vacuum

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

Radiation resistance

Plain bearings made from iglidur® G are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® G plain bearings are resistant to permanent UV radiation.

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

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® G

iglidur® G is the decathlete among iglidur® materials. It performs exceedingly well in all technical disciplines and is the classic all-rounder, primarily with respect to the overall general, mechanical, thermal and tribological specifications.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® G plain bearings decreases. Diagram 02 shows this inverse relationship. However, at the long-term maximum temperature of +130°C the permissible surface pressure is around 35MPa. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

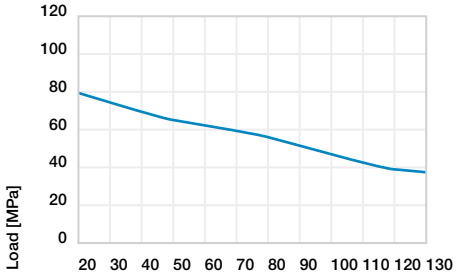


Diagram 02: Maximum recommended surface pressure as a function of temperature (80MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® G at radial loads. The plastic deformation is minimal up to a pressure of approximately 100MPa. However, it is also dependent on the service time.

Surface pressure, page 50

Permissible surface speeds

iglidur® G has been developed for low to medium surface speeds. The maximum values shown in table 03 can only be achieved at low pressures. At the given speeds, friction can cause a temperature increase to maximum permissible levels. In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.0	0.7	4.0
short-term	**m/s**	2.0	1.4	5.0

Table 03: Maximum surface speeds

Temperature

The ambient temperatures strongly influence the properties of plain bearings. The temperatures prevailing in the bearing system also have an influence on the wear. With increasing temperatures, the wear increases and this effect is significant when temperatures rise over +120°C. For temperatures over +80°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the surface speed and load (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

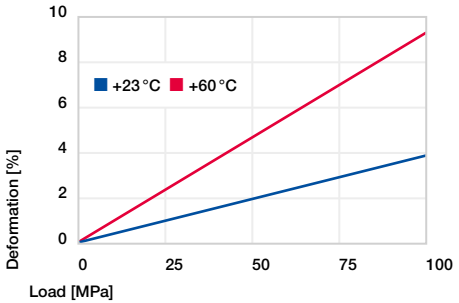


Diagram 03: Deformation under pressure and temperature

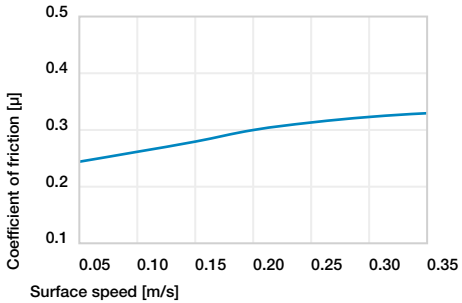


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

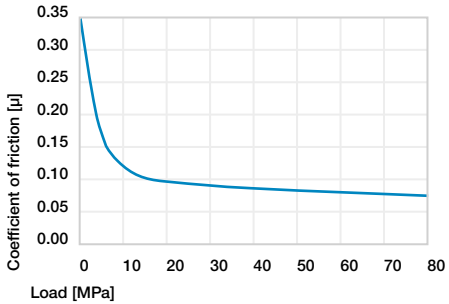


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

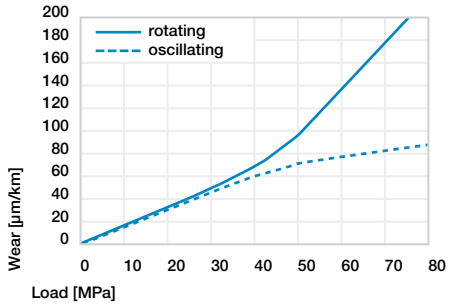


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

The friction and wear are also dependent, to a large degree, on the shaft material. Shafts that are too smooth, increase both the coefficient of friction and the wear of the bearing. For iglidur® G a ground surface with an average surface finish Ra = 0.8μm is recommended. Diagram 06 shows results of testing different shaft materials with plain bearings made from iglidur® G. It is important to notice that with increasing loads, the recommended hardness of the shaft increases. The „soft" shafts tend to wear more easily and thus the wear of the overall system increases. If the loads exceed 2MPa it is important to recognise that the wear rate (the gradient of the curves) clearly decreases with the hard shaft materials. If the shaft material you plan on using is not shown in these test results, please contact us.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.08 – 0.15	0.09	0.04	0.04

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

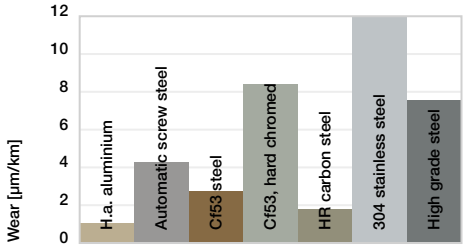


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® G 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 E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

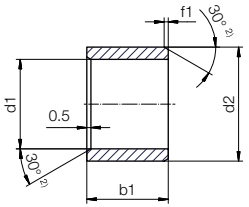
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® G

Sleeve bearing (form S)



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

Dimensions according to ISO 3547-1 and special dimensions

Order example: GSM-0103-02 – no minimum order quantity.
G iglidur® material S Sleeve bearing M Metric 01 Inner Ø d1 03 Outer Ø d2 02 Total length b1

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
1.5		3.0	2.0	GSM-0103-02
2.0		3.5	3.0	GSM-0203-03
2.5	+0.014	4.5	5.0	GSM-02504-05
3.0	+0.054	4.5	3.0	GSM-0304-03
3.0		4.5	5.0	GSM-0304-05
3.0		4.5	6.0	GSM-0304-06
4.0		5.5	4.0	GSM-0405-04
4.0	+0.020	5.5	6.0	GSM-0405-06
4.0	+0.068	7.0	5.5	GSM-0407-05
4.5		6.0	8.0	GSM-0406-08
5.0		6.0	4.6	GSM-0506-046
5.0	+0.010	6.0	5.0	GSM-0506-05
5.0	+0.040	6.0	7.0	GSM-0506-07
5.0		7.0	5.0	GSM-0507-05
5.0	+0.020	7.0	7.0	GSM-0507-07
5.0	+0.068	7.0	8.0	GSM-0507-08
5.0		7.0	10.0	GSM-0507-10
6.0		7.0	6.0	GSM-0607-06
6.0		7.0	12.0	GSM-0607-12
6.0	+0.010	7.0	17.0	GSM-0607-17
6.0	+0.040	7.0	17.5	GSM-0607-17.5
6.0		7.0	19.0	GSM-0607-19
6.0		8.0	1.5	GSM-0608-015
6.0		8.0	2.5	GSM-0608-025
6.0	+0.020	8.0	3.0	GSM-0608-03
6.0	+0.068	8.0	4.0	GSM-0608-04
6.0		8.0	5.0	GSM-0608-05

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
6.0		8.0	5.5	GSM-0608-055
6.0		8.0	6.0	GSM-0608-06
6.0	+0.020	8.0	8.0	GSM-0608-08
6.0	+0.068	8.0	9.5	GSM-0608-09
6.0		8.0	10.0	GSM-0608-10
6.0		8.0	11.8	GSM-0608-11
6.0		8.0	13.8	GSM-0608-13
7.0	+0.013	8.0	10.0	GSM-0708-10
7.0	+0.049	8.0	19.0	GSM-0708-19
7.0		9.0	8.0	GSM-0709-08
7.0	+0.025	9.0	9.0	GSM-0709-09
7.0	+0.083	9.0	10.0	GSM-0709-10
7.0		9.0	12.0	GSM-0709-12
8.0		9.0	5.0	GSM-0809-05
8.0	+0.013	9.0	6.0	GSM-0809-06
8.0	+0.049	9.0	8.0	GSM-0809-08
8.0		9.0	12.0	GSM-0809-12
8.0		10.0	5.0	GSM-0810-05
8.0		10.0	6.0	GSM-0810-06
8.0		10.0	6.8	GSM-0810-07
8.0		10.0	8.0	GSM-0810-08
8.0	+0.025	10.0	10.0	GSM-0810-10
8.0	+0.083	10.0	12.0	GSM-0810-12
8.0		10.0	13.8	GSM-0810-13
8.0		10.0	14.0	GSM-0810-14
8.0		10.0	15.0	GSM-0810-15
8.0		10.0	16.0	GSM-0810-16

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

Product range

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
8.0		10.0	18.0	GSM-0810-18
8.0	+0.025	10.0	20.0	GSM-0810-20
8.0	+0.083	10.0	22.0	GSM-0810-22
8.0		10.0	25.0	GSM-0810-25
8.0	+0.040 +0.130	12.0	9.0	GSM-0812-09
9.0	+0.013	10.0	12.0	GSM-0910-12
9.0	+0.049	10.0	16.0	GSM-0910-16
9.0	+0.025	11.0	6.0	GSM-0911-06
9.0	+0.083	11.0	20.0	GSM-0911-20
10.0		11.0	6.0	GSM-1011-06
10.0		11.0	7.0	GSM-1011-07
10.0	+0.013	11.0	10.0	GSM-1011-10
10.0	+0.049	11.0	20.0	GSM-1011-20
10.0		11.0	25.0	GSM-1011-25
10.0		11.0	30.0	GSM-1011-30
10.0		12.0	4.0	GSM-1012-04
10.0		12.0	4.5	GSM-1012-045
10.0		12.0	5.0	GSM-1012-05
10.0		12.0	6.0	GSM-1012-06
10.0		12.0	7.0	GSM-1012-07
10.0		12.0	8.0	GSM-1012-08
10.0	+0.025	12.0	9.0	GSM-1012-09
10.0	+0.083	12.0	10.0	GSM-1012-10
10.0		12.0	12.0	GSM-1012-12
10.0		12.0	14.0	GSM-1012-14
10.0		12.0	15.0	GSM-1012-15
10.0		12.0	17.0	GSM-1012-17
10.0		12.0	20.0	GSM-1012-20
10.0		13.0	13.5	GSM-1013-13
10.0	+0.025	14.0	10.0	GSM-1014-10
10.0	+0.115	14.0	20.0	GSM-1014-20
10.0	+0.040 +0.130	16.0	10.0	GSM-1016-10
12.0		13.0	4.7	GSM-1213-047
12.0	+0.016	13.0	10.0	GSM-1213-10
12.0	+0.059	13.0	12.0	GSM-1213-12
12.0		13.0	15.0	GSM-1213-15
12.0		14.0	4.0	GSM-1214-04
12.0		14.0	5.0	GSM-1214-05
12.0		14.0	6.0	GSM-1214-06
12.0		14.0	8.0	GSM-1214-08
12.0	+0.032	14.0	10.0	GSM-1214-10
12.0	+0.102	14.0	12.0	GSM-1214-12
12.0		14.0	14.0	GSM-1214-14
12.0		14.0	15.0	GSM-1214-15
12.0		14.0	20.0	GSM-1214-20
12.0		14.0	25.0	GSM-1214-25

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
12.0	+0.032	15.0	6.0	GSM-1215-06
12.0	+0.102	15.0	22.0	GSM-1215-22
12.0	+0.050	16.0	10.0	GSM-1216-10
12.0	+0.160	16.0	20.0	GSM-1216-20
13.0		15.0	7.0	GSM-1315-070
13.0		15.0	7.5	GSM-1315-075
13.0		15.0	10.0	GSM-1315-10
13.0		15.0	15.0	GSM-1315-15
13.0		15.0	20.0	GSM-1315-20
13.0		15.0	25.0	GSM-1315-25
14.0	+0.032	16.0	3.0	GSM-1416-03
14.0	+0.102	16.0	6.0	GSM-1416-06
14.0		16.0	8.0	GSM-1416-08
14.0		16.0	10.0	GSM-1416-10
14.0		16.0	12.0	GSM-1416-12
14.0		16.0	15.0	GSM-1416-15
14.0		16.0	20.0	GSM-1416-20
14.0		16.0	25.0	GSM-1416-25
14.0		16.0	45.0	GSM-1416-45
15.0	+0.016	16.0	10.0	GSM-1516-10
15.0	+0.059	16.0	15.0	GSM-1516-15
15.0		17.0	4.0	GSM-1517-04
15.0		17.0	10.0	GSM-1517-10
15.0		17.0	12.0	GSM-1517-12
15.0		17.0	15.0	GSM-1517-15
15.0		17.0	20.0	GSM-1517-20
15.0		17.0	25.0	GSM-1517-25
16.0		18.0	5.5	GSM-1618-055
16.0		18.0	8.0	GSM-1618-08
16.0	+0.032	18.0	10.0	GSM-1618-10
16.0	+0.102	18.0	12.0	GSM-1618-12
16.0		18.0	13.5	GSM-1618-13.5
16.0		18.0	15.0	GSM-1618-15
16.0		18.0	20.0	GSM-1618-20
16.0		18.0	25.0	GSM-1618-25
16.0		18.0	30.0	GSM-1618-30
16.0		18.0	38.5	GSM-1618-38.5
16.0		18.0	50.0	GSM-1618-50
17.0		19.0	15.0	GSM-1719-15
18.0	+0.016 +0.059	19.0	15.0	GSM-1819-15
18.0		20.0	6.0	GSM-1820-06
18.0		20.0	10.0	GSM-1820-10
18.0		20.0	12.0	GSM-1820-12
18.0	+0.032	20.0	15.0	GSM-1820-15
18.0	+0.102	20.0	20.0	GSM-1820-20
18.0		20.0	25.0	GSM-1820-25
18.0		20.0	34.0	GSM-1820-34

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

Bearing technology | Plain bearings | iglidur® G

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
18.0	+0.032 +0.102	20.0	38.0	GSM-1820-38
18.0		20.0	45.0	GSM-1820-45
18.0		22.0	30.0	GSM-1822-30
19.0	+0.040 +0.124	22.0	6.0	GSM-1922-06
19.0		22.0	28.0	GSM-1922-28
19.0		22.0	35.0	GSM-1922-35
20.0	+0.020 +0.072	21.0	20.0	GSM-2021-20
20.0		22.0	3.0	GSM-2022-03
20.0		22.0	8.0	GSM-2022-08
20.0		22.0	10.5	GSM-2022-105
20.0		22.0	15.0	GSM-2022-15
20.0		22.0	20.0	GSM-2022-20
20.0		22.0	22.0	GSM-2022-22
20.0		22.0	28.0	GSM-2022-28
20.0		22.0	30.0	GSM-2022-30
20.0		22.0	47.0	GSM-2022-47
20.0		23.0	4.5	GSM-2023-045
20.0		23.0	10.0	GSM-2023-10
20.0		23.0	15.0	GSM-2023-15
20.0		23.0	20.0	GSM-2023-20
20.0		23.0	24.0	GSM-2023-24
20.0	+0.040 +0.124	23.0	25.0	GSM-2023-25
20.0		23.0	30.0	GSM-2023-30
20.0		23.0	35.0	GSM-2023-35
22.0		24.0	8.0	GSM-2224-08
22.0		24.0	10.0	GSM-2224-10
22.0		24.0	12.0	GSM-2224-12
22.0		24.0	15.0	GSM-2224-15
22.0		24.0	17.0	GSM-2224-17
22.0		24.0	20.0	GSM-2224-20
22.0		24.0	30.0	GSM-2224-30
22.0		24.0	48.0	GSM-2224-48
22.0		25.0	15.0	GSM-2225-15
22.0		25.0	20.0	GSM-2225-20
22.0		25.0	25.0	GSM-2225-25
22.0		25.0	30.0	GSM-2225-30
22.0		25.0	38.5	GSM-2225-38.5
24.0	+0.020 +0.072	25.0	25.0	GSM-2425-25
24.0		27.0	6.0	GSM-2427-06
24.0		27.0	15.0	GSM-2427-15
24.0	+0.040 +0.124	27.0	20.0	GSM-2427-20
24.0		27.0	24.0	GSM-2427-24
24.0		27.0	25.0	GSM-2427-25
24.0		27.0	30.0	GSM-2427-30
25.0	+0.020 +0.072	26.0	23.0	GSM-2526-23
25.0		26.0	25.0	GSM-2526-25
25.0	+0.040 +0.124	28.0	12.0	GSM-2528-12
25.0		28.0	15.0	GSM-2528-15
25.0		28.0	20.0	GSM-2528-20
25.0		28.0	24.0	GSM-2528-24
25.0		28.0	25.0	GSM-2528-25
25.0		28.0	30.0	GSM-2528-30
25.0		28.0	35.0	GSM-2528-35
25.0		28.0	50.0	GSM-2528-50
26.0		30.0	16.0	GSM-2630-16
27.0		30.0	5.0	GSM-2730-05
28.0		32.0	10.5	GSM-2832-105
28.0		32.0	12.0	GSM-2832-12
28.0		32.0	15.0	GSM-2832-15
28.0		32.0	20.0	GSM-2832-20
28.0		32.0	23.0	GSM-2832-23
28.0		32.0	25.0	GSM-2832-25
28.0		32.0	30.0	GSM-2832-30
28.0	+0.065 +0.195	35.0	19.0	GSM-2835-19
28.0		35.0	28.0	GSM-2835-28
29.0	+0.040 +0.124	33.0	6.0	GSM-2933-06
30.0	+0.020 +0.072	31.0	5.0	GSM-3031-05
30.0		31.0	12.0	GSM-3031-12
30.0		31.0	30.0	GSM-3031-30
30.0	+0.040 +0.124	34.0	12.0	GSM-3034-12
30.0		34.0	15.0	GSM-3034-15
30.0		34.0	20.0	GSM-3034-20
30.0		34.0	24.0	GSM-3034-24
30.0		34.0	25.0	GSM-3034-25
30.0		34.0	30.0	GSM-3034-30
30.0		34.0	35.0	GSM-3034-35
30.0		34.0	40.0	GSM-3034-40
30.0		34.0	52.5	GSM-3034-525
32.0	+0.050 +0.150	36.0	15.0	GSM-3236-15
32.0		36.0	20.0	GSM-3236-20
32.0		36.0	30.0	GSM-3236-30
32.0		36.0	40.0	GSM-3236-40
35.0		39.0	14.0	GSM-3539-14
35.0		39.0	20.0	GSM-3539-20
35.0		39.0	25.0	GSM-3539-25
35.0		39.0	30.0	GSM-3539-30
35.0		39.0	40.0	GSM-3539-40
35.0		39.0	50.0	GSM-3539-50
35.0		41.0	50.0	GSM-3541-50
36.0		40.0	20.0	GSM-3640-20
37.0		41.0	20.0	GSM-3741-20
38.0		42.0	25.0	GSM-3842-25
40.0		44.0	10.0	GSM-4044-10

[3] After press-fit. *Testing methods page 57*

iglidur® G
+130°C
80MPa

Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
40.0	+0.050 +0.150	44.0	16.5	GSM-4044-16
40.0		44.0	20.0	GSM-4044-20
40.0		44.0	30.0	GSM-4044-30
40.0		44.0	40.0	GSM-4044-40
40.0		44.0	50.0	GSM-4044-50
40.0		44.0	52.5	GSM-4044-525
42.0		46.0	40.0	GSM-4246-40
44.0		48.0	20.0	GSM-4448-20
45.0		50.0	10.0	GSM-4550-10
45.0		50.0	20.0	GSM-4550-20
45.0		50.0	22.0	GSM-4550-22
45.0		50.0	23.5	GSM-4550-235
45.0		50.0	30.0	GSM-4550-30
45.0		50.0	38.0	GSM-4550-38
45.0		50.0	40.0	GSM-4550-40
45.0		50.0	50.0	GSM-4550-50
50.0		55.0	20.0	GSM-5055-20
50.0		55.0	25.0	GSM-5055-25
50.0		55.0	30.0	GSM-5055-30
50.0		55.0	40.0	GSM-5055-40
50.0		55.0	50.0	GSM-5055-50
50.0		55.0	60.0	GSM-5055-60
52.0		57.0	20.0	GSM-5257-20
55.0		60.0	20.0	GSM-5560-20
55.0		60.0	40.0	GSM-5560-40
55.0		60.0	50.0	GSM-5560-50
55.0	+0.060 +0.180	60.0	60.0	GSM-5560-60
60.0		65.0	30.0	GSM-6065-30
60.0		65.0	40.0	GSM-6065-40
60.0		65.0	50.0	GSM-6065-50
60.0		65.0	60.0	GSM-6065-60
60.0		65.0	70.0	GSM-6065-70
62.0	+0.100 +0.250	67.0	35.0	GSM-6267-35
62.0		67.0	72.0	GSM-6267-72
65.0		70.0	30.0	GSM-6570-30
65.0		70.0	50.0	GSM-6570-50
65.0		70.0	104.0	GSM-6570-104
68.0		73.0	60.0	GSM-6873-60
70.0	+0.060 +0.180	75.0	60.0	GSM-7075-60
72.0		77.0	24.5	GSM-7277-24.5
72.0		77.0	76.0	GSM-7277-76
75.0		80.0	40.0	GSM-7580-40
75.0		80.0	60.0	GSM-7580-60
80.0		85.0	60.0	GSM-8085-60
80.0		85.0	100.0	GSM-8085-100
85.0		90.0	100.0	GSM-8590-100
90.0		95.0	100.0	GSM-9095-100
95.0		100.0	100.0	GSM-95100-100
100.0		105.0	21.5	GSM-100105-21.5
100.0	+0.072 +0.212	105.0	30.0	GSM-100105-30
100.0		105.0	32.0	GSM-100105-32
100.0		105.0	100.0	GSM-100105-100
105.0		110.0	100.0	GSM-105110-100
110.0		115.0	100.0	GSM-110115-100
120.0		125.0	100.0	GSM-120125-100
125.0		130.0	100.0	GSM-125130-100
130.0		135.0	100.0	GSM-130135-100
135.0	+0.085 +0.245	140.0	80.0	GSM-135140-80
140.0		145.0	100.0	GSM-140145-100
140.0		145.0	104.0	GSM-140145-104
150.0		155.0	100.0	GSM-150155-100

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/G

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Our prices are scaled according to order quantities, current prices can be found online.

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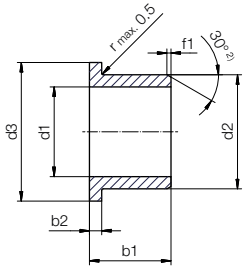
Bearing technology | Plain bearings | iglidur® G

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: GFM-0304-02 – no minimum order quantity.
G iglidur® material F Flange bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 02 Total length b1

d1 [mm]	d1 Tolerance 3)	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
3.0		4.5	7.5	2.0	0.50	GFM-0304-02
3.0		4.5	7.5	2.7	0.75	GFM-0304-0275
3.0	+0.014 +0.054	4.5	7.5	3.0	0.75	GFM-0304-03
3.0		4.5	7.5	5.0	0.75	GFM-0304-05
3.0		4.5	7.0	5.0	0.75	GFM-030407-05
4.0	+0.010	5.0	9.5	4.0	0.50	GFM-04050-04
4.0	+0.040	5.0	9.5	6.0	0.50	GFM-04050-06
4.0		5.5	9.5	2.5	0.75	GFM-0405-0255
4.0		5.5	9.5	3.0	0.75	GFM-0405-03
4.0	+0.020 +0.068	5.5	9.5	4.0	0.75	GFM-0405-04
4.0		5.5	9.5	6.0	0.75	GFM-0405-06
4.0		5.5	8.0	10.0	1.00	GFM-040508-10
5.0		6.0	10.0	3.5	0.50	GFM-0506-035
5.0		6.0	10.0	4.0	0.50	GFM-0506-04
5.0	+0.010 +0.040	6.0	10.0	5.0	0.50	GFM-0506-05
5.0		6.0	10.0	6.0	0.50	GFM-0506-06
5.0		6.0	10.0	15.3	0.50	GFM-0506-15
5.0		7.0	11.0	3.5	1.00	GFM-0507-03
5.0		7.0	15.0	4.0	1.00	GFM-050715-04
5.0		7.0	11.0	4.0	1.00	GFM-0507-04
5.0		7.0	9.5	5.0	1.00	GFM-050709-05
5.0	+0.020 +0.068	7.0	11.0	5.0	1.00	GFM-0507-05
5.0		7.0	11.0	7.0	1.00	GFM-0507-07
5.0		7.0	11.0	11.0	1.00	GFM-0507-11
5.0		7.0	11.0	14.5	1.00	GFM-0507-145
5.0		7.0	11.0	30.0	1.00	GFM-0507-30
6.0	+0.010	7.0	11.0	2.4	0.50	GFM-0607-024
6.0	+0.040	7.0	11.0	4.5	0.50	GFM-0607-045

d1 [mm]	d1 Tolerance 3)	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.010	7.0	11.0	6.0	0.50	GFM-0607-06
6.0	+0.040	7.0	11.0	10.0	0.50	GFM-0607-10
6.0		8.0	12.0	2.5	1.00	GFM-0608-025
6.0		8.0	14.0	2.8	1.00	GFM-060814-028
6.0		8.0	12.0	4.0	1.00	GFM-0608-04
6.0		8.0	12.0	4.8	1.00	GFM-0608-048
6.0		8.0	12.0	5.0	1.00	GFM-0608-05
6.0	+0.020	8.0	12.0	6.0	1.00	GFM-0608-06
6.0	+0.068	8.0	12.0	7.0	1.00	GFM-0608-07
6.0		8.0	12.0	8.0	1.00	GFM-0608-08
6.0		8.0	12.0	10.0	1.00	GFM-0608-10
6.0		8.0	14.0	12.0	1.00	GFM-060814-12
6.0		8.0	12.0	25.0	1.00	GFM-0608-25
6.0		8.0	12.0	35.0	1.00	GFM-0608-35
7.0		8.0	12.0	1.7	0.50	GFM-0708-017
7.0	+0.013	8.0	12.0	3.0	0.50	GFM-0708-03
7.0	+0.049	8.0	12.0	6.0	0.50	GFM-0708-06
7.0		8.0	12.0	8.0	0.50	GFM-0708-08
7.0		9.0	15.0	3.5	1.00	GFM-0709-035
7.0		9.0	15.0	6.0	1.00	GFM-0709-06
7.0	+0.025 +0.083	9.0	19.0	10.0	1.00	GFM-070919-10
7.0		9.0	15.0	10.0	1.00	GFM-0709-10
7.0		9.0	15.0	12.0	1.00	GFM-0709-12
8.0		9.0	15.0	3.0	0.50	GFM-0809-03
8.0		9.0	13.0	3.5	0.50	GFM-0809-035
8.0	+0.013 +0.049	9.0	13.0	5.5	0.50	GFM-0809-055
8.0		9.0	13.0	8.0	0.50	GFM-0809-08
8.0		9.0	13.0	12.0	0.50	GFM-0809-12

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

iglidur® G
+130°C
80MPa

Product range

d1 [mm]	d1 Tolerance 3)	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
8.0		10.0	18.0	3.0	1.00	GFM-081018-03
8.0	+0.025	10.0	15.0	3.0	1.00	GFM-0810-03
8.0	+0.083	10.0	15.0	4.0	1.00	GFM-0810-04
8.0	+0.040 +0.098	10.0	14.0	5.0	1.00	GFM-081014-05
8.0		10.0	15.0	5.5	1.00	GFM-0810-05
8.0		10.0	14.0	6.0	1.00	GFM-081014-06
8.0		10.0	15.0	6.5	1.00	GFM-0810-065
8.0	+0.025	10.0	15.0	7.5	1.00	GFM-0810-07
8.0	+0.083	10.0	13.0	8.0	1.00	GFM-081013-08
8.0		10.0	14.0	8.0	1.00	GFM-081014-08
8.0		10.0	15.0	9.5	1.00	GFM-0810-09
8.0	+0.040 +0.098	10.0	14.0	10.0	1.00	GFM-081014-10
8.0		10.0	15.0	10.0	1.00	GFM-0810-10
8.0		10.0	14.0	11.0	1.00	GFM-0810-11
8.0		10.0	16.0	11.5	1.50	GFM-081016-11
8.0		10.0	12.0	12.5	1.00	GFM-081012-125
8.0	+0.025 +0.083	10.0	16.0	15.0	1.50	GFM-081016-15
8.0		10.0	15.0	15.0	1.00	GFM-0810-15
8.0		10.0	17.0	15.0	1.00	GFM-081017-15
8.0		10.0	15.0	25.0	1.00	GFM-0810-25
8.0		10.0	15.0	30.0	1.00	GFM-0810-30
8.0	+0.040	12.0	16.0	6.0	2.00	GFM-0812-06
8.0	+0.130	12.0	21.0	8.0	2.00	GFM-081221-08
9.0	+0.013	10.0	15.0	6.5	0.50	GFM-0910-065
9.0	+0.049	10.0	15.0	17.5	0.50	GFM-0910-17
10.0	+0.013 +0.046	11.0	20.0	3.5	0.50	GFM-1011-03
10.0	+0.013	11.0	15.0	4.4	0.50	GFM-1011-044
10.0	+0.049	11.0	15.0	10.0	0.50	GFM-1011-10
10.0		12.0	18.0	3.5	1.00	GFM-1012-035
10.0		12.0	18.0	4.0	1.00	GFM-1012-04
10.0		12.0	18.0	5.0	1.00	GFM-1012-05
10.0		12.0	18.0	6.0	1.00	GFM-1012-06
10.0		12.0	16.0	6.0	1.00	GFM-101216-06
10.0		12.0	18.0	7.0	1.00	GFM-1012-07
10.0	+0.025	12.0	16.0	9.0	1.00	GFM-101216-09
10.0	+0.083	12.0	18.0	9.0	1.00	GFM-1012-09
10.0		12.0	18.0	10.0	1.00	GFM-1012-10
10.0		12.0	18.0	12.0	1.00	GFM-1012-12
10.0		12.0	15.0	12.0	1.00	GFM-101215-12
10.0		12.0	18.0	15.0	1.00	GFM-1012-15
10.0		12.0	16.0	15.0	1.00	GFM-101216-15
10.0		12.0	18.0	17.0	1.00	GFM-1012-17
11.0	+0.016	12.0	16.0	6.0	0.50	GFM-1112-06
12.0	+0.059	13.0	17.0	3.0	0.50	GFM-1213-03
12.0		13.0	15.0	12.0	0.50	GFM-121315-12

d1 [mm]	d1 Tolerance 3)	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
12.0	+0.016 +0.059	13.0	17.0	12.0	0.50	GFM-1213-12
12.0		14.0	20.0	3.0	1.00	GFM-1214-03
12.0		14.0	18.0	4.0	1.00	GFM-121418-04
12.0		14.0	20.0	5.0	1.00	GFM-1214-05
12.0		14.0	20.0	6.0	1.00	GFM-1214-06
12.0		14.0	20.0	7.0	1.00	GFM-1214-07
12.0		14.0	18.0	8.0	1.00	GFM-121418-08
12.0		14.0	20.0	9.0	1.00	GFM-1214-09
12.0		14.0	18.0	10.0	1.00	GFM-121418-10
12.0		14.0	20.0	10.0	1.00	GFM-1214-10
12.0		14.0	20.0	11.0	1.00	GFM-1214-11
12.0		14.0	20.0	12.0	1.00	GFM-1214-12
12.0		14.0	18.0	12.0	1.00	GFM-121418-12
12.0		14.0	20.0	15.0	1.00	GFM-1214-15
12.0		14.0	18.0	15.0	1.00	GFM-121418-15
12.0		14.0	20.0	17.0	1.00	GFM-1214-17
12.0	+0.032 +0.102	14.0	20.0	20.0	1.00	GFM-1214-20
12.0		14.0	18.0	20.0	1.00	GFM-121418-20
12.0		14.0	20.0	24.0	1.00	GFM-1214-24
12.0		14.0	20.0	31.0	1.00	GFM-1214-31
12.0		14.0	20.0	40.0	1.00	GFM-1214-40
13.0		15.0	22.0	6.0	1.00	GFM-1315-06
13.0		15.0	22.0	8.0	1.00	GFM-1315-08
13.0		15.0	22.0	40.0	1.00	GFM-131522-40
14.0		16.0	22.0	3.0	1.00	GFM-1416-03
14.0		16.0	22.0	4.0	1.00	GFM-1416-04
14.0		16.0	22.0	6.0	1.00	GFM-1416-06
14.0		16.0	22.0	8.0	1.00	GFM-1416-08
14.0		16.0	22.0	10.0	1.00	GFM-1416-10
14.0		16.0	22.0	12.0	1.00	GFM-1416-12
14.0		16.0	22.0	17.0	1.00	GFM-1416-17
14.0		16.0	22.0	21.0	1.00	GFM-1416-21
15.0		16.0	20.0	2.0	0.50	GFM-1516-02
15.0	+0.016	16.0	20.0	2.5	0.50	GFM-1516-025
15.0	+0.059	16.0	20.0	3.0	0.50	GFM-1516-03
15.0		16.0	20.0	15.0	0.50	GFM-1516-15
15.0		17.0	23.0	4.0	1.00	GFM-1517-04
15.0		17.0	23.0	4.5	1.00	GFM-1517-045
15.0		17.0	23.0	5.0	1.00	GFM-1517-05
15.0		17.0	23.0	9.0	1.00	GFM-1517-09
15.0		17.0	23.0	12.0	1.00	GFM-1517-12
15.0	+0.032 +0.102	17.0	23.0	17.0	1.00	GFM-1517-17
15.0		17.0	23.0	20.0	1.00	GFM-1517-20
15.0		18.0	24.0	32.0	1.50	GFM-151824-32
16.0		18.0	24.0	4.0	1.00	GFM-1618-04
16.0		18.0	24.0	5.0	1.00	GFM-1618-05
16.0		18.0	24.0	6.0	1.00	GFM-1618-06

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

Bearing technology | Plain bearings | iglidur® G

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
16.0		18.0	24.0	9.0	1.00	GFM-1618-09
16.0		18.0	24.0	12.0	1.00	GFM-1618-12
16.0		18.0	24.0	16.0	1.00	GFM-1618-16
16.0		18.0	24.0	17.0	1.00	GFM-1618-17
16.0		18.0	24.0	21.0	1.00	GFM-1618-21
17.0		19.0	25.0	9.0	1.00	GFM-1719-09
17.0		19.0	25.0	16.0	1.00	GFM-1719-16
17.0		19.0	25.0	25.0	1.00	GFM-1719-25
18.0		20.0	26.0	4.0	1.00	GFM-1820-04
18.0	+0.032 +0.102	20.0	26.0	6.0	1.00	GFM-1820-06
18.0		20.0	22.0	6.0	1.00	GFM-182022-06
18.0		20.0	26.0	9.0	1.00	GFM-1820-09
18.0		20.0	26.0	11.0	1.00	GFM-1820-11
18.0		20.0	26.0	12.0	1.00	GFM-1820-12
18.0		20.0	26.0	17.0	1.00	GFM-1820-17
18.0		20.0	26.0	22.0	1.00	GFM-1820-22
18.0		20.0	26.0	30.0	1.00	GFM-1820-30
18.0		20.0	26.0	32.0	1.00	GFM-1820-32
18.0		22.0	26.0	28.0	2.00	GFM-1822-28
20.0		21.0	26.0	3.5	0.50	GFM-2021-035
20.0	+0.020 +0.072	21.0	25.0	15.0	0.50	GFM-2021-15
20.0		21.0	25.0	20.0	0.50	GFM-2021-20
20.0		23.0	30.0	7.0	1.50	GFM-2023-07
20.0		23.0	26.0	7.0	1.50	GFM-202326-07
20.0		23.0	30.0	11.5	1.50	GFM-2023-11
20.0		23.0	28.0	15.0	1.50	GFM-202328-15
20.0		23.0	30.0	16.5	1.50	GFM-2023-16
20.0		23.0	29.0	20.0	1.50	GFM-202329-20
20.0		23.0	30.0	21.5	1.50	GFM-2023-21
20.0	+0.040 +0.124	23.0	26.0	21.5	1.50	GFM-202326-21
22.0		24.0	30.0	25.0	1.00	GFM-2224-25
22.0		25.0	29.0	4.5	1.50	GFM-222529-045
22.0		25.0	30.0	21.5	1.50	GFM-222530-215
22.0		25.0	30.0	25.0	1.50	GFM-222530-25
22.0		25.0	35.0	31.5	1.50	GFM-222535-315
24.0		27.0	32.0	7.0	1.50	GFM-2427-07
24.0		27.0	32.0	10.5	1.50	GFM-2427-10
25.0	+0.020 +0.072	26.0	30.0	25.0	0.50	GFM-2526-25
25.0		27.0	32.0	7.0	1.00	GFM-2527-07
25.0		27.0	32.0	48.0	1.00	GFM-2527-48
25.0		28.0	30.0	10.0	1.50	GFM-252830-10
25.0		28.0	35.0	11.5	1.50	GFM-2528-11
25.0	+0.040 +0.124	28.0	35.0	16.5	1.50	GFM-2528-16
25.0		28.0	35.0	21.5	1.50	GFM-2528-21
26.0		30.0	37.0	12.0	2.00	GFM-2630-12
27.0		30.0	38.0	20.0	1.50	GFM-2730-20
28.0		30.0	36.0	10.0	1.00	GFM-2830-10
28.0		30.0	36.0	31.0	1.00	GFM-283036-31
28.0		30.0	35.0	36.0	1.00	GFM-2830-36
28.0		30.0	35.0	48.0	1.00	GFM-2830-48
28.0		32.0	39.0	20.0	2.00	GFM-283239-20
28.0		32.0	50.0	35.0	2.00	GFM-283250-35
30.0		31.0	36.0	20.0	0.50	GFM-3031-20
30.0		31.0	35.0	30.0	0.50	GFM-3031-30
30.0		32.0	37.0	4.0	1.00	GFM-3032-04
30.0	+0.040 +0.124	32.0	37.0	12.0	1.00	GFM-3032-12
30.0		32.0	37.0	17.5	1.00	GFM-3032-17
30.0		32.0	37.0	22.0	1.00	GFM-3032-22
30.0		34.0	42.0	9.0	2.00	GFM-3034-09
30.0		34.0	40.0	10.0	2.00	GFM-303440-10
30.0		34.0	42.0	16.0	2.00	GFM-3034-16
30.0		34.0	42.0	20.0	2.00	GFM-3034-20
30.0		34.0	42.0	26.0	2.00	GFM-3034-26
30.0		34.0	42.0	37.0	2.00	GFM-3034-37
32.0		36.0	40.0	16.0	2.00	GFM-3236-16
32.0		36.0	40.0	26.0	2.00	GFM-3236-26
34.0		38.0	50.0	35.0	2.00	GFM-343850-35
35.0		39.0	47.0	5.8	2.00	GFM-3539-058
35.0		39.0	47.0	7.0	2.00	GFM-3539-07
35.0		39.0	47.0	12.0	2.00	GFM-3539-12
35.0		39.0	47.0	16.0	2.00	GFM-3539-16
35.0		39.0	47.0	26.0	2.00	GFM-3539-26
35.0		39.0	47.0	36.0	2.00	GFM-3539-36
38.0		42.0	54.0	22.0	2.00	GFM-3842-22
40.0		44.0	52.0	7.0	2.00	GFM-4044-07
40.0		44.0	52.0	14.0	2.00	GFM-4044-14
40.0	+0.050 +0.150	44.0	52.0	20.0	2.00	GFM-4044-20
40.0		44.0	52.0	30.0	2.00	GFM-4044-30
40.0		44.0	52.0	40.0	2.00	GFM-4044-40
40.0		44.0	52.0	50.0	2.00	GFM-4044-50
40.0		46.0	50.0	20.0	2.00	GFM-4046-20
42.0		46.0	53.0	19.0	2.00	GFM-4246-19
45.0		50.0	58.0	25.0	2.00	GFM-4550-25
45.0		50.0	58.0	30.0	2.00	GFM-4550-30
45.0		50.0	58.0	50.0	2.00	GFM-4550-50
50.0		55.0	63.0	7.0	2.00	GFM-5055-07
50.0		55.0	63.0	10.0	2.00	GFM-5055-10
50.0		55.0	63.0	25.0	2.00	GFM-5055-25
50.0		55.0	63.0	40.0	2.00	GFM-5055-40
50.0		55.0	63.0	50.0	2.00	GFM-5055-50
60.0		65.0	73.0	7.0	2.00	GFM-6065-07
60.0		65.0	73.0	22.0	2.00	GFM-6065-22
60.0	+0.060 +0.180	65.0	73.0	30.0	2.00	GFM-6065-30
60.0		65.0	73.0	50.0	2.00	GFM-6065-50
60.0		65.0	80.0	62.0	2.00	GFM-606580-62

[3] After press-fit. *Testing methods page 57*

iglidur® G
+130°C
80MPa

Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
65.0		70.0	78.0	50.0	2.00	GFM-6570-50
70.0		75.0	83.0	50.0	2.00	GFM-7075-50
70.0	+0.060	75.0	83.0	85.5	2.00	GFM-7075-855
75.0	+0.180	80.0	88.0	50.0	2.00	GFM-7580-50
80.0		85.0	93.0	50.0	2.50	GFM-8085-50
80.0		85.0	93.0	100.0	2.50	GFM-8085-100
85.0		90.0	98.0	100.0	2.50	GFM-8590-100
90.0	+0.072	95.0	103.0	100.0	2.50	GFM-9095-100
95.0	+0.212	100.0	108.0	100.0	2.50	GFM-95100-100
100.0		105.0	113.0	42.5	2.50	GFM-100105-425
100.0		105.0	113.0	100.0	2.50	GFM-100105-100
110.0	+0.072 +0.212	115.0	123.0	100.0	2.50	GFM-110115-100
120.0		125.0	133.0	80.0	2.50	GFM-120125-80
120.0		125.0	133.0	100.0	2.50	GFM-120125-100
125.0		130.0	138.0	100.0	2.50	GFM-125130-100
130.0	+0.085 +0.245	135.0	143.0	100.0	2.50	GFM-130135-100
140.0		145.0	153.0	100.0	2.50	GFM-140145-100
150.0		155.0	163.0	40.0	2.50	GFM-150155-40
150.0		155.0	163.0	100.0	2.50	GFM-150155-100
195.0	+0.100 +0.285	205.0	240.0	65.0	5.00	GFM-195205240-65

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/G

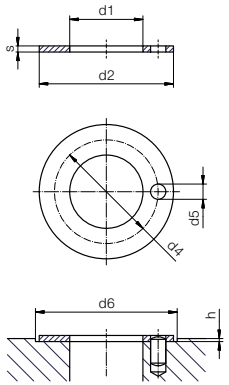
Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® G

Thrust washer (form T)



Dimensions according to ISO 3547-1 and special dimensions

Order example: GTM-0408-005 – no minimum order quantity.
G iglidur® material T Thrust washer M Metric 04 Inner Ø d1 08 Outer Ø d2 005 Thickness s

d1	d2	d4	d5	h	d6	s	Part No.
+0.25	-0.25	-0.12 +0.12	+0.375 +0.125	+0.2/-0.2	+0.12	-0.05	
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
4	8	4)	4)	0.2	8	0.5	GTM-0408-005
4	9	4)	4)	0.3	9	0.6	GTM-0409-006
4	9	4)	4)	0.3	9	1.6	GTM-0409-016
4	10	4)	4)	0.2	10	0.5	GTM-0410-005
4	11	4)	4)	0.2	11	0.5	GTM-0411-005
5	9.5	4)	4)	0.3	9.5	0.6	GTM-0509-006
6	12	4)	4)	1	12	1.5	GTM-0612-015
6	15	4)	4)	1	15	1.5	GTM-0615-015
6	20	13	1.5	1	20	1.5	GTM-0620-015
6.2	11	4)	4)	0.7	11	1	GTM-0611-010
7	12	4)	4)	0.2	12	0.5	GTM-0712-005
7	13	4)	4)	0.2	13	0.5	GTM-0713-005
8	15	4)	4)	0.2	15	0.5	GTM-0815-005
8	15	4)	4)	1	15	1.5	GTM-0815-015
8	18	4)	4)	0.7	18	1	GTM-0818-010
8	18	13	1.5	1	18	1.5	GTM-0818-015
8	18	4)	4)	1.5	18	2	GTM-0818-020
9	13	4)	4)	0.7	13	1	GTM-0913-010
9	18	13.5	1.5	1	18	1.5	GTM-0918-015
10	17.8	4)	4)	0.2	17.8	0.5	GTM-1018-005
10	18	4)	4)	0.7	18	1	GTM-1018-010
10	18	4)	4)	1	18	1.5	GTM-1018-015
10	18	4)	4)	1.5	18	2	GTM-1018-020
10	20	4)	4)	0.7	20	1.5	GTM-1020-015
11	15	4)	4)	0.7	15	1	GTM-1115-010
11	27	4)	4)	0.2	27	0.5	GTM-1127-005
12	24	18	1.5	1	24	1.5	GTM-1224-015
12	30	4)	4)	1	30	1.5	GTM-1230-015

4) Design without fixing hole

iglidur® G
+130°C
80MPa

Product range

d1	d2	d4	d5	h	d6	s	Part No.
+0.25	-0.25	-0.12 +0.12	+0.375 +0.125	+0.2/-0.2	+0.12	-0.05	
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
14	20	4)	4)	1	20	1.5	GTM-1420-015
14	26	20	2	1	26	1.5	GTM-1426-015
15	19	4)	4)	0.5	19	0.8	GTM-1519-008
15	22	4)	4)	0.5	22	0.8	GTM-1522-008
15	24	19.5	1.5	1	24	1.5	GTM-1524-015
15	24	4)	4)	2	24	2.75	GTM-1524-0275
16	28	4)	4)	0.7	28	1	GTM-1628-010
16	30	22	2	1	30	1.5	GTM-1630-015
18	32	25	2	1	32	1.5	GTM-1832-015
20	36	28	3	1	36	1.5	GTM-2036-015
22	30	4)	4)	1	30	1.5	GTM-2230-015
22	38	30	3	1	38	1.5	GTM-2238-015
24	42	33	3	1	42	1.5	GTM-2442-015
26	44	35	3	1	44	1.5	GTM-2644-015
28	48	38	4	1	48	1.5	GTM-2848-015
28.5	35.8	4)	4)	0.2	35.8	0.5	GTM-2835-005
32	45.8	4)	4)	0.7	45.8	1	GTM-3246-010
32	54	43	4	1	54	1.5	GTM-3254-015
38	62	50	4	1	62	1.5	GTM-3862-015
42	66	54	4	1	66	1.5	GTM-4266-015
48	60	61	4	1.5	74	2	GTM-4860-020
48	74	61	4	1.5	74	2	GTM-4874-020
52	78	65	4	1.5	78	2	GTM-5278-020
52.5	69	4)	4)	1.5	69	2	GTM-52569-020
62	78	4)	4)	1.5	78	2	GTM-6278-020
62	90	4)	4)	0.7	90	1	GTM-6290-010
62	90	76	4	1.5	90	2	GTM-6290-020
68	81	4)	4)	1.5	81	2	GTM-6881-020
78	114	4)	4)	1	114	1.5	GTM-78114-015
80.5	114	4)	4)	1	114	1.5	GTM-80114-015

4) Design without fixing hole

Available from stock
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Online ordering
including delivery times, prices, online tools
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25 – 49	200 – 499	2,500 – 4,999

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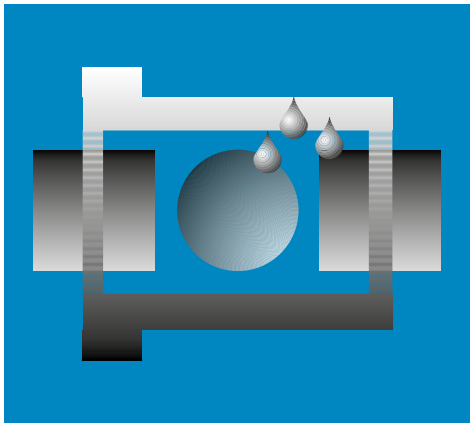


More universal

The advanced development of iglidur® G

iglidur® G1

When to use it?

- When a universal all-round bearing is required
- When low moisture absorption is fundamental
- For low to medium speeds
- For pivoting and rotational movements

When not to use?

- When high shock, impact and edge loads occur
  iglidur® G
- When lowest wear is required
  iglidur® W300
- When the ultimate media resistance is required
  iglidur® X
- For underwater applications
  iglidur® H370

Bearing technology | Plain bearings | iglidur® G1

Ø
4.0 – 50.0mm

Also available as:

Bar stock, round bar:
Page 629

Bar stock, plate:
Page 651

tribo-tape liner:
Page 657

Piston rings:
Page 559

Two hole flange bearing:
Page 581

Moulded special parts:
Page 602

igubal® spherical balls:
Page 783

More universal:
The advanced development of iglidur® G

The most successful plastic bearing in the world - iglidur® G - improved all round: iglidur® G1, the new standard.

- Double service life at high loads
- Up to 4 times less wear at low loads
- Continuous operating temperatures up to +180°C
- Press-fit up to +120°C (iglidur® G: up to +80°C)
- Moisture absorption reduced by 50 %

Typical application areas

- Mechanical engineering
- Automation
- Sports and leisure
- Automotive industry
- Mechatronics

Descriptive technical specifications			
Wear resistance at +23°C	–	■■■■□	+
Wear resistance at +90°C	–	■■■■□	+
Wear resistance at +150°C	–	■■■□□	+
Low coefficient of friction	–	■■■■□	+
Low moisture absorption	–	■■■■□	+
Wear resistance under water	–	■□□□□	+
High media resistance	–	■■■□□	+
Resistant to edge pressures	–	■■■□□	+
Suitable for shock and impact loads	–	■■■□□	+
Resistant to dirt	–	■■■■□	+

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

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

iglidur® G1
+180°C
91MPa

Technical data

General properties			Testing method
Density	g/cm³	1.58	
Colour		grey	
Max. moisture absorption at +23°C and 50 % r.h.	% weight	0.2	DIN 53495
Max. moisture absorption	% weight	1.7	
Coefficient of friction, dynamic, against steel	µ	0.10 – 0.29	
pv value, max. (dry)	MPa · m/s	0.60	
Mechanical properties			
Flexural modulus	MPa	11,486	DIN 53457
Flexural strength at +20°C	MPa	178	DIN 53452
Compressive strength	MPa	115	
Max. recommended surface pressure (+20°C)	MPa	91	
Shore D hardness		81	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+180	
Max. application temperature short-term	°C	+220	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.25	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	3.7	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	> 10^9	DIN IEC 93
Surface resistance	Ω	> 10^9	DIN 53482

Table 01: Material properties table

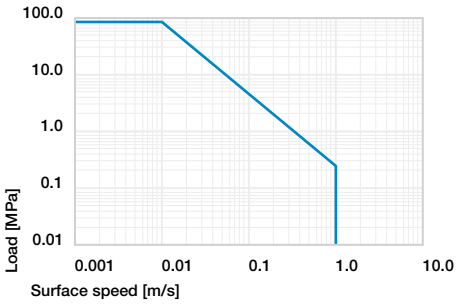


Diagram 01: Permissible pv values for iglidur® G1 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® G1 plain bearings is approximately 0.2% weight. The saturation limit in water is 1.7% weight. This must be taken into account for these types of applications.

Vacuum

In vacuum, any present moisture is released as vapour. Use in vacuum is only possible with dehumidified iglidur® G1 bearings.

Radiation resistance

Plain bearings made from iglidur® G1 are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® G1 plain bearings are resistant to permanent UV radiation.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

–40°C up to +180°C

91MPa

Bearing technology | Plain bearings | iglidur® G1

The requirement profile is demanding: comprehensive advanced development of the successful all-round classic iglidur® G. This has been achieved especially in terms of moisture absorption, thermal properties and consistently improved wear resistance. Only with shock, impact and edge loads, the robustness of iglidur® G could not quite be achieved.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® G1 plain bearings decreases. Diagram 02 shows this inverse relationship. However, at the long-term maximum temperature of +180°C the permissible surface pressure is around 40MPa. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

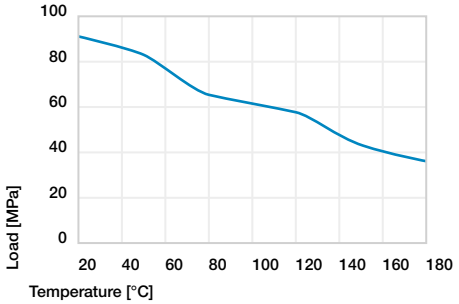


Diagram 02: Maximum recommended surface pressure as a function of temperature (91MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® G1 at radial loads. The plastic deformation is minimal up to a pressure of approximately 100MPa. However, it is also dependent on the service time.

Surface pressure, page 41

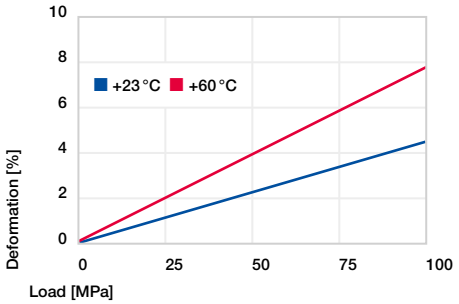


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® G1 has been developed for low to medium surface speeds. The maximum values shown in table 03 can only be achieved at low pressures. At the given speeds, friction can cause a temperature increase to maximum permissible levels. In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.3	1.0	5.0
short-term	**m/s**	2.5	1.8	6.0

Table 03: Maximum surface speeds

Temperature

The ambient temperatures strongly influence the properties of plain bearings. The temperatures prevailing in the bearing system also have an influence on the wear. With increasing temperatures, the wear increases and this effect is significant when temperatures rise over +120°C. For temperatures over 120°C an additional securing of the bearings in the housing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction μ of a plain bearing among other factors is influenced by the surface speed and the load (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

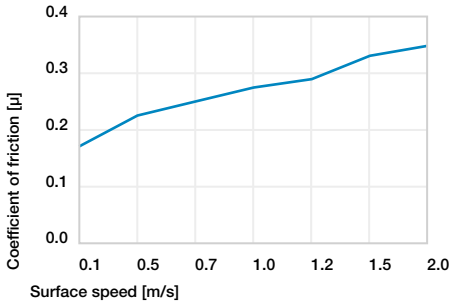


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

Technical data

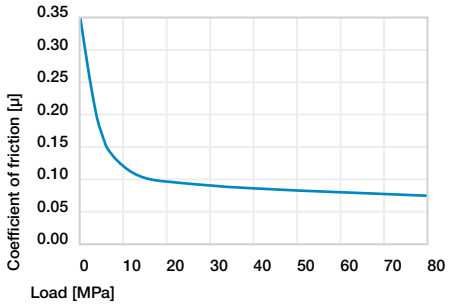


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

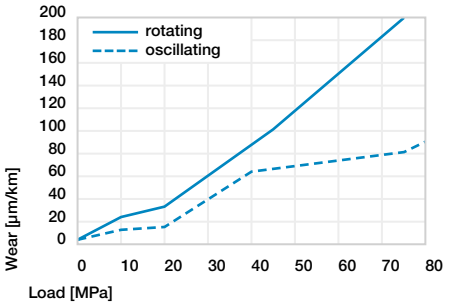


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

The friction and wear are also dependent, to a large degree, on the shaft material. Shafts that are too smooth, increase both the coefficient of friction and the wear of the bearing. For iglidur® G1 a ground surface with an average surface finish Ra = 0.8μm is recommended. Diagram 06 shows results of testing different shaft materials with plain bearings made from iglidur® G1. It can be observed that iglidur® G1 achieves good to very good wear results with all shaft materials. The results for stainless steel types are most likely slightly lower. Diagram 07 compares the wear in rotating and pivoting applications. As with many of the iglidur® materials, wear rate is better in pivoting applications.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.10 – 0.29	0.09	0.04	0.04

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

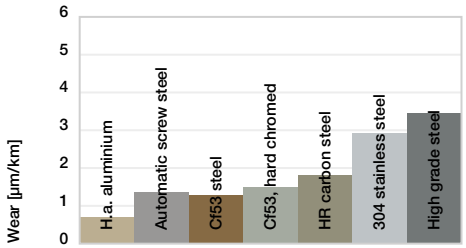


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® G1 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 F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

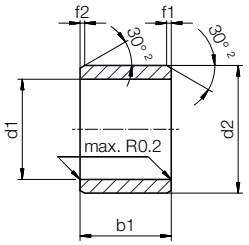
Testing methods, page 57

Ø d1 [mm]	Housing H7 [mm]		Plain bearing F10 [mm]		Shaft h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Bearing technology | Plain bearings | iglidur® G1

Sleeve bearing (form S)



[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

Dimensions according to ISO 3547-1 and special dimensions

Order example: G1SM-0405-04 - no minimum order quantity.
G1 iglidur® material S Sleeve bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 04 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
4.0	+0.020	5.5	4.0	G1SM-0405-04
4.0	+0.068	5.5	6.0	G1SM-0405-06
5.0		7.0	5.0	G1SM-0507-05
5.0		7.0	10.0	G1SM-0507-10
6.0	+0.010 +0.040	8.0	6.0	G1SM-0608-06
6.0		8.0	8.0	G1SM-0608-08
6.0		8.0	10.0	G1SM-0608-10
8.0		10.0	8.0	G1SM-0810-08
8.0		10.0	10.0	G1SM-0810-10
8.0		10.0	12.0	G1SM-0810-12
10.0	+0.025	12.0	8.0	G1SM-1012-08
10.0	+0.083	12.0	10.0	G1SM-1012-10
10.0		12.0	12.0	G1SM-1012-12
10.0		12.0	15.0	G1SM-1012-15
10.0		12.0	20.0	G1SM-1012-20
12.0		14.0	10.0	G1SM-1214-10
12.0		14.0	12.0	G1SM-1214-12
12.0		14.0	15.0	G1SM-1214-15
12.0		14.0	20.0	G1SM-1214-20
13.0		15.0	10.0	G1SM-1315-10
13.0	+0.032	15.0	20.0	G1SM-1315-20
14.0	+0.102	16.0	15.0	G1SM-1416-15
14.0		16.0	20.0	G1SM-1416-20
14.0		16.0	25.0	G1SM-1416-25
15.0		17.0	15.0	G1SM-1517-15
15.0		17.0	20.0	G1SM-1517-20
15.0		17.0	25.0	G1SM-1517-25

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
16.0		18.0	15.0	G1SM-1618-15
16.0		18.0	20.0	G1SM-1618-20
16.0	+0.032	18.0	25.0	G1SM-1618-25
18.0	+0.102	20.0	15.0	G1SM-1820-15
18.0		20.0	20.0	G1SM-1820-20
18.0		20.0	25.0	G1SM-1820-25
20.0		23.0	10.0	G1SM-2023-10
20.0		23.0	15.0	G1SM-2023-15
20.0		23.0	20.0	G1SM-2023-20
20.0		23.0	25.0	G1SM-2023-25
20.0		23.0	30.0	G1SM-2023-30
22.0		25.0	15.0	G1SM-2225-15
22.0		25.0	20.0	G1SM-2225-20
22.0		25.0	25.0	G1SM-2225-25
22.0		25.0	30.0	G1SM-2225-30
24.0	+0.040	27.0	15.0	G1SM-2427-15
24.0	+0.124	27.0	20.0	G1SM-2427-20
24.0		27.0	25.0	G1SM-2427-25
24.0		27.0	30.0	G1SM-2427-30
25.0		28.0	15.0	G1SM-2528-15
25.0		28.0	20.0	G1SM-2528-20
25.0		28.0	25.0	G1SM-2528-25
25.0		28.0	30.0	G1SM-2528-30
28.0		32.0	20.0	G1SM-2832-20
28.0		32.0	25.0	G1SM-2832-25
28.0		32.0	25.0	G1SM-2832-30
30.0		34.0	20.0	G1SM-3034-20

[3] After press-fit. *Testing methods page 57*

Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
30.0	+0.040 +0.124	34.0	25.0	G1SM-3034-25
30.0		34.0	30.0	G1SM-3034-30
30.0		34.0	40.0	G1SM-3034-40
32.0		36.0	20.0	G1SM-3236-20
32.0		36.0	30.0	G1SM-3236-30
32.0		36.0	40.0	G1SM-3236-40
35.0	+0.050 +0.150	39.0	20.0	G1SM-3539-20
35.0		39.0	30.0	G1SM-3539-30
35.0		39.0	40.0	G1SM-3539-40
35.0		39.0	50.0	G1SM-3539-50
40.0		44.0	20.0	G1SM-4044-20
40.0		44.0	30.0	G1SM-4044-30

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
40.0		44.0	40.0	G1SM-4044-40
40.0		44.0	50.0	G1SM-4044-50
45.0		50.0	20.0	G1SM-4550-20
45.0		50.0	30.0	G1SM-4550-30
45.0		50.0	40.0	G1SM-4550-40
45.0	+0.050 +0.150	50.0	50.0	G1SM-4550-50
50.0		55.0	20.0	G1SM-5055-20
50.0		55.0	30.0	G1SM-5055-30
50.0		55.0	40.0	G1SM-5055-40
50.0		55.0	50.0	G1SM-5055-50
50.0		55.0	60.0	G1SM-5055-60

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
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Online ordering
including delivery times, prices, online tools
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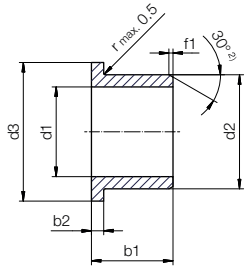
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® G1

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: G1FM-0608-04 - no minimum order quantity.
G1 iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 04 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.020 +0.068	8.0	12.0	4.0	1.00	G1FM-0608-04
6.0		8.0	12.0	8.0	1.00	G1FM-0608-08
8.0	+0.025 +0.083	10.0	15.0	5.5	1.00	G1FM-0810-05
8.0		10.0	15.0	7.5	1.00	G1FM-0810-07
8.0		10.0	15.0	9.5	1.00	G1FM-0810-09
10.0		12.0	18.0	7.0	1.00	G1FM-1012-07
10.0		12.0	18.0	9.0	1.00	G1FM-1012-09
10.0		12.0	18.0	12.0	1.00	G1FM-1012-12
10.0		12.0	18.0	17.0	1.00	G1FM-1012-17
12.0	+0.032 +0.102	14.0	20.0	7.0	1.00	G1FM-1214-07
12.0		14.0	20.0	9.0	1.00	G1FM-1214-09
12.0		14.0	20.0	12.0	1.00	G1FM-1214-12
12.0		14.0	20.0	17.0	1.00	G1FM-1214-17
14.0		16.0	22.0	12.0	1.00	G1FM-1416-12
14.0		16.0	22.0	17.0	1.00	G1FM-1416-17
15.0		17.0	23.0	9.0	1.00	G1FM-1517-09
15.0		17.0	23.0	12.0	1.00	G1FM-1517-12
15.0		17.0	23.0	17.0	1.00	G1FM-1517-17
16.0		18.0	24.0	12.0	1.00	G1FM-1618-12
16.0		18.0	24.0	17.0	1.00	G1FM-1618-17
18.0		20.0	26.0	12.0	1.00	G1FM-1820-12
18.0		20.0	26.0	17.0	1.00	G1FM-1820-17
18.0		20.0	26.0	22.0	1.00	G1FM-1820-22
20.0	+0.040 +0.124	23.0	30.0	11.5	1.50	G1FM-2023-11
20.0		23.0	30.0	16.5	1.50	G1FM-2023-16
20.0		23.0	30.0	21.5	1.50	G1FM-2023-21
25.0		28.0	35.0	11.5	1.50	G1FM-2528-11
25.0		28.0	35.0	16.5	1.50	G1FM-2528-16

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

iglidur® G1
+180°C
91MPa

Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
25.0	+0.040 +0.124	28.0	35.0	21.5	1.50	G1FM-2528-21
30.0		34.0	42.0	16.0	2.00	G1FM-3034-16
30.0		34.0	42.0	26.0	2.00	G1FM-3034-26
35.0	+0.050 +0.150	39.0	47.0	16.0	2.00	G1FM-3539-16
35.0		39.0	47.0	26.0	2.00	G1FM-3539-26
40.0		44.0	52.0	30.0	2.00	G1FM-4044-30
40.0		44.0	52.0	40.0	2.00	G1FM-4044-40
45.0		50.0	58.0	50.0	2.00	G1FM-4044-50

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

Available from stock
Detailed information about delivery time online.
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Online ordering
including delivery times, prices, online tools
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Ordering note
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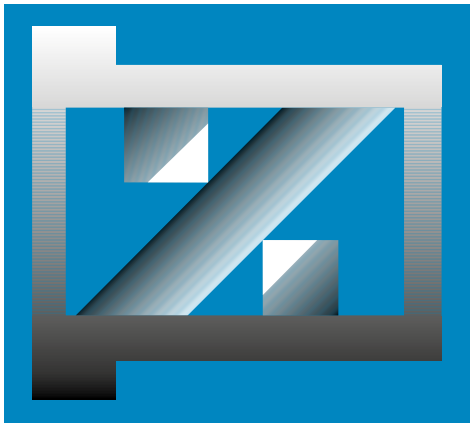


The robust all-rounder according to ISO 2795

Excellent vibration dampening

iglidur® M250

When to use it?

- When the bearings are exposed to large amounts of dirt
- When high vibration dampening is necessary
- For low to medium speeds
- When mechanical reaming of the bore is necessary

When not to use?

- For applications in wet areas
  iglidur® H
- When very high precision is necessary
  iglidur® P
- For very smooth shafts
  iglidur® J
- When a cost-effective wear-resistant plain bearing is required
  iglidur® R

Bearing technology | Plain bearings | iglidur® M250

Ø
1.0 – 75.0mm

Also available as:

Bar stock, round bar:
Page 636

Bar stock, plate:
Page 651

tribo-tape liner:
Page 657

Piston rings:
Page 562

Two hole flange bearing:
Page 581

Moulded special parts:
Page 602

igubal® spherical balls:
Page 783

The robust all-rounder according to ISO 2795: Excellent vibration dampening

The self-lubricating plain bearing made from iglidur® M250 distinguishes itself through its impact resistance, vibration dampening and wear resistance. They excel in applications in which vibration dampening is necessary, for example, in fitness and packaging machines.

- Over 450 sizes available from stock
- Excellent vibration dampening
- Suitable for high edge pressures
- Suitable for impact loads
- Thick-walled according to ISO 2795
- Dirt can become embedded for shaft protection, page 1507
- Lubrication-free
- Maintenance-free
- Thrust washers available only in imperial sizes

Typical application areas

- Agricultural machines
- Furniture/Industrial design
- Textile industry
- Doors and gates
- Mechanical engineering

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® M250 +80°C 20MPa

Technical data

General properties			Testing method
Density	g/cm³	1.14	
Colour		dark grey	
Max. moisture absorption at +23°C and 50 % r.h.	% weight	1.4	DIN 53495
Max. moisture absorption	% weight	7.6	
Coefficient of friction, dynamic, against steel	μ	0.18 – 0.40	
pv value, max. (dry)	MPa · m/s	0.12	
Mechanical properties			
Flexural modulus	MPa	2,700	DIN 53457
Flexural strength at +20°C	MPa	112	DIN 53452
Compressive strength	MPa	52	
Max. recommended surface pressure (+20°C)	MPa	20	
Shore D hardness		79	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+80	
Max. application temperature short-term	°C	+170	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	10	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{13}$	DIN IEC 93
Surface resistance	Ω	$> 10^{11}$	DIN 53482

Table 01: Material properties table

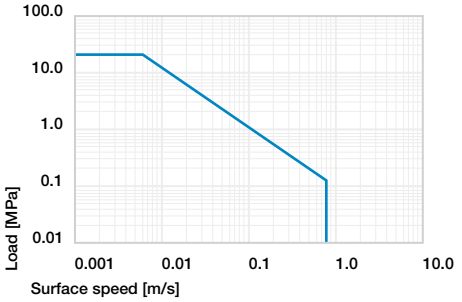


Diagram 01: Permissible pv values for iglidur® M250 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® M250 plain bearings is approximately 1.4% weight. The saturation limit in water is 7.6% weight. This must be taken into account for these types of applications.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is only possible to a limited extent.

Radiation resistance

Plain bearings made from iglidur® M250 have limited use under radioactive radiation. They are resistant to radiation up to an intensity of $1 \cdot 10^4$Gy.

UV resistance

iglidur® M250 plain bearings are resistant to permanent UV radiation.

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

+ resistant 0 conditionally resistant – not resistant
All information given at room temperature [+20°C]
Table 02: Chemical resistance

Chemical table, page 1542

–40°C up to +80°C

20MPa

V-2

RoHS-II

ISO 2795

Bearing technology | Plain bearings | iglidur® M250

The self-lubricating plain bearing made from iglidur® M250 distinguishes itself through its impact resistance, vibration dampening and wear resistance. They excel in applications in which vibration dampening is necessary, for example, in fitness and packaging machines. Since they are additionally able to absorb dirt, they are also suited for agricultural machines and garden appliances.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® M250 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

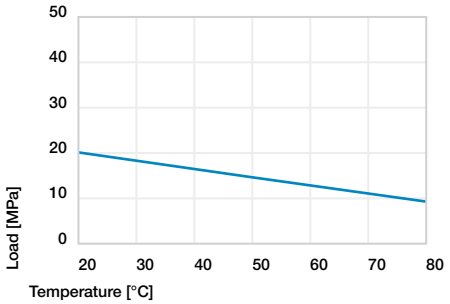


Diagram 02: Maximum recommended surface pressure as a function of temperature (20MPa at +20°C)

iglidur® M250 plain bearings can withstand a maximum recommended surface pressure of 20MPa. Compared with other iglidur® materials iglidur® M250 plain bearings are highly elastic. By this elasticity they can yield very well, but retain their original shape again. A plastic deformation is minimal up to the maximum recommended surface pressure.

Surface pressure, page 41

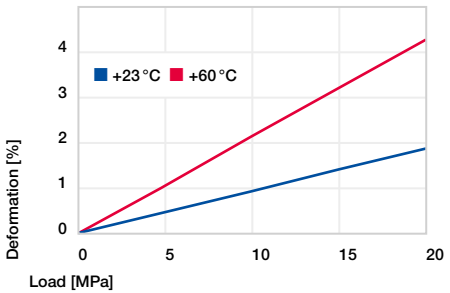


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

As standard, iglidur® M250 is manufactured as a thick-walled bearing. iglidur® M250 is best suited for low to medium surface speeds. The maximum permissible surface speed for dry operation is 0.8m/s (rotating) or 2.5m/s (linear). In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.8	0.6	2.5
short-term	**m/s**	2.0	1.4	5.0

Table 03: Maximum surface speeds

Temperature

Short-term application temperatures up to +170°C are permitted. However, iglidur® M250 plain bearings can only be exposed to this temperature if no additional load is applied. The maximum long-term application temperature is +80°C. This is also the point of the wear limit, i. e. the temperature over which the wear increases exponentially. For temperatures over +60°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction μ of a plain bearing among other factors is influenced by the surface speed and the load (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

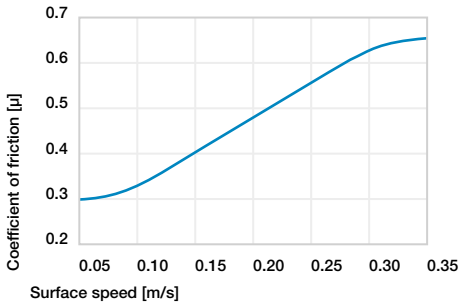


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

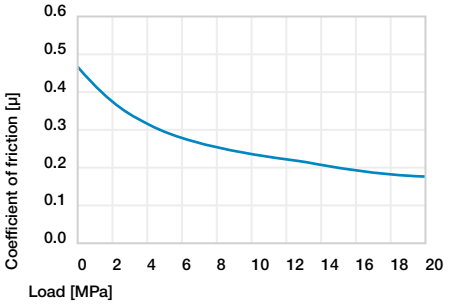


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

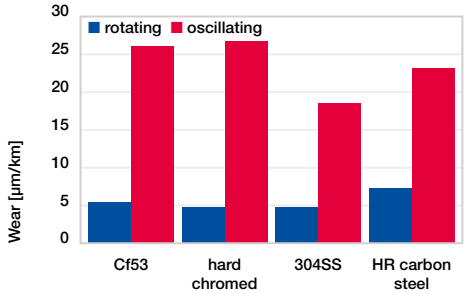


Diagram 07: Wear for rotating and oscillating applications with different shaft materials, p = 2MPa

Shaft materials

The friction and wear are also dependent, to a large degree, on the shaft material. If you observe the coefficient of friction, then the ideal shaft surface finish for iglidur® M250 bearings is Ra = 0.6mm. Diagrams 06 and 07 show the test results of iglidur® M250 plain bearings running against various shaft materials. Up to loads of 2MPa the shaft material plays a relatively small role for rotational movements. Therefore, a suitable shaft material must be considered for higher loads. These are hardened shafts, such as Cf53 or hard-chromed. Diagram 07 shows that iglidur® M250 is considerably better for rotational than for pivoting movements. However, it must be mentioned that pivoting movements often cause high vibrations. Here, iglidur® M250 can utilise its special dampening properties. In our test, these vibrations are excluded for clarity so that the comparison between rotation and pivoting operation is accurate.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.18 – 0.40	0.09	0.04	0.04

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

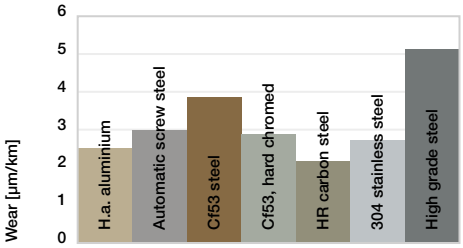


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® M250 plain bearings require a relatively large amount of clearance for optimal operation. This ensures that the bearing remains reliable during temperature change and water absorption. The disadvantages of the bearings clearance are minimised by the vibration-dampening properties. 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 D11 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table). The shaft should have a recommended minimum h9 tolerance.

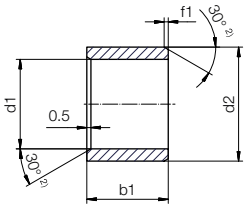
Testing methods, page 57

	Housing		Plain bearing		Shaft	
Ø d1 [mm]	H7 [mm]		D11 [mm]		h9 [mm]	
0 – 3	+0.000	+0.010	+0.020	+0.080	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.030	+0.105	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.040	+0.130	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.050	+0.160	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.065	+0.195	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.080	+0.240	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.100	+0.290	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.120	+0.340	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.145	+0.395	–0.100	+0.000

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

Bearing technology | Plain bearings | iglidur® M250

Sleeve bearing (form S)



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

Dimensions according to ISO 2795 and special dimensions

Order example: MSM-0103-02 - no minimum order quantity.
M250 iglidur® material S Sleeve bearing M Metric 01 Inner Ø d1 03 Outer Ø d2 02 Total length b1

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
1.0		3.0	2.0	MSM-0103-02
1.5		4.0	2.0	MSM-0104-02
2.0		5.0	1.0	MSM-0205-01
2.0		5.0	2.0	MSM-0205-02
2.0	+0.020 +0.080	5.0	3.0	MSM-0205-03
2.5		6.0	3.0	MSM-0206-03
3.0		5.0	3.0	MSM-0305-03
3.0		5.0	4.0	MSM-0305-04
3.0		6.0	3.0	MSM-0306-03
3.0		6.0	4.0	MSM-0306-04
4.0		5.5	4.0	MSM-0405-04
4.0		5.5	6.0	MSM-0405-06
4.0		7.0	3.0	MSM-0407-03
4.0		7.0	4.0	MSM-0407-04
4.0		7.0	6.0	MSM-0407-06
4.0		8.0	4.0	MSM-0408-04
4.0		8.0	6.0	MSM-0408-06
5.0		7.0	5.0	MSM-0507-05
5.0		7.0	10.0	MSM-0507-10
5.0	+0.030 +0.105	8.0	4.0	MSM-0508-04
5.0		8.0	5.0	MSM-0508-05
5.0		8.0	8.0	MSM-0508-08
5.0		9.0	5.0	MSM-0509-05
5.0		9.0	8.0	MSM-0509-08
6.0		8.0	6.0	MSM-0608-06
6.0		8.0	8.0	MSM-0608-08
6.0		8.0	10.0	MSM-0608-10
6.0		9.0	6.0	MSM-0609-06
6.0		10.0	2.5	MSM-0610-02
6.0		10.0	4.0	MSM-0610-04
6.0		10.0	6.0	MSM-0610-06
6.0		10.0	8.0	MSM-0610-08
6.0	+0.030 +0.105	10.0	10.0	MSM-0610-10
6.0		11.0	4.0	MSM-0611-04
6.0		12.0	6.0	MSM-0612-06
6.0		12.0	10.0	MSM-0612-10
7.0		10.0	5.0	MSM-0710-05
7.0		10.0	8.0	MSM-0710-08
7.0		10.0	10.0	MSM-0710-10
7.0		11.0	16.0	MSM-0711-16
8.0		10.0	6.0	MSM-0810-06
8.0		10.0	8.0	MSM-0810-08
8.0		10.0	10.0	MSM-0810-10
8.0		10.0	12.0	MSM-0810-12
8.0		11.0	6.0	MSM-0811-06
8.0		11.0	8.0	MSM-0811-08
8.0	+0.040 +0.130	11.0	12.0	MSM-0811-12
8.0		12.0	4.0	MSM-0812-04
8.0		12.0	6.0	MSM-0812-06
8.0		12.0	8.0	MSM-0812-08
8.0		12.0	10.0	MSM-0812-10
8.0		12.0	12.0	MSM-0812-12
8.0		14.0	6.0	MSM-0814-06
8.0		14.0	10.0	MSM-0814-10
9.0		12.0	14.0	MSM-0912-14
10.0		12.0	8.0	MSM-1012-08
10.0		12.0	10.0	MSM-1012-10
10.0		12.0	12.0	MSM-1012-12

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

Product range

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
10.0		12.0	15.0	MSM-1012-15
10.0		12.0	20.0	MSM-1012-20
10.0		14.0	6.0	MSM-1014-06
10.0		14.0	8.0	MSM-1014-08
10.0		14.0	10.0	MSM-1014-10
10.0	+0.040 +0.130	14.0	16.0	MSM-1014-16
10.0		16.0	6.0	MSM-1016-06
10.0		16.0	8.0	MSM-1016-08
10.0		16.0	10.0	MSM-1016-10
10.0		16.0	16.0	MSM-1016-16
10.0		16.0	50.0	MSM-1016-50
12.0		14.0	10.0	MSM-1214-10
12.0		14.0	12.0	MSM-1214-12
12.0		14.0	15.0	MSM-1214-15
12.0		14.0	20.0	MSM-1214-20
12.0		16.0	15.0	MSM-1216-15
12.0		16.0	20.0	MSM-1216-20
12.0		18.0	8.0	MSM-1218-08
12.0		18.0	10.0	MSM-1218-10
12.0		18.0	15.0	MSM-1218-15
12.0		18.0	20.0	MSM-1218-20
13.0		15.0	10.0	MSM-1315-10
13.0		15.0	20.0	MSM-1315-20
14.0		16.0	8.5	MSM-1416-085
14.0		16.0	10.0	MSM-1416-10
14.0		16.0	15.0	MSM-1416-15
14.0		16.0	20.0	MSM-1416-20
14.0		16.0	25.0	MSM-1416-25
14.0		16.0	29.0	MSM-1416-29
14.0	+0.050 +0.160	18.0	20.0	MSM-1418-20
14.0		20.0	10.0	MSM-1420-10
14.0		20.0	15.0	MSM-1420-15
14.0		20.0	20.0	MSM-1420-20
15.0		17.0	10.0	MSM-1517-10
15.0		17.0	15.0	MSM-1517-15
15.0		17.0	20.0	MSM-1517-20
15.0		17.0	25.0	MSM-1517-25
15.0		21.0	10.0	MSM-1521-10
15.0		21.0	15.0	MSM-1521-15
15.0		21.0	20.0	MSM-1521-20
15.0		21.0	23.0	MSM-1521-23
16.0		18.0	12.0	MSM-1618-12
16.0		18.0	15.0	MSM-1618-15
16.0		18.0	20.0	MSM-1618-20
16.0		18.0	25.0	MSM-1618-25
16.0		20.0	20.0	MSM-1620-20
16.0		20.0	25.0	MSM-1620-25
16.0		20.0	30.0	MSM-1620-30
16.0		21.0	7.0	MSM-1621-07
16.0		22.0	12.0	MSM-1622-12
16.0		22.0	15.0	MSM-1622-15
16.0		22.0	16.0	MSM-1622-16
16.0		22.0	20.0	MSM-1622-20
16.0		22.0	25.0	MSM-1622-25
18.0	+0.050 +0.160	20.0	15.0	MSM-1820-15
18.0		20.0	20.0	MSM-1820-20
18.0		20.0	25.0	MSM-1820-25
18.0		24.0	12.0	MSM-1824-12
18.0		24.0	20.0	MSM-1824-20
18.0		24.0	30.0	MSM-1824-30
18.0		24.0	40.0	MSM-1824-40
20.0		23.0	10.0	MSM-2023-10
20.0		23.0	15.0	MSM-2023-15
20.0		23.0	20.0	MSM-2023-20
20.0		23.0	25.0	MSM-2023-25
20.0		23.0	30.0	MSM-2023-30
20.0		25.0	14.0	MSM-2025-14
20.0		25.0	20.0	MSM-2025-20
20.0		25.0	30.0	MSM-2025-30
20.0		26.0	12.0	MSM-2026-12
20.0		26.0	15.0	MSM-2026-15
20.0		26.0	20.0	MSM-2026-20
20.0		26.0	30.0	MSM-2026-30
22.0		24.0	8.0	MSM-2224-08
22.0		25.0	15.0	MSM-2225-15
22.0		25.0	20.0	MSM-2225-20
22.0		25.0	25.0	MSM-2225-25
22.0		25.0	30.0	MSM-2225-30
22.0	+0.065 +0.195	26.0	15.0	MSM-2226-15
22.0		28.0	10.0	MSM-2228-10
22.0		28.0	15.0	MSM-2228-15
22.0		28.0	20.0	MSM-2228-20
22.0		28.0	30.0	MSM-2228-30
24.0		27.0	15.0	MSM-2427-15
24.0		27.0	20.0	MSM-2427-20
24.0		27.0	25.0	MSM-2427-25
24.0		27.0	30.0	MSM-2427-30
24.0		30.0	15.0	MSM-2430-15
24.0		30.0	20.0	MSM-2430-20
24.0		30.0	30.0	MSM-2430-30
25.0		28.0	12.0	MSM-2528-12
25.0		28.0	15.0	MSM-2528-15
25.0		28.0	20.0	MSM-2528-20
25.0		28.0	25.0	MSM-2528-25
25.0		28.0	30.0	MSM-2528-30
25.0		30.0	20.0	MSM-2530-20

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

Bearing technology | Plain bearings | iglidur® M250

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
25.0		30.0	30.0	**MSM-2530-30**
25.0		30.0	40.0	**MSM-2530-40**
25.0		32.0	10.0	**MSM-2532-10**
25.0		32.0	12.0	**MSM-2532-12**
25.0		32.0	20.0	**MSM-2532-20**
25.0		32.0	30.0	**MSM-2532-30**
25.0		32.0	35.0	**MSM-2532-35**
25.0		32.0	40.0	**MSM-2532-40**
26.0		30.0	20.0	**MSM-2630-20**
26.0		32.0	30.0	**MSM-2632-30**
27.0		34.0	20.0	**MSM-2734-20**
27.0		34.0	30.0	**MSM-2734-30**
27.0	+0.065	34.0	40.0	**MSM-2734-40**
28.0	+0.195	32.0	20.0	**MSM-2832-20**
28.0		32.0	25.0	**MSM-2832-25**
28.0		32.0	30.0	**MSM-2832-30**
28.0		33.0	20.0	**MSM-2833-20**
28.0		36.0	20.0	**MSM-2836-20**
28.0		36.0	30.0	**MSM-2836-30**
28.0		36.0	40.0	**MSM-2836-40**
30.0		34.0	20.0	**MSM-3034-20**
30.0		34.0	25.0	**MSM-3034-25**
30.0		34.0	30.0	**MSM-3034-30**
30.0		34.0	40.0	**MSM-3034-40**
30.0		35.0	20.0	**MSM-3035-20**
30.0		35.0	40.0	**MSM-3035-40**
30.0	+0.032 +0.102	38.0	3.0	**MSM-3038-03**
30.0	+0.065 +0.195	38.0	4.5	**MSM-3038-045**
30.0	+0.080 +0.240	38.0	17.0	**MSM-3038-17**
30.0		38.0	20.0	**MSM-3038-20**
30.0	+0.065 +0.195	38.0	30.0	**MSM-3038-30**
30.0		38.0	40.0	**MSM-3038-40**
30.0		40.0	40.0	**MSM-3040-40**
32.0		36.0	20.0	**MSM-3236-20**
32.0		36.0	30.0	**MSM-3236-30**
32.0		36.0	40.0	**MSM-3236-40**
32.0		40.0	20.0	**MSM-3240-20**
32.0		40.0	30.0	**MSM-3240-30**
32.0		40.0	40.0	**MSM-3240-40**
35.0		39.0	20.0	**MSM-3539-20**
35.0		39.0	30.0	**MSM-3539-30**
35.0		39.0	40.0	**MSM-3539-40**
35.0		39.0	50.0	**MSM-3539-50**
35.0		42.0	50.0	**MSM-3542-50**
40.0	+0.080 +0.240	44.0	20.0	**MSM-4044-20**
40.0		44.0	30.0	**MSM-4044-30**
40.0		44.0	40.0	**MSM-4044-40**
40.0		44.0	50.0	**MSM-4044-50**
40.0		46.0	20.0	**MSM-4046-20**
45.0		50.0	20.0	**MSM-4550-20**
45.0		50.0	30.0	**MSM-4550-30**
45.0		50.0	40.0	**MSM-4550-40**
45.0		50.0	50.0	**MSM-4550-50**
50.0		55.0	20.0	**MSM-5055-20**
50.0		55.0	30.0	**MSM-5055-30**
50.0		55.0	40.0	**MSM-5055-40**
50.0		55.0	50.0	**MSM-5055-50**
50.0		55.0	60.0	**MSM-5055-60**
75.0	+0.100 +0.290	80.0	60.0	**MSM-7580-60**

[3] After press-fit. *Testing methods page 57*

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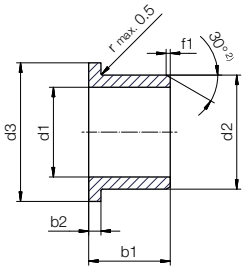
Bearing technology | Plain bearings | iglidur® M250

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 2795 and special dimensions

Order example: MFM-0103-02 - no minimum order quantity.
M250 iglidur® material F Flange bearing M Metric 01 Inner Ø d1 03 Outer Ø d2 02 Total length b1

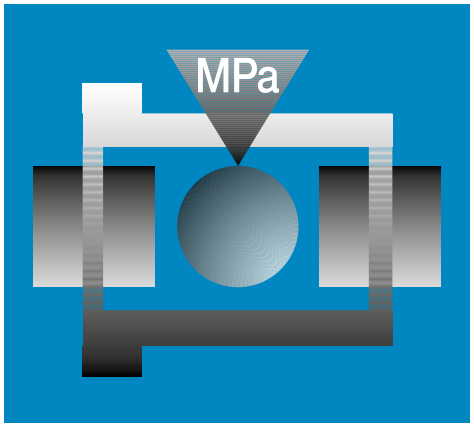
d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
1.0		3.0	5.0	2.0	1.00	**MFM-0103-02**
1.5	+0.020 +0.080	4.0	6.0	2.0	1.00	**MFM-0104-02**
2.0		5.0	8.0	3.0	1.50	**MFM-0205-03**
2.5		6.0	9.0	3.0	1.50	**MFM-0206-03**
3.0		6.0	9.0	4.0	1.50	**MFM-0306-04**
4.0		8.0	12.0	4.0	2.00	**MFM-0408-04**
4.0		8.0	12.0	6.0	2.00	**MFM-0408-06**
4.0		8.0	12.0	8.0	2.00	**MFM-0408-08**
5.0		9.0	13.0	5.0	2.00	**MFM-0509-05**
5.0		9.0	13.0	6.0	2.00	**MFM-0509-06**
5.0		9.0	13.0	8.0	2.00	**MFM-0509-08**
6.0	+0.030	8.0	12.0	4.0	1.00	**MFM-0608-04**
6.0	+0.105	8.0	12.0	8.0	1.00	**MFM-0608-08**
6.0		10.0	14.0	4.0	2.00	**MFM-0610-04**
6.0		10.0	14.0	6.0	2.00	**MFM-0610-06**
6.0		10.0	14.0	10.0	2.00	**MFM-0610-10**
6.0		11.0	14.0	4.0	2.00	**MFM-0611-04**
6.0		12.0	14.0	6.0	3.00	**MFM-0612-06**
6.0		12.0	14.0	10.0	3.00	**MFM-0612-10**
7.0		11.0	15.0	6.0	2.00	**MFM-0711-06**
7.0		11.0	15.0	8.0	2.00	**MFM-0711-08**
8.0	+0.040 +0.130	9.0	13.0	5.5	0.50	**MFM-0809-055**
8.0		10.0	15.0	5.5	1.00	**MFM-0810-05**
8.0		10.0	15.0	7.5	1.00	**MFM-0810-07**
8.0		10.0	15.0	9.5	1.00	**MFM-0810-09**
8.0		11.0	13.0	5.0	2.00	**MFM-0811-05**
8.0		11.0	13.0	8.0	2.00	**MFM-0811-08**
8.0		12.0	16.0	6.0	2.00	**MFM-0812-06**
8.0		12.0	16.0	8.0	2.00	**MFM-0812-08**
8.0		12.0	16.0	12.0	2.00	**MFM-0812-12**
8.0		14.0	16.0	6.0	3.00	**MFM-081416-06**
8.0		14.0	18.0	6.0	3.00	**MFM-0814-06**
8.0		14.0	16.0	10.0	3.00	**MFM-081416-10**
8.0		14.0	18.0	10.0	3.00	**MFM-0814-10**
9.0		14.0	19.0	6.0	2.00	**MFM-0914-06**
9.0		14.0	19.0	10.0	2.00	**MFM-0914-10**
9.0		14.0	19.0	14.0	2.00	**MFM-0914-14**
10.0		12.0	18.0	7.0	1.00	**MFM-1012-07**
10.0	+0.040	12.0	18.0	9.0	1.00	**MFM-1012-09**
10.0	+0.130	12.0	18.0	9.0	1.00	**MFM-1014-09**
10.0		12.0	18.0	12.0	1.00	**MFM-1012-12**
10.0		12.0	18.0	17.0	1.00	**MFM-1012-17**
10.0		14.0	19.0	8.0	2.00	**MFM-101419-08**
10.0		14.0	19.0	10.0	2.00	**MFM-1014-10**
10.0		14.0	20.0	12.0	2.00	**MFM-101420-12**
10.0		14.0	19.0	12.0	1.50	**MFM-101419-12**
10.0		14.0	17.5	14.0	1.00	**MFM-1014-14**
10.0		14.0	17.5	19.0	1.00	**MFM-1014-19**
10.0		14.0	17.5	24.0	1.00	**MFM-1014-24**
10.0		14.0	17.5	34.0	1.00	**MFM-1014-34**
10.0		16.0	20.0	6.0	3.00	**MFM-101620-06**
10.0		16.0	22.0	8.0	3.00	**MFM-1016-08**

[3] After press-fit. *Testing methods page 57*

Bearing technology | Plain bearings | iglidur® M250

d1	d1 Tolerance[3]	d2	d3 d13	b1 h13	b2 –0,14	Part No.
[mm]		[mm]	[mm]	[mm]	[mm]	
10.0	+0.040 +0.130	16.0	22.0	10.0	3.00	**MFM-1016-10**
10.0		16.0	20.0	10.0	3.00	**MFM-101620-10**
10.0		16.0	22.0	16.0	3.00	**MFM-1016-16**
12.0		14.0	20.0	7.0	1.00	**MFM-1214-07**
12.0		14.0	20.0	9.0	1.00	**MFM-1214-09**
12.0		14.0	20.0	12.0	1.00	**MFM-1214-12**
12.0		14.0	20.0	17.0	1.00	**MFM-1214-17**
12.0		16.0	22.0	10.0	2.00	**MFM-1216-10**
12.0		16.0	22.0	20.0	2.00	**MFM-1216-20**
12.0		18.0	24.0	8.0	3.00	**MFM-1218-08**
12.0		18.0	22.0	10.0	3.00	**MFM-1218-10**
12.0		18.0	24.0	12.0	3.00	**MFM-1218-12**
12.0		18.0	22.0	15.0	3.00	**MFM-1218-15**
12.0		18.0	22.0	20.0	3.00	**MFM-1218-20**
13.0		15.0	20.0	14.0	2.00	**MFM-1315-14**
13.0		16.0	24.0	8.0	2.00	**MFM-131624-08**
14.0		16.0	22.0	12.0	1.00	**MFM-1416-12**
14.0		16.0	22.0	17.0	1.00	**MFM-1416-17**
14.0		20.0	25.0	7.0	3.00	**MFM-1420-07**
14.0		20.0	25.0	10.0	3.00	**MFM-1420-10**
14.0		20.0	25.0	15.0	3.00	**MFM-1420-15**
14.0		20.0	25.0	20.0	3.00	**MFM-1420-20**
15.0	+0.050 +0.160	17.0	23.0	9.0	1.00	**MFM-1517-09**
15.0		17.0	23.0	12.0	1.00	**MFM-1517-12**
15.0		17.0	23.0	17.0	1.00	**MFM-1517-17**
15.0		21.0	27.0	10.0	3.00	**MFM-1521-10**
15.0		21.0	27.0	15.0	3.00	**MFM-1521-15**
15.0		21.0	27.0	20.0	3.00	**MFM-1521-20**
15.0		21.0	27.0	25.0	3.00	**MFM-1521-25**
16.0		18.0	28.0	8.0	2.00	**MFM-1618-08/02**
16.0		18.0	24.0	12.0	1.00	**MFM-1618-12**
16.0		18.0	24.0	17.0	1.00	**MFM-1618-17**
16.0		22.0	28.0	12.0	3.00	**MFM-1622-12**
16.0		22.0	28.0	15.0	3.00	**MFM-1622-15**
16.0		22.0	28.0	20.0	3.00	**MFM-1622-20**
16.0		22.0	28.0	25.0	3.00	**MFM-1622-25**
18.0		20.0	26.0	12.0	1.00	**MFM-1820-12**
18.0		20.0	26.0	17.0	1.00	**MFM-1820-17**
18.0		20.0	26.0	22.0	1.00	**MFM-1820-22**
18.0		24.0	26.0	7.8	3.00	**MFM-182426-078**
18.0		24.0	30.0	8.0	3.00	**MFM-1824-08**
18.0		24.0	30.0	12.0	3.00	**MFM-1824-12**
18.0		24.0	30.0	18.0	3.00	**MFM-1824-18**
18.0		24.0	30.0	20.0	3.00	**MFM-1824-20**
18.0	+0.050 +0.160	24.0	30.0	30.0	3.00	**MFM-1824-30**
19.0		24.0	27.0	12.0	2.00	**MFM-192427-12**
20.0		23.0	30.0	11.5	1.50	**MFM-2023-11**
20.0		23.0	30.0	16.5	1.50	**MFM-2023-16**
20.0		23.0	30.0	21.5	1.50	**MFM-2023-21**
20.0		26.0	28.0	12.0	3.00	**MFM-202628-12**
20.0		26.0	32.0	15.0	3.00	**MFM-2026-15**
20.0		26.0	32.0	20.0	3.00	**MFM-2026-20**
20.0		26.0	32.0	30.0	3.00	**MFM-2026-30**
22.0		28.0	34.0	15.0	3.00	**MFM-2228-15**
22.0		28.0	34.0	20.0	3.00	**MFM-2228-20**
22.0		28.0	34.0	30.0	3.00	**MFM-2228-30**
24.0		30.0	36.0	15.0	3.00	**MFM-2430-15**
24.0		30.0	36.0	20.0	3.00	**MFM-2430-20**
24.0		30.0	36.0	30.0	3.00	**MFM-2430-30**
25.0		28.0	35.0	11.5	1.50	**MFM-2528-11**
25.0		28.0	35.0	16.5	1.50	**MFM-2528-16**
25.0	+0.065 +0.195	28.0	35.0	21.5	1.50	**MFM-2528-21**
25.0		32.0	38.0	12.0	4.00	**MFM-2532-12**
25.0		32.0	38.0	15.0	4.00	**MFM-2532-15**
25.0		32.0	38.0	20.0	4.00	**MFM-2532-20**
25.0		32.0	38.0	30.0	4.00	**MFM-2532-30**
25.0		32.0	38.0	40.0	4.00	**MFM-2532-40**
27.0		34.0	40.0	20.0	4.00	**MFM-2734-20**
27.0		34.0	40.0	30.0	4.00	**MFM-2734-30**
27.0		34.0	40.0	40.0	4.00	**MFM-2734-40**
28.0		36.0	42.0	20.0	4.00	**MFM-2836-20**
28.0		36.0	42.0	30.0	4.00	**MFM-2836-30**
28.0		36.0	42.0	40.0	4.00	**MFM-2836-40**
30.0		34.0	42.0	16.0	2.00	**MFM-3034-16**
30.0		34.0	42.0	26.0	2.00	**MFM-3034-26**
30.0		35.0	44.0	20.0	4.00	**MFM-3035-20**
30.0		38.0	44.0	20.0	4.00	**MFM-3038-20**
30.0		38.0	44.0	30.0	4.00	**MFM-3038-30**
30.0		38.0	44.0	40.0	4.00	**MFM-3038-40**
32.0		40.0	46.0	20.0	4.00	**MFM-3240-20**
32.0		40.0	46.0	30.0	4.00	**MFM-3240-30**
32.0		40.0	46.0	40.0	4.00	**MFM-3240-40**
35.0	+0.080 +0.240	39.0	47.0	16.0	2.00	**MFM-3539-16**
35.0		39.0	47.0	26.0	2.00	**MFM-3539-26**
40.0		44.0	52.0	30.0	2.00	**MFM-4044-30**
40.0		44.0	52.0	40.0	2.00	**MFM-4044-40**
45.0		50.0	58.0	50.0	2.00	**MFM-4550-50**

[3] After press-fit. *Testing methods page 57*



Specialist for pivoting, rolling applications and more

Low coefficient of friction and wear on almost every shaft

iglidur® P210

When to use it?

- When a universal plain bearing for use in a moist environment is required
- When a wear-resistant plain bearing for pivoting applications at medium loads is required
- When edge loads and shocks occur
- When the surface pressure of iglidur® J is insufficient

When not to use?

- When a universal plain bearing with the largest possible range of dimensions is required
  iglidur® G
- When a plain bearing for highly loaded pivoting applications is required
  iglidur® Q, iglidur® Q2
- When temperatures are higher than +100°C
  iglidur® G, iglidur® J350

Bearing technology | Plain bearings | iglidur® P210

Ø 4.0 – 50.0mm

Also available as:

Bar stock, round bar: **Page 636**

Bar stock, plate: **Page 651**

tribo-tape liner: **Page 657**

Piston rings: **Page 562**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 783**

Specialist for pivoting, rolling applications and more:

Low coefficient of friction and wear on almost every shaft

This versatile material has already proven its worth in many customer-specific solutions and as a bar stock material. Clip-on or pre-loaded designs as well as vehicle interior applications are possible. Now available in a standard size range from stock.

- Low moisture absorption
- Versatile: performance on many different shafts
- Suitable for high edge pressures
- Lubrication-free
- Maintenance-free

Typical application areas

- Agricultural machines
- Furniture/Industrial design
- Textile industry
- Doors and gates
- Mechanical engineering

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® P210 +100°C 50MPa

Technical data

General properties			Testing method
Density	g/cm³	1.40	
Colour		yellow	
Max. moisture absorption at +23°C and 50 % r.h.	% weight	0.3	DIN 53495
Max. moisture absorption	% weight	0.5	
Coefficient of friction, dynamic, against steel	µ	0.07 – 0.19	
pv value, max. (dry)	MPa · m/s	0.40	
Mechanical properties			
Flexural modulus	MPa	2,500	DIN 53457
Flexural strength at +20°C	MPa	70	DIN 53452
Compressive strength	MPa	50	
Max. recommended surface pressure (+20°C)	MPa	50	
Shore D hardness		75	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+100	
Max. application temperature short-term	°C	+160	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.25	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	8	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{12}$	DIN IEC 93
Surface resistance	Ω	$> 10^{11}$	DIN 53482

Table 01: Material properties table

–40°C up to +100°C

50MPa

HB

RoHS-II

ISO 3547-1

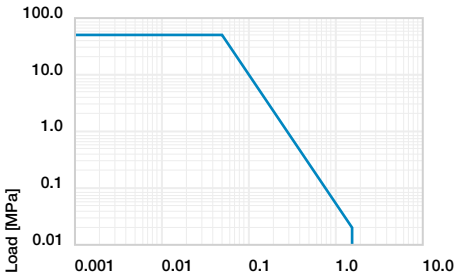


Diagram 01: Permissible pv values for iglidur® P210 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® P210 plain bearings is approximately 0.3% weight. The saturation limit in water is 0.5% weight. This low moisture absorption is well below the values of iglidur® G.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is only possible to a limited extent.

Radiation resistance

Plain bearings made from iglidur® P210 have limited use under radioactive radiation. They are resistant to radiation up to an intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® P210 bearings have a good resistance to UV radiation.

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

+ resistant 0 conditionally resistant – not resistant
All information given at room temperature [+20°C]
Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® P210

iglidur® P210 plain bearings provide the user with versatile all-round bearings, which have proven to have above average service life, primarily in pivoting applications at medium loads of up to 20MPa.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® P210 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

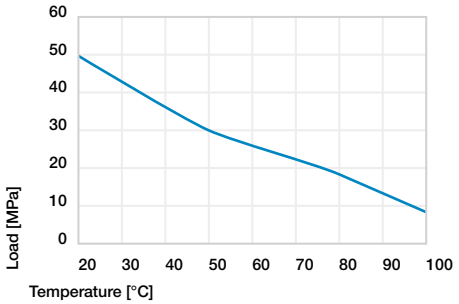


Diagram 02: Maximum recommended surface pressure as a function of temperature (50MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® P210 at radial loads. At the maximum recommended surface pressure of 50MPa at room temperature the deformation is less than 3%.

Surface pressure, page 41

Permissible surface speeds

Plain bearings made from iglidur® P210 are maintenance-free, they are developed for low to medium surface speeds. The maximum values given in table 03 can only be achieved at a very low surface pressure. The maximum speed given is the speed at which an increase up to the continuous use temperature occurs due to friction.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.0	0.7	3.0
short-term	**m/s**	2.0	1.4	4.0

Table 03: Maximum surface speeds

Temperature

Due to its maximum long-term application temperature of +100°C, iglidur® P210 is suitable for a wide range of applications. If even higher temperatures are required, iglidur® G is also available with a max. long-term application temperature of +130°C. The temperatures prevailing in the bearing system also have an influence on the wear. The wear rises with increasing temperatures. For temperatures over +50°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the surface speed and load (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

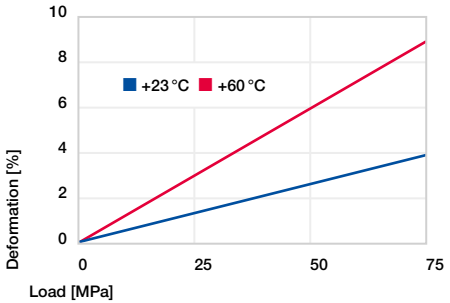


Diagram 03: Deformation under pressure and temperature

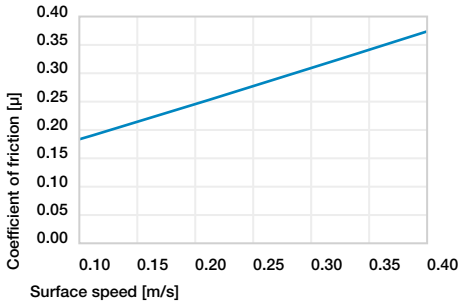


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

Technical data

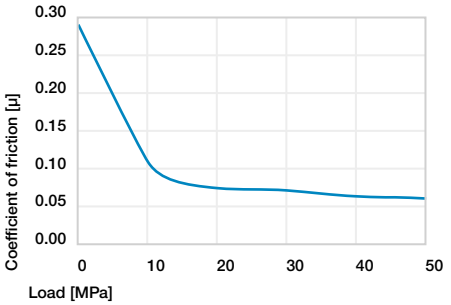


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

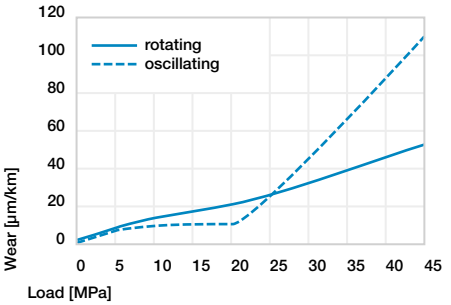


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

Diagram 06 shows results of testing different shaft materials with plain bearings made from iglidur® P210. For rotational movements at radial loads below 1MPa, iglidur® P210 has generally very low wear. Wear is only significantly higher in combination with HR carbon steel shafts. Generally, rotational wear will be higher than for a pivoting application of equal load. This is only reversed at loads above 25MPa (diagram 07).

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.07 – 0.19	0.09	0.04	0.04

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

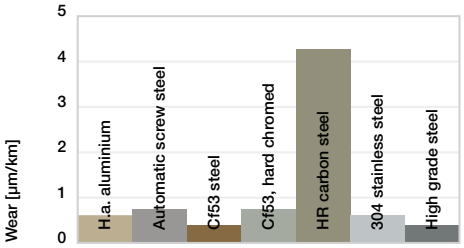


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® P210 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 E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

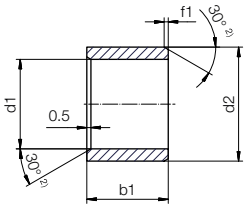
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® P210

Sleeve bearing (form S)



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

Dimensions according to ISO 3547-1 and special dimensions

Order example: P210SM-0405-06 - no minimum order quantity.
P210 iglidur® material S Sleeve bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
4.0		5.5	4.0	P210SM-0405-04
4.0		5.5	6.0	P210SM-0405-06
5.0	+0.020	7.0	5.0	P210SM-0507-05
5.0	+0.068	7.0	10.0	P210SM-0507-10
6.0		8.0	6.0	P210SM-0608-06
6.0		8.0	8.0	P210SM-0608-08
6.0		8.0	10.0	P210SM-0608-10
8.0		10.0	8.0	P210SM-0810-08
8.0		10.0	10.0	P210SM-0810-10
8.0		10.0	12.0	P210SM-0810-12
10.0	+0.025	12.0	8.0	P210SM-1012-08
10.0	+0.083	12.0	10.0	P210SM-1012-10
10.0		12.0	12.0	P210SM-1012-12
10.0		12.0	15.0	P210SM-1012-15
10.0		12.0	20.0	P210SM-1012-20
12.0		14.0	10.0	P210SM-1214-10
12.0		14.0	12.0	P210SM-1214-12
12.0		14.0	15.0	P210SM-1214-15
12.0		14.0	20.0	P210SM-1214-20
13.0		15.0	10.0	P210SM-1315-10
13.0	+0.032	15.0	20.0	P210SM-1315-20
14.0	+0.102	16.0	15.0	P210SM-1416-15
14.0		16.0	20.0	P210SM-1416-20
14.0		16.0	25.0	P210SM-1416-25
15.0		17.0	15.0	P210SM-1517-15
15.0		17.0	20.0	P210SM-1517-20
15.0		17.0	25.0	P210SM-1517-25

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
16.0		18.0	15.0	P210SM-1618-15
16.0		18.0	20.0	P210SM-1618-20
16.0	+0.032	18.0	25.0	P210SM-1618-25
18.0	+0.102	20.0	15.0	P210SM-1820-15
18.0		20.0	20.0	P210SM-1820-20
18.0		20.0	25.0	P210SM-1820-25
20.0		23.0	10.0	P210SM-2023-10
20.0		23.0	15.0	P210SM-2023-15
20.0		23.0	20.0	P210SM-2023-20
20.0		23.0	25.0	P210SM-2023-25
20.0		23.0	30.0	P210SM-2023-30
22.0		25.0	15.0	P210SM-2225-15
22.0		25.0	20.0	P210SM-2225-20
22.0		25.0	25.0	P210SM-2225-25
22.0		25.0	30.0	P210SM-2225-30
24.0	+0.040	27.0	15.0	P210SM-2427-15
24.0	+0.124	27.0	20.0	P210SM-2427-20
24.0		27.0	25.0	P210SM-2427-25
24.0		27.0	30.0	P210SM-2427-30
25.0		28.0	15.0	P210SM-2528-15
25.0		28.0	20.0	P210SM-2528-20
25.0		28.0	25.0	P210SM-2528-25
25.0		28.0	30.0	P210SM-2528-30
28.0		32.0	20.0	P210SM-2832-20
28.0		32.0	25.0	P210SM-2832-25
28.0		32.0	30.0	P210SM-2832-30
30.0		34.0	20.0	P210SM-3034-20

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

Product range

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
30.0		34.0	25.0	P210SM-3034-25
30.0	+0.040	34.0	30.0	P210SM-3034-30
30.0	+0.124	34.0	40.0	P210SM-3034-40
32.0		36.0	20.0	P210SM-3236-20
32.0		36.0	30.0	P210SM-3236-30
32.0		36.0	40.0	P210SM-3236-40
35.0		39.0	20.0	P210SM-3539-20
35.0	+0.050	39.0	30.0	P210SM-3539-30
35.0	+0.150	39.0	40.0	P210SM-3539-40
35.0		39.0	50.0	P210SM-3539-50
40.0		44.0	20.0	P210SM-4044-20
40.0		44.0	30.0	P210SM-4044-30

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
40.0		44.0	40.0	P210SM-4044-40
40.0		44.0	50.0	P210SM-4044-50
45.0		50.0	20.0	P210SM-4550-20
45.0		50.0	30.0	P210SM-4550-30
45.0		50.0	40.0	P210SM-4550-40
45.0	+0.050	50.0	50.0	P210SM-4550-50
50.0	+0.150	55.0	20.0	P210SM-5055-20
50.0		55.0	30.0	P210SM-5055-30
50.0		55.0	40.0	P210SM-5055-40
50.0		55.0	50.0	P210SM-5055-50
50.0		55.0	60.0	P210SM-5055-60

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/P210

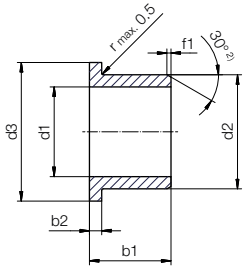
Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® P210

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

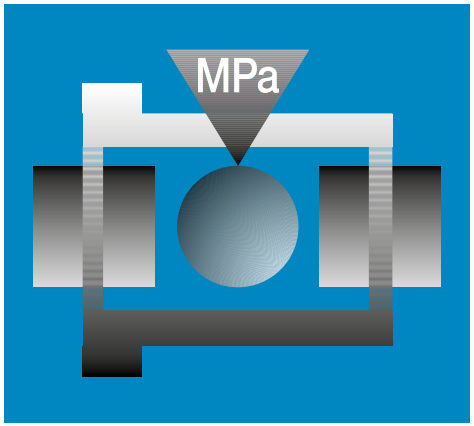
d1 [mm]	Ø 1–6	Ø 6–12	Ø 12–30	Ø > 30
f [mm]	0.3	0.5	0.8	1.2

Dimensions according to ISO 3547-1 and special dimensions

Order example: P210FM-0608-04 - no minimum order quantity.
P210 iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 04 Total length b1

d1 [mm]	d1 Tolerance 3)	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.020 +0.068	8.0	12.0	4.0	1.00	P210FM-0608-04
6.0		8.0	12.0	6.0	1.00	P210FM-0608-06
6.0		8.0	12.0	8.0	1.00	P210FM-0608-08
8.0		10.0	15.0	5.5	1.00	P210FM-0810-05
8.0		10.0	15.0	7.5	1.00	P210FM-0810-07
8.0		10.0	15.0	9.5	1.00	P210FM-0810-09
8.0		10.0	15.0	10.0	1.00	P210FM-0810-10
8.0	+0.025 +0.083	10.0	16.0	15.0	1.50	P210FM-081016-15
10.0		12.0	18.0	7.0	1.00	P210FM-1012-07
10.0		12.0	18.0	9.0	1.00	P210FM-1012-09
10.0		12.0	18.0	10.0	1.00	P210FM-1012-10
10.0		12.0	18.0	12.0	1.00	P210FM-1012-12
10.0		12.0	18.0	17.0	1.00	P210FM-1012-17
12.0		14.0	20.0	7.0	1.00	P210FM-1214-07
12.0		14.0	20.0	9.0	1.00	P210FM-1214-09
12.0		14.0	20.0	12.0	1.00	P210FM-1214-12
12.0	+0.032 +0.102	14.0	20.0	17.0	1.00	P210FM-1214-17
14.0		16.0	22.0	12.0	1.00	P210FM-1416-12
14.0		16.0	22.0	17.0	1.00	P210FM-1416-17
15.0		17.0	23.0	9.0	1.00	P210FM-1517-09
15.0		17.0	23.0	12.0	1.00	P210FM-1517-12
15.0		17.0	23.0	17.0	1.00	P210FM-1517-17
16.0	+0.032 +0.102	18.0	24.0	12.0	1.00	P210FM-1618-12
16.0		18.0	24.0	17.0	1.00	P210FM-1618-17
18.0		20.0	26.0	12.0	1.00	P210FM-1820-12
18.0		20.0	26.0	17.0	1.00	P210FM-1820-17
18.0		20.0	26.0	22.0	1.00	P210FM-1820-22
20.0		23.0	30.0	11.5	1.50	P210FM-2023-11
20.0		23.0	30.0	16.5	1.50	P210FM-2023-16
20.0		23.0	30.0	21.5	1.50	P210FM-2023-21
25.0		28.0	35.0	11.5	1.50	P210FM-2528-11
25.0		28.0	35.0	16.5	1.50	P210FM-2528-16
25.0		28.0	35.0	21.5	1.50	P210FM-2528-21
30.0	+0.040 +0.124	34.0	42.0	16.0	2.00	P210FM-3034-16
30.0		34.0	42.0	26.0	2.00	P210FM-3034-26
35.0		39.0	47.0	16.0	2.00	P210FM-3539-16
35.0		39.0	47.0	26.0	2.00	P210FM-3539-26
40.0		44.0	52.0	30.0	2.00	P210FM-4044-30
40.0		44.0	52.0	40.0	2.00	P210FM-4044-40
45.0		50.0	58.0	50.0	2.00	P210FM-4550-50

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



The low-cost all-rounder

Well-balanced properties at a low price

iglidur® P230

When to use it?

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

When not to use?

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

Bearing technology | Plain bearings | iglidur® P230

Ø
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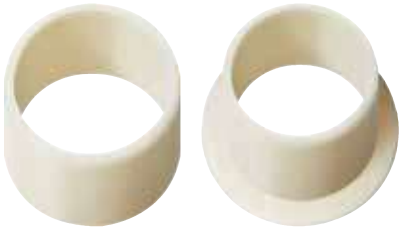


Also available as:

Bar stock, round bar: **Page 629**

Bar stock, plate: **Page 651**

tribo-tape liner: **Page 657**

Piston rings: **Page 559**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 783**

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

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

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

Typical application areas

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

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® P230 +110°C 60MPa

Technical data

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

Table 01: Material properties table

–30°C up to +110°C

60MPa

HB

FDA

RoHS-II

ISO 3547-1

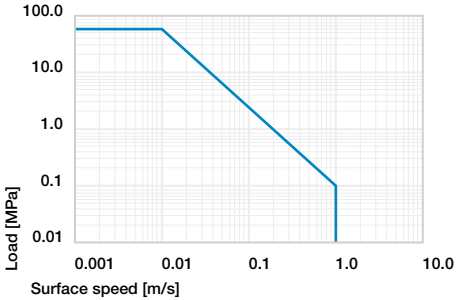


Diagram 01: Permissible pv values for iglidur® P230 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

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

Vacuum

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

Radiation resistance

Plain bearings made from iglidur® P230 have limited use under radioactive radiation. They are resistant to radiation up to an intensity of $3 \cdot 10^2$ Gy.

UV resistance

iglidur® P230 bearings have a good resistance to UV radiation.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

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

Mechanical properties

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

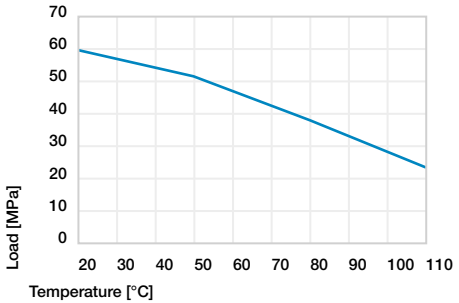


Diagram 02: Maximum recommended surface pressure as a function of temperature (60MPa at +20°C)

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

Surface pressure, page 41

Permissible surface speeds

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

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.0	0.7	3.0
short-term	**m/s**	2.0	1.4	4.0

Table 03: Maximum surface speeds

Temperature

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

Application temperatures, page 49
Additional securing, page 49

Friction and wear

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

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

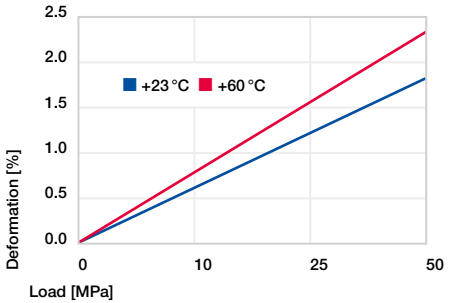


Diagram 03: Deformation under pressure and temperature

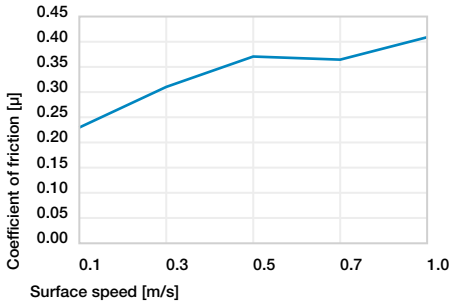


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

Shaft materials

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

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.13 – 0.32	0.09	0.04	0.04

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

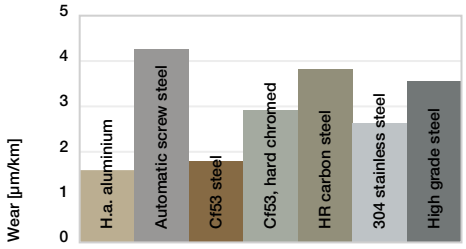


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

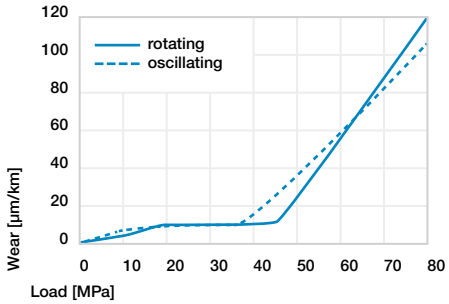


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Installation tolerances

iglidur® P230 plain bearings are standard bearings for shafts with h tolerance (recommended minimum h9). The bearings are designed for press-fit into a housing machined to a H7 tolerance. After being assembled into a nominal size housing, the inner diameter automatically adjusts to the E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

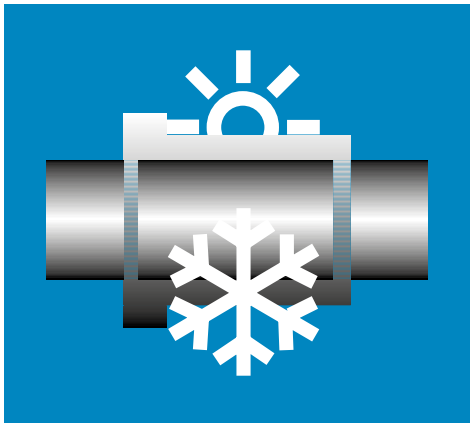
Testing methods, page 57

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

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

Product range

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



The cost-effective outdoor all-rounder

No moisture absorption even with high ambient humidity

iglidur® P

When to use it?

- When low moisture absorption is fundamental
- When a cost-effective plain bearing for high pressure loads is required
- When high precision in high humidity and moderately high temperatures are required

When not to use?

- When the maximum application temperature is above +120°C
  iglidur® K
- When mechanical reaming of the bore is necessary
  iglidur® M250
- When the highest wear resistance is required
  iglidur® W300

Bearing technology | Plain bearings | iglidur® P

Ø
3.0 – 95.0mm

Also available as:

Bar stock, round bar:
Page 629

Bar stock, plate:
Page 651

tribo-tape liner:
Page 657

Piston rings:
Page 562

Two hole flange bearing:
Page 581

Moulded special parts:
Page 602

igubal® spherical balls:
Page 783

The cost-effective outdoor all-rounder: No moisture absorption even with high ambient humidity

Due to thermal stability and low water absorption, the iglidur® P bearings are among the most dimensionally strong all-round bearings under varying environmental conditions. iglidur® P plain bearings are recommended for pivoting and rotational movements at average loads.

- Low moisture absorption
- High wear resistance
- Suitable for high loads
- Cost-effective
- Lubrication-free
- Standard range from stock
- Maintenance-free

Typical application areas

- Solar technology
- Mechanical engineering
- Doors and gates
- Railway technology
- Sports and leisure

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® P
+130°C
50MPa

Technical data

General properties			Testing method
Density	g/cm³	1.58	
Colour		black	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.2	DIN 53495
Max. moisture absorption	% weight	0.4	
Coefficient of friction, dynamic, against steel	µ	0.06 – 0.21	
pv value, max. (dry)	MPa · m/s	0.39	
Mechanical properties			
Flexural modulus	MPa	5,300	DIN 53457
Flexural strength at +20°C	MPa	120	DIN 53452
Compressive strength	MPa	66	
Max. recommended surface pressure (+20°C)	MPa	50	
Shore D hardness		75	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+130	
Max. application temperature short-term	°C	+200	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.25	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	4	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{13}$	DIN IEC 93
Surface resistance	Ω	$> 10^{12}$	DIN 53482

Table 01: Material properties table

–40°C up to +130°C

50MPa

HB

RoHS-II

ISO 3547-1

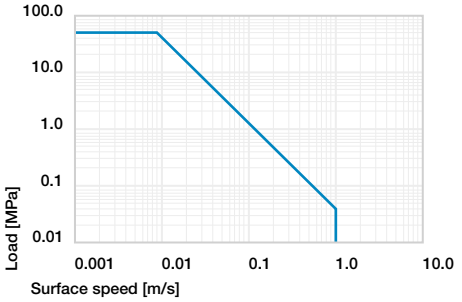


Diagram 01: Permissible pv values for iglidur® P plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® P plain bearings is approximately 0.2% weight. The saturation limit in water is 0.4% weight. This low moisture absorption is well below the values of iglidur® G.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is only possible to a limited extent.

Radiation resistance

Plain bearings made from iglidur® P have limited use under radioactive radiation. They are resistant to radiation up to an intensity of $5 \cdot 10^2$Gy.

UV resistance

iglidur® P bearings have a good resistance to UV radiation.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® P

The iglidur® P plain bearings are a cost-effective, maintenance-free bearing solution for the user. Compared to iglidur® G, plain bearings made from iglidur® P are suitable for use with rotational movements and average loads.

Mechanical properties

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

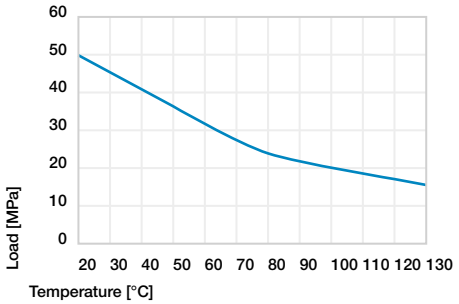


Diagram 02: Maximum recommended surface pressure as a function of temperature (50MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® P at radial loads. At the maximum recommended surface pressure of 50MPa the deformation is less than 4%.

Surface pressure, page 41

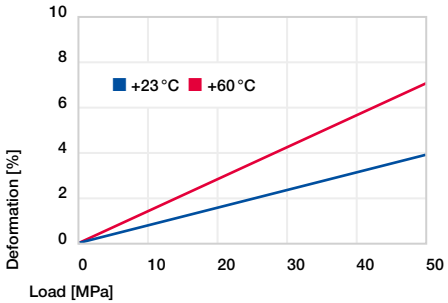


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

Plain bearings made from iglidur® P are maintenance-free, they are developed for low to medium surface speeds. The maximum values given in table 03 can only be achieved at a very low surface pressure. The maximum speed given is the speed at which an increase up to the continuous use temperature occurs due to friction.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.0	0.7	3.0
short-term	**m/s**	2.0	1.4	4.0

Table 03: Maximum surface speeds

Temperature

Even with its maximum long-term application temperature of +130°C, the values for iglidur® P do not quite come up to those of iglidur® G. The temperatures prevailing in the bearing system also have an influence on the wear. The wear rises with increasing temperatures. For temperatures over +90°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction declines just as the wear resistance with increasing load (diagrams 04 and 05). iglidur® P plain bearings obtain a minimum coefficient of friction on shafts with a surface finish Ra from 0.1 – 0.2µm. Both smoother and rougher shaft surface finish cause the friction to clearly increase.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

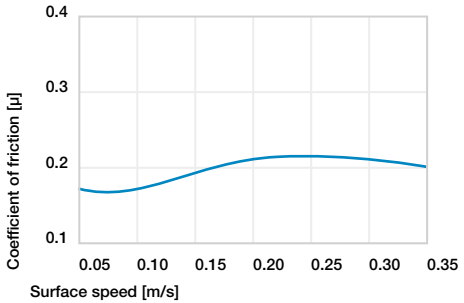


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

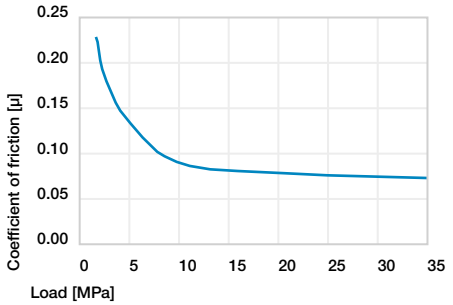


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

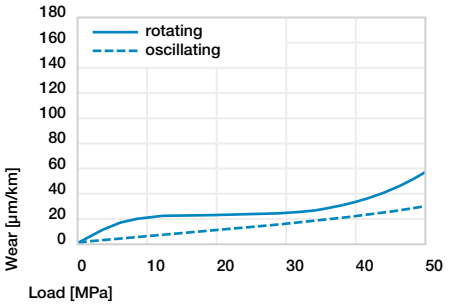


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

Diagram 06 shows results of testing different shaft materials with plain bearings made from iglidur® P. For rotational movements, the wear of iglidur® P with Cf53 and HR carbon steel shafts is very low. On the other hand, the bearings hard-chromed shafts result in higher wear than other shaft materials even in the low load range. For example at a load of 2MPa, cold rolled steel is six times better than 304 stainless steel. For pivoting movements, however, is the „soft“ HR carbon steel shaft significantly less favourable than the hardened shaft versions or the 304 stainless steel shafts.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.06 – 0.21	0.09	0.04	0.04

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

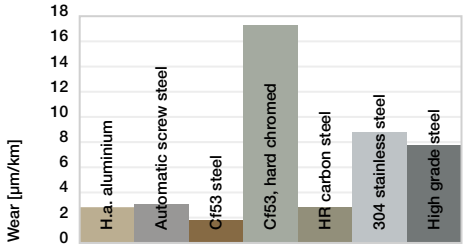


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® P 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 E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

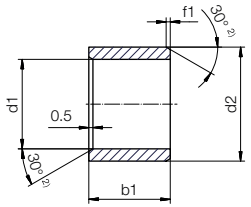
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® P

Sleeve bearing (form S)



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

Dimensions according to ISO 3547-1 and special dimensions

Order example: PSM-0304-03 - no minimum order quantity.
P iglidur® material S Sleeve bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 03 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
3.0	+0.014 +0.054	4.5	3.0	PSM-0304-03
4.0		5.5	4.0	PSM-0405-04
4.0	+0.020 +0.068	5.5	6.0	PSM-0405-06
5.0		7.0	5.0	PSM-0507-05
5.0		7.0	10.0	PSM-0507-10
6.0		8.0	6.0	PSM-0608-06
6.0		8.0	8.0	PSM-0608-08
6.0		8.0	10.0	PSM-0608-10
8.0		10.0	8.0	PSM-0810-08
8.0		10.0	10.0	PSM-0810-10
8.0	+0.025 +0.083	10.0	11.5	PSM-0810-11
8.0		10.0	12.0	PSM-0810-12
10.0		12.0	8.0	PSM-1012-08
10.0		12.0	10.0	PSM-1012-10
10.0		12.0	12.0	PSM-1012-12
10.0		12.0	15.0	PSM-1012-15
10.0		12.0	20.0	PSM-1012-20
12.0		14.0	10.0	PSM-1214-10
12.0		14.0	12.0	PSM-1214-12
12.0		14.0	15.0	PSM-1214-15
12.0		14.0	20.0	PSM-1214-20
12.0		14.0	25.0	PSM-1214-25
13.0	+0.032 +0.102	15.0	10.0	PSM-1315-10
13.0		15.0	20.0	PSM-1315-20
14.0		16.0	15.0	PSM-1416-15
14.0		16.0	20.0	PSM-1416-20
14.0		16.0	25.0	PSM-1416-25
15.0		17.0	15.0	PSM-1517-15

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
15.0		17.0	20.0	PSM-1517-20
15.0		17.0	25.0	PSM-1517-25
16.0		18.0	15.0	PSM-1618-15
16.0		18.0	20.0	PSM-1618-20
16.0	+0.032	18.0	25.0	PSM-1618-25
16.0	+0.102	18.0	42.0	PSM-1618-42
18.0		20.0	15.0	PSM-1820-15
18.0		20.0	20.0	PSM-1820-20
18.0		20.0	25.0	PSM-1820-25
18.0		20.0	33.0	PSM-1820-33
20.0		22.0	22.0	PSM-2022-22
20.0		22.0	30.0	PSM-2022-30
20.0		22.0	48.0	PSM-2022-48
20.0		22.0	51.0	PSM-2022-51
20.0		23.0	10.0	PSM-2023-10
20.0		23.0	15.0	PSM-2023-15
20.0		23.0	20.0	PSM-2023-20
20.0		23.0	25.0	PSM-2023-25
20.0		23.0	30.0	PSM-2023-30
22.0	+0.040 +0.124	24.0	42.0	PSM-2224-42
22.0		24.0	45.0	PSM-2224-45
22.0		25.0	15.0	PSM-2225-15
22.0		25.0	20.0	PSM-2225-20
22.0		25.0	25.0	PSM-2225-25
22.0		25.0	30.0	PSM-2225-30
22.0		25.0	45.0	PSM-2225-45
23.0		25.0	37.0	PSM-2325-37
23.0		25.0	58.0	PSM-2325-58
23.0		25.0	68.0	PSM-2325-68

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

Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
24.0		27.0	15.0	PSM-2427-15
24.0		27.0	20.0	PSM-2427-20
24.0		27.0	25.0	PSM-2427-25
24.0		27.0	30.0	PSM-2427-30
25.0		28.0	15.0	PSM-2528-15
25.0		28.0	20.0	PSM-2528-20
25.0		28.0	25.0	PSM-2528-25
25.0		28.0	30.0	PSM-2528-30
25.0	+0.040	28.0	35.0	PSM-2528-35
26.0	+0.124	30.0	25.0	PSM-2630-25
28.0		32.0	20.0	PSM-2832-20
28.0		32.0	25.0	PSM-2832-25
28.0		32.0	30.0	PSM-2832-30
30.0		34.0	20.0	PSM-3034-20
30.0		34.0	25.0	PSM-3034-25
30.0		34.0	30.0	PSM-3034-30
30.0		34.0	40.0	PSM-3034-40
30.0		34.0	45.0	PSM-3034-45
32.0		36.0	20.0	PSM-3236-20
32.0		36.0	30.0	PSM-3236-30
32.0	+0.050 +0.150	36.0	40.0	PSM-3236-40
35.0		39.0	20.0	PSM-3539-20
35.0		39.0	30.0	PSM-3539-30

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
35.0		39.0	40.0	PSM-3539-40
35.0		39.0	50.0	PSM-3539-50
40.0		44.0	20.0	PSM-4044-20
40.0		44.0	30.0	PSM-4044-30
40.0		44.0	40.0	PSM-4044-40
40.0		44.0	50.0	PSM-4044-50
40.0	+0.050	44.0	58.0	PSM-4044-58
45.0	+0.150	50.0	20.0	PSM-4550-20
45.0		50.0	30.0	PSM-4550-30
45.0		50.0	40.0	PSM-4550-40
45.0		50.0	50.0	PSM-4550-50
50.0		55.0	20.0	PSM-5055-20
50.0		55.0	30.0	PSM-5055-30
50.0		55.0	40.0	PSM-5055-40
50.0		55.0	50.0	PSM-5055-50
50.0		55.0	60.0	PSM-5055-60
60.0	+0.060	65.0	50.0	PSM-6065-50
60.0	+0.180	65.0	60.0	PSM-6065-60
65.0		70.0	50.0	PSM-6570-50
75.0		80.0	80.0	PSM-7580-80
90.0	+0.072	95.0	100.0	PSM-9095-100
95.0	+0.212	100.0	100.0	PSM-95100-100

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

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including delivery times, prices, online tools
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25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
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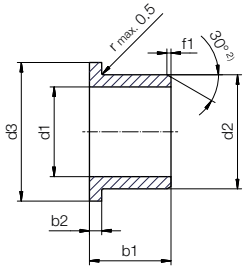
Bearing technology | Plain bearings | iglidur® P

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: PFM-0405-04 - no minimum order quantity.
P iglidur® material F Flange bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 04 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
4.0		5.5	9.5	4.0	0.75	PFM-0405-04
5.0	+0.020 +0.068	6.0	10.0	3.0	0.50	PFM-0506-03
5.0		7.0	11.0	5.0	1.00	PFM-0507-05
6.0		8.0	12.0	4.0	1.00	PFM-0608-04
6.0		8.0	12.0	6.0	1.00	PFM-0608-06
6.0		8.0	12.0	8.0	1.00	PFM-0608-08
7.0		9.0	15.0	4.0	1.00	PFM-0709-04
8.0		10.0	15.0	5.5	1.00	PFM-0810-05
8.0		10.0	15.0	7.5	1.00	PFM-0810-07
8.0		10.0	15.0	9.5	1.00	PFM-0810-09
8.0		10.0	12.0	10.0	1.00	PFM-081012-10
8.0	+0.025 +0.083	10.0	15.0	10.0	1.00	PFM-0810-10
8.0		10.0	15.0	15.0	1.00	PFM-0810-15
10.0		12.0	18.0	7.0	1.00	PFM-1012-07
10.0		12.0	18.0	9.0	1.00	PFM-1012-09
10.0		12.0	18.0	10.0	1.00	PFM-1012-10
10.0		12.0	18.0	12.0	1.00	PFM-1012-12
10.0		12.0	18.0	17.0	1.00	PFM-1012-17
12.0		14.0	20.0	7.0	1.00	PFM-1214-07
12.0		14.0	18.0	8.0	1.00	PFM-121418-08
12.0		14.0	20.0	9.0	1.00	PFM-1214-09
12.0		14.0	20.0	10.0	1.00	PFM-1214-10
12.0	+0.032	14.0	20.0	10.0	1.00	PFM-121420-10
12.0	+0.102	14.0	20.0	12.0	1.00	PFM-1214-12
12.0		14.0	20.0	15.0	1.00	PFM-1214-15
12.0		14.0	20.0	17.0	1.00	PFM-1214-17
14.0		16.0	22.0	4.0	1.00	PFM-1416-04
14.0		16.0	22.0	8.0	1.00	PFM-1416-08
14.0	+0.032 +0.102	16.0	22.0	12.0	1.00	PFM-1416-12
14.0		16.0	22.0	17.0	1.00	PFM-1416-17
14.0		16.0	24.0	25.0	1.00	PFM-141624-25
14.0	+0.050 +0.160	20.0	25.0	10.0	3.00	PFM-1420-10
15.0		17.0	23.0	9.0	1.00	PFM-1517-09
15.0		17.0	23.0	12.0	1.00	PFM-1517-12
15.0		17.0	23.0	17.0	1.00	PFM-1517-17
15.0		17.0	23.0	22.0	1.00	PFM-1517-22
15.0		18.0	24.0	32.0	1.50	PFM-151824-32
16.0	+0.032 +0.102	18.0	24.0	12.0	1.00	PFM-1618-12
16.0		18.0	24.0	17.0	1.00	PFM-1618-17
16.0		18.0	24.0	40.0	1.00	PFM-161824-40
17.0		19.0	25.0	25.0	1.00	PFM-1719-25
18.0		20.0	26.0	12.0	1.00	PFM-1820-12
18.0		20.0	26.0	17.0	1.00	PFM-1820-17
18.0		20.0	26.0	22.0	1.00	PFM-1820-22
20.0		23.0	30.0	11.5	1.50	PFM-2023-11
20.0		23.0	28.0	15.0	1.50	PFM-202328-15
20.0		23.0	30.0	16.5	1.50	PFM-2023-16
20.0		23.0	30.0	21.5	1.50	PFM-2023-21
20.0	+0.040	23.0	30.0	30.0	1.50	PFM-2023-30
24.0	+0.124	27.0	32.0	22.0	1.50	PFM-2427-22
25.0		28.0	35.0	11.5	1.50	PFM-2528-11
25.0		28.0	35.0	16.5	1.50	PFM-2528-16
25.0		28.0	35.0	21.5	1.50	PFM-2528-21
30.0		34.0	42.0	16.0	2.00	PFM-3034-16
30.0		34.0	42.0	26.0	2.00	PFM-3034-26

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

Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
30.0	+0.040	34.0	42.0	30.0	2.00	PFM-3034-30
30.0	+0.124	34.0	42.0	37.0	2.00	PFM-3034-37
35.0		39.0	47.0	16.0	2.00	PFM-3539-16
35.0	+0.050	39.0	47.0	26.0	2.00	PFM-3539-26
40.0	+0.150	44.0	52.0	30.0	2.00	PFM-4044-30
40.0		44.0	52.0	40.0	2.00	PFM-4044-40
45.0	+0.050	50.0	58.0	50.0	2.00	PFM-4550-50
50.0	+0.150	55.0	63.0	50.0	2.00	PFM-5055-50
60.0		65.0	73.0	40.0	2.00	PFM-6065-40
60.0	+0.060	65.0	73.0	50.0	2.00	PFM-6065-50
70.0	+0.180	75.0	83.0	50.0	2.00	PFM-7075-50
80.0		85.0	93.0	100.0	2.50	PFM-8085-100

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

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including delivery times, prices, online tools
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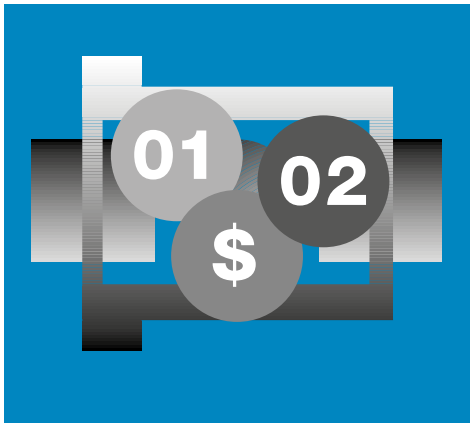


Versatile and cost-effective

For medium temperatures and wet environments

iglidur® K

When to use it?

- When a cost-effective all-round plain bearing is required
- For operations in wet environments
- When good wear resistance is required at medium loads

When not to use?

- When the highest wear resistance is required
  iglidur® W300
- When high media resistance is required
  iglidur® X6
- When a high-temperature bearing is required
  iglidur® H

Bearing technology | Plain bearings | iglidur® K

Ø
6.0 – 20.0mm

Also available as:

Bar stock, round bar:
Page 629

Bar stock, plate:
Page 651

tribo-tape liner:
Page 657

Piston rings:
Page 559

Two hole flange bearing:
Page 581

Moulded special parts:
Page 602

igubal® spherical balls:
Page 783

Versatile and cost-effective:
For medium temperatures and wet environments

iglidur® K is the cost-effective general purpose bearing for medium temperatures, low moisture absorption and good environmental resistance.

- Low moisture absorption
- Wear-resistant
- Cost-effective
- Lubrication-free
- Maintenance-free

Typical application areas

- Printing industry
- Electronics industry
- Packaging
- Medical technology
- Polymer processing machines

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® K
+170°C
50MPa

Technical data

General properties			Testing method
Density	g/cm³	1.52	
Colour		yellow-beige	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.1	DIN 53495
Max. moisture absorption	% weight	0.6	
Coefficient of friction, dynamic, against steel	µ	0.06 – 0.21	
pv value, max. (dry)	MPa · m/s	0.30	
Mechanical properties			
Flexural modulus	MPa	3,500	DIN 53457
Flexural strength at +20°C	MPa	80	DIN 53452
Compressive strength	MPa	60	
Max. recommended surface pressure (+20°C)	MPa	50	
Shore D hardness		72	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+170	
Max. application temperature short-term	°C	+240	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.25	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	3	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{12}$	DIN IEC 93
Surface resistance	Ω	$> 10^{12}$	DIN 53482

Table 01: Material properties table

–40°C up to +170°C

50MPa

HB

RoHS-II

ISO 3547-1

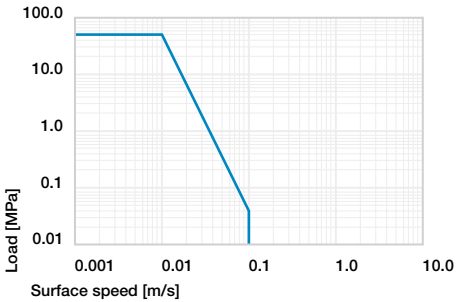


Diagram 01: Permissible pv values for iglidur® K plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® K plain bearings is approximately 0.1% weight. The saturation limit in water is 0.6% weight. These values are so low that a moisture expansion need to be considered only in extreme cases.

Vacuum

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

Radiation resistance

Plain bearings made from iglidur® K are resistant up to a radiation intensity of $5 \cdot 10^2$Gy.

UV resistance

iglidur® K plain bearings become discoloured when exposed to UV radiation. However, the material properties are not affected.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® K

iglidur® K is characterised by its good wear characteristics at low moisture absorption and good thermal and mechanical specifications. This supports a very universal application spectrum.

Mechanical properties

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

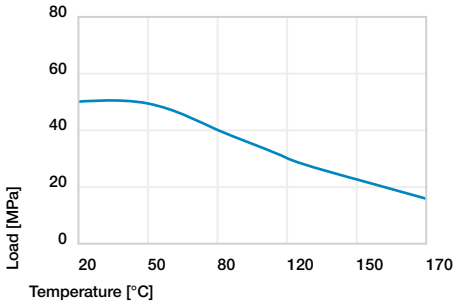


Diagram 02: Maximum recommended surface pressure as a function of temperature (50MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® K at radial loads. At the maximum recommended surface pressure of 50MPa the deformation is less than 3%. A possible deformation could be, among others, dependant on the duty cycle of the load.

Surface pressure, page 41

Permissible surface speeds

iglidur® K has been developed for low to medium surface speeds. The maximum values shown in table 03 can only be achieved at low pressures. At the given speeds, friction can cause a temperature increase to maximum permissible levels. In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.0	0.7	3.0
short-term	**m/s**	2.0	1.4	4.0

Table 03: Maximum surface speeds

Temperature

The temperatures prevailing in the bearing system also have an influence on the wear. With increasing temperatures, the wear increases and this effect is significant when temperatures rise over +100°C. For temperatures over +70°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the surface speed and load (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

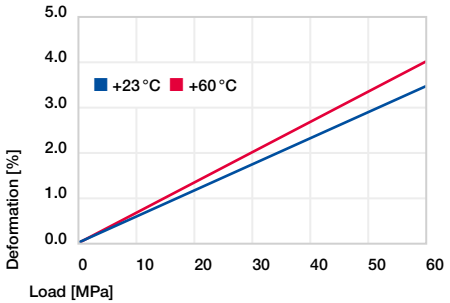


Diagram 03: Deformation under pressure and temperature

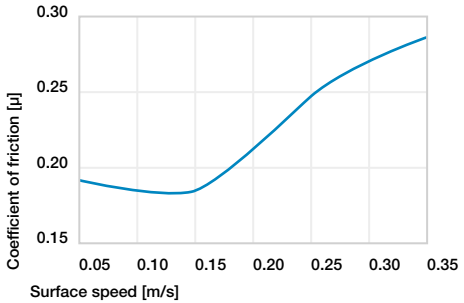


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

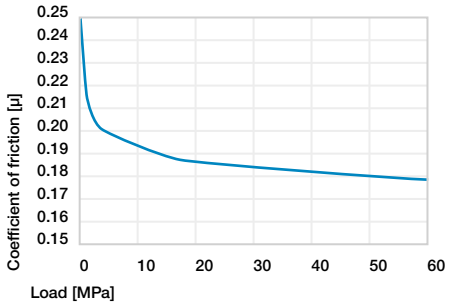


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

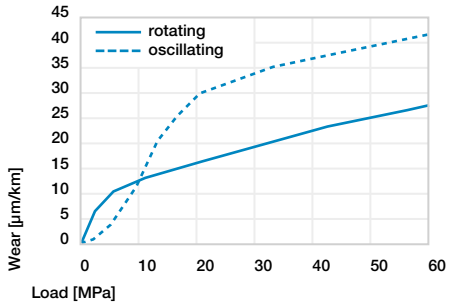


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

The friction and wear are also dependent, to a large degree, on the shaft material. Shafts that are too smooth, increase both the coefficient of friction and the wear of the bearing. For iglidur® K a ground surface with an average surface finish Ra = 0.15 – 0.2μm is recommended. Diagram 06 shows results of testing different shaft materials with plain bearings made from iglidur® K. It is important to notice that with increasing loads, the recommended hardness of the shaft increases. The „soft" shafts tend to wear more easily and thus increase the wear of the overall system, if the loads exceed 2MPa. The comparison of rotation and pivoting shows that the wear is almost identical at a pressure up to 5MPa. The higher the loads, the greater the difference (diagram 07).

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.06 – 0.21	0.09	0.04	0.04

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

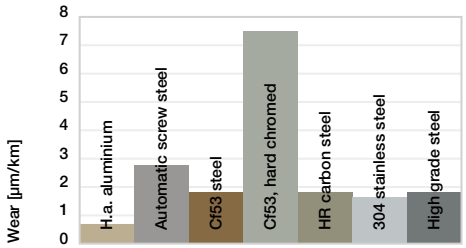


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

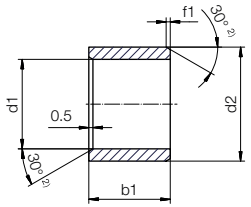
iglidur® K plain bearings are standard bearings for shafts with h tolerance (recommended minimum h9). The bearings are designed for press-fit into a housing machined to a H7 tolerance. After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table). In relation to the installation tolerance, the inner diameter changes with the absorption of humidity.

Testing methods, page 57

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

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

Sleeve bearing (form S)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: KSM-0608-06 - no minimum order quantity.
K iglidur® material S Sleeve bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
6.0	+0.020 +0.068	8.0	6.0	**KSM-0608-06**
8.0	+0.025 +0.083	10.0	10.0	**KSM-0810-10**
10.0		12.0	10.0	**KSM-1012-10**
12.0	+0.032 +0.102	14.0	12.0	**KSM-1214-12**
16.0		18.0	15.0	**KSM-1618-15**
20.0	+0.040 +0.124	23.0	20.0	**KSM-2023-20**

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/K

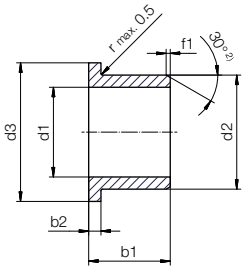
Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® K

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 6–12	Ø 12–30
f [mm]	0.5	0.8

Dimensions according to ISO 3547-1 and special dimensions

Order example: KFM-0608-06 - no minimum order quantity.
K iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.020 +0.068	8.0	12.0	6.0	1.00	**KFM-0608-06**
8.0	+0.025 +0.083	10.0	15.0	10.0	1.00	**KFM-0810-10**
10.0		12.0	18.0	10.0	1.00	**KFM-1012-10**
12.0	+0.032 +0.102	14.0	20.0	12.0	1.00	**KFM-1214-12**
16.0		18.0	24.0	17.0	1.00	**KFM-1618-17**
20.0	+0.040 +0.124	23.0	30.0	21.5	1.50	**KFM-2023-21**

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/K

Ordering note
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Discount scaling		
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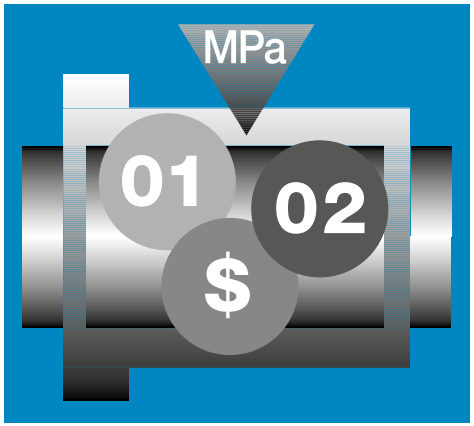


Low-cost material for high-volume production

For applications with mainly static loads

iglidur® GLW

When to use it?

- When an economical universal bearing for high volumes is required
- For high, primarily static loads
- For low to medium speeds

When not to use?

- When mechanical reaming of the bore is necessary
  iglidur® M250
- For primarily dynamic loads
  iglidur® G
- When the highest wear resistance is required
  iglidur® W300
- When continuous operating temperatures are higher than +130°C
  iglidur® K
- For underwater applications
  iglidur® H2

Bearing technology | Plain bearings | iglidur® GLW

Ø
–

Also available as:

Bar stock, round bar: **Page 637**

Bar stock, plate: **Page 651**

tribo-tape liner: **Page 657**

Piston rings: **Page 559**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 783**

Low-cost material for high-volume production: For applications with mainly static loads

iglidur® GLW plain bearings are preferred in applications with static load, where only occasional movement takes place.

- Applications with static loads
- Cost-effective
- Resistant to dirt
- Resistant to vibrations
- Lubrication-free
- Maintenance-free

Typical application areas

- Automation
- Automotive
- Industrial handling

Descriptive technical specifications			
Wear resistance at +23°C	–		+
Wear resistance at +90°C	–		+
Wear resistance at +150°C	–		+
Low coefficient of friction	–		+
Low moisture absorption	–		+
Wear resistance under water	–		+
High media resistance	–		+
Resistant to edge pressures	–		+
Suitable for shock and impact loads	–		+
Resistant to dirt	–		+

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

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

Technical data

General properties			Testing method
Density	g/cm³	1.36	
Colour		black	
Max. moisture absorption at +23°C and 50 % r.h.	% weight	1.3	DIN 53495
Max. moisture absorption	% weight	5.5	
Coefficient of friction, dynamic, against steel	µ	0.10 – 0.24	
pv value, max. (dry)	MPa · m/s	0.30	
Mechanical properties			
Flexural modulus	MPa	7,700	DIN 53457
Flexural strength at +20°C	MPa	235	DIN 53452
Compressive strength	MPa	74	
Max. recommended surface pressure (+20°C)	MPa	80	
Shore D hardness		78	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+100	
Max. application temperature short-term	°C	+160	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	17	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{11}$	DIN IEC 93
Surface resistance	Ω	$> 10^{11}$	DIN 53482

Table 01: Material properties table

–40°C up to +100°C

80MPa

HB

RoHS-II

ISO 3547-1

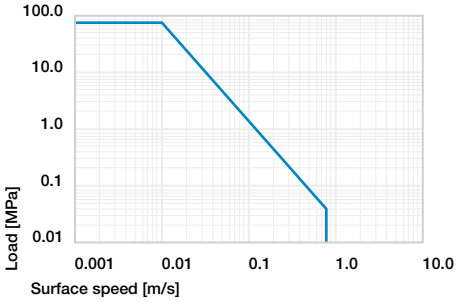


Diagram 01: Permissible pv values for iglidur® GLW plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® GLW plain bearings is approximately 1.3% weight. The saturation limit in water is 5.5% weight. This must be taken into account for these types of applications.

Vacuum

In vacuum, any present moisture is released as vapour.

Radiation resistance

Plain bearings made from iglidur® GLW are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® GLW plain bearings are resistant to permanent UV radiation.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® GLW

With plain bearings made from iglidur® GLW, we can offer our customers an alternative to iglidur® G for high-volume production applications. Featuring similar mechanical designed as iglidur® G, iglidur® GLW plain bearings are primarily recommended for static loads. With regard to these applications, in which the dynamic properties of iglidur® G to a large extent are unimportant, iglidur® GLW presents a cost-effective alternative.

Mechanical properties

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

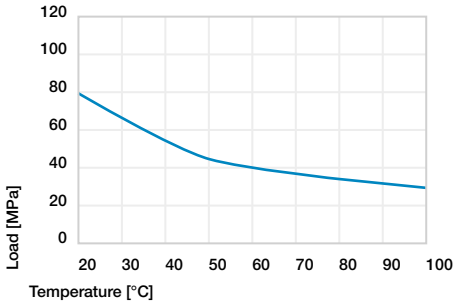


Diagram 02: Maximum recommended surface pressure as a function of temperature (80MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® GLW at radial loads. At the maximum recommended surface pressure of 80MPa at room temperature the deformation is less than 3%. A plastic deformation can be negligible up to this value. It is however also dependent on the duty cycle of the load.

Surface pressure, page 41

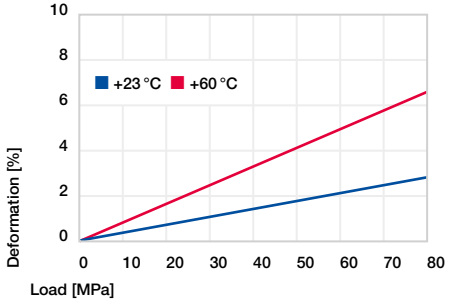


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® GLW has been developed for low to medium surface speeds. During continuous operation, a maximum speed of 0.8m/s (rotating) or 2.5m/s (linear) is permissible. The maximum values shown in table 03 can only be achieved at low pressures. In practice, these values are rarely reached, due to the increasing temperatures approaching or exceeding the maximum permitted value.

Surface speed, page 44

		rotating	oscillating	linear
long-term	m/s	0.8	0.6	2.5
short-term	m/s	1.0	0.7	3.0

Table 03: Maximum surface speeds

Temperature

The ambient temperatures strongly influence the properties of plain bearings. Diagram 02 shows this inverse relationship. The wear rises with increasing temperatures. For temperatures over +80°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the surface speed and load (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

Technical data

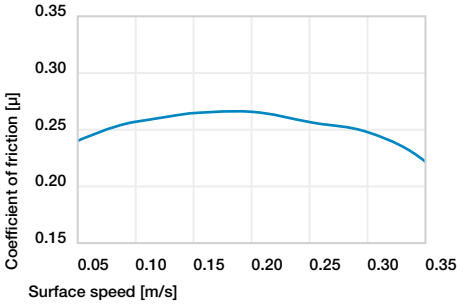


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

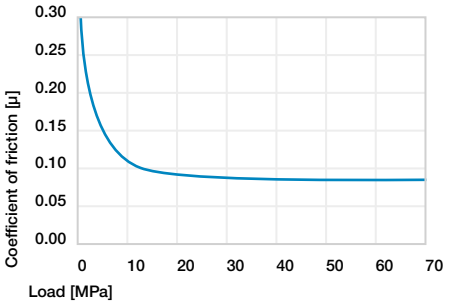


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

Shaft materials

The friction and wear are also dependent, to a large degree, on the shaft material. Shafts that are too smooth, increase both the coefficient of friction and the wear of the bearing. For iglidur® GLW a ground surface with an average surface finish Ra = 0.1 – 0.2μm is recommended. Diagram 06 shows results of testing different shaft materials with plain bearings made from iglidur® GLW. If the shaft material you plan on using is not shown in these test results, please contact us.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.10 – 0.24	0.09	0.04	0.04

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

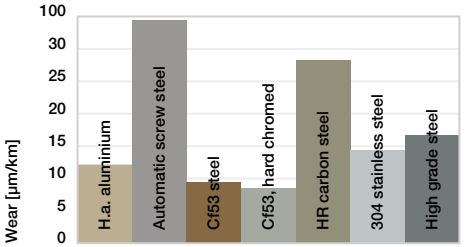


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® GLW 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 E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

Testing methods, page 57

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

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

Product range

iglidur® GLW plain bearings are manufactured to special order. For high volume applications, please request iglidur® GLW plain bearings as an alternative to iglidur® G.

Materials for long service life

Materials for long service life

Every iglidur® plain bearing is naturally optimised for wear, but the materials in this group are characterised byvery low rates of wear and therefore the ability to provide a long service life.
Besides the absolute service life and price level, they differ inter alia in terms of potential temperature and load ranges, and the suitability in conjunction with special shaft materials.

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

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

iglidur® J:
The versatile endurance runner

Temperature [°C] [123]	+90	–	+
Surface pressure [MPa] [124]	35	–	+
Coefficient of friction [µ] [125]	0.16	–	+
Wear [µm/km] [125]	0.29	–	+
Price index		–	+

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

Temperature [°C] [123]	+90	–	+
Surface pressure [MPa] [124]	60	–	+
Coefficient of friction [µ] [125]	0.18	–	+
Wear [µm/km] [125]	0.33	–	+
Price index		–	+

iglidur® J3:
The new endurance runner: specialist for pivoting applications and pulsating loads

Temperature [°C] [123]	+90	–	+
Surface pressure [MPa] [124]	45	–	+
Coefficient of friction [µ] [125]	0.13	–	+
Wear [µm/km] [125]	0.07	–	+
Price index		–	+

iglidur® J350:
Endurance runner with high dimensional stability at high temperatures

Temperature [°C] [123]	+180	–	+
Surface pressure [MPa] [124]	60	–	+
Coefficient of friction [µ] [125]	0.16	–	+
Wear [µm/km] [125]	1.14	–	+
Price index		–	+

iglidur® J260:
Ideal for plastic shafts

Temperature [°C] [123]	+120	–	+
Surface pressure [MPa] [124]	40	–	+
Coefficient of friction [µ] [125]	0.16	–	+
Wear [µm/km] [125]	0.11	–	+
Price index		–	+

[123] Max. long-term application temperature [124] Max. recommended surface pressure at +20°C [125] Best combination for p = 1MPa, v = 0.3m/s, rotating

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

Temperature [°C] [123]	+180	–	+
Surface pressure [MPa] [124]	75	–	+
Coefficient of friction [µ] [125]	0.07	–	+
Wear [µm/km] [125]	0.24	–	+
Price index		–	+

iglidur® L250:
For fast rotating applications

Temperature [°C] [123]	+90	–	+
Surface pressure [MPa] [124]	45	–	+
Coefficient of friction [µ] [125]	0.18	–	+
Wear [µm/km] [125]	0.20	–	+
Price index		–	+

iglidur® L350:
For high rotational speeds

Temperature [°C] [123]	+180	–	+
Surface pressure [MPa] [124]	59	–	+
Coefficient of friction [µ] [125]	0.12	–	+
Wear [µm/km] [125]	1.50	–	+
Price index		–	+

iglidur® L500:
For extreme rotational speeds

Temperature [°C] [123]	+250	–	+
Surface pressure [MPa] [124]	70	–	+
Coefficient of friction [µ] [125]	0.19	–	+
Wear [µm/km] [125]	1.00	–	+
Price index		–	+

iglidur® R:
Low-cost

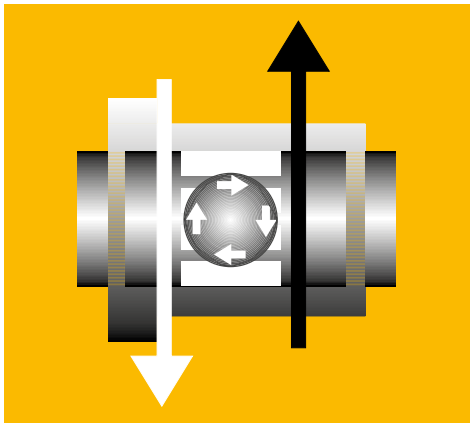
Temperature [°C] [123]	+90	–	+
Surface pressure [MPa] [124]	23	–	+
Coefficient of friction [µ] [125]	0.20	–	+
Wear [µm/km] [125]	0.95	–	+
Price index		–	+

iglidur® D:
Low-cost with silicone

Temperature [°C] [123]	+90	–	+
Surface pressure [MPa] [124]	23	–	+
Coefficient of friction [µ] [125]	0.25	–	+
Wear [µm/km] [125]	1.91	–	+

iglidur® J200:
Specialist for aluminium shafts

Temperature [°C] [123]	+90	–	+
Surface pressure [MPa] [124]	23	–	+
Coefficient of friction [µ] [125]	0.15	–	+
Wear [µm/km] [125]	1.30	–	+
Price index		–	+



The versatile endurance runner

Wear resistance on (almost) all shafts, very low coefficient of friction

iglidur® J

When to use it?

- For high speeds
- When highest wear resistance at low to medium pressures is required
- Low wear against different shafts
- When a low coefficient of friction in dry operation is requested
- For vibration dampening
- When good chemical resistance is required
- For best performance with soft shaft materials
- Low moisture absorption

When not to use?

- When high pressures occur
  iglidur® G, iglidur® W300
- When short-term temperatures higher than +120°C occur
  iglidur® G, iglidur® Z
- When a cost-effective plain bearing for occasional movements is necessary
  iglidur® G

Bearing technology | Plain bearings | iglidur® J

Ø
1.5 –
120.0mm

Also available as:

Bar stock, round bar:
Page 638

Bar stock, plate:
Page 652

tribo-tape liner:
Page 657

Piston rings:
Page 562

Two hole flange bearing:
Page 581

Moulded special parts:
Page 602

igubal® spherical balls:
Page 790

The versatile endurance runner:
Wear resistance on (almost) all shafts, very low coefficient of friction

One main advantage of iglidur® J plain bearings is the combination of a low coefficient of friction in dry operation and the low stickslip tendency. With a maximum recommended surface pressure of 35MPa, iglidur® J plain bearings are not suitable for extreme loads.

- Over 250 sizes available from stock
- High wear resistance
- Low coefficient of friction
- Vibration-dampening
- High chemical resistance
- Recommended for soft shafts
- Low moisture absorption

Typical application areas

- Automation
- Printing industry
- Beverage industry
- Aerospace engineering
- Cleanroom

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® J
+90°C
35MPa

Technical data

General properties			Testing method
Density	g/cm³	1.49	
Colour		yellow	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.3	DIN 53495
Max. moisture absorption	% weight	1.3	
Coefficient of friction, dynamic, against steel	µ	0.06 – 0.18	
pv value, max. (dry)	MPa · m/s	0.34	
Mechanical properties			
Flexural modulus	MPa	2,400	DIN 53457
Flexural strength at +20°C	MPa	73	DIN 53452
Compressive strength	MPa	60	
Max. recommended surface pressure (+20°C)	MPa	35	
Shore D hardness		74	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+90	
Max. application temperature short-term	°C	+120	
Min. application temperature	°C	–50	
Thermal conductivity	W/m · K	0.25	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	10	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{13}$	DIN IEC 93
Surface resistance	Ω	$> 10^{12}$	DIN 53482

Table 01: Material properties table

–50°C up to +90°C

35MPa

HB

FDA

RoHS-II

ISO 3547-1

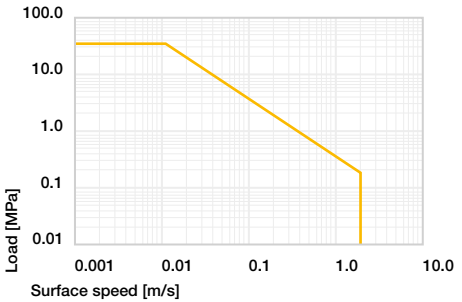


Diagram 01: Permissible pv values for iglidur® J plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® J plain bearings is approximately 0.3% weight. The saturation limit in water is 1.3% weight. These values are so low that a moisture expansion need to be considered only in extreme cases.

Vacuum

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

Radiation resistance

Plain bearings made from iglidur® J are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® J plain bearings become discoloured when exposed to UV radiation. However, the material properties are not affected.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® J

One main advantage of iglidur® J plain bearings is the combination of a low coefficient of friction in dry operation and the low stickslip tendency.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® J plain bearings decreases. Diagram 02 shows this inverse relationship. However, at the long-term maximum temperature of +90°C the permissible surface pressure is around 20MPa. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

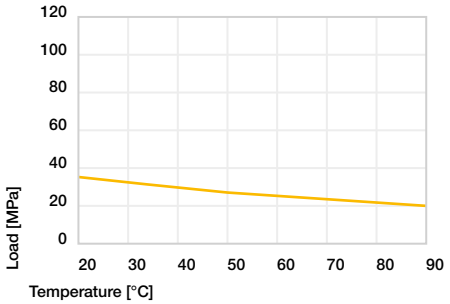


Diagram 02: Maximum recommended surface pressure as a function of temperature (35MPa at +20°C)

With a maximum recommended surface pressure of 35MPa, iglidur® J plain bearings are not suitable for extreme loads. Diagram 03 shows the elastic deformation of iglidur® J at radial loads.

Surface pressure, page 41

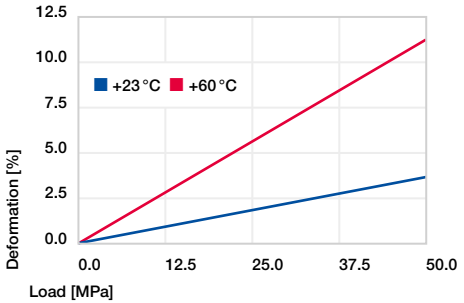


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

The low coefficient of friction and the very low stick slip tendency of iglidur® J plain bearings are particularly important at very low speeds. However, iglidur® J can also be used for high speeds of over 1m/s. In both cases the static friction is very low and stick slip does not occur. The maximum values shown in table 03 can only be achieved at low pressures. At the given speeds, friction can cause a temperature increase to maximum permissible levels. In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	m/s	1.5	1.1	8.0
short-term	m/s	3.0	2.1	10.0

Table 03: Maximum surface speeds

Temperature

iglidur® J plain bearings can be used between –50°C and +90°C; the short-term maximum permissible temperature is +120°C. Wear increases significantly at temperatures above +80°C. For temperatures over +60°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the surface speed and load (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

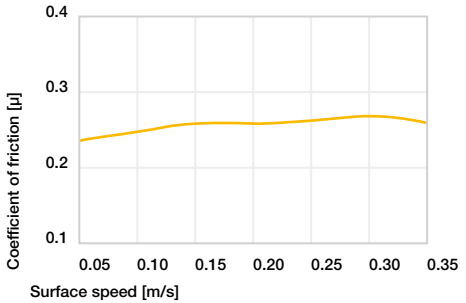


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

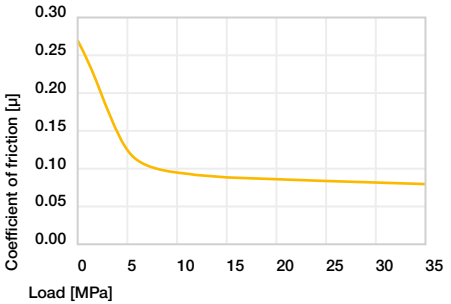


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

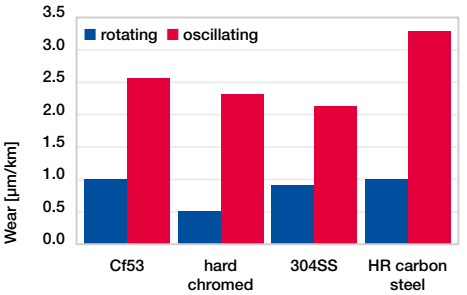


Diagram 07: Wear for rotating and oscillating applications with different shaft materials, p = 2MPa

Shaft materials

The friction and wear are also dependent, to a large degree, on the shaft material. With increasing shaft surface finish, the coefficient of friction also increases. For iglidur® J a ground surface with an average surface finish Ra = 0.1 – 0.3μm is recommended. Diagrams 06 and 07 show the test results of iglidur® J plain bearings running against various shaft materials. When compared to most iglidur® materials, iglidur® J plain bearings have very low wear results at low loads compared with all shaft materials tested. Also, for increasing loads up to 5MPa, the wear resistance of iglidur® J is excellent. If the shaft material you plan on using is not shown in these test results, please contact us.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.06 – 0.18	0.09	0.04	0.04

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

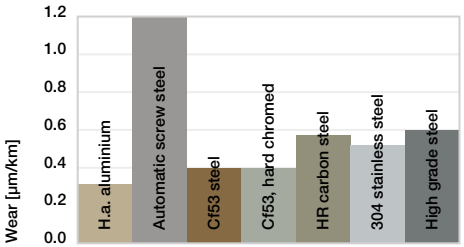


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® J 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 E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

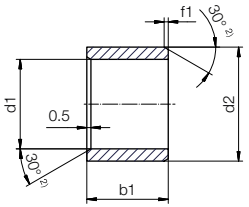
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® J

Sleeve bearing (form S)



[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

Dimensions according to ISO 3547-1 and special dimensions

Order example: JSM-0104-02 - no minimum order quantity.
J iglidur® material S Sleeve bearing M Metric 01 Inner Ø d1 04 Outer Ø d2 02 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
1.5	+0.014	4.0	2.0	JSM-0104-02
2.0	+0.054	3.5	7.0	JSM-0203-07
2.0	+0.020	5.0	2.5	JSM-0205-02
2.5	+0.080	6.0	2.5	JSM-0206-02
3.0	+0.014	4.5	5.0	JSM-0304-05
3.0	+0.054	4.5	9.0	JSM-0304-09
3.0		5.0	4.0	JSM-0305-04
3.0	+0.020	7.0	14.0	JSM-0307-14
3.0	+0.080	8.0	4.0	JSM-0308-04
3.0		8.0	5.0	JSM-0308-05
4.0		5.5	4.0	JSM-0405-04
4.0		5.5	6.0	JSM-0405-06
4.0		5.5	8.0	JSM-0405-08
5.0	+0.020	7.0	4.6	JSM-0507-046
5.0	+0.068	7.0	5.0	JSM-0507-05
5.0		7.0	10.0	JSM-0507-10
5.0		7.0	14.0	JSM-0507-14
5.0	+0.020 +0.080	7.0	15.0	JSM-0507-15
5.0	+0.030 +0.105	8.0	5.0	JSM-0508-05
6.0		7.0	3.0	JSM-0607-03
6.0		7.0	5.0	JSM-0607-05
6.0	+0.010	7.0	8.0	JSM-0607-08
6.0	+0.058	7.0	12.5	JSM-0607-12.5
6.0		7.0	14.0	JSM-0607-14

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
6.0		8.0	4.3	JSM-0608-043
6.0		8.0	6.0	JSM-0608-06
6.0	+0.020 +0.068	8.0	8.0	JSM-0608-08
6.0		8.0	10.0	JSM-0608-10
6.0	+0.030	9.0	6.0	JSM-0609-06
6.0	+0.105	10.0	10.0	JSM-0610-10
7.0		9.0	5.0	JSM-0709-05
7.0		9.0	7.0	JSM-0709-07
7.0		9.0	9.0	JSM-0709-09
7.0		9.0	12.5	JSM-0709-125
8.0	+0.025	10.0	3.0	JSM-0810-03
8.0	+0.083	10.0	4.0	JSM-0810-04
8.0		10.0	6.0	JSM-0810-06
8.0		10.0	8.0	JSM-0810-08
8.0		10.0	10.0	JSM-0810-10
8.0		10.0	12.0	JSM-0810-12
8.0		10.0	16.0	JSM-0810-16
8.0	+0.040	12.0	10.0	JSM-0812-10
8.0	+0.130	12.0	12.0	JSM-0812-12
9.0		11.0	10.0	JSM-0911-10
10.0		12.0	5.0	JSM-1012-05
10.0	+0.025	12.0	6.0	JSM-1012-06
10.0	+0.083	12.0	8.0	JSM-1012-08
10.0		12.0	10.0	JSM-1012-10
10.0		12.0	11.0	JSM-1012-11

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

iglidur® J
+90°C
35MPa

Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
10.0	+0.025	12.0	12.0	JSM-1012-12
10.0	+0.083	12.0	15.0	JSM-1012-15
10.0		12.0	20.0	JSM-1012-20
10.0	+0.040	14.0	10.0	JSM-1014-10
10.0	+0.130	14.0	16.0	JSM-1014-16
12.0		14.0	6.0	JSM-1214-06
12.0		14.0	8.0	JSM-1214-08
12.0		14.0	9.0	JSM-1214-09
12.0	+0.032	14.0	10.0	JSM-1214-10
12.0	+0.102	14.0	12.0	JSM-1214-12
12.0		14.0	15.0	JSM-1214-15
12.0		14.0	20.0	JSM-1214-20
12.0	+0.050	16.0	12.0	JSM-1216-12
12.0	+0.160	16.0	17.0	JSM-1216-17
13.0		15.0	10.0	JSM-1315-10
13.0		15.0	20.0	JSM-1315-20
13.0		16.0	18.5	JSM-1316-185
14.0		16.0	5.0	JSM-1416-05
14.0	+0.032	16.0	8.0	JSM-1416-08
14.0	+0.102	16.0	10.0	JSM-1416-10
14.0		16.0	15.0	JSM-1416-15
14.0		16.0	20.0	JSM-1416-20
14.0		16.0	25.0	JSM-1416-25
14.0		18.0	18.0	JSM-1418-18
14.0	+0.050 +0.160	20.0	20.0	JSM-1420-20
15.0		17.0	6.0	JSM-1517-06
15.0		17.0	10.0	JSM-1517-10
15.0		17.0	12.0	JSM-1517-12
15.0		17.0	15.0	JSM-1517-15
15.0		17.0	20.0	JSM-1517-20
15.0	+0.032	17.0	25.0	JSM-1517-25
15.0	+0.102	18.0	10.0	JSM-1518-10
16.0		18.0	10.0	JSM-1618-10
16.0		18.0	12.0	JSM-1618-12
16.0		18.0	15.0	JSM-1618-15
16.0		18.0	20.0	JSM-1618-20
16.0		18.0	25.0	JSM-1618-25
16.0	+0.050	20.0	16.0	JSM-1620-16
16.0	+0.160	22.0	16.0	JSM-1622-16
16.0		22.0	20.0	JSM-1622-20
17.0		19.0	6.0	JSM-1719-06
18.0		20.0	10.0	JSM-1820-10
18.0	+0.032	20.0	15.0	JSM-1820-15
18.0	+0.102	20.0	20.0	JSM-1820-20
18.0		20.0	25.0	JSM-1820-25
19.0		22.0	14.0	JSM-1922-14

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
20.0		22.0	20.0	JSM-2022-20
20.0	+0.040	22.0	30.0	JSM-2022-30
20.0	+0.124	23.0	10.0	JSM-2023-10
20.0		23.0	15.0	JSM-2023-15
20.0		23.0	20.0	JSM-2023-20
20.0	+0.020	23.0	25.0	JSM-2023-25
20.0	+0.104	23.0	30.0	JSM-2023-30
20.0		26.0	6.0	JSM-2026-06
20.0	+0.065	26.0	20.0	JSM-2026-20
20.0	+0.195	26.0	25.0	JSM-2026-25
20.0		26.0	30.0	JSM-2026-30
21.0		24.0	12.0	JSM-2124-12
22.0		25.0	15.0	JSM-2225-15
22.0		25.0	20.0	JSM-2225-20
22.0		25.0	25.0	JSM-2225-25
22.0		25.0	30.0	JSM-2225-30
23.0		26.0	12.0	JSM-2326-12
24.0		27.0	15.0	JSM-2427-15
24.0		27.0	20.0	JSM-2427-20
24.0	+0.040	27.0	25.0	JSM-2427-25
24.0	+0.124	27.0	30.0	JSM-2427-30
24.0		27.0	46.0	JSM-2427-46
25.0		28.0	12.0	JSM-2528-12
25.0		28.0	15.0	JSM-2528-15
25.0		28.0	20.0	JSM-2528-20
25.0		28.0	25.0	JSM-2528-25
25.0		28.0	30.0	JSM-2528-30
25.0		28.0	60.0	JSM-2528-60
25.0		30.0	40.0	JSM-2530-40
25.0	+0.065	32.0	25.0	JSM-2532-25
25.0	+0.195	32.0	32.0	JSM-2532-32
25.0		32.0	35.0	JSM-2532-35
26.0		30.0	20.0	JSM-2630-20
27.0	+0.040 +0.124	30.0	20.0	JSM-2730-20
28.0	+0.065	32.0	20.0	JSM-2832-20
28.0	+0.195	32.0	25.0	JSM-2832-25
28.0		32.0	30.0	JSM-2832-30
30.0		34.0	20.0	JSM-3034-20
30.0	+0.040	34.0	25.0	JSM-3034-25
30.0	+0.124	34.0	30.0	JSM-3034-30
30.0		34.0	40.0	JSM-3034-40
30.0	+0.065 +0.195	38.0	40.0	JSM-3038-40
32.0	+0.050	36.0	20.0	JSM-3236-20
32.0	+0.150	36.0	30.0	JSM-3236-30
32.0		36.0	40.0	JSM-3236-40

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

Bearing technology | Plain bearings | iglidur® J

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
32.0		37.0	25.0	**JSM-3237-25**
32.0		38.0	50.0	**JSM-3238-50**
35.0		39.0	20.0	**JSM-3539-20**
35.0		39.0	30.0	**JSM-3539-30**
35.0		39.0	40.0	**JSM-3539-40**
35.0	+0.050	39.0	50.0	**JSM-3539-50**
36.0	+0.150	40.0	45.0	**JSM-3640-45**
40.0		44.0	20.0	**JSM-4044-20**
40.0		44.0	30.0	**JSM-4044-30**
40.0		44.0	35.0	**JSM-4044-35**
40.0		44.0	40.0	**JSM-4044-40**
40.0		44.0	50.0	**JSM-4044-50**
42.0	+0.080 +0.240	46.0	73.0	**JSM-4246-73**
45.0	+0.025	50.0	20.0	**JSM-4550-20**
45.0	+0.125	50.0	30.0	**JSM-4550-30**

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
45.0	+0.025	50.0	40.0	**JSM-4550-40**
45.0	+0.125	50.0	50.0	**JSM-4550-50**
50.0		55.0	20.0	**JSM-5055-20**
50.0	+0.050	55.0	30.0	**JSM-5055-30**
50.0	+0.150	55.0	40.0	**JSM-5055-40**
50.0		55.0	50.0	**JSM-5055-50**
50.0		55.0	60.0	**JSM-5055-60**
55.0		60.0	60.0	**JSM-5560-60**
60.0		65.0	60.0	**JSM-6065-60**
65.0	+0.060	70.0	50.0	**JSM-6570-50**
70.0	+0.180	75.0	60.0	**JSM-7075-60**
75.0		80.0	60.0	**JSM-7580-60**
80.0		85.0	100.0	**JSM-8085-100**
80.0		86.0	60.0	**JSM-8086-60**
100.0	+0.072	105.0	100.0	**JSM-100105-100**
110.0	+0.212	115.0	60.0	**JSM-110115-60**

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/J

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

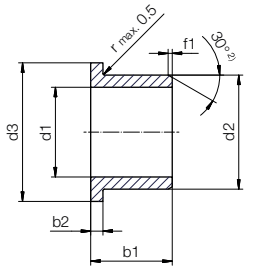
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur® J
+90°C
35MPa

Bearing technology | Plain bearings | iglidur® J

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: JFM-0306-10 **- no minimum order quantity.**
J iglidur® material F Flange bearing M Metric 03 Inner Ø d1 06 Outer Ø d2 10 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
3.0	+0.014 +0.054	4.5	7.5	3.0	0.75	**JFM-0304-03**
3.0		4.5	7.5	4.5	0.75	**JFM-0304-045**
3.0		4.5	7.5	5.0	0.75	**JFM-0304-05**
3.0	+0.020 +0.080	6.0	9.0	10.0	1.50	**JFM-0306-10**
4.0		5.5	9.5	3.0	0.75	**JFM-0405-03**
4.0		5.5	9.5	6.0	0.75	**JFM-0405-06**
5.0		6.0	10.0	5.0	0.50	**JFM-0506-05**
5.0		7.0	11.0	3.0	1.00	**JFM-0507-03**
5.0	+0.020 +0.068	7.0	11.0	5.0	1.00	**JFM-0507-05**
6.0		8.0	12.0	4.0	1.00	**JFM-0608-04**
6.0		8.0	12.0	6.0	1.00	**JFM-0608-06**
6.0		8.0	12.0	8.0	1.00	**JFM-0608-08**
6.0		8.0	12.0	10.0	1.00	**JFM-0608-10**
6.0	+0.030 +0.105	10.0	14.0	10.0	2.00	**JFM-0610-10**
8.0		10.0	15.0	3.8	1.00	**JFM-0810-038**
8.0		10.0	15.0	5.0	1.00	**JFM-0810-05**
8.0		10.0	15.0	6.0	1.00	**JFM-0810-06**
8.0		10.0	15.0	7.5	1.00	**JFM-0810-07**
8.0		10.0	15.0	8.0	1.00	**JFM-0810-08**
8.0		10.0	15.0	9.5	1.00	**JFM-0810-09**
8.0	+0.025 +0.083	10.0	12.5	10.0	1.00	**JFM-0810125-10**
8.0		10.0	14.0	10.0	1.00	**JFM-081014-10**
8.0		10.0	15.0	10.0	1.00	**JFM-0810-10**
8.0		10.0	16.0	11.0	2.00	**JFM-081016-11**
8.0		10.0	12.0	16.0	1.00	**JFM-081012-16**
8.0		12.0	16.0	6.0	2.00	**JFM-0812-06**
8.0		12.0	16.0	9.0	2.00	**JFM-0812-09**

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
10.0		12.0	15.0	3.5	1.00	**JFM-101215-035**
10.0		12.0	18.0	5.0	1.00	**JFM-1012-05**
10.0		12.0	18.0	7.0	1.00	**JFM-1012-07**
10.0		12.0	18.0	9.0	1.00	**JFM-1012-09**
10.0		12.0	18.0	10.0	1.00	**JFM-1012-10**
10.0	+0.025 +0.083	12.0	18.0	12.0	1.00	**JFM-1012-12**
10.0		12.0	18.0	15.0	1.00	**JFM-1012-15**
10.0		12.0	18.0	17.0	1.00	**JFM-1012-17**
10.0		12.0	18.0	18.0	1.00	**JFM-1012-18**
10.0		14.0	17.5	14.0	1.00	**JFM-1014-14**
10.0		16.0	22.0	16.0	3.00	**JFM-1016-16**
11.0		13.0	18.0	5.0	1.00	**JFM-1113-05**
12.0		14.0	20.0	4.0	1.00	**JFM-1214-04**
12.0		14.0	18.0	4.5	1.00	**JFM-121418-045**
12.0		14.0	20.0	5.0	1.00	**JFM-1214-05**
12.0	+0.032	14.0	20.0	7.0	1.00	**JFM-1214-07**
12.0	+0.102	14.0	20.0	9.0	1.00	**JFM-1214-09**
12.0		14.0	18.0	10.0	1.00	**JFM-121418-10**
12.0		14.0	20.0	12.0	1.00	**JFM-1214-12**
12.0		14.0	20.0	15.0	1.00	**JFM-1214-15**
12.0		14.0	20.0	17.0	1.00	**JFM-1214-17**
12.0		18.0	24.0	8.0	3.00	**JFM-1218-08**
12.0	+0.050 +0.160	18.0	24.0	12.0	3.00	**JFM-1218-12**
12.0		18.0	22.0	20.0	3.00	**JFM-1218-20**
14.0		16.0	22.0	3.0	1.00	**JFM-1416-03**
14.0		16.0	22.0	10.0	1.00	**JFM-1416-10**
14.0	+0.032 +0.102	16.0	22.0	12.0	1.00	**JFM-1416-12**
14.0		16.0	22.0	17.0	1.00	**JFM-1416-17**
14.0		18.0	22.0	20.0	2.00	**JFM-141822-20**

[3] After press-fit. *Testing methods page 57*

Bearing technology | Plain bearings | iglidur® J

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
14.0		18.0	25.0	24.0	2.00	**JFM-141825-24**
15.0		17.0	23.0	4.0	1.00	**JFM-1517-04**
15.0	+0.032	17.0	23.0	5.5	1.00	**JFM-1517-055**
15.0	+0.102	17.0	23.0	9.0	1.00	**JFM-1517-09**
15.0		17.0	23.0	12.0	1.00	**JFM-1517-12**
15.0		17.0	23.0	17.0	1.00	**JFM-1517-17**
15.0	+0.050 +0.160	21.0	27.0	20.0	3.00	**JFM-1521-20**
16.0		18.0	24.0	6.0	1.00	**JFM-1618-06**
16.0	+0.032	18.0	24.0	12.0	1.00	**JFM-1618-12**
16.0	+0.102	18.0	24.0	16.0	1.00	**JFM-1618-16**
16.0		18.0	24.0	17.0	1.00	**JFM-1618-17**
16.0	+0.050	22.0	28.0	12.0	3.00	**JFM-1622-12**
16.0	+0.160	22.0	28.0	15.0	3.00	**JFM-1622-15**
17.0		19.0	25.0	9.0	1.00	**JFM-1719-09**
17.0		19.0	25.0	21.0	1.00	**JFM-1719-21**
18.0		20.0	26.0	4.0	1.00	**JFM-1820-04**
18.0	+0.032	20.0	26.0	12.0	1.00	**JFM-1820-12**
18.0	+0.102	20.0	26.0	17.0	1.00	**JFM-1820-17**
18.0		20.0	26.0	22.0	1.00	**JFM-1820-22**
18.0		21.0	25.0	12.0	1.00	**JFM-1821-12**
19.0		22.0	26.0	23.0	1.00	**JFM-1922-23**
19.0		22.0	26.0	36.0	1.00	**JFM-1922-36**
20.0		23.0	30.0	11.5	1.50	**JFM-2023-11**
20.0	+0.040	23.0	30.0	15.5	1.50	**JFM-2023-15.5**
20.0	+0.124	23.0	30.0	16.5	1.50	**JFM-2023-16**
20.0		23.0	30.0	21.5	1.50	**JFM-2023-21**
20.0		26.0	32.0	15.0	3.00	**JFM-2026-15**
20.0	+0.065 +0.195	26.0	32.0	20.0	3.00	**JFM-2026-20**
20.0		26.0	32.0	25.0	3.00	**JFM-2026-25**
22.0		25.0	32.0	8.0	1.50	**JFM-222532-08**
24.0		30.0	36.0	30.0	3.00	**JFM-2430-30**
25.0	+0.040	28.0	39.0	5.0	1.50	**JFM-252839-05**
25.0	+0.124	28.0	35.0	6.0	1.50	**JFM-2528-06**
25.0		28.0	39.0	7.5	1.50	**JFM-252839-075**
25.0		28.0	35.0	11.5	1.50	**JFM-2528-11**
25.0	+0.040 +0.124	28.0	35.0	12.0	1.50	**JFM-2528-12**
25.0		28.0	35.0	14.5	1.50	**JFM-2528-14.5**
25.0		28.0	35.0	21.5	1.50	**JFM-2528-21**
25.0	+0.065 +0.195	32.0	38.0	20.0	4.00	**JFM-2532-20**
25.0		32.0	38.0	25.0	4.00	**JFM-2532-25**
28.0		32.0	35.0	7.0	2.00	**JFM-283235-07**
28.0		32.0	39.0	20.0	2.00	**JFM-283239-20**
30.0	+0.040 +0.124	32.0	40.0	12.0	1.00	**JFM-303240-12**
30.0		34.0	42.0	16.0	2.00	**JFM-3034-16**
30.0		34.0	42.0	20.0	2.00	**JFM-3034-20**
30.0		34.0	42.0	26.0	2.00	**JFM-3034-26**
30.0	+0.080 +0.240	38.0	44.0	20.0	4.00	**JFM-3038-20**
30.0	+0.065 +0.195	38.0	44.0	30.0	4.00	**JFM-3038-30**
30.0		38.0	44.0	36.0	4.00	**JFM-3038-36**
35.0		39.0	47.0	12.0	2.00	**JFM-3539-12**
35.0		39.0	47.0	16.0	2.00	**JFM-3539-16**
35.0		39.0	47.0	26.0	2.00	**JFM-3539-26**
40.0		44.0	52.0	20.0	2.00	**JFM-4044-20**
40.0	+0.050 +0.150	44.0	52.0	30.0	2.00	**JFM-4044-30**
40.0		44.0	52.0	40.0	2.00	**JFM-4044-40**
45.0		50.0	58.0	12.0	2.00	**JFM-4550-12**
45.0		50.0	58.0	20.0	2.00	**JFM-4550-20**
45.0		50.0	58.0	50.0	2.00	**JFM-4550-50**
50.0		55.0	63.0	11.5	2.00	**JFM-5055-115**
50.0		55.0	63.0	50.0	2.00	**JFM-5055-50**
55.0		60.0	68.0	50.0	2.00	**JFM-5560-50**
60.0	+0.060 +0.180	65.0	73.0	37.0	2.00	**JFM-6065-37**
60.0		65.0	73.0	50.0	2.00	**JFM-6065-50**
60.0		70.0	78.0	60.0	2.00	**JFM-6570-60**
70.0		75.0	83.0	50.0	2.00	**JFM-7075-50**
90.0		95.0	103.0	100.0	2.50	**JFM-9095-100**
100.0	+0.072	105.0	113.0	100.0	2.50	**JFM-100105-100**
110.0	+0.212	115.0	123.0	100.0	2.50	**JFM-110115-100**
120.0		125.0	133.0	100.0	2.50	**JFM-120125-100**

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/J

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

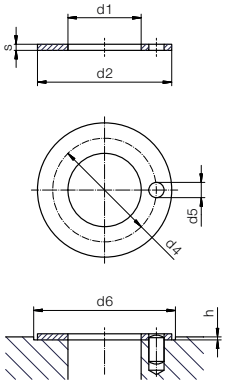
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur® J
+90°C
35MPa

Bearing technology | Plain bearings | iglidur® J

Thrust washer (form T)



Dimensions according to ISO 3547-1 and special dimensions

Order example: JTM-1224-015 **- no minimum order quantity.**
J iglidur® material T Thrust washer M Metric 12 Inner Ø d1 24 Outer Ø d2 015 Thickness s

d1 +0.25 [mm]	d2 -0.25 [mm]	d4 -0.12 +0.12 [mm]	d5 +0.375 +0.125 [mm]	h +0.2/-0.2 [mm]	d6 +0.12 [mm]	s -0.05 [mm]	Part No.
12	24	18	1.5	1	24	1.5	**JTM-1224-015**
12	34	[4]	[4]	1	34	1.5	**JTM-1234-015**
14	20	[4]	[4]	1	20	1.5	**JTM-1420-015**
20	36	28	3	1	36	1.5	**JTM-2036-015**
28	42	35	3	1	42	2	**JTM-2842-020**
30	39	[4]	[4]	1	39	1.5	**JTM-3039-015**
56	70	[4]	[4]	0.7	70	1	**JTM-5670-010**
139	188	[4]	[4]	1.5	188	2	**JTM-139188-020**

[4] **Design without fixing hole**

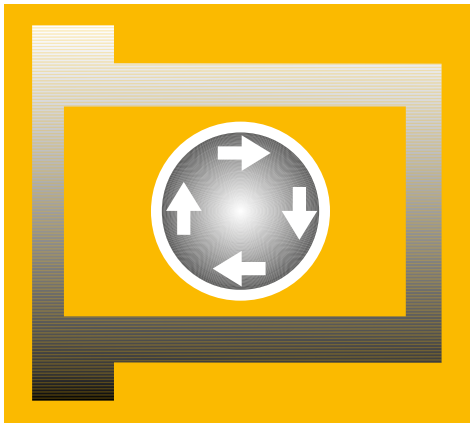
Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/J

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.



The classic endurance runner up to 30MPa

Excellent wear resistance on (virtually) all shafts

iglidur® W300

When to use it?

- When especially high service life is necessary
- When low coefficient of dynamic friction and high wear resistance are required
- For use on 304 stainless steel shafts
- For harsh environments and rough shafts
- Dirt-resistant

When not to use?

- For high loads starting at 50MPa
  iglidur® Q
- When continuous operating temperatures are higher than +90°C
  iglidur® H, iglidur® X
- For very wet environments
  iglidur® P
- When a cost-effective plain bearing is required
  iglidur® G

Bearing technology | Plain bearings | iglidur® W300

Ø 2.0 – 120.0mm

Also available as:

Bar stock, round bar: **Page 638**

Bar stock, plate: **Page 651**

tribo-tape liner: **Page 657**

Piston rings: **Page 562**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 787**

The classic endurance runner up to 30MPa: Excellent wear resistance on (virtually) all shafts

iglidur® W300 gives excellent wear resistance, even in harsh environments or when used with rough shafts. Of all iglidur® materials, iglidur® W300 is the most resistant to these conditions.

- Over 400 sizes available from stock
- Very long service life
- Low coefficient of friction
- Very wear-resistant
- Suitable for applications with soft shafts
- Lubrication-free
- Maintenance-free

Typical application areas

- Automation
- Printing industry
- Woodworking
- Mechatronics
- Test engineering and quality assurance

Descriptive technical specifications			
Wear resistance at +23°C	–	■■■■■	+
Wear resistance at +90°C	–	■■■■■	+
Wear resistance at +150°C	–	■□□□□	+
Low coefficient of friction	–	■■■■□	+
Low moisture absorption	–	■□□□□	+
Wear resistance under water	–	■□□□□	+
High media resistance	–	■■□□□	+
Resistant to edge pressures	–	■■■■■	+
Suitable for shock and impact loads	–	■■■■■	+
Resistant to dirt	–	■■■■□	+

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

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

Technical data

General properties			Testing method
Density	g/cm³	1.24	
Colour		yellow	
Max. moisture absorption at +23°C and 50% r.h.	% weight	1.3	DIN 53495
Max. moisture absorption	% weight	6.5	
Coefficient of friction, dynamic, against steel	μ	0.08 – 0.23	
pv value, max. (dry)	MPa · m/s	0.23	
Mechanical properties			
Flexural modulus	MPa	3,500	DIN 53457
Flexural strength at +20°C	MPa	125	DIN 53452
Compressive strength	MPa	61	
Max. recommended surface pressure (+20°C)	MPa	60	
Shore D hardness		77	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+90	
Max. application temperature short-term	°C	+180	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	9	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{13}$	DIN IEC 93
Surface resistance	Ω	$> 10^{12}$	DIN 53482

Table 01: Material properties table

–40°C up to +90°C

60MPa

HB

RoHS-II

ISO 3547-1

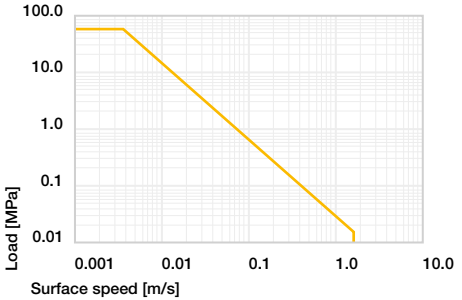


Diagram 01: Permissible pv values for iglidur® W300 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® W300 plain bearings is approximately 1.3% weight. The saturation limit in water is 6.5% weight. This must be taken into account for these types of applications.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is only possible to a limited extent.

Radiation resistance

Plain bearings made from iglidur® W300 are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® W300 plain bearings are resistant to permanent UV radiation. A slight change in colour will not significantly influence their properties.

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

+ resistant 0 conditionally resistant – not resistant
All information given at room temperature [+20°C]
Table 02: Chemical resistance

Chemical table, page 1542

iglidur® W300 gives excellent wear resistance, even in harsh environments or when used with rough shafts. This material is the most tolerant of these external effects out of all the iglidur® range.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® W300 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

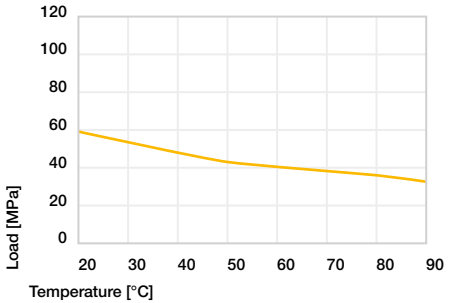


Diagram 02: Maximum recommended surface pressure as a function of temperature (60MPa at +20°C)

iglidur® W300 presents a very high compressive strength in spite of its high elasticity. Diagram 03 shows the elastic deformation of iglidur® W300 at radial loads. At the maximum recommended surface pressure of 60MPa the deformation is less than 3%.

Surface pressure, page 41

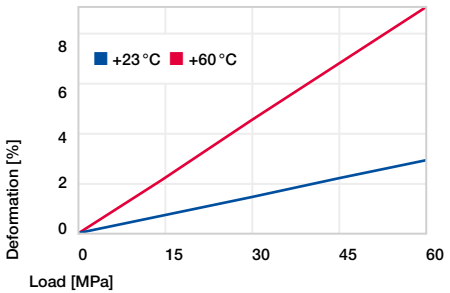


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

Even at higher surface speeds, the coefficient of friction of iglidur® W300 plain bearings remains the same. In relation to other materials, somewhat higher surface speeds can be attained, for example, up to 1.5m/s rotating and up to 6.0m/s linear. The wear remains low when used for long periods at high speeds, due to exceptional wear resistance. Relatively high speeds can be obtained with iglidur® W300 bearings on hardened shafts with the recommended surface finish.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.0	0.7	4.0
short-term	**m/s**	1.5	1.8	6.0

Table 03: Maximum surface speeds

Temperature

iglidur® W300 plain bearings retain their exceptional wear resistance even up to the highest permissible application temperatures and at the same time resist becoming brittle at low temperatures. For temperatures over +60°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the load. In contrast to other iglidur® materials, the coefficient of friction of iglidur® W300 remains consistently low at higher rotational speeds.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

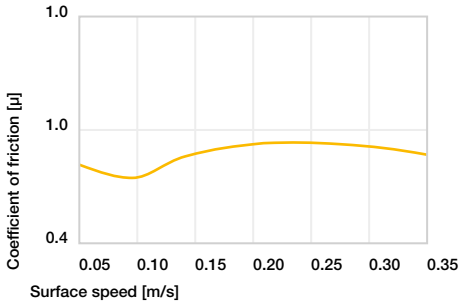


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

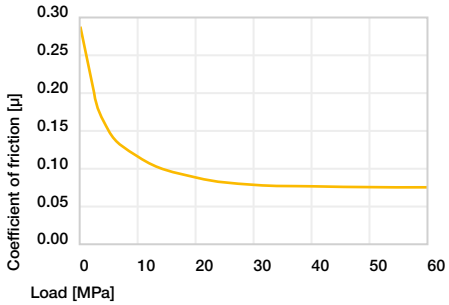


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

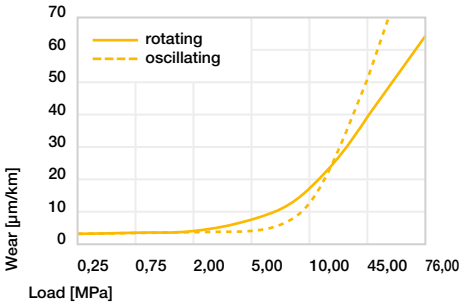


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

The friction and wear are also dependent, to a large degree, on the shaft material. Shafts that are too smooth, increase both the coefficient of friction and the wear of the bearing. Smooth shafts have the danger of stick slip. Squeaking as an effect of stick slip is usually the result of shafts that are too smooth. Shaft surface finish of 0.4 – 0.5μm have proven to be the best. For iglidur® W300, the wear resistance is still excellent with this surface finish as the friction adopts the minimum value. Diagram 06 shows results of testing different shafts. Hardened shafts are preferred for applications for higher loads. If the shaft material you plan on using is not shown in these test results, please contact us.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.08 – 0.23	0.09	0.04	0.04

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

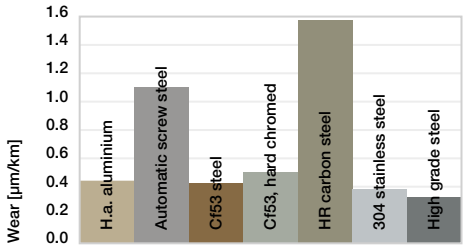


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

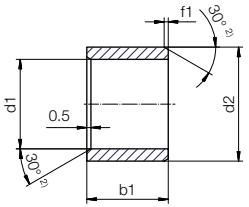
iglidur® W300 plain bearings are standard bearings for shafts with h tolerance (recommended minimum h9). The bearings are designed for press-fit into a housing machined to a H7 tolerance. After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

Testing methods, page 57

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

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

Sleeve bearing (form S)



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

Dimensions according to ISO 3547-1 and special dimensions

Order example: WSM-0203-03 - no minimum order quantity.
W300 iglidur® material S Sleeve bearing M Metric 02 Inner Ø d1 03 Outer Ø d2 03 Total length b1

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
2.0		3.5	3.0	WSM-0203-03
2.0		4.0	1.8	WSM-0204-018
2.5	+0.014	4.0	3.0	WSM-0204-03
3.0	+0.054	4.5	3.0	WSM-0304-03
3.0		4.5	5.0	WSM-0304-05
3.0		4.5	6.0	WSM-0304-06
4.0		5.5	4.0	WSM-0405-04
4.0		5.5	6.0	WSM-0405-06
4.0		5.5	8.0	WSM-0405-08
4.0	+0.020	5.5	10.0	WSM-0405-10
5.0	+0.068	7.0	5.0	WSM-0507-05
5.0		7.0	8.0	WSM-0507-08
5.0		7.0	10.0	WSM-0507-10
6.0	+0.010	7.0	14.0	WSM-0607-14
	+0.058			
6.0		8.0	6.0	WSM-0608-06
6.0		8.0	8.0	WSM-0608-08
6.0	+0.020	8.0	9.5	WSM-0608-09
6.0	+0.068	8.0	10.0	WSM-0608-10
6.0		8.0	11.8	WSM-0608-11
6.0		8.0	13.8	WSM-0608-13
7.0		9.0	9.0	WSM-0709-09
7.0		9.0	12.0	WSM-0709-12
7.0		9.0	12.5	WSM-0709-125
8.0	+0.025	10.0	6.0	WSM-0810-06
8.0	+0.083	10.0	8.0	WSM-0810-08
8.0		10.0	10.0	WSM-0810-10
8.0		10.0	12.0	WSM-0810-12
8.0		10.0	13.8	WSM-0810-13

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
8.0		10.0	15.0	WSM-0810-15
8.0		10.0	16.0	WSM-0810-16
8.0		10.0	20.0	WSM-0810-20
8.0		10.0	21.0	WSM-0810-21
9.0		11.0	6.0	WSM-0911-06
10.0		12.0	4.0	WSM-1012-04
10.0		12.0	6.0	WSM-1012-06
10.0	+0.025	12.0	8.0	WSM-1012-08
10.0	+0.083	12.0	9.0	WSM-1012-09
10.0		12.0	10.0	WSM-1012-10
10.0		12.0	12.0	WSM-1012-12
10.0		12.0	15.0	WSM-1012-15
10.0		12.0	17.0	WSM-1012-17
10.0		12.0	20.0	WSM-1012-20
10.0		12.0	25.5	WSM-1012-25.5
11.0		13.0	8.0	WSM-1113-08
12.0		14.0	4.0	WSM-1214-04
12.0		14.0	5.0	WSM-1214-05
12.0		14.0	6.0	WSM-1214-06
12.0		14.0	8.0	WSM-1214-08
12.0		14.0	10.0	WSM-1214-10
12.0	+0.032	14.0	12.0	WSM-1214-12
12.0	+0.102	14.0	15.0	WSM-1214-15
12.0		14.0	20.0	WSM-1214-20
12.0		14.0	25.0	WSM-1214-25
13.0		15.0	7.0	WSM-1315-07
13.0		15.0	10.0	WSM-1315-10
13.0		15.0	15.0	WSM-1315-15
13.0		15.0	20.0	WSM-1315-20

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

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
14.0		16.0	7.3	WSM-1416-07
14.0		16.0	10.0	WSM-1416-10
14.0		16.0	15.0	WSM-1416-15
14.0		16.0	20.0	WSM-1416-20
14.0		16.0	25.0	WSM-1416-25
14.0		16.0	33.0	WSM-1416-33
15.0		17.0	10.0	WSM-1517-10
15.0		17.0	15.0	WSM-1517-15
15.0		17.0	20.0	WSM-1517-20
15.0		17.0	25.0	WSM-1517-25
16.0		18.0	7.0	WSM-1618-07
16.0		18.0	8.0	WSM-1618-08
16.0	+0.032	18.0	11.5	WSM-1618-11
16.0	+0.102	18.0	12.0	WSM-1618-12
16.0		18.0	15.0	WSM-1618-15
16.0		18.0	20.0	WSM-1618-20
16.0		18.0	25.0	WSM-1618-25
16.0		18.0	30.0	WSM-1618-30
16.0		18.0	35.0	WSM-1618-35
16.0		18.0	45.0	WSM-1618-45
18.0		20.0	12.0	WSM-1820-12
18.0		20.0	15.0	WSM-1820-15
18.0		20.0	20.0	WSM-1820-20
18.0		20.0	25.0	WSM-1820-25
18.0		20.0	33.0	WSM-1820-33
18.0		20.0	35.0	WSM-1820-35
19.0		22.0	28.0	WSM-1922-28
20.0		22.0	11.5	WSM-2022-11
20.0		22.0	12.0	WSM-2022-12
20.0		22.0	15.0	WSM-2022-15
20.0		22.0	20.0	WSM-2022-20
20.0		22.0	30.0	WSM-2022-30
20.0		23.0	8.0	WSM-2023-08
20.0		23.0	10.0	WSM-2023-10
20.0		23.0	12.0	WSM-2023-12
20.0		23.0	15.0	WSM-2023-15
20.0	+0.040	23.0	20.0	WSM-2023-20
20.0	+0.124	23.0	23.0	WSM-2023-23
20.0		23.0	25.0	WSM-2023-25
20.0		23.0	30.0	WSM-2023-30
22.0		24.0	15.0	WSM-2224-15
22.0		24.0	20.0	WSM-2224-20
22.0		24.0	30.0	WSM-2224-30
22.0		24.0	35.0	WSM-2224-35
22.0		24.0	45.0	WSM-2224-45
22.0		25.0	15.0	WSM-2225-15
22.0		25.0	20.0	WSM-2225-20
22.0		25.0	25.0	WSM-2225-25

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
22.0		25.0	30.0	WSM-2225-30
24.0		27.0	15.0	WSM-2427-15
24.0		27.0	20.0	WSM-2427-20
24.0		27.0	25.0	WSM-2427-25
24.0		27.0	30.0	WSM-2427-30
25.0		28.0	12.0	WSM-2528-12
25.0		28.0	14.0	WSM-2528-14
25.0		28.0	15.0	WSM-2528-15
25.0		28.0	20.0	WSM-2528-20
25.0		28.0	25.0	WSM-2528-25
25.0		28.0	30.0	WSM-2528-30
25.0		28.0	50.0	WSM-2528-50
26.0		30.0	16.0	WSM-2630-16
26.0	+0.040	30.0	25.0	WSM-2630-25
28.0	+0.124	30.0	10.0	WSM-2830-10
28.0		31.0	10.0	WSM-2831-10
28.0		32.0	20.0	WSM-2832-20
28.0		32.0	25.0	WSM-2832-25
28.0		32.0	30.0	WSM-2832-30
30.0		34.0	16.0	WSM-3034-16
30.0		34.0	20.0	WSM-3034-20
30.0		34.0	24.0	WSM-3034-24
30.0		34.0	25.0	WSM-3034-25
30.0		34.0	30.0	WSM-3034-30
30.0		34.0	36.0	WSM-3034-36
30.0		34.0	38.0	WSM-3034-38
30.0		34.0	40.0	WSM-3034-40
30.0		34.0	45.0	WSM-3034-45
30.0		34.0	47.0	WSM-3034-47
32.0		36.0	20.0	WSM-3236-20
32.0		36.0	25.0	WSM-3236-25
32.0		36.0	30.0	WSM-3236-30
32.0		36.0	40.0	WSM-3236-40
35.0		39.0	20.0	WSM-3539-20
35.0		39.0	30.0	WSM-3539-30
35.0		39.0	40.0	WSM-3539-40
35.0		39.0	50.0	WSM-3539-50
35.0		40.0	7.0	WSM-3540-07
40.0	+0.050	44.0	20.0	WSM-4044-20
40.0	+0.150	44.0	30.0	WSM-4044-30
40.0		44.0	40.0	WSM-4044-40
40.0		44.0	50.0	WSM-4044-50
45.0		50.0	20.0	WSM-4550-20
45.0		50.0	30.0	WSM-4550-30
45.0		50.0	40.0	WSM-4550-40
45.0		50.0	50.0	WSM-4550-50
50.0		55.0	20.0	WSM-5055-20
50.0		55.0	30.0	WSM-5055-30

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

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
50.0		55.0	40.0	**WSM-5055-40**
50.0	+0.050	55.0	50.0	**WSM-5055-50**
50.0	+0.150	55.0	55.0	**WSM-5055-55**
50.0		55.0	60.0	**WSM-5055-60**
55.0		60.0	40.0	**WSM-5560-40**
55.0	+0.060	60.0	60.0	**WSM-5560-60**
60.0	+0.180	65.0	30.0	**WSM-6065-30**
60.0		65.0	60.0	**WSM-6065-60**

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
65.0		70.0	60.0	**WSM-6570-60**
70.0	+0.060	75.0	60.0	**WSM-7075-60**
75.0	+0.180	80.0	100.0	**WSM-7580-100**
80.0		85.0	20.0	**WSM-8085-20**
80.0		85.0	100.0	**WSM-8085-100**
90.0	+0.072	95.0	100.0	**WSM-9095-100**
100.0	+0.212	105.0	100.0	**WSM-100105-100**

[3] After press-fit. *Testing methods page 57*

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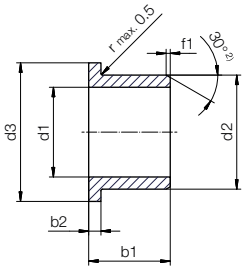
Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: WFM-0204-03 **- no minimum order quantity.**
W300 iglidur® material F Flange bearing M Metric 02 Inner Ø d1 04 Outer Ø d2 03 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
2.5		4.0	6.5	3.0	0.75	**WFM-0204-03**
3.0	+0.014 +0.054	4.5	7.5	3.0	0.75	**WFM-0304-03**
3.0		4.5	7.5	5.0	0.75	**WFM-0304-05**
4.0		5.5	9.5	3.0	0.75	**WFM-0405-03**
4.0	+0.020 +0.068	5.5	9.5	4.0	0.75	**WFM-0405-04**
4.0		5.5	9.5	6.0	0.75	**WFM-0405-06**
5.0	+0.010 +0.040	6.0	10.0	8.0	0.50	**WFM-0506-08**
5.0		7.0	11.0	4.0	1.00	**WFM-0507-04**
5.0		7.0	11.0	5.0	1.00	**WFM-0507-05**
6.0		8.0	12.0	4.0	1.00	**WFM-0608-04**
6.0	+0.020 +0.068	8.0	12.0	6.0	1.00	**WFM-0608-06**
6.0		8.0	12.0	8.0	1.00	**WFM-0608-08**
6.0		8.0	12.0	10.0	1.00	**WFM-0608-10**
6.0		8.0	12.0	15.0	1.00	**WFM-0608-15**
7.0		9.0	15.0	10.0	1.00	**WFM-0709-10**
7.0		9.0	15.0	12.0	1.00	**WFM-0709-12**
8.0		10.0	15.0	2.7	1.00	**WFM-0810-02**
8.0		10.0	15.0	4.0	1.00	**WFM-0810-04**
8.0		10.0	15.0	5.0	1.00	**WFM-081015-05**
8.0		10.0	15.0	5.5	1.00	**WFM-0810-05**
8.0	+0.025 +0.083	10.0	15.0	7.5	1.00	**WFM-0810-07**
8.0		10.0	15.0	9.5	1.00	**WFM-0810-09**
8.0		10.0	15.0	10.0	1.00	**WFM-0810-10**
8.0		10.0	15.0	23.0	1.00	**WFM-0810-23**
8.0		10.0	15.0	30.0	1.00	**WFM-0810-30**
10.0		12.0	18.0	4.0	1.00	**WFM-1012-04**
10.0		12.0	18.0	5.0	1.00	**WFM-1012-05**

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
10.0		12.0	18.0	6.0	1.00	**WFM-1012-06**
10.0		12.0	18.0	7.0	1.00	**WFM-1012-07**
10.0		12.0	18.0	9.0	1.00	**WFM-1012-09**
10.0	+0.025 +0.083	12.0	18.0	10.0	1.00	**WFM-1012-10**
10.0		12.0	18.0	12.0	1.00	**WFM-1012-12**
10.0		12.0	18.0	15.0	1.00	**WFM-1012-15**
10.0		12.0	18.0	17.0	1.00	**WFM-1012-17**
12.0		14.0	20.0	4.0	1.00	**WFM-1214-04**
12.0		14.0	20.0	4.4	1.00	**WFM-1214-044**
12.0		14.0	20.0	6.0	1.00	**WFM-1214-06**
12.0		14.0	20.0	7.0	1.00	**WFM-1214-07**
12.0		14.0	20.0	9.0	1.00	**WFM-1214-09**
12.0		14.0	20.0	10.0	1.00	**WFM-1214-10**
12.0		14.0	20.0	11.0	1.00	**WFM-1214-11**
12.0		14.0	20.0	12.0	1.00	**WFM-1214-12**
12.0		14.0	20.0	15.0	1.00	**WFM-1214-15**
12.0		14.0	20.0	17.0	1.00	**WFM-1214-17**
12.0	+0.032 +0.102	14.0	20.0	20.0	1.00	**WFM-1214-20**
13.0		15.0	22.0	6.0	1.00	**WFM-1315-06**
14.0		16.0	22.0	4.0	1.00	**WFM-1416-04**
14.0		16.0	22.0	5.0	1.00	**WFM-1416-05**
14.0		16.0	22.0	8.0	1.00	**WFM-1416-08**
14.0		16.0	22.0	12.0	1.00	**WFM-1416-12**
14.0		16.0	22.0	17.0	1.00	**WFM-1416-17**
14.0		16.0	22.0	29.0	1.00	**WFM-1416-29**
15.0		17.0	23.0	9.0	1.00	**WFM-1517-09**
15.0		17.0	23.0	12.0	1.00	**WFM-1517-12**
15.0		17.0	23.0	17.0	1.00	**WFM-1517-17**

[3] After press-fit. *Testing methods page 57*

d1	d1 Tolerance[3]	d2	d3 d13	b1 h13	b2 –0,14	Part No.
[mm]		[mm]	[mm]	[mm]	[mm]	
15.0		17.0	23.0	20.0	1.00	**WFM-1517-20**
16.0		18.0	24.0	9.0	1.00	**WFM-1618-09**
16.0		18.0	24.0	12.0	1.00	**WFM-1618-12**
16.0		18.0	24.0	17.0	1.00	**WFM-1618-17**
17.0		19.0	25.0	12.0	1.00	**WFM-1719-12**
17.0	+0.032 +0.102	19.0	25.0	18.0	1.00	**WFM-1719-18**
17.0		19.0	25.0	25.0	1.00	**WFM-1719-25**
18.0		20.0	26.0	6.0	1.00	**WFM-1820-06**
18.0		20.0	26.0	12.0	1.00	**WFM-1820-12**
18.0		20.0	26.0	17.0	1.00	**WFM-1820-17**
18.0		20.0	26.0	22.0	1.00	**WFM-1820-22**
20.0		23.0	30.0	11.5	1.50	**WFM-2023-11**
20.0		23.0	30.0	14.5	1.50	**WFM-2023-14**
20.0		23.0	30.0	16.5	1.50	**WFM-2023-16**
20.0		23.0	30.0	21.5	1.50	**WFM-2023-21**
24.0		27.0	32.0	10.5	1.50	**WFM-2427-10**
25.0	+0.040	28.0	35.0	11.5	1.50	**WFM-2528-11**
25.0	+0.124	28.0	31.0	13.5	1.50	**WFM-252831-13**
25.0		28.0	35.0	16.5	1.50	**WFM-2528-16**
25.0		28.0	35.0	21.5	1.50	**WFM-2528-21**
25.0		28.0	32.0	30.0	1.50	**WFM-2528-30**
28.0		30.0	35.0	36.0	1.00	**WFM-2830-36**
30.0		34.0	42.0	10.0	2.00	**WFM-3034-10**
30.0		34.0	42.0	16.0	2.00	**WFM-3034-16**

d1	d1 Tolerance[3]	d2	d3 d13	b1 h13	b2 –0,14	Part No.
[mm]		[mm]	[mm]	[mm]	[mm]	
30.0	+0.040	34.0	42.0	26.0	2.00	**WFM-3034-26**
30.0	+0.124	34.0	42.0	37.0	2.00	**WFM-3034-37**
32.0		36.0	40.0	16.0	2.00	**WFM-3236-16**
32.0		36.0	40.0	26.0	2.00	**WFM-3236-26**
35.0		39.0	47.0	9.0	2.00	**WFM-3539-09**
35.0		39.0	47.0	16.0	2.00	**WFM-3539-16**
35.0		39.0	47.0	26.0	2.00	**WFM-3539-26**
35.0	+0.050	39.0	50.0	35.0	2.00	**WFM-353950-35**
38.0	+0.150	42.0	50.0	22.0	2.00	**WFM-3842-22**
40.0		44.0	52.0	30.0	2.00	**WFM-4044-30**
40.0		44.0	52.0	40.0	2.00	**WFM-4044-40**
45.0		50.0	58.0	50.0	2.00	**WFM-4550-50**
50.0		55.0	63.0	40.0	2.00	**WFM-5055-40**
50.0		55.0	63.0	50.0	2.00	**WFM-5055-50**
55.0		60.0	68.0	60.0	2.00	**WFM-5560-60**
57.0		62.0	67.0	40.0	2.00	**WFM-5762-40**
60.0	+0.060	65.0	73.0	60.0	2.00	**WFM-6065-60**
65.0	+0.180	70.0	78.0	60.0	2.00	**WFM-6570-60**
70.0		75.0	83.0	100.0	2.50	**WFM-7075-100**
75.0		80.0	88.0	100.0	2.50	**WFM-7580-100**
80.0		85.0	93.0	100.0	2.50	**WFM-8085-100**
90.0	+0.072	95.0	103.0	100.0	2.50	**WFM-9095-100**
100.0	+0.212	105.0	113.0	100.0	2.50	**WFM-100105-100**
120.0		125.0	133.0	100.0	2.50	**WFM-120125-100**

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/W300

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

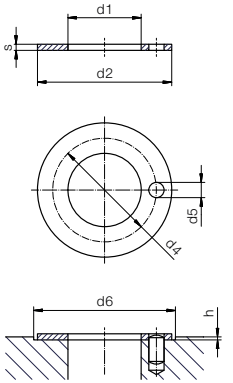
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur® W300 +90°C 60MPa

Bearing technology | Plain bearings | iglidur® W300

Thrust washer (form T)

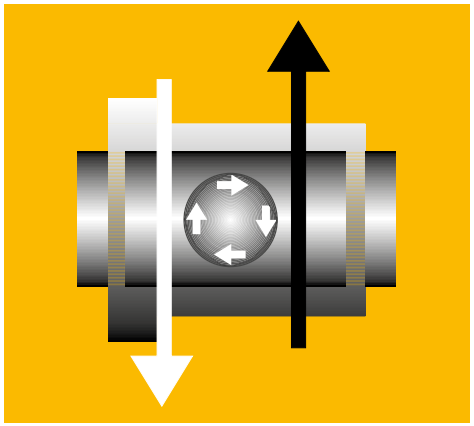


Dimensions according to ISO 3547-1 and special dimensions

Order example: WTM-0509-006 - no minimum order quantity.
W300 iglidur® material T Thrust washer M Metric 05 Inner Ø d1 09 Outer Ø d2 006 Thickness s

d1 +0.25	d2 -0.25	d4 -0.12 +0.12	d5 +0.375 +0.125	h +0.2/-0.2	d6 +0.12	s -0.05	Part No.
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
5	9.5	[4]	[4]	0.3	9.5	0.6	**WTM-0509-006**
6	20	13	1.5	1	20	1.5	**WTM-0620-015**
8	18	13	1.5	1	18	1.5	**WTM-0818-015**
10	18	[4]	[4]	0.7	18	1	**WTM-1018-010**
10	18	[4]	[4]	1	18	1.5	**WTM-1018-015**
12	24	18	1.5	1	24	1.5	**WTM-1224-015**
14	26	20	2	1	26	1.5	**WTM-1426-015**
15	24	19.5	1.5	1	24	1.5	**WTM-1524-015**
16	30	23	2	1	30	1.5	**WTM-1630-015**
18	32	25	2	1	32	1.5	**WTM-1832-015**
18	44	30	7	1	44	1.5	**WTM-1844-015**
20	36	28	3	1	36	1.5	**WTM-2036-015**
22	38	30	3	1	38	1.5	**WTM-2238-015**
24	42	33	3	1	42	1.5	**WTM-2442-015**
26	44	35	3	1	44	1.5	**WTM-2644-015**
28	40	38	4	1	48	1.5	**WTM-2840-015**
28	48	38	4	1	48	1.5	**WTM-2848-015**
32	54	43	4	1	54	1.5	**WTM-3254-015**
38	62	50	4	1	62	1.5	**WTM-3862-015**
42	66	54	4	1	66	1.5	**WTM-4266-015**
48	74	61	4	1.5	74	2	**WTM-4874-020**
52	78	65	4	1.5	78	2	**WTM-5278-020**
62	90	76	4	1.5	90	2	**WTM-6290-020**
82	110	[4]	[4]	1.5	110	2	**WTM-82110-020**
102	130	[4]	[4]	1.5	130	2	**WTM-102130-020**
120	150	[4]	[4]	1.5	150	2	**WTM-120150-020**

[4] Design without fixing hole



The new endurance runner: specialist for pivoting applications and pulsating loads

Up to 10MPa, up to three times more wear-resistant than iglidur® J

iglidur® J3

When to use it?

- When optimising wear resistance compared to iglidur® J
- When very low coefficient of friction in dry operation is required
- When high wear resistance at low loads is required
- When low moisture absorption is fundamental
- When good liquid media resistance is required

When not to use?

- When a wear-resistant plain bearing for linear motion is required
  iglidur® J
- When continuous operating temperatures are higher than +90°C
  iglidur® J260
- When radial surface pressure is higher than 45MPa
  iglidur® W300

Bearing technology | Plain bearings | iglidur® J3

Ø
2.0 – 50.0mm

Also available as:

Bar stock, round bar:
Page 639

Bar stock, plate:
Page 651

tribo-tape liner:
Page 657

Piston rings:
Page 562

Two hole flange bearing:
Page 581

Moulded special parts:
Page 602

igubal® spherical balls:
Page 783

The new endurance runner: specialist for pivoting applications and pulsating loads: Up to 10MPa, up to three times more wear-resistant than iglidur® J

iglidur® J3 is a material with improved wear resistance at low to medium loads and high speed. The service life is up to 300% longer than iglidur® J – the proven top endurance runner material.

- Low coefficient of friction
- High media resistance
- Low moisture absorption
- PTFE-free
- Lubrication-free
- Maintenance-free

Typical application areas

- Automation
- Printing industry
- Beverage industry
- Glass industry
- Aerospace engineering

Descriptive technical specifications			
Wear resistance at +23°C	–		+
Wear resistance at +90°C	–		+
Wear resistance at +150°C	–		+
Low coefficient of friction	–		+
Low moisture absorption	–		+
Wear resistance under water	–		+
High media resistance	–		+
Resistant to edge pressures	–		+
Suitable for shock and impact loads	–		+
Resistant to dirt	–		+

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

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

iglidur® J3
+90°C
45MPa

Technical data

General properties			Testing method
Density	g/cm³	1.42	
Colour		yellow	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.3	DIN 53495
Max. moisture absorption	% weight	1.3	
Coefficient of friction, dynamic, against steel	µ	0.06 – 0.20	
pv value, max. (dry)	MPa · m/s	0.50	
Mechanical properties			
Flexural modulus	MPa	2,700	DIN 53457
Flexural strength at +20°C	MPa	70	DIN 53452
Compressive strength	MPa	60	
Max. recommended surface pressure (+20°C)	MPa	45	
Shore D hardness		73	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+90	
Max. application temperature short-term	°C	+120	
Min. application temperature	°C	–50	
Thermal conductivity	W/m · K	0.25	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	13	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{12}$	DIN IEC 93
Surface resistance	Ω	$> 10^{12}$	DIN 53482

Table 01: Material properties table

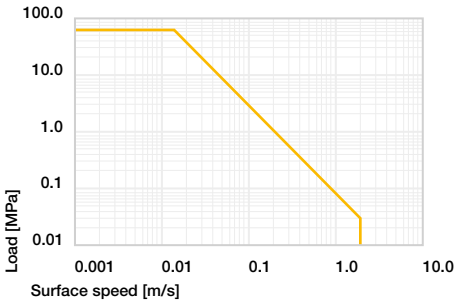


Diagram 01: Permissible pv values for iglidur® J3 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® J3 plain bearings is approximately 0.3% weight. The saturation limit in water is 1.3% weight. These values are so low that a moisture expansion need to be considered only in extreme cases.

Vacuum

In vacuum, any present moisture is released as vapour. Use in vacuum is only possible with dehumidified iglidur® J3 bearings.

Radiation resistance

Resistant to radiation up to an intensity of $1 \cdot 10^4$Gy.

UV resistance

iglidur® J3 plain bearings become discoloured when exposed to UV radiation. However, hardness, compressive strength and wear resistance of the material do not change.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

–50°C up to +90°C

45MPa

Bearing technology | Plain bearings | iglidur® J3

With respect to its general mechanical and thermal specifications, iglidur® J3 is directly comparable to our classic, iglidur® J.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® J3 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

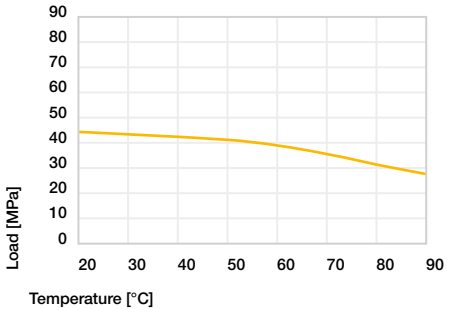


Diagram 02: Maximum recommended surface pressure as a function of temperature (45MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® J3 at radial loads. At the maximum recommended surface pressure of 45MPa at room temperature the deformation is less than 6%. A possible deformation could be, among others, dependant on the duty cycle of the load.

Surface pressure, page 41

Permissible surface speeds

iglidur® J3 is also suitable for medium to high surface speeds. The maximum values shown in table 03 can only be achieved at low pressures. At the given speeds, friction can cause a temperature increase to maximum permissible levels. In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.5	1.1	8.0
short-term	**m/s**	3.0	2.1	10.0

Table 03: Maximum surface speeds

Temperature

The temperatures prevailing in the bearing system also have an influence on the wear. With increasing temperatures, the wear increases and this effect is significant when temperatures rise over +90°C. For temperatures over +60°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the surface speed and load (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

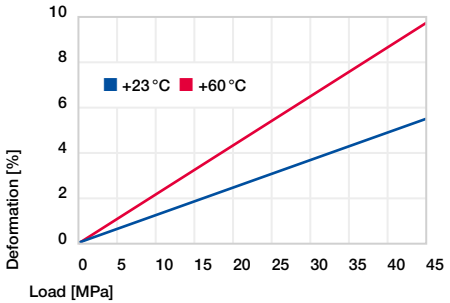


Diagram 03: Deformation under pressure and temperature

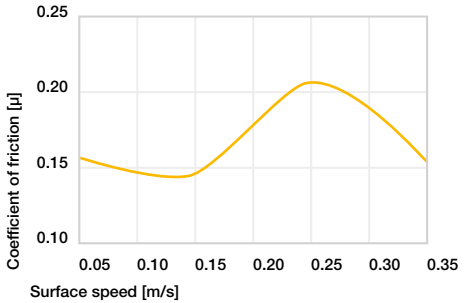


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

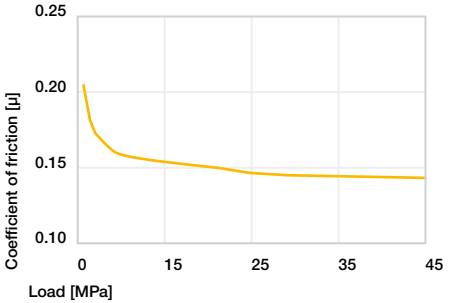


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

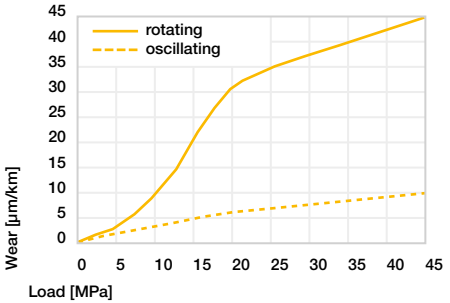


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

The friction and wear are also dependent, to a large degree, on the shaft material. Shafts that are too smooth, increase both the coefficient of friction and the wear of the bearing. For iglidur® J3 a ground surface with an average surface finish Ra = 0.1 – 0.3μm is recommended. The diagram 06 shows that iglidur® J3 can be combined with various shaft materials. Diagram 07 shows rotating and pivoting applications in comparison. With higher load, the wear increases more for rotating than for pivoting movements.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.06 – 0.20	0.09	0.04	0.04

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

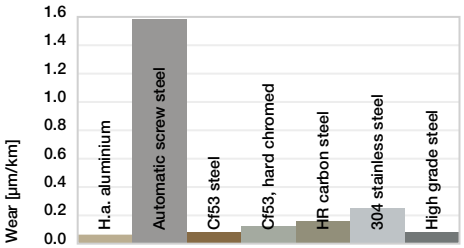


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® J3 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 E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table). In relation to the installation tolerance, the inner diameter changes with the absorption of humidity.

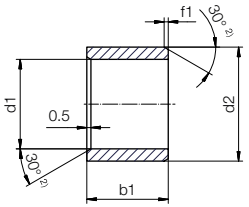
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® J3

Sleeve bearing (form S)



[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

Dimensions according to ISO 3547-1 and special dimensions

Order example: J3SM-0304-05 - no minimum order quantity.
J3 iglidur® material S Sleeve bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 05 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
3.0	+0.014 +0.054	4.5	5.0	J3SM-0304-05
4.0		5.5	4.0	J3SM-0405-04
4.0		5.5	6.0	J3SM-0405-06
5.0	+0.020 +0.068	7.0	5.0	J3SM-0507-05
5.0		7.0	10.0	J3SM-0507-10
6.0		8.0	6.0	J3SM-0608-06
6.0		8.0	8.0	J3SM-0608-08
6.0		8.0	10.0	J3SM-0608-10
8.0		10.0	8.0	J3SM-0810-08
8.0		10.0	10.0	J3SM-0810-10
8.0		10.0	12.0	J3SM-0810-12
10.0	+0.025 +0.083	12.0	8.0	J3SM-1012-08
10.0		12.0	10.0	J3SM-1012-10
10.0		12.0	12.0	J3SM-1012-12
10.0		12.0	15.0	J3SM-1012-15
10.0		12.0	20.0	J3SM-1012-20
12.0		14.0	10.0	J3SM-1214-10
12.0		14.0	12.0	J3SM-1214-12
12.0		14.0	15.0	J3SM-1214-15
12.0		14.0	20.0	J3SM-1214-20
13.0		15.0	10.0	J3SM-1315-10
13.0	+0.032	15.0	20.0	J3SM-1315-20
14.0	+0.102	16.0	15.0	J3SM-1416-15
14.0		16.0	20.0	J3SM-1416-20
14.0		16.0	25.0	J3SM-1416-25
15.0		17.0	15.0	J3SM-1517-15
15.0		17.0	20.0	J3SM-1517-20
15.0		17.0	25.0	J3SM-1517-25
15.0		17.0	30.0	J3SM-1517-30
16.0		18.0	15.0	J3SM-1618-15
16.0		18.0	20.0	J3SM-1618-20
16.0	+0.032	18.0	25.0	J3SM-1618-25
18.0	+0.102	20.0	15.0	J3SM-1820-15
18.0		20.0	20.0	J3SM-1820-20
18.0		20.0	25.0	J3SM-1820-25
18.0		21.0	25.0	J3SM-1821-25
20.0		23.0	10.0	J3SM-2023-10
20.0		23.0	15.0	J3SM-2023-15
20.0		23.0	20.0	J3SM-2023-20
20.0		23.0	25.0	J3SM-2023-25
20.0		23.0	30.0	J3SM-2023-30
22.0		25.0	15.0	J3SM-2225-15
22.0		25.0	20.0	J3SM-2225-20
22.0		25.0	25.0	J3SM-2225-25
22.0		25.0	30.0	J3SM-2225-30
24.0	+0.040	27.0	15.0	J3SM-2427-15
24.0	+0.124	27.0	20.0	J3SM-2427-20
24.0		27.0	25.0	J3SM-2427-25
24.0		27.0	30.0	J3SM-2427-30
25.0		28.0	15.0	J3SM-2528-15
25.0		28.0	20.0	J3SM-2528-20
25.0		28.0	25.0	J3SM-2528-25
25.0		28.0	30.0	J3SM-2528-30
28.0		32.0	20.0	J3SM-2832-20
28.0		32.0	25.0	J3SM-2832-25
28.0		32.0	30.0	J3SM-2832-30
30.0		34.0	20.0	J3SM-3034-20

[3] After press-fit. *Testing methods page 57*

iglidur® J3
+90°C
45MPa

Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
30.0	+0.040 +0.124	34.0	25.0	J3SM-3034-25
30.0		34.0	30.0	J3SM-3034-30
30.0		34.0	40.0	J3SM-3034-40
32.0	+0.050 +0.150	36.0	20.0	J3SM-3236-20
32.0		36.0	30.0	J3SM-3236-30
32.0		36.0	40.0	J3SM-3236-40
35.0		39.0	20.0	J3SM-3539-20
35.0		39.0	30.0	J3SM-3539-30
35.0		39.0	40.0	J3SM-3539-40
35.0		39.0	50.0	J3SM-3539-50
40.0		44.0	20.0	J3SM-4044-20
40.0		44.0	30.0	J3SM-4044-30
40.0		44.0	40.0	J3SM-4044-40
40.0		44.0	50.0	J3SM-4044-50
45.0		50.0	20.0	J3SM-4550-20
45.0		50.0	30.0	J3SM-4550-30
45.0		50.0	40.0	J3SM-4550-40
45.0	+0.050 +0.150	50.0	50.0	J3SM-4550-50
50.0		55.0	20.0	J3SM-5055-20
50.0		55.0	30.0	J3SM-5055-30
50.0		55.0	40.0	J3SM-5055-40
50.0		55.0	50.0	J3SM-5055-50
50.0		55.0	60.0	J3SM-5055-60

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/J3

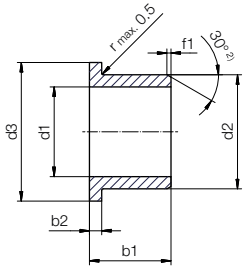
Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® J3

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

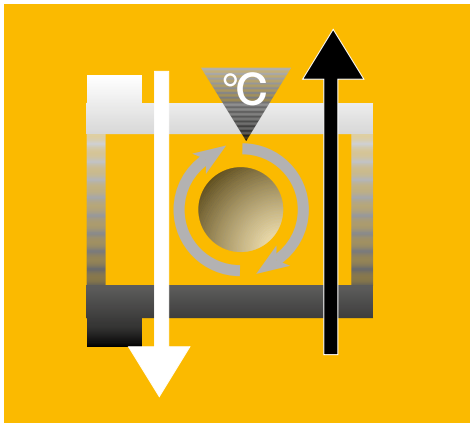
d1 [mm]	Ø 1–6	Ø 6–12	Ø 12–30	Ø > 30
f [mm]	0.3	0.5	0.8	1.2

Dimensions according to ISO 3547-1 and special dimensions

Order example: J3FM-0203505-05 - no minimum order quantity.
J3 iglidur® material F Flange bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 05 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
2.0	+0.014	3.5	5.0	5.0	0.75	J3FM-0203505-05
3.0	+0.054	4.5	7.5	5.0	0.75	J3FM-0304-05
5.0		7.0	11.0	5.0	1.00	J3FM-0507-05
6.0	+0.020	8.0	12.0	4.0	1.00	J3FM-0608-04
6.0	+0.068	8.0	12.0	6.0	1.00	J3FM-0608-06
6.0		8.0	12.0	8.0	1.00	J3FM-0608-08
8.0		10.0	15.0	5.5	1.00	J3FM-0810-05
8.0		10.0	15.0	7.5	1.00	J3FM-0810-07
8.0		10.0	15.0	9.5	1.00	J3FM-0810-09
8.0		10.0	15.0	10.0	1.00	J3FM-0810-10
10.0	+0.025 +0.083	12.0	18.0	7.0	1.00	J3FM-1012-07
10.0		12.0	18.0	9.0	1.00	J3FM-1012-09
10.0		12.0	18.0	10.0	1.00	J3FM-1012-10
10.0		12.0	18.0	12.0	1.00	J3FM-1012-12
10.0		12.0	18.0	17.0	1.00	J3FM-1012-17
12.0		14.0	20.0	7.0	1.00	J3FM-1214-07
12.0		14.0	20.0	9.0	1.00	J3FM-1214-09
12.0		14.0	20.0	12.0	1.00	J3FM-1214-12
12.0	+0.032 +0.102	14.0	20.0	17.0	1.00	J3FM-1214-17
14.0		16.0	22.0	12.0	1.00	J3FM-1416-12
14.0		16.0	22.0	17.0	1.00	J3FM-1416-17
15.0		17.0	23.0	9.0	1.00	J3FM-1517-09
15.0		17.0	23.0	12.0	1.00	J3FM-1517-12
15.0	+0.032	17.0	23.0	17.0	1.00	J3FM-1517-17
16.0	+0.102	18.0	24.0	12.0	1.00	J3FM-1618-12
16.0		18.0	24.0	17.0	1.00	J3FM-1618-17
18.0		20.0	26.0	12.0	1.00	J3FM-1820-12
18.0		20.0	26.0	17.0	1.00	J3FM-1820-17
18.0		20.0	26.0	22.0	1.00	J3FM-1820-22
18.0		21.0	25.0	12.0	1.00	J3FM-1821-12
20.0		23.0	30.0	11.5	1.50	J3FM-2023-11
20.0	+0.040	23.0	30.0	16.5	1.50	J3FM-2023-16
20.0	+0.124	23.0	30.0	21.5	1.50	J3FM-2023-21
25.0		28.0	35.0	11.5	1.50	J3FM-2528-11
25.0		28.0	35.0	16.5	1.50	J3FM-2528-16
25.0		28.0	35.0	21.5	1.50	J3FM-2528-21
30.0		34.0	42.0	16.0	2.00	J3FM-3034-16
30.0		34.0	42.0	26.0	2.00	J3FM-3034-26
35.0		39.0	47.0	16.0	2.00	J3FM-3539-16
35.0	+0.050	39.0	47.0	26.0	2.00	J3FM-3539-26
40.0	+0.150	44.0	52.0	30.0	2.00	J3FM-4044-30
40.0		44.0	52.0	40.0	2.00	J3FM-4044-40
45.0		50.0	58.0	50.0	2.00	J3FM-4550-50

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



Endurance runner with high dimensional stability at high temperatures

Can be used with many kinds of shafts and loads

iglidur® J350

When to use it?

- When a wear-resistant bearing for rotational movement at medium and high loads is required
- When a cost-effective plain bearing for high temperatures is required
- When press-fit up to +150°C is necessary
- When high wear resistance is required at high loads
- When the bearing is exposed to shock loading

When not to use?

- When continuous operating temperatures are higher than +180°C
  iglidur® X
- When the lowest friction is required
  iglidur® J
- When a cost-effective plain bearing with low friction is required
  iglidur® D, iglidur® R
- For high rotational speeds
  iglidur® J

Bearing technology | Plain bearings | iglidur® J350

Ø 4.0 – 50.0mm

Also available as:

Bar stock, round bar: **Page 639**

Bar stock, plate: **Page 651**

tribo-tape liner: **Page 657**

Piston rings: **Page 559**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 783**

Endurance runner with high dimensional stability at high temperatures:
Can be used with many kinds of shafts and loads

An outstanding plain bearing for rotating applications - and for a wide range of different shaft materials: with iglidur® J350 plain bearings, the service life can often be increased for applications between 2 and 50MPa. In addition, the high temperature resistance makes it a very versatile material.

- Recommended for steel shafts
- Continuous operating temperatures up to +180°C
- Suitable for medium and high loads
- Suitable for rotating applications
- Lubrication-free
- Maintenance-free

Typical application areas

- Automation
- Mechanical engineering
- Automotive
- Glass industry

Descriptive technical specifications			
Wear resistance at +23°C	–		+
Wear resistance at +90°C	–		+
Wear resistance at +150°C	–		+
Low coefficient of friction	–		+
Low moisture absorption	–		+
Wear resistance under water	–		+
High media resistance	–		+
Resistant to edge pressures	–		+
Suitable for shock and impact loads	–		+
Resistant to dirt	–		+

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

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

Technical data

General properties			Testing method
Density	g/cm³	1.44	
Colour		yellow	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.3	DIN 53495
Max. moisture absorption	% weight	1.6	
Coefficient of friction, dynamic, against steel	µ	0.10 – 0.20	
pv value, max. (dry)	MPa · m/s	0.45	
Mechanical properties			
Flexural modulus	MPa	2,000	DIN 53457
Flexural strength at +20°C	MPa	55	DIN 53452
Compressive strength	MPa	60	
Max. recommended surface pressure (+20°C)	MPa	60	
Shore D hardness		80	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+180	
Max. application temperature short-term	°C	+220	
Min. application temperature	°C	–100	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	7	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{13}$	DIN IEC 93
Surface resistance	Ω	$> 10^{10}$	DIN 53482

Table 01: Material properties table

–100°C up to +180°C

60MPa

V-0

RoHS-II

ISO 3547-1

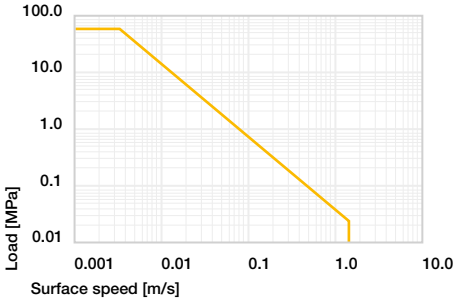


Diagram 01: Permissible pv values for iglidur® J350 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

The moisture absorption of iglidur® J350 is low and can be ignored when using standard plain bearings. Even when saturated with water, iglidur® J350 does not absorb more than 1.6% weight of water (by weight).

Vacuum

In vacuum, any present moisture is released as vapour. Use in vacuum is only possible with dehumidified iglidur® J350 bearings.

Radiation resistance

Plain bearings made from iglidur® J350 are resistant up to a radiation intensity of $2 \cdot 10^2$Gy.

UV resistance

iglidur® J350 plain bearings are partially resistant to UV radiation.

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

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® J350

iglidur® J350 blends universally good wear resistance, flexibility and temperature resistance into a very versatile iglidur® material with a broad application spectrum.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® J350 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

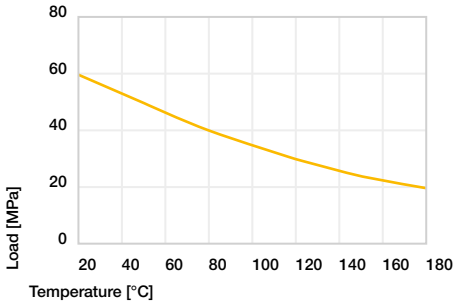


Diagram 02: Maximum recommended surface pressure as a function of temperature (60MPa at +20°C)

iglidur® J350 plain bearings are adequate for medium and high loads. Diagram 03 shows the elastic deformation of iglidur® J350 at radial loads. It shows the material behaviour submitted to a short-term load. The ambient temperatures are only noticeable at 60MPa.

Surface pressure, page 41

Permissible surface speeds

iglidur® J350 plain bearings are suitable for low and medium speeds in rotating and oscillating applications. The wear rates, however, are much better in the case of rotating applications. iglidur® J350 is also excellent for linear movements.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.3	1.0	4.0
short-term	**m/s**	3.0	2.3	8.0

Table 03: Maximum surface speeds

Temperature

The temperatures prevailing in the bearing system also have an influence on the wear. The wear-rate of iglidur® J350 bearings changes very little at high temperatures. In some cases, wear even decreases at +100°C. For temperatures over +140°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction of iglidur® J350 in dry operation against steel is very good. They decrease significantly at higher surface speeds. This benefits the service life of the plain bearings in continuous operations with high surface speeds. Diagram 04 illustrates this relationship. Especially with loads higher than 2MPa, the iglidur® J350 plain bearings are clearly superior to other bearings in rotating applications.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

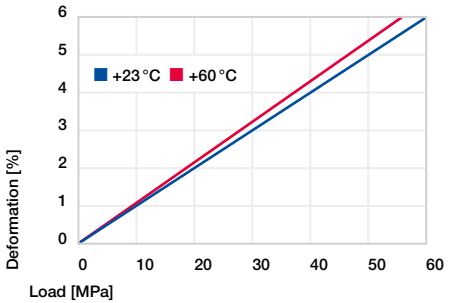


Diagram 03: Deformation under pressure and temperature

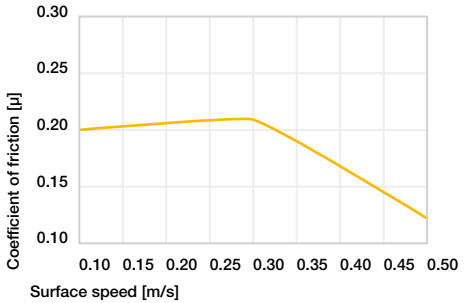


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

Technical data

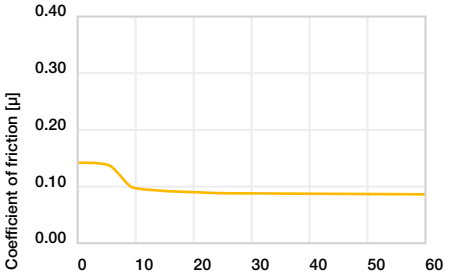


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

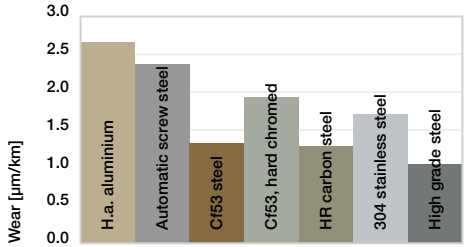


Diagram 07: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Shaft materials

Diagrams 06 and 07 show the test results of iglidur® J350 plain bearings running against various shaft materials. iglidur® J350 plain bearings can be combined with various shaft materials. One shaft - bearing combination stands out when looking at the wear results of the test: iglidur® J350 with soft 304 stainless steel. Not many bearing materials are suitable for use with this rather difficult soft stainless steel material (304 stainless steel) and achieve good wear results. Also, good properties are reached with hard-anodised aluminium shafts. If the shaft material you plan on using is not shown in these test results, please contact us.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.10 – 0.20	0.09	0.04	0.04

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

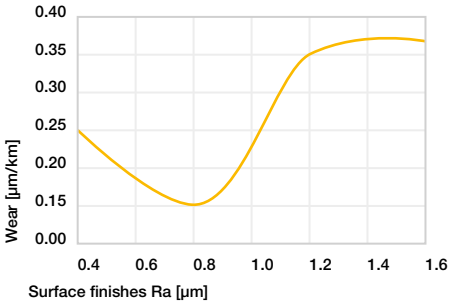


Diagram 06: Coefficient of friction as a function of the shaft surface (Cf53 shaft)

Installation tolerances

iglidur® J350 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 F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

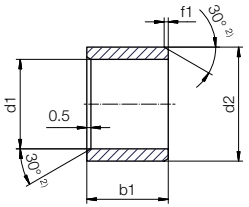
Testing methods, page 57

	Housing		Plain bearing		Shaft	
Ø d1 [mm]	H7 [mm]		F10 [mm]		h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Bearing technology | Plain bearings | iglidur® J350

Sleeve bearing (form S)



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

Dimensions according to ISO 3547-1 and special dimensions

Order example: J350SM-0405-06 - no minimum order quantity.
J350 iglidur® material S Sleeve bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
4.0		5.5	4.0	J350SM-0405-04
4.0		5.5	6.0	J350SM-0405-06
5.0		7.0	5.0	J350SM-0507-05
5.0	+0.010 +0.058	7.0	10.0	J350SM-0507-10
6.0		8.0	6.0	J350SM-0608-06
6.0		8.0	8.0	J350SM-0608-08
6.0		8.0	10.0	J350SM-0608-10
8.0		10.0	8.0	J350SM-0810-08
8.0		10.0	10.0	J350SM-0810-10
8.0		10.0	12.0	J350SM-0810-12
10.0	+0.013	12.0	8.0	J350SM-1012-08
10.0	+0.071	12.0	10.0	J350SM-1012-10
10.0		12.0	12.0	J350SM-1012-12
10.0		12.0	15.0	J350SM-1012-15
10.0		12.0	20.0	J350SM-1012-20
12.0		14.0	10.0	J350SM-1214-10
12.0		14.0	12.0	J350SM-1214-12
12.0		14.0	15.0	J350SM-1214-15
12.0		14.0	20.0	J350SM-1214-20
13.0		15.0	10.0	J350SM-1315-10
13.0		15.0	20.0	J350SM-1315-20
14.0	+0.016	16.0	15.0	J350SM-1416-15
14.0	+0.086	16.0	20.0	J350SM-1416-20
14.0		16.0	25.0	J350SM-1416-25
15.0		17.0	15.0	J350SM-1517-15
15.0		17.0	20.0	J350SM-1517-20
15.0		17.0	25.0	J350SM-1517-25
16.0		18.0	4.0	J350SM-1618-04
16.0		18.0	15.0	J350SM-1618-15

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
16.0		18.0	20.0	J350SM-1618-20
16.0		18.0	25.0	J350SM-1618-25
18.0	+0.016 +0.086	20.0	15.0	J350SM-1820-15
18.0		20.0	20.0	J350SM-1820-20
18.0		20.0	25.0	J350SM-1820-25
20.0		23.0	10.0	J350SM-2023-10
20.0		23.0	15.0	J350SM-2023-15
20.0		23.0	20.0	J350SM-2023-20
20.0		23.0	25.0	J350SM-2023-25
20.0		23.0	30.0	J350SM-2023-30
22.0		25.0	15.0	J350SM-2225-15
22.0		25.0	20.0	J350SM-2225-20
22.0		25.0	25.0	J350SM-2225-25
22.0		25.0	30.0	J350SM-2225-30
24.0		27.0	15.0	J350SM-2427-15
24.0		27.0	20.0	J350SM-2427-20
24.0	+0.020 +0.104	27.0	25.0	J350SM-2427-25
24.0		27.0	30.0	J350SM-2427-30
25.0		28.0	15.0	J350SM-2528-15
25.0		28.0	20.0	J350SM-2528-20
25.0		28.0	25.0	J350SM-2528-25
25.0		28.0	30.0	J350SM-2528-30
25.0		28.0	45.0	J350SM-2528-45
28.0		32.0	20.0	J350SM-2832-20
28.0		32.0	25.0	J350SM-2832-25
28.0		32.0	30.0	J350SM-2832-30
30.0		34.0	20.0	J350SM-3034-20
30.0		34.0	25.0	J350SM-3034-25
30.0		34.0	30.0	J350SM-3034-30

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

Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
30.0	+0.020 +0.104	34.0	40.0	J350SM-3034-40
32.0		36.0	20.0	J350SM-3236-20
32.0		36.0	30.0	J350SM-3236-30
32.0		36.0	40.0	J350SM-3236-40
35.0		39.0	20.0	J350SM-3539-20
35.0	+0.025 +0.125	39.0	30.0	J350SM-3539-30
35.0		39.0	40.0	J350SM-3539-40
35.0		39.0	50.0	J350SM-3539-50
40.0		44.0	20.0	J350SM-4044-20
40.0		44.0	30.0	J350SM-4044-30

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
40.0		44.0	40.0	J350SM-4044-40
40.0		44.0	50.0	J350SM-4044-50
45.0		50.0	20.0	J350SM-4550-20
45.0		50.0	30.0	J350SM-4550-30
45.0		50.0	40.0	J350SM-4550-40
45.0	+0.025 +0.125	50.0	50.0	J350SM-4550-50
50.0		55.0	20.0	J350SM-5055-20
50.0		55.0	30.0	J350SM-5055-30
50.0		55.0	40.0	J350SM-5055-40
50.0		55.0	50.0	J350SM-5055-50
50.0		55.0	60.0	J350SM-5055-60

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/J350

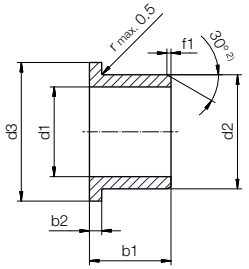
Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® J350

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

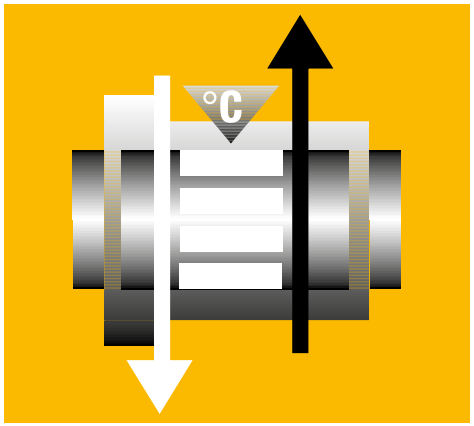
Dimensions according to ISO 3547-1 and special dimensions

Order example: J350FM-0608-04 - no minimum order quantity.
J350 iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 04 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.010 +0.058	8.0	12.0	4.0	1.00	**J350FM-0608-04**
6.0		8.0	12.0	6.0	1.00	**J350FM-0608-06**
6.0		8.0	12.0	8.0	1.00	**J350FM-0608-08**
8.0	+0.013 +0.071	10.0	15.0	5.5	1.00	**J350FM-0810-05**
8.0		10.0	15.0	7.5	1.00	**J350FM-0810-07**
8.0		10.0	15.0	9.5	1.00	**J350FM-0810-09**
8.0		10.0	15.0	10.0	1.00	**J350FM-0810-10**
10.0		12.0	18.0	7.0	1.00	**J350FM-1012-07**
10.0		12.0	18.0	9.0	1.00	**J350FM-1012-09**
10.0		12.0	18.0	10.0	1.00	**J350FM-1012-10**
10.0		12.0	18.0	12.0	1.00	**J350FM-1012-12**
10.0		12.0	18.0	17.0	1.00	**J350FM-1012-17**
12.0	+0.016 +0.086	14.0	20.0	7.0	1.00	**J350FM-1214-07**
12.0		14.0	20.0	9.0	1.00	**J350FM-1214-09**
12.0		14.0	20.0	12.0	1.00	**J350FM-1214-12**
12.0		14.0	20.0	17.0	1.00	**J350FM-1214-17**
14.0		16.0	22.0	12.0	1.00	**J350FM-1416-12**
14.0		16.0	22.0	17.0	1.00	**J350FM-1416-17**
15.0		17.0	23.0	9.0	1.00	**J350FM-1517-09**
15.0		17.0	23.0	12.0	1.00	**J350FM-1517-12**
15.0		17.0	23.0	17.0	1.00	**J350FM-1517-17**

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
16.0	+0.016 +0.086	18.0	24.0	12.0	1.00	**J350FM-1618-12**
16.0		18.0	24.0	17.0	1.00	**J350FM-1618-17**
18.0		20.0	26.0	12.0	1.00	**J350FM-1820-12**
18.0		20.0	26.0	17.0	1.00	**J350FM-1820-17**
18.0		20.0	26.0	22.0	1.00	**J350FM-1820-22**
20.0	+0.020 +0.104	23.0	30.0	11.5	1.50	**J350FM-2023-11**
20.0		23.0	30.0	16.5	1.50	**J350FM-2023-16**
20.0		23.0	30.0	21.5	1.50	**J350FM-2023-21**
25.0		28.0	35.0	11.5	1.50	**J350FM-2528-11**
25.0		28.0	35.0	16.5	1.50	**J350FM-2528-16**
25.0		28.0	35.0	21.5	1.50	**J350FM-2528-21**
30.0		34.0	42.0	16.0	2.00	**J350FM-3034-16**
30.0		34.0	42.0	22.0	2.00	**J350FM-3034-22**
30.0		34.0	42.0	26.0	2.00	**J350FM-3034-26**
30.0		34.0	42.0	37.0	2.00	**J350FM-3034-37**
35.0	+0.025 +0.125	39.0	47.0	16.0	2.00	**J350FM-3539-16**
35.0		39.0	47.0	26.0	2.00	**J350FM-3539-26**
40.0		44.0	52.0	30.0	2.00	**J350FM-4044-30**
40.0		44.0	52.0	40.0	2.00	**J350FM-4044-40**
45.0		50.0	58.0	50.0	2.00	**J350FM-4550-50**

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



Ideal for plastic shafts

Wear-resistant at medium temperatures and loads

iglidur® J260

When to use it?

- When polymer shafts are used
- When the temperature rating of iglidur® J is not sufficient
- When a plain bearing with low coefficient of friction is required
- When high wear resistance is required at medium loads
- When good liquid media resistance is required

When not to use?

- When high surface pressures occur
  iglidur® Z
- When continuous operating temperatures are higher than +120°C
  iglidur® J350
- When universal wear resistance is required
  iglidur® J

Bearing technology | Plain bearings | iglidur® J260

Ø 6.0 – 20.0mm

Also available as:

Bar stock, round bar: **Page 640**

Bar stock, plate: **Page 651**

tribo-tape liner: **Page 657**

Piston rings: **Page 559**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 783**

Ideal for plastic shafts:
Wear-resistant at medium temperatures and loads

Time and again the iglidur® J260 material proves its worth where the maximum service life and best coefficient of friction are required under special application conditions – particularly in connection with plastic shafts!

- For low and medium loads
- High media resistance
- Slightly higher temperature rating than iglidur® J
- Long service life – even on polymer shafts and other special cases

Typical application areas

- Automation
- Plant construction
- Test engineering and quality assurance
- Robotics industry
- Electronics industry

Descriptive technical specifications			
Wear resistance at +23°C	–	■■■□□	+
Wear resistance at +90°C	–	■■■□□	+
Wear resistance at +150°C	–	■■□□□	+
Low coefficient of friction	–	■■■■□	+
Low moisture absorption	–	■■■■□	+
Wear resistance under water	–	■■□□□	+
High media resistance	–	■■■□□	+
Resistant to edge pressures	–	■■■□□	+
Suitable for shock and impact loads	–	■■■□□	+
Resistant to dirt	–	■■■□□	+

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

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

iglidur® J260 +120°C 40MPa

Technical data

General properties			Testing method
Density	g/cm³	1.35	
Colour		yellow	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.2	DIN 53495
Max. moisture absorption	% weight	0.4	
Coefficient of friction, dynamic, against steel	μ	0.06 – 0.20	
pv value, max. (dry)	MPa · m/s	0.35	
Mechanical properties			
Flexural modulus	MPa	2,200	DIN 53457
Flexural strength at +20°C	MPa	60	DIN 53452
Compressive strength	MPa	50	
Max. recommended surface pressure (+20°C)	MPa	40	
Shore D hardness		77	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+120	
Max. application temperature short-term	°C	+140	
Min. application temperature	°C	–100	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	13	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{12}$	DIN IEC 93
Surface resistance	Ω	$> 10^{10}$	DIN 53482

Table 01: Material properties table

–100°C up to +120°C

40MPa

V-2

RoHS-II

ISO 3547-1

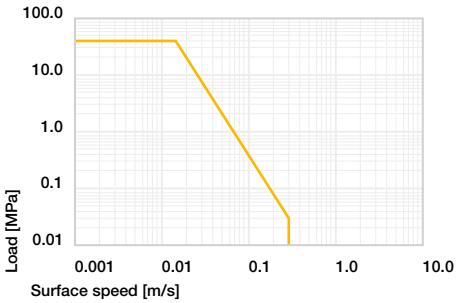


Diagram 01: Permissible pv values for iglidur® J260 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® J260 plain bearings is approximately 0.2% weight. The saturation limit in water is 0.4% weight. These values are so low that a moisture expansion need to be considered only in extreme cases.

Vacuum

In vacuum, any present moisture is released as vapour. Use in vacuum is only possible with dehumidified iglidur® J260 bearings.

Radiation resistance

Resistant to radiation up to an intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® J260 plain bearings are partially resistant to UV radiation.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® J260

Similar to the classic, iglidur® J, iglidur® J260 is an endurance runner with outstanding wear behaviour, but provides increased reserves at its long-term application temperature of +120°C.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® J260 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

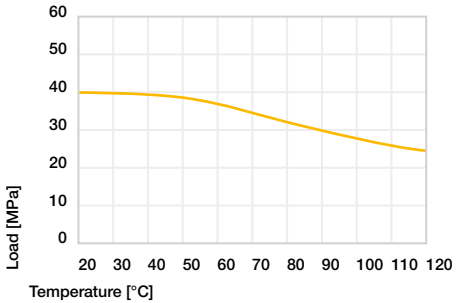


Diagram 02: Maximum recommended surface pressure as a function of temperature (40MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® J260 at radial loads. At the maximum recommended surface pressure of 40MPa at room temperature the deformation is less than 2.5%. A possible deformation could be, among others, dependant on the duty cycle of the load.

Surface pressure, page 41

Permissible surface speeds

iglidur® J260 has been developed for low to medium surface speeds. The maximum values shown in table 03 can only be achieved at low pressures. At the given speeds, friction can cause a temperature increase to maximum permissible levels. In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.0	0.7	3.0
short-term	**m/s**	2.0	1.4	4.0

Table 03: Maximum surface speeds

Temperature

The temperatures prevailing in the bearing system also have an influence on the wear. With increasing temperatures, the wear increases and this effect is significant when temperatures rise over +80°C. For temperatures over +80°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the load. The coefficient of friction decreases considerably with increasing pressures, whereas a slight increase in surface speed causes an increase of the coefficient of friction (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

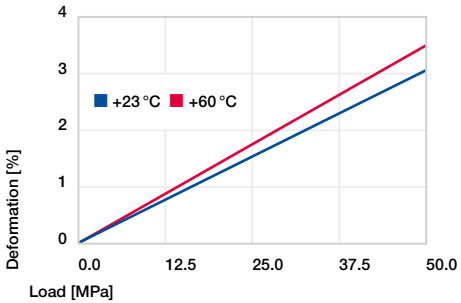


Diagram 03: Deformation under pressure and temperature

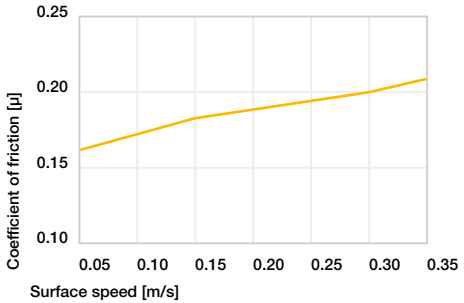


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

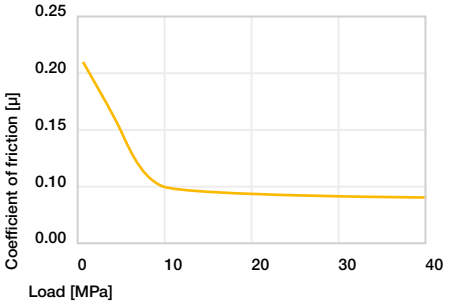


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

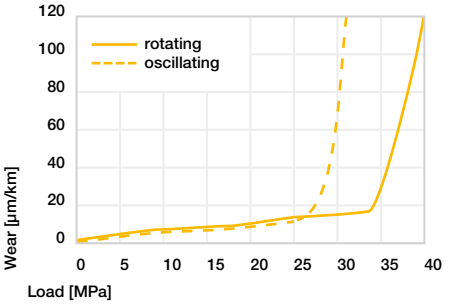


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

The friction and wear are also dependent, to a large degree, on the shaft material. Shafts that are too smooth, increase both the coefficient of friction and the wear of the bearing. For iglidur® J260 a ground surface with an average surface finish Ra = 0.8μm is recommended. Diagram 06 shows the test results of iglidur® J260 plain bearings running against various shaft materials. It is important to notice that with increasing loads, the recommended hardness of the shaft increases. The „soft" shafts tend to wear more easily and thus increase the wear of the overall system, if the loads exceed 2MPa. The comparison of rotating and pivoting movements in diagram 07 makes it very clear that iglidur® J260 plain bearings are most suited for rotating operation.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.06 – 0.20	0.09	0.04	0.04

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

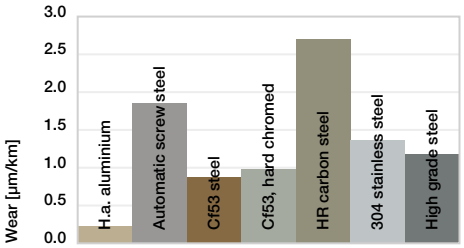


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

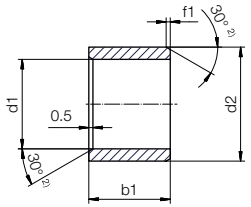
iglidur® J260 plain bearings are standard bearings for shafts with h tolerance (recommended minimum h9). The bearings are designed for press-fit into a housing machined to a H7 tolerance. After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

Testing methods, page 57

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

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

Sleeve bearing (form S)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: J260SM-0608-06 - no minimum order quantity.
J260 iglidur® material S Sleeve bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
6.0	+0.020 +0.068	8.0	6.0	**J260SM-0608-06**
8.0	+0.025 +0.083	10.0	6.0	**J260SM-0810-06**
8.0		10.0	10.0	**J260SM-0810-10**
10.0		12.0	10.0	**J260SM-1012-10**
12.0	+0.032 +0.102	14.0	12.0	**J260SM-1214-12**
12.0		14.0	15.0	**J260SM-1214-15**
16.0		18.0	13.5	**J260SM-1618-135**
16.0		18.0	15.0	**J260SM-1618-15**
18.0		20.0	12.0	**J260SM-1820-12**
18.0		20.0	20.0	**J260SM-1820-20**
20.0	+0.040 +0.124	23.0	20.0	**J260SM-2023-20**

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/J260

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
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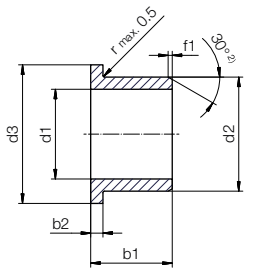
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® J260

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: J260FM-0608-06 - no minimum order quantity.
J260 iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.020 +0.068	8.0	12.0	6.0	1.00	**J260FM-0608-06**
8.0	+0.025 +0.083	10.0	15.0	10.0	1.00	**J260FM-0810-10**
10.0		12.0	18.0	10.0	1.00	**J260FM-1012-10**
12.0	+0.032 +0.102	14.0	20.0	12.0	1.00	**J260FM-1214-12**
16.0		18.0	24.0	17.0	1.00	**J260FM-1618-17**
20.0	+0.040 +0.124	23.0	30.0	21.5	1.50	**J260FM-2023-21**

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/J260

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

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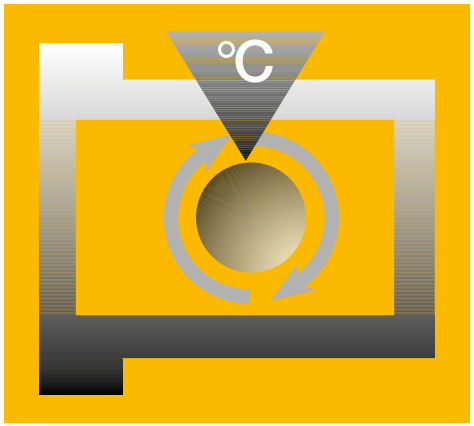

Endurance runner up to +180°C

For applications that are clean and dry

iglidur® W360

When to use it?

- When an extremely wear-resistant plain bearing is required for medium loads
- When continuous operating temperatures are higher than +90°C

When not to use?

- When a wear-resistant plain bearing is sought for the standard temperature range and low to medium loads
  iglidur® J
- When the maximum temperature resistance and high wear resistance is required
  iglidur® Z, iglidur® J350, iglidur® V400
- When the highest wear resistance under water is required
  iglidur® UW, iglidur® H370

Bearing technology | Plain bearings | iglidur® W360

Ø 6.0 – 20.0mm

Also available as:

Bar stock, round bar: Page 629

Bar stock, plate: Page 651

tribo-tape liner: Page 657

Piston rings: Page 559

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

Endurance runner up to +180°C: For applications that are clean and dry

The new iglidur® material combines outstanding endurance running properties with excellent temperature resistance, reduced moisture absorption and good value for money - a real all-rounder in the endurance field.

- High wear resistance
- Temperature-resistant up to +180°C
- Suitable for wet environments
- Good price-performance ratio
- Lubrication-free
- Maintenance-free

Typical application areas

- Material handling
- Automation
- Two-wheel technology
- Electromobility

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

Online product finder
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Online service life calculation
www.igus.eu/iglidur-expert

iglidur® W360 +180°C 75MPa

Technical data

General properties			Testing method
Density	g/cm³	1.34	
Colour		yellow	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.2	DIN 53495
Max. moisture absorption	% weight	1.6	
Coefficient of friction, dynamic, against steel	µ	0.07 – 0.21	
pv value, max. (dry)	MPa · m/s	0.35	
Mechanical properties			
Flexural modulus	MPa	3,829	DIN 53457
Flexural strength at +20°C	MPa	119	DIN 53452
Compressive strength	MPa	75	
Max. recommended surface pressure (+20°C)	MPa	75	
Shore D hardness		80	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+180	
Max. application temperature short-term	°C	+200	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	6	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{13}$	DIN IEC 93
Surface resistance	Ω	$> 10^{12}$	DIN 53482

Table 01: Material properties table

–40°C up to +180°C

75MPa

HB

RoHS-II

ISO 3547-1

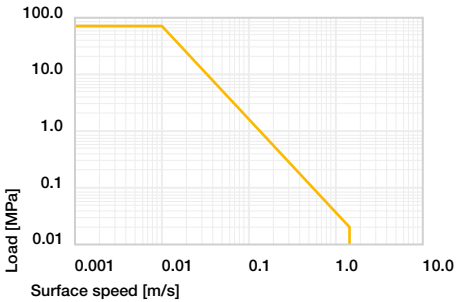


Diagram 01: Permissible pv values for iglidur® W360 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

The moisture absorption of iglidur® W360 is low and can be disregarded when used in a humid environment. With a full saturation of 1.6% weight, however, underwater use is only possible to a very restricted extent.

Vacuum

In vacuum, any present moisture is released as vapour. Use in vacuum is only possible with dehumidified iglidur® W360 bearings.

Radiation resistance

Plain bearings made from iglidur® W360 are resistant up to a radiation intensity of $2 \cdot 10^2$Gy.

UV resistance

iglidur® W360 plain bearings are partially resistant to UV radiation.

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

+ resistant 0 conditionally resistant – not resistant

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® W360

Low moisture absorption and high temperature resistance result in an extremely broad range of uses for this extremely wear-resistant material.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® W360 plain bearings decreases. Diagram 02 shows this inverse relationship. However, at the long-term maximum temperature of +180°C the permissible surface pressure is around 10MPa. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

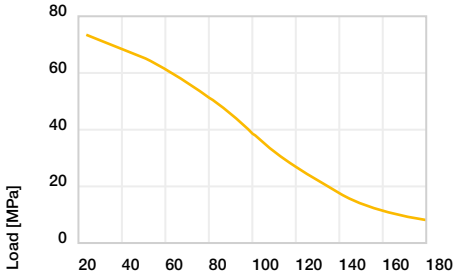


Diagram 02: Maximum recommended surface pressure as a function of temperature (75MPa at +20°C)

iglidur® W360 plain bearings are suitable for a broad range of loads. Diagram 03 shows the deformation under temperature. It shows the material behaviour submitted to a short-term load.

Surface pressure, page 41

Permissible surface speeds

iglidur® W360 plain bearings are suitable for low and medium speeds in rotating and oscillating applications. The wear rates, however, are much better in the case of rotating applications. iglidur® W360 is also excellent for linear movements.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.2	0.9	3.0
short-term	**m/s**	2.7	2.0	5.0

Table 03: Maximum surface speeds

Temperature

The temperature resistance makes iglidur® W360 a very universal material for plain bearings in different industries. Short-term application temperatures up to +200°C are permitted. For temperatures over +90°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction of iglidur® W360 in dry operation against steel is very good. They constantly remain at a low level regardless of the speed. Diagram 04 illustrates this relationship. As the load increases, the coefficient of friction decreases. The correlation is especially strong up to approximately 15MPa (diagram 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

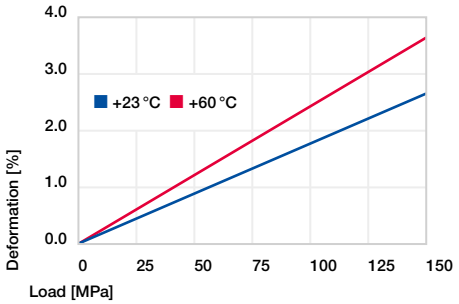


Diagram 03: Deformation under pressure and temperature

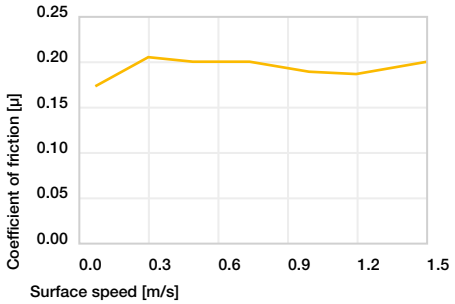


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

Technical data

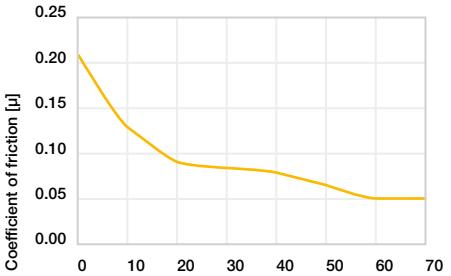


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

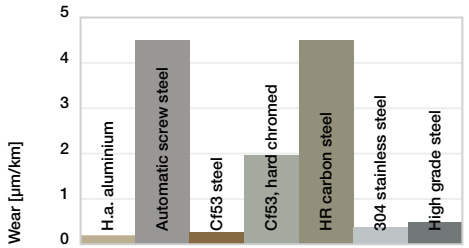


Diagram 07: Wear, rotating with different shaft materials, p = 1MPa, v = 0.3m/s

Shaft materials

In the case of iglidur® W360, the shaft's surface finish has practically no effect on the coefficient of friction in the range of up to 1.6MPa (diagram 06). Diagram 07 shows results of testing different shafts. iglidur® W360 plain bearings are suitable for all sliding surfaces. During rotation with a load of 1MPa, all HC aluminium, Cf53 and stainless steel shafts stand out. A similar picture also exists with other loads or pivoting movements. If the shaft material you plan on using is not shown in these test results, please contact us.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.07 – 0.21	0.09	0.04	0.04

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

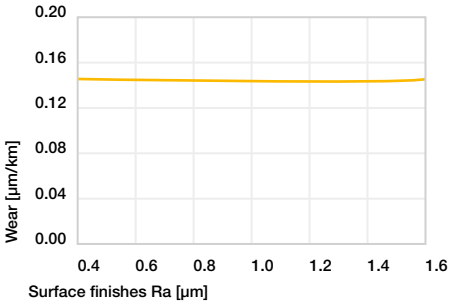


Diagram 06: Coefficient of friction as a function of the shaft surface (Cf53 shaft)

Installation tolerances

iglidur® W360 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 E10 tolerances.

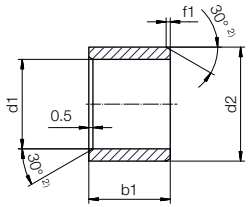
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® W360

Sleeve bearing (form S)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: W360SM-0608-06 - no minimum order quantity.
W360 iglidur® material S Sleeve bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
6.0	+0.020 +0.068	8.0	6.0	**W360SM-0608-06**
8.0	+0.025 +0.083	10.0	10.0	**W360SM-0810-10**
10.0		12.0	10.0	**W360SM-1012-10**
12.0	+0.032 +0.102	14.0	12.0	**W360SM-1214-12**
16.0		18.0	15.0	**W360SM-1618-15**
20.0	+0.040 +0.124	23.0	20.0	**W360SM-2023-20**

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/W360

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

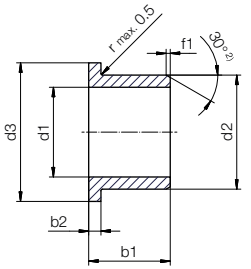
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur® W360 +180°C 75MPa

Bearing technology | Plain bearings | iglidur® W360

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: W360FM-0608-06 - no minimum order quantity.
W360 iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.020 +0.068	8.0	12.0	6.0	1.00	**W360FM-0608-06**
8.0	+0.025 +0.083	10.0	15.0	10.0	1.00	**W360FM-0810-10**
10.0		12.0	18.0	10.0	1.00	**W360FM-1012-10**
12.0	+0.032 +0.102	14.0	20.0	12.0	1.00	**W360FM-1214-12**
16.0		18.0	24.0	17.0	1.00	**W360FM-1618-17**
20.0	+0.040 +0.124	23.0	30.0	21.5	1.50	**W360FM-2023-21**

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/W360

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

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No low-quantity surcharges.
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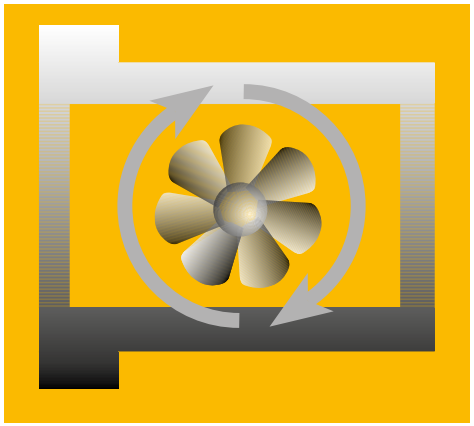


For fast rotating applications

Low coefficient of friction under low load

iglidur® L250

When to use it?

- For rotating applications at high speed
- When the highest service life is required
- For low load applications
- When a low noise level is required
- For very low coefficient of friction

When not to use?

- When high pressure occurs
  iglidur® Q, iglidur® W300
- When continuous operating temperatures are higher than +90°C
  iglidur® V400
- When low moisture absorption is required
  iglidur® H1, iglidur® J

Bearing technology | Plain bearings | iglidur® L250

Ø 6.0 – 20.0mm

Also available as:

Bar stock, round bar: Page 629

Bar stock, plate: Page 651

tribo-tape liner: Page 657

Piston rings: Page 559

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

For fast rotating applications:
Low coefficient of friction under low load

Plain bearings for high speed rotation applications, especially for fans and motors.

- Suitable for high rotating speeds
- Very low coefficient of friction
- Very wear-resistant
- Lubrication-free
- Maintenance-free

Typical application areas

- Automotive industry
- Electronics industry
- Mechatronics
- Optical industry
- Test engineering and quality assurance

Descriptive technical specifications			
Wear resistance at +23°C	–		+
Wear resistance at +90°C	–		+
Wear resistance at +150°C	–		+
Low coefficient of friction	–		+
Low moisture absorption	–		+
Wear resistance under water	–		+
High media resistance	–		+
Resistant to edge pressures	–		+
Suitable for shock and impact loads	–		+
Resistant to dirt	–		+

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

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

iglidur® L250 +90°C 45MPa

Technical data

General properties			Testing method
Density	g/cm³	1.50	
Colour		beige	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.7	DIN 53495
Max. moisture absorption	% weight	3.9	
Coefficient of friction, dynamic, against steel	µ	0.08 – 0.19	
pv value, max. (dry)	MPa · m/s	0.40	
Mechanical properties			
Flexural modulus	MPa	1,950	DIN 53457
Flexural strength at +20°C	MPa	67	DIN 53452
Compressive strength	MPa	47	
Max. recommended surface pressure (+20°C)	MPa	45	
Shore D hardness		68	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+90	
Max. application temperature short-term	°C	+180	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	10	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{10}$	DIN IEC 93
Surface resistance	Ω	$> 10^{11}$	DIN 53482

Table 01: Material properties table

–40°C up to +90°C

45MPa

HB

RoHS-II

ISO 3547-1

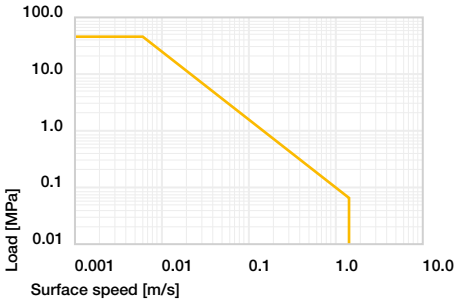


Diagram 01: Permissible pv values for iglidur® L250 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

With regard to applications where the smallest bearing clearances are concerned, please take the moisture absorption into consideration.

Vacuum

In vacuum, any present moisture is released as vapour. Use in vacuum is only possible with dehumidified iglidur® L250 bearings.

Radiation resistance

Plain bearings made from iglidur® L250 are resistant up to a radiation intensity of $3 \cdot 10^4$Gy. Higher radiation weakens the material and may result in a significant decrease in mechanical properties.

UV resistance

iglidur® L250 plain bearings become discoloured when exposed to UV radiation. However, the material properties are not affected.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® L250

iglidur® L250 is a bearing material for high rotation speeds and low coefficient of friction. The iglidur® L250 material can feature these advantages particularly with low loads. Applications which feature these advantages are fans, small motors, fast-running sensors or the magnet technology.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® L250 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

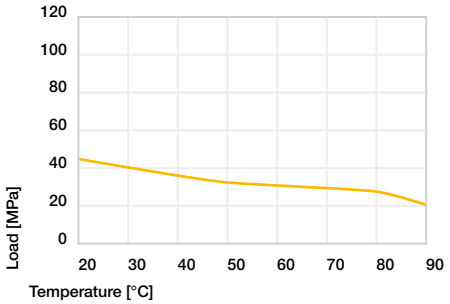


Diagram 02: Maximum recommended surface pressure as a function of temperature (45MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® L250 at radial loads. At the maximum recommended surface pressure of 45MPa at room temperature the deformation is less than 3%. A plastic deformation can be negligible up to this value. It is however also dependent on the duty cycle of the load.

Surface pressure, page 41

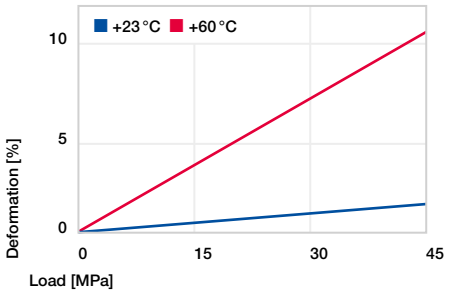


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® L250 has been developed especially for high surface speeds with low loads. Besides the physical limit, which is pre-set by the heating of the bearing, the coefficient of wear also acts limiting if rapidly high glide paths emerge at high peripheral speeds and the permitted wear limit is thus reached earlier. The maximum speeds are shown in table 03.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.0	0.7	2.0
short-term	**m/s**	1.5	1.1	3.0

Table 03: Maximum surface speeds

Temperature

The iglidur® L250 plain bearings can be used in short-term temperatures up to +180°C. Note that a mechanical securing of the bearing is recommended from temperatures of +55°C. Higher temperatures can also cause the plain bearing to lose its press-fit and move in the hole.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

In the best pairing (with 304 stainless steel shafts), coefficient of friction of 0.14µ is already reached with low loads. Coefficient of friction under 0.1 was measured already below 10MPa (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

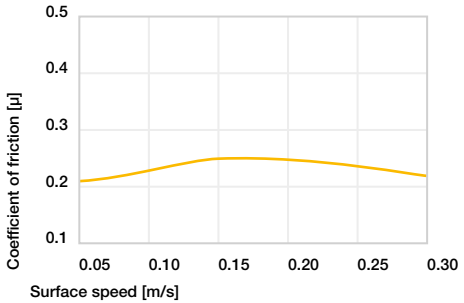


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

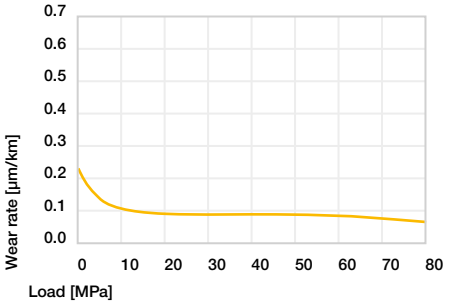


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

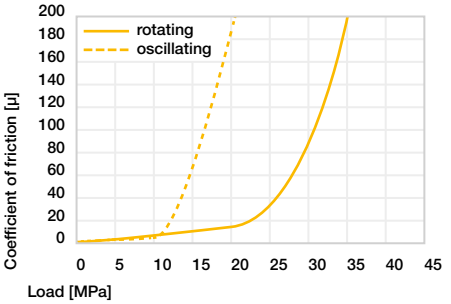


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

As seen in diagram 06, many shafts are recommendable for low loads and low rotations. The low coefficient of friction is additionally retained over a wide range of recommendable shaft surfaces finish. For loads higher than 1MPa, particular attention should be paid to the shaft material used.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.08 – 0.19	0.09	0.04	0.04

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

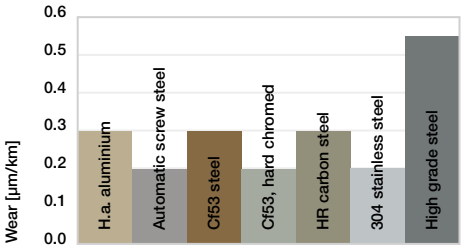


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® L250 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 E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

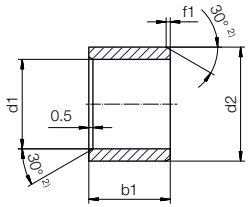
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® L250

Sleeve bearing (form S)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: L250SM-0608-06 - no minimum order quantity.
L250 iglidur® material S Sleeve bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
6.0	+0.020 +0.068	8.0	6.0	**L250SM-0608-06**
8.0	+0.025 +0.083	10.0	10.0	**L250SM-0810-10**
10.0		12.0	10.0	**L250SM-1012-10**
12.0	+0.032 +0.102	14.0	12.0	**L250SM-1214-12**
16.0		18.0	15.0	**L250SM-1618-15**
20.0	+0.040 +0.124	23.0	20.0	**L250SM-2023-20**

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/L250

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

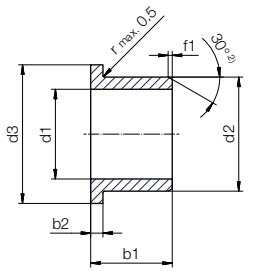
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur® L250 +90°C 45MPa

Bearing technology | Plain bearings | iglidur® L250

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: L250FM-0608-06 - no minimum order quantity.
L250 iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.020 +0.068	8.0	12.0	6.0	1.00	**L250FM-0608-06**
8.0	+0.025 +0.083	10.0	15.0	10.0	1.00	**L250FM-0810-10**
10.0		12.0	18.0	10.0	1.00	**L250FM-1012-10**
12.0	+0.032 +0.102	14.0	20.0	12.0	1.00	**L250FM-1214-12**
16.0		18.0	24.0	17.0	1.00	**L250FM-1618-17**
20.0	+0.040 +0.124	23.0	30.0	21.5	1.50	**L250FM-2023-21**

[3] After press-fit. *Testing methods page 57*

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www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/L250

Ordering note
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Discount scaling		
1 – 9	50 – 99	500 – 999
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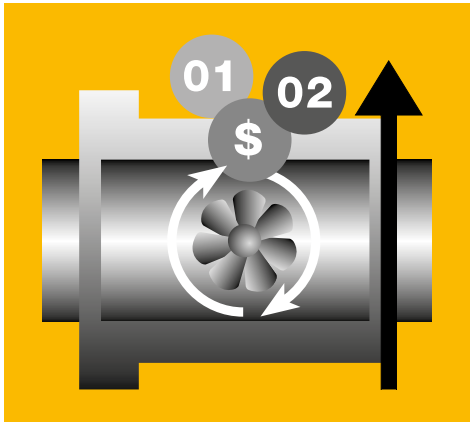


For high rotational speeds

High performance at lower cost

iglidur® L350

When to use it?

- For rotating applications at high speed
- When the highest service life is required
- For high pv values with low loads
- At operating temperatures up to +180°C (long-term, short-term up to max. +210°C)

When not to use?

- When a universal bearing for high temperatures is required
  iglidur® X
- When medium to high pressures occur
  iglidur® G, iglidur® Q
- For oscillating applications
  iglidur® W300, iglidur® J350

Bearing technology | Plain bearings | iglidur® L350

Ø 3.0 – 10.0mm

Also available as:

Bar stock, round bar: Page 629

Bar stock, plate: Page 651

tribo-tape liner: Page 657

Piston rings: Page 559

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

For high rotational speeds: High performance at lower cost

iglidur® L350 is extremely long-lasting. Developed for the best coefficient of wear and friction at speeds of 1.5m/s and more, this material outperforms classic plain bearings in high-speed rotation operation.

- Up to 3.5m/s rotating
- Temperature-resistant up to +210°C in continuous use
- Low moisture absorption
- Good price-performance ratio
- Extremely wear-resistant
- Lubrication and maintenance-free
- Standard range from stock

Typical application areas

- Electric motors
- Fans
- Household appliances

Descriptive technical specifications			
Wear resistance at +23°C	–		+
Wear resistance at +90°C	–		+
Wear resistance at +150°C	–		+
Low coefficient of friction	–		+
Low moisture absorption	–		+
Wear resistance under water	–		+
High media resistance	–		+
Resistant to edge pressures	–		+
Suitable for shock and impact loads	–		+
Resistant to dirt	–		+

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

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

iglidur® L350 +180°C 59MPa

Technical data

General properties			Testing method
Density	g/cm³	1.54	
Colour		dark grey	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.4	DIN 53495
Max. moisture absorption	% weight	1.4	
Coefficient of friction, dynamic, against steel	µ	0.07 – 0.18	
pv value, max. (dry)	MPa · m/s	3.00	
Mechanical properties			
Flexural modulus	MPa	15,882	DIN 53457
Flexural strength at +20°C	MPa	210	DIN 53452
Compressive strength	MPa	210	
Max. recommended surface pressure (+20°C)	MPa	59	
Shore D hardness		80	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+180	
Max. application temperature short-term	°C	+210	
Min. application temperature	°C	–100	
Thermal conductivity	W/m · K	0.61	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	7	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	> 10^5	DIN IEC 93
Surface resistance	Ω	> 10^5	DIN 53482

Table 01: Material properties table

–100°C up to +180°C

59MPa

V-0

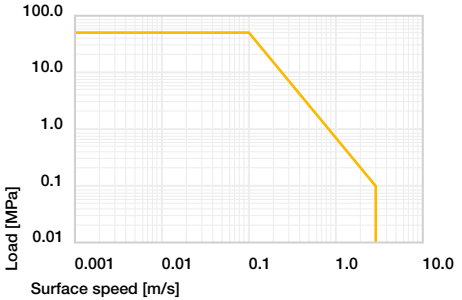


Diagram 01: Permissible pv values for iglidur® L350 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

The very low moisture absorption of 0.4% weight in standard climatic conditions and 1.4% weight at maximum water absorption also enables continuous operation in high humidity or in liquid media.

Vacuum

In vacuum, the moisture content is released as vapour. Due to its low moisture absorption, use in a vacuum is possible.

Radiation resistance

Plain bearings made from iglidur® L350 are resistant up to a radiation intensity of $2 \cdot 10^2$Gy. Higher radiation affects the material and may result in a significant decrease in mechanical properties.

UV resistance

The material properties of iglidur® L350 plain bearings do not change under UV rays or other weathering effects.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® L350

With iglidur L350, another lubrication and maintenance-free material is now available, which is designed for continuous high speeds. Due to the low thermal expansion and low moisture absorption, bearings can be manufactured with minimal potential to expand. iglidur® L350 is especially suitable for use in fans, blowers or electric motors - and the costs are also lower.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® L350 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

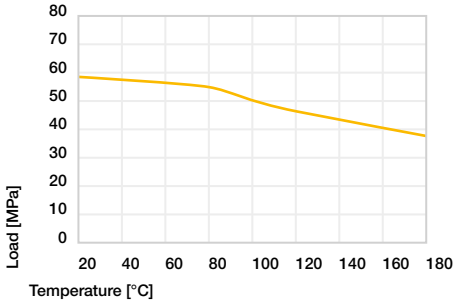


Diagram 02: Maximum recommended surface pressure as a function of temperature (59MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® L350 at radial loads. At the maximum recommended surface pressure of 59MPa at room temperature the deformation is less than 2.5%. A plastic deformation can be negligible up to this value. It is however also dependent on the duty cycle of the load.

Surface pressure, page 41

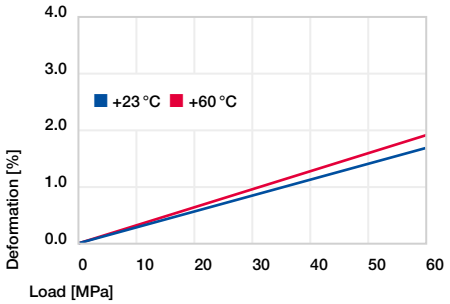


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® L350 has been developed especially for high surface speeds with low loads. Due to the high temperature resistance of iglidur® L350, the limit of the bearing has been increased significantly. In addition, the extremely low wear allows the high acceleration speeds to be reached and maintained.The maximum speeds are shown in table 03.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	3.0	1.5	4.0
short-term	**m/s**	4.0	3.0	6.0

Table 03: Maximum surface speeds

Temperature

The iglidur® L350 plain bearings can be used in temperatures up to +210°C for the short-term. Note that a mechanical securing of the bearing is recommended from temperatures of +140°C. Higher temperatures can sometimes cause the plain bearings to lose their press-fit and move in the housing.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The very low coefficient of friction remains, even at high speeds. Diagram 04 shows this relationship on a steel shaft at 0.75MPa surface pressure.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

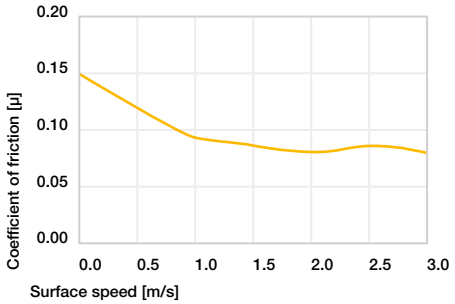


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

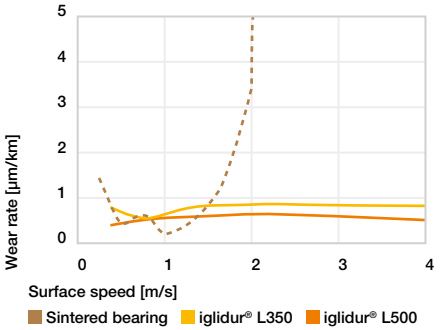


Diagram 05: Rotating wear against Cf53, p = 0.25MPa, T = +23°C

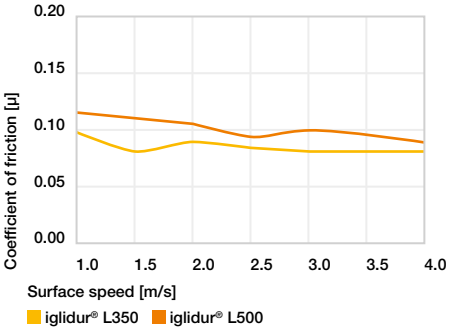


Diagram 07: Rotating coefficient of friction – „High speed" against Cf53, p = 1MPa (except for iglidur® L250), T = +23°C

Shaft materials

Diagram 05 compares the wear of a sintered bearing with that of bearings made of the materials iglidur® L500 and L350. At a surface speed of 1.5m/s or more, the wear of the sintered bearing increases exponentially whereas the wear of the iglidur® plain bearings almost remains the same up to a speed of more than 3m/s.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.07 – 0.18	0.06	0.04	0.03

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

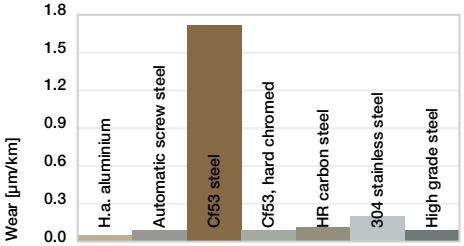


Diagram 06: Wear, rotating with different shaft materials, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® L350 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 F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

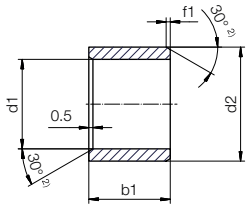
Testing methods, page 57

	Housing		Plain bearing		Shaft	
Ø d1 [mm]	H7 [mm]		F10 [mm]		h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Bearing technology | Plain bearings | iglidur® L350

Sleeve bearing (form S)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 1–6	Ø 6–12
f [mm]	0.3	0.5

Dimensions according to ISO 3547-1 and special dimensions

Order example: L350SM-0304-03 - no minimum order quantity.
L350 iglidur® material S Sleeve bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 03 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
3.0	+0.006 +0.046	4.5	5.0	**L350SM-0304-03**
4.0	+0.010 +0.058	5.5	6.0	**L350SM-0405-04**
5.0		7.0	7.0	**L350SM-0507-05**
6.0		8.0	8.0	**L350SM-0608-06**
8.0	+0.013 +0.071	10.0	9.0	**L350SM-0810-10**
10.0		12.0	9.0	**L350SM-1012-10**

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/L350

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

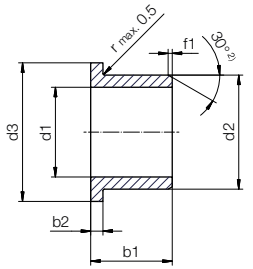
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur® L350 +180°C 59MPa

Bearing technology | Plain bearings | iglidur® L350

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 1–6	Ø 6–12
f [mm]	0.3	0.5

Dimensions according to ISO 3547-1 and special dimensions

Order example: L350FM-0304-05 - no minimum order quantity.
L350 iglidur® material F Flange bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 05 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
3.0	+0.006 +0.046	4.5	7.5	3.0	0.75	**L350FM-0304-05**
4.0	+0.010 +0.058	5.5	9.5	4.0	0.75	**L350FM-0405-06**
5.0		7.0	11.0	5.0	1.00	**L350FM-0507-07**
6.0		8.0	12.0	6.0	1.00	**L350FM-0608-08**
8.0	+0.013 +0.071	10.0	15.0	10.0	1.00	**L350FM-0810-09**
10.0		12.0	18.0	10.0	1.00	**L350FM-1012-09**

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/L350

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

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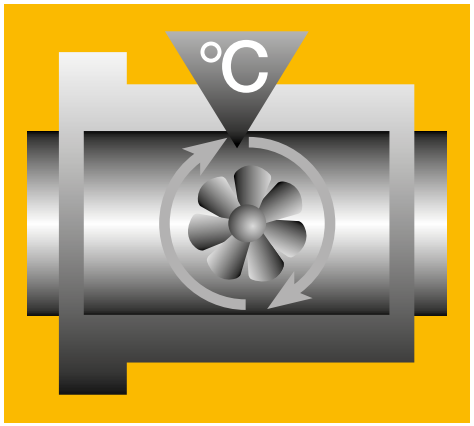


For extreme rotational speeds

Temperature-resistant and media-resistant

iglidur® L500

When to use it?

- For rotating applications at high speed
- When the highest service life is required
- For high pv values with low loads
- At continuous operating temperatures up to +250°C (short-term up to max. +350°C)

When not to use?

- When a universal plain bearing for high temperatures is required
  iglidur® X
- When medium to high pressures occur
  iglidur® G, iglidur® Q
- For oscillating applications
  iglidur® W300, iglidur® J350

Bearing technology | Plain bearings | iglidur® L500

Ø 3.0 – 10.0mm

Also available as:

Bar stock, round bar: Page 629

Bar stock, plate: Page 651

tribo-tape liner: Page 657

Piston rings: Page 559

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

For extreme rotational speeds: Temperature-resistant and media-resistant

Specially developed for fast continuous operation under low loads, iglidur® L500, inter alia, is intended for fan and electric motor applications.

- Temperature-resistant up to +250°C
- For rotational movements with surface speeds up to 5m/s
- Very wear-resistant
- Low moisture absorption
- Low thermal expansion
- Lubrication-free
- Maintenance-free

Typical application areas

- Cooling fans
- Electric motors
- Fans, etc.

Descriptive technical specifications			
Wear resistance at +23°C	–		+
Wear resistance at +90°C	–		+
Wear resistance at +150°C	–		+
Low coefficient of friction	–		+
Low moisture absorption	–		+
Wear resistance under water	–		+
High media resistance	–		+
Resistant to edge pressures	–		+
Suitable for shock and impact loads	–		+
Resistant to dirt	–		+

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

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

iglidur® L500 +250°C 70MPa

Technical data

General properties			Testing method
Density	g/cm³	1.53	
Colour		black	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.1	DIN 53495
Max. moisture absorption	% weight	0.3	
Coefficient of friction, dynamic, against steel	µ	0.08 – 0.15	
pv value, max. (dry)	MPa · m/s	4.00	
Mechanical properties			
Flexural modulus	MPa	12,015	DIN 53457
Flexural strength at +20°C	MPa	201	DIN 53452
Compressive strength	MPa	70	
Max. recommended surface pressure (+20°C)	MPa	70	
Shore D hardness		81	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+250	
Max. application temperature short-term	°C	+315	
Min. application temperature	°C	–100	
Thermal conductivity	W/m · K	0.45	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	6	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{10}$	DIN IEC 93
Surface resistance	Ω	$> 10^{12}$	DIN 53482

Table 01: Material properties table

–100°C up to +250°C

70MPa

V-0

RoHS-II

ISO 3547-1

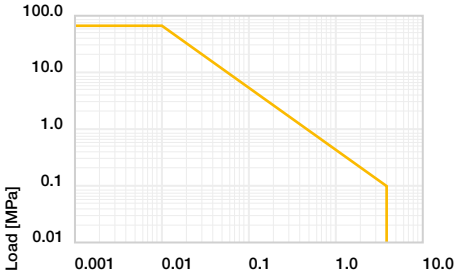


Diagram 01: Permissible pv values for iglidur® L500 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

The very low moisture absorption of 0.1% weight in standard climatic conditions and 0.3% weight at maximum water absorption also enables continuous operation in high humidity or in liquid media.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is generally possible.

Radiation resistance

Plain bearings made from iglidur® L500 are resistant up to a radiation intensity of $3 \cdot 10^2$Gy. Higher radiation weakens the material and may result in a significant decrease in mechanical properties.

UV resistance

The material properties of iglidur® L500 plain bearings do not change under UV rays or other weathering effects.

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

+ resistant 0 conditionally resistant – not resistant

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® L500

iglidur® L500 is a plain bearing material for high speeds and fast sliding movements with low loads. Due to the low thermal expansion and low moisture absorption, bearings can be manufactured with minimal potential to expand. Applications which feature these advantages are fans, small motors, fast-running sensors or the magnet technology.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® L500 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

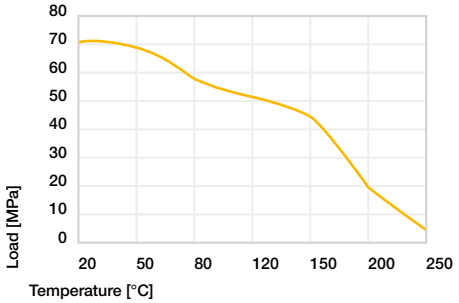


Diagram 02: Maximum recommended surface pressure as a function of temperature (70MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® L500 at radial loads. At the maximum recommended surface pressure of 70MPa at room temperature the deformation is less than 2.5%. A plastic deformation can be negligible up to this value. It is however also dependent on the duty cycle of the load.

Surface pressure, page 41

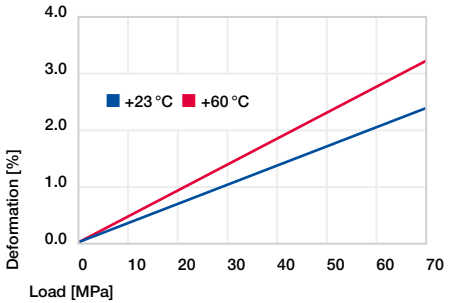


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® L500 has been developed especially for high surface speeds with low loads. Due to the high temperature resistance of iglidur® L500, the limit of the bearing has been increased significantly. In addition, the extremely low wear allows the high acceleration speeds to be reached and maintained. The maximum speeds are shown in table 03.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	4.0	1.5	5.0
short-term	**m/s**	5.0	3.0	8.0

Table 03: Maximum surface speeds

Temperature

The iglidur® L500 plain bearings can be used in short-term temperatures up to +315°C. For temperatures over +135°C an additional securing is required. Higher temperatures can also cause the plain bearing to lose its press-fit and move in the hole.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The excellent coefficient of friction level of iglidur® L500 in dry operation decreases considerably with speed. Diagram 04 shows this with respect to a steel shaft. As the load increases, the coefficient of friction decreases, especially in the range up to 20MPa (diagram 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

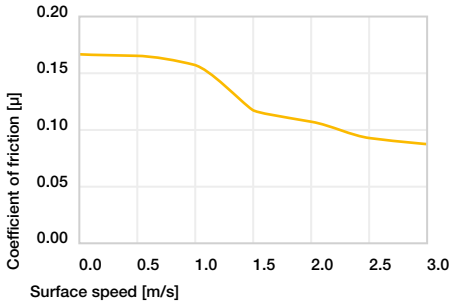


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

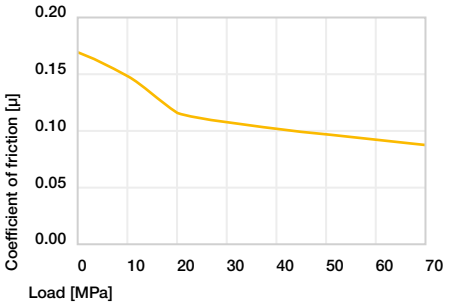


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

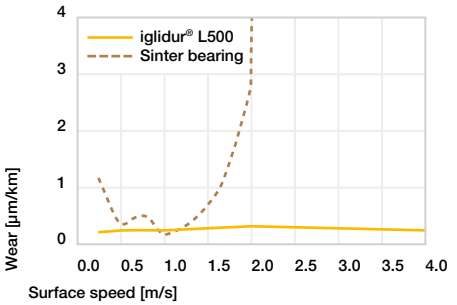


Diagram 07: Rotating wear against Cf53, p = 0.25MPa, T = +23°C

Shaft materials

Diagram 07 shows the result of a comparison test between iglidur® L500 and a sintered bearing. The wear of the sintered bearing increases exponentially above 1.5m/s, while the iglidur® L500 plain bearing retains a near constant wear rate up to and above 4m/s.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.08 – 0.15	0.09	0.04	0.04

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

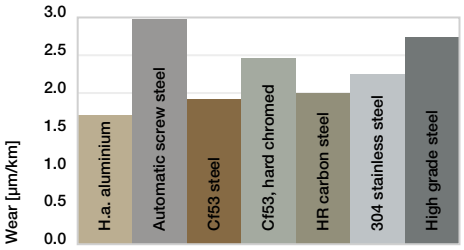


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® L500 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 F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

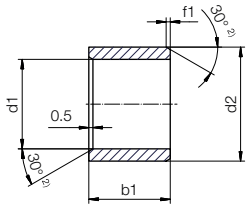
Testing methods, page 57

	Housing		Plain bearing		Shaft	
Ø d1 [mm]	H7 [mm]		F10 [mm]		h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Bearing technology | Plain bearings | iglidur® L500

Sleeve bearing (form S)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 1–6	Ø 6–12
f [mm]	0.3	0.5

Dimensions according to ISO 3547-1 and special dimensions

Order example: L500SM-0304-03 - no minimum order quantity.
L500 iglidur® material S Sleeve bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 03 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
3.0	+0.006 +0.046	4.5	3.0	**L500SM-0304-03**
4.0	+0.010 +0.058	5.5	4.0	**L500SM-0405-04**
5.0		7.0	5.0	**L500SM-0507-05**
6.0		8.0	6.0	**L500SM-0608-06**
8.0	+0.013 +0.071	10.0	10.0	**L500SM-0810-10**
10.0		12.0	10.0	**L500SM-1012-10**

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/L500

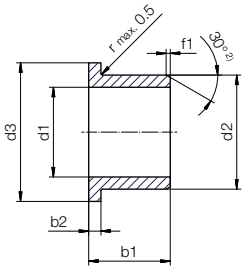
Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® L500

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 1–6	Ø 6–12
f [mm]	0.3	0.5

Dimensions according to ISO 3547-1 and special dimensions

Order example: L500FM-0304-05 - no minimum order quantity.
L500 iglidur® material F Flange bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 05 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
3.0	+0.006 +0.046	4.5	7.5	5.0	0.75	**L500FM-0304-05**
4.0	+0.010 +0.058	5.5	9.5	6.0	0.75	**L500FM-0405-06**
5.0		7.0	11.0	7.0	1.00	**L500FM-0507-07**
6.0		8.0	12.0	8.0	1.00	**L500FM-0608-08**
8.0	+0.013 +0.071	10.0	15.0	9.5	1.00	**L500FM-0810-09**
10.0		12.0	18.0	9.5	1.00	**L500FM-1012-09**

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
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Ordering note
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No minimum order value.
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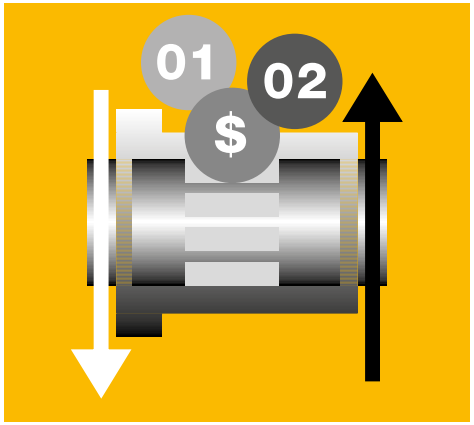


Low-cost
Good abrasion resistance
iglidur® R

When to use it?

- When high wear resistance at low loads is required
- When a cost-effective plain bearing is required
- When very low coefficient of friction in dry operation is required
- When high edge loads occur
- When you are looking for low water absorption
- When PTFE and silicone are not allowed in your application

When not to use?

- When high pressure occurs
  iglidur® G
- When continuous operating temperatures are higher than +90°C
  iglidur® G, iglidur® P
- When the best wear resistance is required
  iglidur® J

Bearing technology | Plain bearings | iglidur® R

Ø
2.0 – 35.0mm

Also available as:

Bar stock, round bar:
Page 640

Bar stock, plate:
Page 651

tribo-tape liner:
Page 657

Piston rings:
Page 559

Two hole flange bearing:
Page 581

Moulded special parts:
Page 602

igubal® spherical balls:
Page 788

Low-cost:
Good abrasion resistance

Low-cost material with low coefficient of friction and good wear resistance at low to medium loads.

- High wear resistance
- Low coefficient of friction
- Cost-effective
- Low moisture absorption
- Lubrication-free
- Maintenance-free

Typical application areas

- Sports and leisure
- Model making
- Furniture industry
- Mechatronics

Descriptive technical specifications			
Wear resistance at +23°C	–		+
Wear resistance at +90°C	–		+
Wear resistance at +150°C	–		+
Low coefficient of friction	–		+
Low moisture absorption	–		+
Wear resistance under water	–		+
High media resistance	–		+
Resistant to edge pressures	–		+
Suitable for shock and impact loads	–		+
Resistant to dirt	–		+

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

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

iglidur® R
+90°C
23MPa

Technical data

General properties			Testing method
Density	g/cm³	1.39	
Colour		dark red	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.2	DIN 53495
Max. moisture absorption	% weight	1.1	
Coefficient of friction, dynamic, against steel	µ	0.09 – 0.25	
pv value, max. (dry)	MPa · m/s	0.27	
Mechanical properties			
Flexural modulus	MPa	1,950	DIN 53457
Flexural strength at +20°C	MPa	70	DIN 53452
Compressive strength	MPa	68	
Max. recommended surface pressure (+20°C)	MPa	23	
Shore D hardness		77	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+90	
Max. application temperature short-term	°C	+110	
Min. application temperature	°C	–50	
Thermal conductivity	W/m · K	0.25	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	11	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{12}$	DIN IEC 93
Surface resistance	Ω	$> 10^{12}$	DIN 53482

Table 01: Material properties table

–50°C up to +90°C

23MPa

HB

FDA

RoHS-II

ISO 3547-1

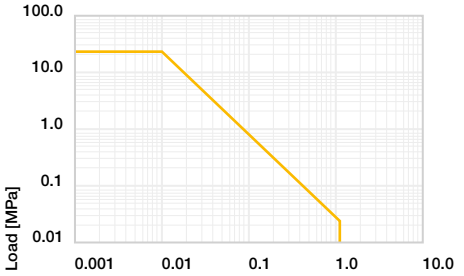


Diagram 01: Permissible pv values for iglidur® R plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® R plain bearings is approximately 0.2% weight. The saturation limit in water is 1.1% weight. This must be taken into account for these types of applications.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is only possible to a limited extent.

Radiation resistance

Plain bearings made from iglidur® R are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® R plain bearings are resistant to UV radiation, but the tribological properties are reduced by permanent exposure.

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

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® R

The development of the iglidur® R as a bearing material focused on high performance and very low cost. Especially in the dry operation low coefficient of friction and wear were to be achieved. Plain bearings made from iglidur® R are supported by a combination of solid lubricants. The PTFE and silicon-free material achieves extremely low coefficient of friction in dry operation and runs largely free of stick-slip effects.

Mechanical properties

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

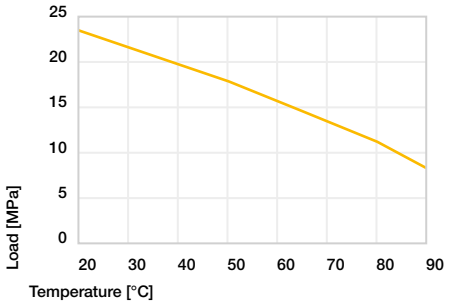


Diagram 02: Maximum recommended surface pressure as a function of temperature (23MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® R at radial loads. At the maximum recommended surface pressure of 23MPa the deformation is about 4% at room temperature. A plastic deformation can be negligible up to this value. However, it is also dependent on the service time.

Surface pressure, page 41

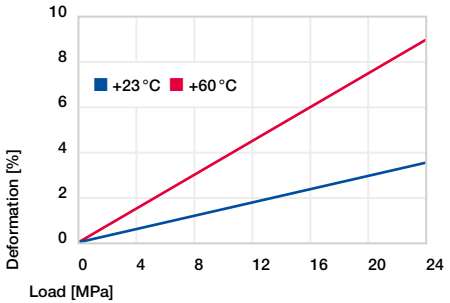


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® R plain bearings are suitable for high surface speeds. Speeds of up to 5.0m/s are permitted in linear motions. The maximum values shown in table 03 can only be achieved at low pressures. The specified values show the speed at which due to friction an increase in temperature up to the long-term permitted value can occur.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.8	0.6	3.5
short-term	**m/s**	1.2	1.0	5.0

Table 03: Maximum surface speeds

Temperature

With increasing temperatures, the compressive strength of iglidur® R plain bearings decreases. Diagram 02 shows this inverse relationship. The temperatures prevailing in the bearing system also have an influence on the wear. For temperatures over +50°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the surface speed and load (diagrams 04 and 05). iglidur® R is especially suitable for applications in which high pv values are induced mainly through the high surface speed rather than surface pressure. Less distinct is the dependency of the coefficient of friction of the iglidur® R plain bearings on the shaft surface.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

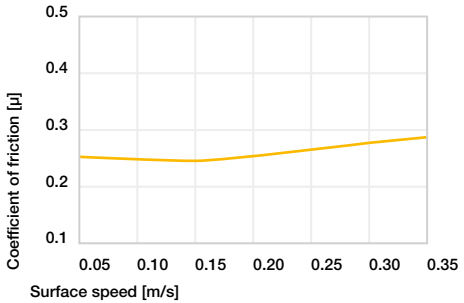


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

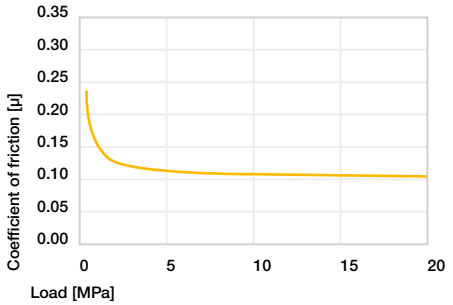


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

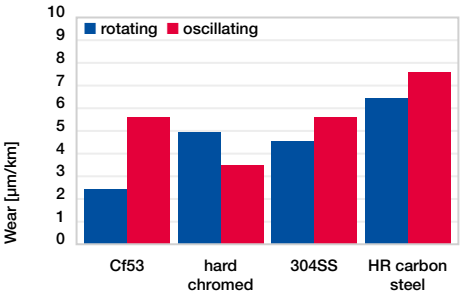


Diagram 07: Wear for rotating and oscillating applications with different shaft materials, p = 2MPa

Shaft materials

Diagrams 06 and 07 show the test results of iglidur® R plain bearings running against various shaft materials. At 0.3m/s and 1MPa, the high grade steel and Cf53 shafts are the best materials. With increasing loads the iglidur® R bearings feature the best wear behaviour with Cf53 and 304 stainless steel shafts. In pivoting applications, the hard-chromed shaft proves to be the ideal mating surface. If the shaft material you plan on using is not shown in these test results, please contact us.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.09 – 0.25	0.09	0.04	0.04

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

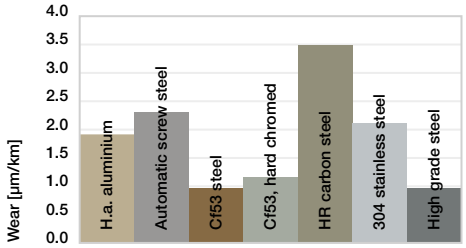


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® R 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 E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

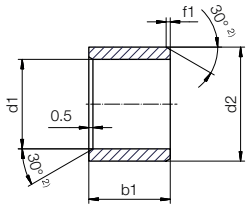
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® R

Sleeve bearing (form S)



[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

Dimensions according to ISO 3547-1 and special dimensions

Order example: RSM-0203-07 - no minimum order quantity.
R iglidur® material S Sleeve bearing M Metric 02 Inner Ø d1 03 Outer Ø d2 07 Total length b1

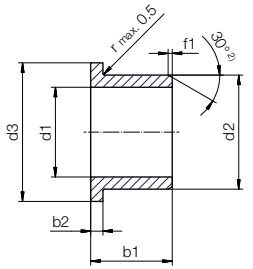
d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
2.0	+0.014 +0.054	3.6	7.0	**RSM-0203-07**
4.0	+0.020 +0.068	5.5	4.0	**RSM-0405-04**
5.0		7.0	5.0	**RSM-0507-05**
6.0		8.0	6.0	**RSM-0608-06**
8.0	+0.025 +0.083	10.0	10.0	**RSM-0810-10**
10.0		12.0	5.0	**RSM-1012-05**
10.0		12.0	10.0	**RSM-1012-10**
10.0		12.0	15.0	**RSM-1012-15**
12.0	+0.032 +0.102	14.0	12.0	**RSM-1214-12**
14.0		16.0	15.0	**RSM-1416-15**
15.0		17.0	15.0	**RSM-1517-15**
16.0		18.0	15.0	**RSM-1618-15**
18.0		20.0	25.0	**RSM-1820-25**
20.0	+0.040 +0.124	23.0	15.0	**RSM-2023-15**
20.0		23.0	20.0	**RSM-2023-20**
25.0		28.0	25.0	**RSM-2528-25**
28.0		32.0	12.0	**RSM-2832-12**
30.0		34.0	25.0	**RSM-3034-25**
30.0		34.0	30.0	**RSM-3034-30**
35.0	+0.050 +0.150	39.0	30.0	**RSM-3539-30**

[3] After press-fit. *Testing methods page 57*

iglidur® R
+90°C
23MPa

Bearing technology | Plain bearings | iglidur® R

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

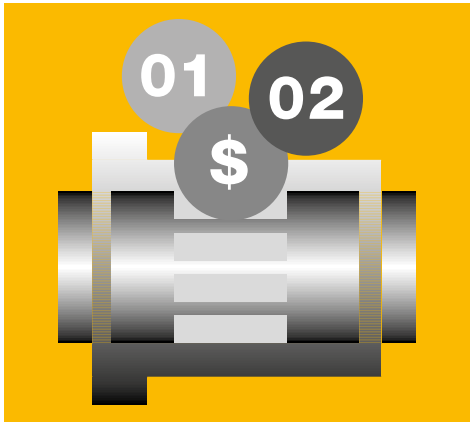
d1 [mm]	Ø 1–6	Ø 6–12	Ø 12–30
f [mm]	0.3	0.5	0.8

Dimensions according to ISO 3547-1 and special dimensions

Order example: RFM-0405-03 - no minimum order quantity.
R iglidur® material F Flange bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 03 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
4.0	+0.020 +0.068	5.5	9.0	3.0	0.50	**RFM-0405-03**
4.0		5.5	9.5	4.0	0.75	**RFM-0405-04**
5.0		7.0	11.0	5.0	1.00	**RFM-0507-05**
6.0		8.0	12.0	6.0	1.00	**RFM-0608-06**
8.0	+0.025 +0.083	10.0	15.0	5.0	1.00	**RFM-0810-05**
8.0		10.0	15.0	10.0	1.00	**RFM-0810-10**
10.0		12.0	18.0	10.0	1.00	**RFM-1012-10**
10.0		12.0	18.0	18.0	1.00	**RFM-1012-18**
12.0	+0.032 +0.102	14.0	20.0	10.0	1.00	**RFM-1214-10**
12.0		14.0	20.0	12.0	1.00	**RFM-1214-12**
14.0		16.0	22.0	17.0	1.00	**RFM-1416-17**
15.0		17.0	23.0	17.0	1.00	**RFM-1517-17**
16.0		18.0	24.0	17.0	1.00	**RFM-1618-17**
18.0		20.0	26.0	17.0	1.00	**RFM-1820-17**
20.0	+0.040 +0.124	23.0	30.0	21.5	1.50	**RFM-2023-21**
22.0		25.0	29.0	4.5	1.50	**RFM-222529-045**
25.0		28.0	35.0	21.5	1.50	**RFM-2528-21**

[3] After press-fit. *Testing methods page 57*



Low-cost with silicone

Good abrasion resistance

iglidur® D

When to use it?

- When low coefficient of friction is required
- For high speeds
- For low load
- When a cost-effective plain bearing is required

When not to use?

- When high pressure occurs
  iglidur® G
- When the part should be free of silicone
  iglidur® J, iglidur® R
- When continuous operating temperatures are higher than +90°C
  iglidur® G, iglidur® P

Bearing technology | Plain bearings | iglidur® D

Ø
–

Low-cost with silicone:
Good abrasion resistance

Low-cost-material with low coefficient of friction and good wear resistance at low loads.

- Low coefficient of friction
- For low loads
- Cost-effective
- Vibration-dampening
- Very low moisture absorption
- Lubrication-free
- Suitable for high surface speeds

Typical application areas

- Sports and leisure
- Model making
- Furniture industry
- Mechatronics

Descriptive technical specifications			
Wear resistance at +23°C	–	■■■□□	+
Wear resistance at +90°C	–	■□□□□	+
Wear resistance at +150°C	–	■□□□□	+
Low coefficient of friction	–	■■■□□	+
Low moisture absorption	–	■■■□□	+
Wear resistance under water	–	■□□□□	+
High media resistance	–	■■■■□	+
Resistant to edge pressures	–	■■■■□	+
Suitable for shock and impact loads	–	■■■■□	+
Resistant to dirt	–	■■■■□	+

Also available as:

Bar stock, round bar: **Page 629**

Bar stock, plate: **Page 651**

tribo-tape liner: **Page 657**

Piston rings: **Page 559**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 783**

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

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

iglidur® D
+90°C
23MPa

Technical data

General properties			Testing method
Density	g/cm³	1.40	
Colour		green	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.3	DIN 53495
Max. moisture absorption	% weight	1.1	
Coefficient of friction, dynamic, against steel	µ	0.08 – 0.26	
pv value, max. (dry)	MPa · m/s	0.27	
Mechanical properties			
Flexural modulus	MPa	2,000	DIN 53457
Flexural strength at +20°C	MPa	72	DIN 53452
Compressive strength	MPa	70	
Max. recommended surface pressure (+20°C)	MPa	23	
Shore D hardness		78	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+90	
Max. application temperature short-term	°C	+110	
Min. application temperature	°C	–50	
Thermal conductivity	W/m · K	0.25	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	11	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{14}$	DIN IEC 93
Surface resistance	Ω	$> 10^{14}$	DIN 53482

Table 01: Material properties table

–50°C up to +90°C

23MPa

HB

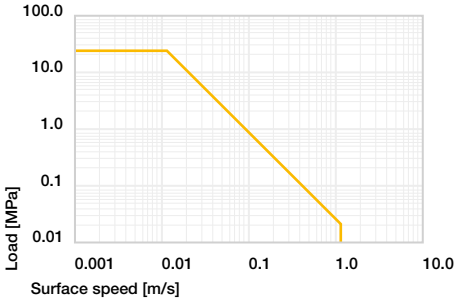


Diagram 01: Permissible pv values for iglidur® D plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® D plain bearings is approximately 0.3% weight. The saturation limit in water is 1.1% weight. This low moisture absorption allows its use in wet environments.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is only possible to a limited extent.

Radiation resistance

Plain bearings made from iglidur® D are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® D plain bearings are resistant to UV radiation, but the tribological properties are reduced by permanent exposure.

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

+ resistant **0 conditionally resistant** **– not resistant**
All information given at room temperature [+20°C]
Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® D

During the development process of iglidur® D as a bearing material, high performance and low price were the top requirements. In particular, low coefficient of friction was required at high speeds in dry operation. This material containing silicone achieves low coefficient of friction in dry operation and runs with virtually no stick-slip.

Mechanical properties

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

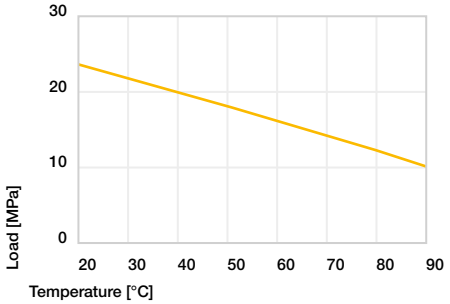


Diagram 02: Maximum recommended surface pressure as a function of temperature (23MPa at +20°C)

iglidur® D plain bearings were specially developed for low radial loads. Diagram 03 shows the elastic deformation of iglidur® D at radial loads. At the maximum recommended surface pressure of 23MPa the deformation is less than 3%. A plastic deformation can be negligible up to this value. However, it is also dependent on the service time.

Surface pressure, page 41

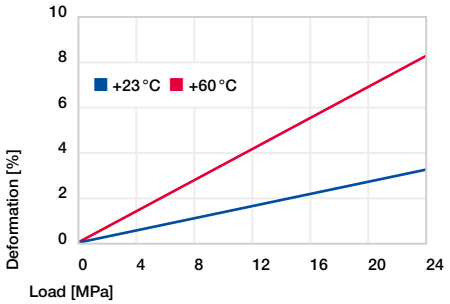


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® D plain bearings are suitable for high surface speeds. Speeds of up to 10.0m/s are permitted in linear motions. The maximum values shown in table 03 can only be achieved at low pressures. The specified values show the speed at which due to friction an increase in temperature up to the long-term permitted value can occur.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.5	1.1	8.0
short-term	**m/s**	3.0	2.1	10.0

Table 03: Maximum surface speeds

Temperature

With increasing temperatures, the compressive strength of iglidur® D plain bearings decreases. Diagram 02 shows this inverse relationship. The temperatures prevailing in the bearing system also have an influence on the wear. For temperatures over +50°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the surface speed and load (diagrams 04 and 05). In the Ra range between 0.4 – 0.6μm, the coefficient of friction attains its optimum value.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

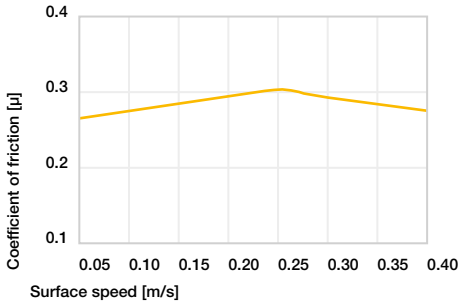


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

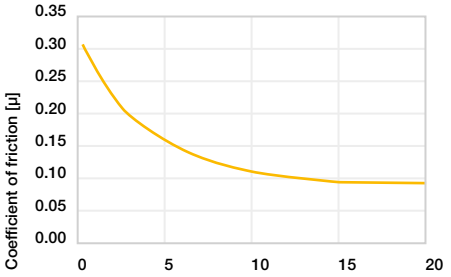


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

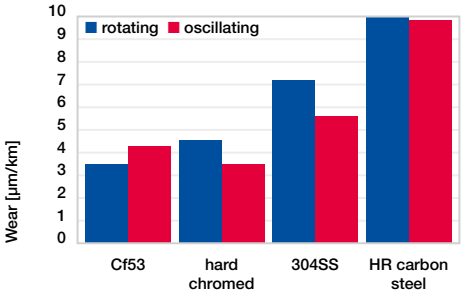


Diagram 07: Wear for rotating and oscillating applications with different shaft materials, p = 2MPa

Shaft materials

Diagrams 06 and 07 show the test results of iglidur® D plain bearings running against various shaft materials. If the shaft material you plan on using is not shown in these test results, please contact us.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.08 – 0.26	0.09	0.04	0.04

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

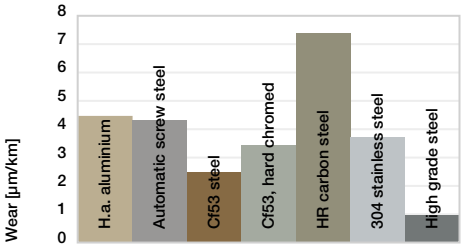


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® D 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 E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

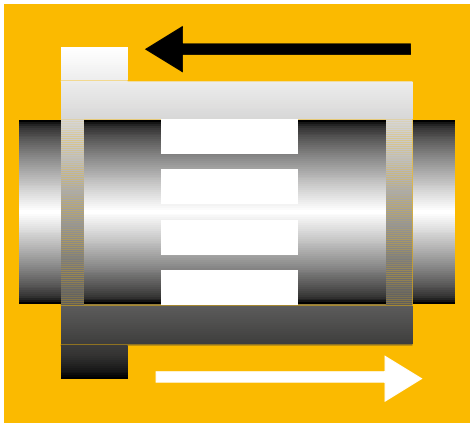
Testing methods, page 57

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

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

Product range

iglidur® D plain bearings are manufactured to special order.



Specialist for aluminium shafts

Low wear with low coefficient of friction

iglidur® J200

When to use it?

- For applications with hard-anodised shafts
- When lowest coefficient of friction is required
- When long service life at low loads is required

When not to use?

- For steel shafts
  iglidur® J, iglidur® W300
- When continuous operating temperatures are higher than +90°C
  iglidur® V400
- When a cost-effective universal plain bearing is required
  iglidur® G, iglidur® P

Bearing technology | Plain bearings | iglidur® J200

Ø
–

Also available as:

Bar stock, round bar: **Page 641**

Bar stock, plate: **Page 651**

tribo-tape liner: **Page 657**

Piston rings: **Page 559**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 783**

Specialist for aluminium shafts: Low wear with low coefficient of friction

The specialist for low coefficient of friction and minimal wear with hard-anodised aluminium shafts.

- Recommended for hard-anodised aluminium shafts
- Low coefficient of friction
- High wear resistance
- For low and medium loads
- Lubrication-free
- Maintenance-free

Typical application areas

- Automation
- Linear technology
- Actuator

Descriptive technical specifications			
Wear resistance at +23°C	–		+
Wear resistance at +90°C	–		+
Wear resistance at +150°C	–		+
Low coefficient of friction	–		+
Low moisture absorption	–		+
Wear resistance under water	–		+
High media resistance	–		+
Resistant to edge pressures	–		+
Suitable for shock and impact loads	–		+
Resistant to dirt	–		+

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

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

iglidur® J200 +90°C 23MPa

Technical data

General properties			Testing method
Density	g/cm³	1.72	
Colour		matt grey	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.2	DIN 53495
Max. moisture absorption	% weight	0.7	
Coefficient of friction, dynamic, against steel	µ	0.11 – 0.17	
pv value, max. (dry)	MPa · m/s	0.30	
Mechanical properties			
Flexural modulus	MPa	2,800	DIN 53457
Flexural strength at +20°C	MPa	58	DIN 53452
Compressive strength	MPa	43	
Max. recommended surface pressure (+20°C)	MPa	23	
Shore D hardness		70	DIN 53505
Physical and thermal properties			
Max. application temperature long-term	°C	+90	
Max. application temperature short-term	°C	+120	
Min. application temperature	°C	–50	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	8	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^8$	DIN IEC 93
Surface resistance	Ω	$> 10^8$	DIN 53482

Table 01: Material properties table

–50°C up to +90°C

23MPa

HB

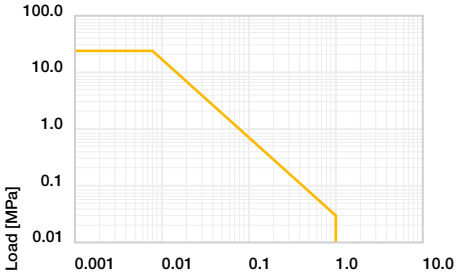


Diagram 01: Permissible pv values for iglidur® J200 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® J200 plain bearings is approximately 0.2 % weight. The saturation limit in water is 0.7 % weight. These values are so low that a moisture expansion need to be considered only in extreme cases.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is only possible to a limited extent.

Radiation resistance

Plain bearings made from iglidur® J200 are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® J200 plain bearings are very resistant to UV radiation.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® J200

iglidur® J200 is the result of the development of extremely low friction plain bearing materials. When using plain bearings in linear motion, friction can be critical. Many materials can give low coefficient of friction under high loads, but iglidur® J200 can give excellent friction values even at low loads.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® J200 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

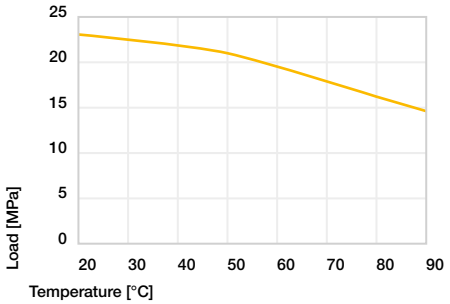


Diagram 02: Maximum recommended surface pressure as a function of temperature (23MPa at +20°C)

At the maximum permissible load of 23MPa, the deformation is approximately 3.5% (diagram 03). A plastic deformation can be negligible up to this value. However, it is also dependent on the service time.

Surface pressure, page 41

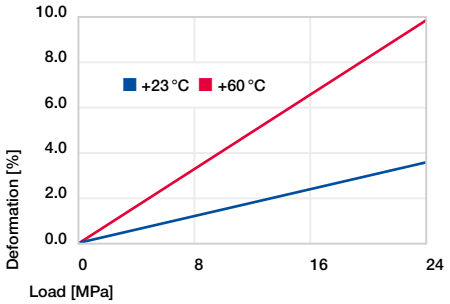


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® J200 attains high surface speeds due to its excellent coefficient of friction. Continuous rotation speeds of 1.0m/s are possible. The permitted speeds are clearly higher yet in linear movements or in short-term operation. Speeds of over 15.0m/s have been successfully tested in linear applications.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.0	0.7	10.0
short-term	**m/s**	1.5	1.1	15.0

Table 03: Maximum surface speeds

Temperature

The maximum permissible temperature of +120°C should not be exceeded. Therefore the ambient temperature generated by friction has to be added. From +60°C onward, the bearing should be mechanically retained, so as to avoid the bearing moving out of the housing. The wear resistance also decreases exponentially from +70°C upwards.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Among all the iglidur® materials, iglidur® J200 exhibits the lowest coefficient of friction. The average coefficient of friction of all measurements, even with different shaft materials, is 0.11µ. The use of hard-anodised aluminium as a shaft material is also of importance. The comparison with the rest of the iglidur® materials shows that iglidur® J200 plain bearings are suitable for rather low loads. The influence of surface speed and load on the coefficient of friction is small. The change of the coefficient of friction at high loads is in the normal range (diagrams 04 and 05). Surface finishes (Ra) of the shaft between 0.2 – 0.4µm are ideal. The influence of the shaft material on the wear resistance is significant. Even at low loads, we recommend to have a closer look into the wear database.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

Technical data

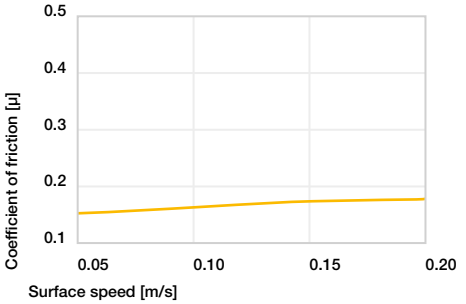


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

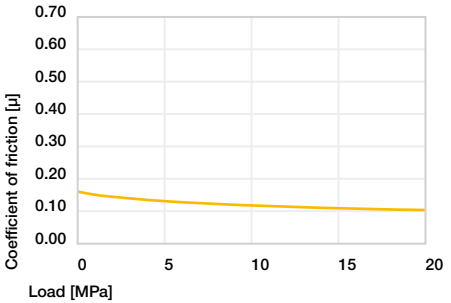


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

Shaft materials

The shaft material has a great impact on the wear resistance. In fact, all shaft materials (smooth or hardened) are suitable for use with iglidur® J200, but the best results are achieved with hard-anodised aluminium. In particular when used in linear motion, this running surface has proven its value.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.11 – 0.17	0.09	0.04	0.04

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

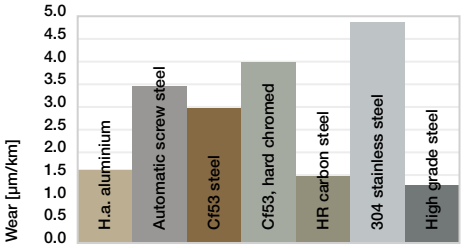


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

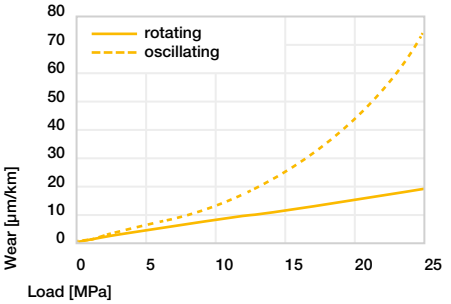


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Installation tolerances

iglidur® J200 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 E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

Testing methods, page 57

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

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

Product range

iglidur® J200 plain bearings are manufactured to special order.

Plain bearing materials for high temperatures

Plain bearing materials for high temperatures

Here you will find high-temperature specialists for continuous operating temperatures up to +250°C (exception: iglidur® V400 with +200°C).
In the meantime, the iglidur® X6 surpasses the standard iglidur® X here in many rotating and pivoting applications. iglidur® Z has also been long established as standard with extremely low wear rates under high loads and/or temperatures. iglidur® V400 is characterised as a problem solver in many special cases, and iglidur® UW500 is the specialist for hot liquids.

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

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

iglidur® X:
The chemical and temperature specialist

Temperature [°C] [123]	+250	–	+
Surface pressure [MPa] [124]	150	–	+
Coefficient of friction [µ] [125]	0.31	–	+
Wear [µm/km] [125]	6.30	–	+
Price index		–	+

iglidur® Z:
Long service life under extreme conditions

Temperature [°C] [123]	+250	–	+
Surface pressure [MPa] [124]	150	–	+
Coefficient of friction [µ] [125]	0.18	–	+
Wear [µm/km] [125]	1.00	–	+
Price index		–	+

iglidur® X6:
The high temperature specialist up to +250°C

Temperature [°C] [123]	+250	–	+
Surface pressure [MPa] [124]	150	–	+
Coefficient of friction [µ] [125]		–	+
Wear [µm/km] [125]		–	+
Price index		–	+

iglidur® V400:
For soft shafts and high temperatures

Temperature [°C] [123]	+200	–	+
Surface pressure [MPa] [124]	45	–	+
Coefficient of friction [µ] [125]	0.19	–	+
Wear [µm/km] [125]	0.30	–	+
Price index		–	+

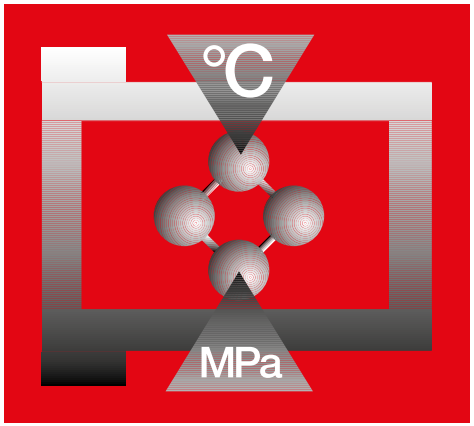
[123] Max. long-term application temperature [124] Max. recommended surface pressure at +20°C [125] Best combination for p = 1 MPa, v = 0.3m/s, rotating

iglidur® HSD350:
All–rounder for steam sterilisation

Temperature [°C] [123]	+180	–	+
Surface pressure [MPa] [124]	30	–	+
Coefficient of friction [µ] [125]	1.15	–	+
Wear [µm/km] [125]	2.00	–	+
Price index		–	+

iglidur® UW500:
For hot liquids

Temperature [°C] [123]	+250	–	+
Surface pressure [MPa] [124]	140	–	+
Coefficient of friction [µ] [125]	0.33	–	+
Wear [µm/km] [125]	2.20	–	+
Price index		–	+



The chemical and temperature specialist

Up to 150MPa

iglidur® X

When to use it?

- For pressure loads up to 150MPa
- For linear movements with stainless steel at high temperatures
- Universal resistance to chemicals
- For temperature resistance from –100°C to +250°C (short-term up to +315°C)
- For very low moisture absorption
- For high wear resistance over the entire temperature range

When not to use?

- For very low wear at high loads
  iglidur® Q, iglidur® Z
- When a cost-effective plain bearing for underwater use is required
  iglidur® H, iglidur® H370
- For edge loads
  iglidur® Z

Bearing technology | Plain bearings | iglidur® X

Ø
2.0 – 120.0
mm

Also available as:

Bar stock, round bar:
Page 642

Bar stock, plate:
Page 651

tribo-tape liner:
Page 657

Piston rings:
Page 562

Two hole flange bearing:
Page 583

Moulded special parts:
Page 602

igubal® spherical balls:
Page 789

The chemical and temperature specialist: Up to 150MPa

iglidur® X is defined by its combination of very high temperature resistance with high compressive strength, along with high resistance to chemicals. iglidur® X is designed for higher speeds than other iglidur® bearings.

- Continuous operating temperature from –100°C to +250°C
- Extremely high chemical resistance
- High compressive strength
- Very low moisture absorption
- High wear resistance

Typical application areas

- Beverage industry
- Woodworking
- Plastic processing industry
- Aerospace engineering
- Cleanroom

Descriptive technical specifications			
Wear resistance at +23°C	–	■■□□□	+
Wear resistance at +90°C	–	■■■□□	+
Wear resistance at +150°C	–	■■■■■	+
Low coefficient of friction	–	■■■□□	+
Low moisture absorption	–	■■■■■	+
Wear resistance under water	–	■■■■■	+
High media resistance	–	■■■■■	+
Resistant to edge pressures	–	■■□□□	+
Suitable for shock and impact loads	–	■■□□□	+
Resistant to dirt	–	■■□□□	+

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

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

iglidur® X
+250°C
150MPa

Technical data

General properties			Testing method
Density	g/cm³	1.44	
Colour		black	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.1	DIN 53495
Max. moisture absorption	% weight	0.5	
Coefficient of friction, dynamic, against steel	µ	0.09 – 0.27	
pv value, max. (dry)	MPa · m/s	1.32	
Mechanical properties			
Flexural modulus	MPa	8,100	DIN 53457
Flexural strength at +20°C	MPa	170	DIN 53452
Compressive strength	MPa	100	
Max. recommended surface pressure (+20°C)	MPa	150	
Shore D hardness		85	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+250	
Max. application temperature short–term	°C	+315	
Min. application temperature	°C	–100	
Thermal conductivity	W/m · K	0.60	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	5	DIN 53752
Electrical properties[5]			
Specific contact resistance	Ωcm	$< 10^5$	DIN IEC 93
Surface resistance	Ω	$< 10^3$	DIN 53482

[5] The good conductivity of this material can favour the generation of corrosion on the metallic contact components.

Table 01: Material properties table

–100°C up to +250°C

150MPa

V-0

FDA

RoHS-II

ISO 3547-1

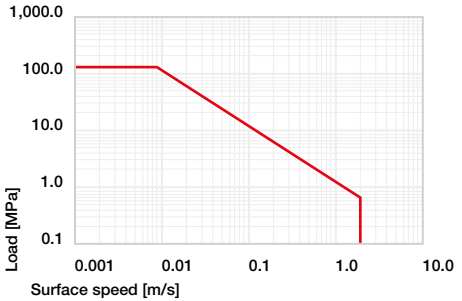


Diagram 01: Permissible pv values for iglidur® X plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

The moisture absorption of iglidur® X plain bearings is very low. It is approximately 0.1% weight under standard climatic conditions. The maximum moisture absorption is 0.5% weight.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is generally possible.

Radiation resistance

Plain bearings made from iglidur® X are resistant up to a radiation intensity of $1 \cdot 10^5$Gy.

UV resistance

The excellent material properties of iglidur® X do not change under UV radiation and other weathering effects.

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

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® X

iglidur® X has an excellent combination of high temperature resistance, high compressive strength, and excellent resistance to chemicals. The aspect of temperature resistance and pressure susceptibility is also reflected in the pv graph.

Mechanical properties

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

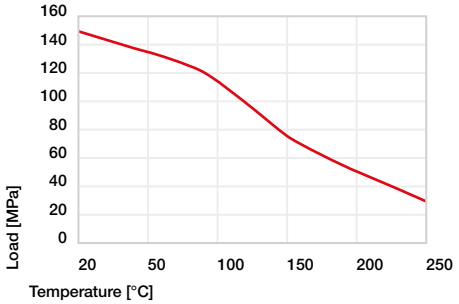


Diagram 02: Maximum recommended surface pressure as a function of temperature (150MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® X at radial loads.

Surface pressure, page 41

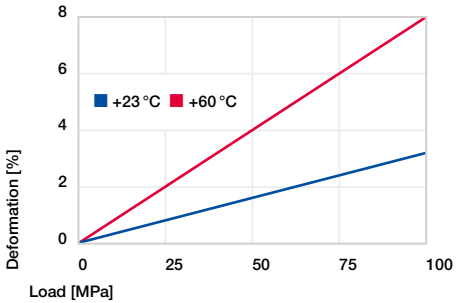


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® X is designed for higher speeds than other iglidur® bearings. This is enabled by its high temperature resistance and excellent thermal conductivity. This is also made clear by the max. pv value of 1.32MPa. However, in this case, only the smallest radial loads may act on the bearings. At the given speeds, friction can cause a temperature increase to maximum permissible levels.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.5	1.1	5.0
short-term	**m/s**	3.5	2.5	10.0

Table 03: Maximum surface speeds

Temperature

In the case of a permissible long-term application temperature of +250°C, iglidur® X will even withstand +315°C for short periods. As in the case of all thermoplastics, the compression strength of iglidur® X decreases when temperatures rise. For temperatures over +135°C an additional securing is required. At temperatures over +170°C the axial security of the bearing in the housing needs to be tested. Please contact us if you have questions on bearing use.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the surface speed and load (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

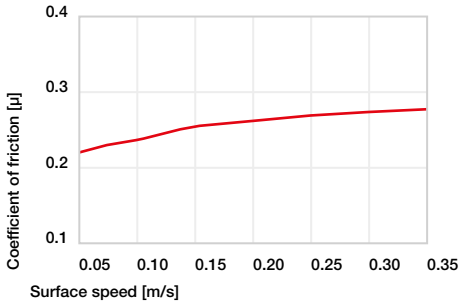


Diagram 04: Coefficient of friction as a function of the surface speed, v = 0.01m/s

Technical data

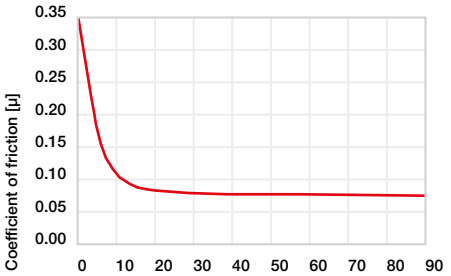


Diagram 05: Coefficient of friction as a function of the load

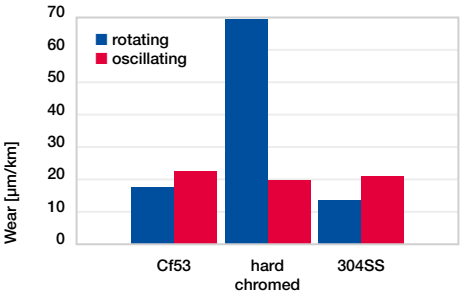


Diagram 07: Wear for rotating and oscillating applications with different shaft materials, p = 2MPa

Shaft materials

The friction and wear are also dependent, to a large degree, on the shaft material. Shafts that are too smooth, increase both the coefficient of friction and the wear of the bearing. For iglidur® X a ground surface with an average surface finish Ra = 0.6 – 0.8 µm is recommended. Diagrams 06 and 07 show the test results of iglidur® X plain bearings running against various shaft materials. If the shaft material you plan on using is not shown in these test results, please contact us.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.09 – 0.27	0.09	0.04	0.04

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

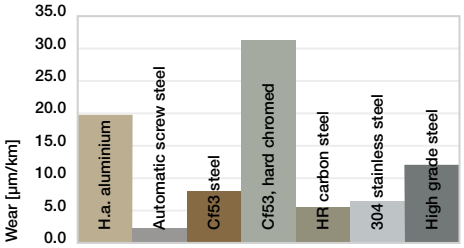


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® X 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 F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

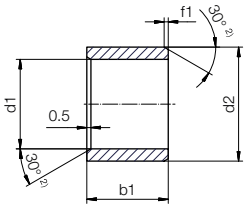
Testing methods, page 57

Ø d1 [mm]	Housing H7 [mm]		Plain bearing F10 [mm]		Shaft h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Bearing technology | Plain bearings | iglidur® X

Sleeve bearing (form S)



[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

Dimensions according to ISO 3547-1 and special dimensions

Order example: XSM-0203-03 - no minimum order quantity.
X iglidur® material S Sleeve bearing M Metric 02 Inner Ø d1 03 Outer Ø d2 03 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
2.0	+0.006 +0.046	3.5	3.0	XSM-0203-03
3.0		4.5	3.0	XSM-0304-03
3.0		4.5	6.0	XSM-0304-06
4.0		5.5	4.0	XSM-0405-04
4.0		5.5	6.0	XSM-0405-06
4.0		5.5	9.0	XSM-0405-09
4.0		5.5	10.0	XSM-0405-10
5.0		7.0	3.5	XSM-0507-035
5.0	+0.010 +0.058	7.0	5.0	XSM-0507-05
5.0		7.0	8.0	XSM-0507-08
5.0		7.0	10.0	XSM-0507-10
6.0		8.0	6.0	XSM-0608-06
6.0		8.0	8.0	XSM-0608-08
6.0		8.0	10.0	XSM-0608-10
6.0		8.0	13.8	XSM-0608-13
7.0		9.0	10.0	XSM-0709-10
7.0		9.0	12.0	XSM-0709-12
8.0		10.0	6.0	XSM-0810-06
8.0		10.0	8.0	XSM-0810-08
8.0		10.0	10.0	XSM-0810-10
8.0		10.0	12.0	XSM-0810-12
8.0	+0.013	10.0	15.0	XSM-0810-15
10.0	+0.071	12.0	3.5	XSM-1012-035
10.0		12.0	6.0	XSM-1012-06
10.0		12.0	8.0	XSM-1012-08
10.0		12.0	10.0	XSM-1012-10
10.0		12.0	12.0	XSM-1012-12
10.0		12.0	15.0	XSM-1012-15
10.0		12.0	20.0	XSM-1012-20
12.0		14.0	3.5	XSM-1214-035
12.0		14.0	6.0	XSM-1214-06
12.0		14.0	8.0	XSM-1214-08
12.0		14.0	10.0	XSM-1214-10
12.0		14.0	12.0	XSM-1214-12
12.0		14.0	15.0	XSM-1214-15
12.0		14.0	20.0	XSM-1214-20
12.0		14.0	25.0	XSM-1214-25
13.0		15.0	10.0	XSM-1315-10
13.0		15.0	20.0	XSM-1315-20
14.0		16.0	12.0	XSM-1416-12
14.0		16.0	15.0	XSM-1416-15
14.0		16.0	20.0	XSM-1416-20
14.0		16.0	25.0	XSM-1416-25
15.0	+0.016 +0.086	17.0	7.0	XSM-1517-07
15.0		17.0	10.0	XSM-1517-10
15.0		17.0	15.0	XSM-1517-15
15.0		17.0	20.0	XSM-1517-20
15.0		17.0	25.0	XSM-1517-25
16.0		18.0	10.0	XSM-1618-10
16.0		18.0	12.0	XSM-1618-12
16.0		18.0	15.0	XSM-1618-15
16.0		18.0	20.0	XSM-1618-20
16.0		18.0	25.0	XSM-1618-25
16.0		18.0	35.0	XSM-1618-35
17.0		19.0	20.0	XSM-1719-20
18.0		20.0	15.0	XSM-1820-15
18.0		20.0	20.0	XSM-1820-20
18.0		20.0	25.0	XSM-1820-25

[3] After press-fit. *Testing methods page 57*

iglidur® X
+250°C
150MPa

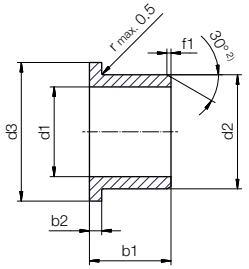
Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
20.0	+0.016 +0.086	22.0	14.0	XSM-2022-140
20.0		22.0	14.5	XSM-2022-145
20.0		22.0	17.0	XSM-2022-17
20.0		22.0	18.0	XSM-2022-18
20.0		22.0	20.0	XSM-2022-20
20.0		23.0	7.0	XSM-2023-07
20.0		23.0	10.0	XSM-2023-10
20.0		23.0	15.0	XSM-2023-15
20.0		23.0	20.0	XSM-2023-20
20.0		23.0	25.0	XSM-2023-25
20.0		23.0	30.0	XSM-2023-30
22.0		25.0	15.0	XSM-2225-15
22.0		25.0	20.0	XSM-2225-20
22.0		25.0	25.0	XSM-2225-25
22.0		25.0	30.0	XSM-2225-30
24.0		26.0	20.0	XSM-2426-20
24.0		27.0	6.0	XSM-2427-06
24.0		27.0	15.0	XSM-2427-15
24.0	+0.020 +0.104	27.0	20.0	XSM-2427-20
24.0		27.0	25.0	XSM-2427-25
24.0		27.0	30.0	XSM-2427-30
25.0		28.0	7.7	XSM-2528-077
25.0		28.0	9.0	XSM-2528-09
25.0		28.0	12.0	XSM-2528-12
25.0		28.0	13.0	XSM-2528-13
25.0		28.0	15.0	XSM-2528-15
25.0		28.0	20.0	XSM-2528-20
25.0		28.0	25.0	XSM-2528-25
25.0		28.0	30.0	XSM-2528-30
25.0		28.0	35.0	XSM-2528-35
26.0		28.0	10.0	XSM-2628-10
27.0		30.0	5.7	XSM-2730-05
28.0		32.0	20.0	XSM-2832-20
28.0		32.0	25.0	XSM-2832-25
28.0		32.0	30.0	XSM-2832-30
28.0		32.0	69.0	XSM-2832-69
30.0		34.0	15.0	XSM-3034-15
30.0		34.0	20.0	XSM-3034-20
30.0	+0.020	34.0	25.0	XSM-3034-25
30.0	+0.104	34.0	30.0	XSM-3034-30
30.0		34.0	40.0	XSM-3034-40
32.0		36.0	20.0	XSM-3236-20
32.0		36.0	25.0	XSM-3236-25
32.0		36.0	30.0	XSM-3236-30
32.0		36.0	35.0	XSM-3236-35
32.0		36.0	40.0	XSM-3236-40
32.0		36.0	54.0	XSM-3236-54
35.0		39.0	20.0	XSM-3539-20
35.0		39.0	30.0	XSM-3539-30
35.0		39.0	40.0	XSM-3539-40
35.0		39.0	50.0	XSM-3539-50
40.0	+0.025 +0.125	44.0	20.0	XSM-4044-20
40.0		44.0	30.0	XSM-4044-30
40.0		44.0	40.0	XSM-4044-40
40.0		44.0	50.0	XSM-4044-50
45.0		50.0	20.0	XSM-4550-20
45.0		50.0	30.0	XSM-4550-30
45.0		50.0	40.0	XSM-4550-40
45.0		50.0	50.0	XSM-4550-50
50.0		55.0	20.0	XSM-5055-20
50.0		55.0	30.0	XSM-5055-30
50.0		55.0	40.0	XSM-5055-40
50.0		55.0	50.0	XSM-5055-50
50.0		55.0	60.0	XSM-5055-60
55.0		60.0	50.0	XSM-5560-50
60.0		65.0	45.0	XSM-6065-45
60.0		65.0	60.0	XSM-6065-60
65.0	+0.030 +0.150	70.0	50.0	XSM-6570-50
70.0		75.0	70.0	XSM-7075-70
75.0		80.0	60.0	XSM-7580-60
80.0		85.0	100.0	XSM-8085-100
90.0		95.0	100.0	XSM-9095-100
100.0	+0.036 +0.176	105.0	100.0	XSM-100105-100
110.0		115.0	100.0	XSM-110115-100
120.0		125.0	100.0	XSM-120125-100

[3] After press-fit. *Testing methods page 57*

Bearing technology | Plain bearings | iglidur® X

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: XFM-020406-03 - no minimum order quantity.
X iglidur® material F Flange bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 05 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
2.0	+0.006	4.0	6.0	3.0	1.00	XFM-020406-03
3.0	+0.046	4.5	7.5	5.0	0.75	XFM-0304-05
4.0		5.5	9.5	4.0	0.75	XFM-0405-04
4.0		5.5	8.0	6.0	0.75	XFM-040508-06
4.0		5.5	9.5	6.0	0.75	XFM-0405-06
5.0	+0.010 +0.058	7.0	11.0	5.0	1.00	XFM-0507-05
6.0		8.0	12.0	4.0	1.00	XFM-0608-04
6.0		8.0	12.0	8.0	1.00	XFM-0608-08
6.0		8.0	12.0	10.0	1.00	XFM-0608-10
8.0		10.0	12.0	4.0	1.00	XFM-081012-04
8.0		10.0	15.0	5.5	1.00	XFM-0810-05
8.0		10.0	15.0	7.5	1.00	XFM-0810-07
8.0		10.0	15.0	8.0	1.00	XFM-0810-08
8.0		10.0	15.0	9.5	1.00	XFM-0810-09
8.0		10.0	14.0	31.5	1.00	XFM-081014-31
9.0		11.0	15.0	18.0	0.50	XFM-0911-18
10.0		12.0	18.0	5.0	1.00	XFM-1012-05
10.0	+0.013	12.0	18.0	6.0	1.00	XFM-1012-06
10.0	+0.071	12.0	18.0	7.0	1.00	XFM-1012-07
10.0		12.0	15.0	8.0	1.00	XFM-1012-08
10.0		12.0	18.0	9.0	1.00	XFM-1012-09
10.0		12.0	18.0	12.0	1.00	XFM-1012-12
10.0		12.0	18.0	15.0	1.00	XFM-1012-15
10.0		12.0	18.0	17.0	1.00	XFM-1012-17
10.0		12.0	18.0	18.0	1.00	XFM-1012-18
10.0		12.0	15.0	22.0	1.00	XFM-1012-22
10.0		12.0	18.0	25.0	1.00	XFM-1012-25
12.0	+0.016	14.0	18.0	3.9	1.00	XFM-121418-039
12.0	+0.086	14.0	20.0	5.5	1.00	XFM-1214-055

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
12.0		14.0	18.0	5.9	1.00	XFM-121418-059
12.0		14.0	20.0	9.0	1.00	XFM-1214-09
12.0		14.0	20.0	12.0	1.00	XFM-1214-12
12.0		14.0	20.0	15.0	1.00	XFM-1214-15
12.0		14.0	20.0	17.0	1.00	XFM-1214-17
14.0		16.0	22.0	10.0	1.00	XFM-1416-10
14.0		16.0	22.0	12.0	1.00	XFM-1416-12
14.0	+0.016	16.0	22.0	17.0	1.00	XFM-1416-17
15.0	+0.086	17.0	23.0	6.0	1.00	XFM-1517-06
15.0		17.0	23.0	9.0	1.00	XFM-1517-09
15.0		17.0	23.0	12.0	1.00	XFM-1517-12
15.0		17.0	23.0	17.0	1.00	XFM-1517-17
16.0		18.0	24.0	12.0	1.00	XFM-1618-12
16.0		18.0	24.0	17.0	1.00	XFM-1618-17
18.0		20.0	26.0	12.0	1.00	XFM-1820-12
18.0		20.0	26.0	17.0	1.00	XFM-1820-17
18.0		20.0	26.0	22.0	1.00	XFM-1820-22
20.0		23.0	30.0	6.5	1.50	XFM-2023-065
20.0		23.0	30.0	7.5	1.50	XFM-2023-075
20.0		23.0	30.0	11.0	1.50	XFM-2023-11
20.0		23.0	30.0	16.5	1.50	XFM-2023-16
20.0		23.0	30.0	21.5	1.50	XFM-2023-21
25.0	+0.020	28.0	33.0	8.0	1.00	XFM-252833-08
25.0	+0.104	28.0	35.0	11.5	1.50	XFM-2528-11
25.0		28.0	35.0	13.5	1.50	XFM-2528-13
25.0		28.0	35.0	16.5	1.50	XFM-2528-16
25.0		28.0	35.0	21.5	1.50	XFM-2528-21
27.0		30.0	38.0	20.0	1.50	XFM-2730-20
30.0		34.0	42.0	16.0	2.00	XFM-3034-16

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

iglidur® X
+250°C
150MPa

Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
30.0	+0.020	34.0	42.0	26.0	2.00	XFM-3034-26
30.0	+0.104	34.0	42.0	40.0	2.00	XFM-3034-40
32.0		36.0	45.0	15.0	2.00	XFM-3236-15
32.0	+0.025	36.0	45.0	26.0	2.00	XFM-3236-26
35.0	+0.125	39.0	47.0	16.0	2.00	XFM-3539-16
35.0		39.0	47.0	26.0	2.00	XFM-3539-26
40.0		44.0	52.0	22.0	2.00	XFM-4044-22

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
40.0		44.0	52.0	30.0	2.00	XFM-4044-30
40.0	+0.025	44.0	52.0	40.0	2.00	XFM-4044-40
45.0	+0.125	50.0	58.0	50.0	2.00	XFM-4550-50
50.0		55.0	63.0	40.0	2.00	XFM-5055-40
60.0	+0.030	65.0	73.0	40.0	2.00	XFM-6065-40
70.0	+0.150	75.0	83.0	40.0	2.00	XFM-7075-40
75.0		80.0	88.0	50.0	2.00	XFM-7580-50

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/X

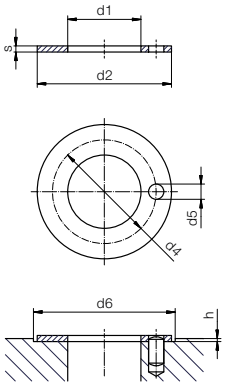
Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® X

Thrust washer (form T)

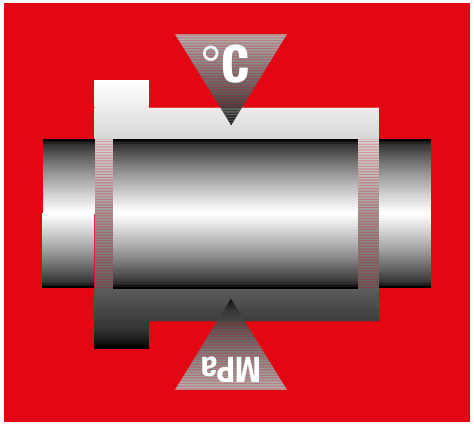


Dimensions according to ISO 3547-1 and special dimensions

Order example: XTM-0620-015 - no minimum order quantity.
X iglidur® material T Thrust washer M Metric 06 Inner Ø d1 20 Outer Ø d2 015 Thickness s

d1 +0.25 [mm]	d2 –0.25 [mm]	d4 –0.12 +0.12 [mm]	d5 +0.375 +0.125 [mm]	h +0.2/–0.2 [mm]	d6 +0.12 [mm]	s –0.05 [mm]	Part No.
6	20	13	1.5	1	20	1.5	**XTM-0620-015**
8	18	13	1.5	1	18	1.5	**XTM-0818-015**
8	29	[4]	[4]	1	29	1.5	**XTM-0829-015**
8	30	[4]	[4]	1	30	1.5	**XTM-0830-015**
10	18	[4]	[4]	0.7	18	1	**XTM-1018-010**
12	24	18	1.5	1	24	1.5	**XTM-1224-015**
14	26	20	2	1	26	1.5	**XTM-1426-015**
15	22	[4]	[4]	0.5	22	0.8	**XTM-1522-008**
15	24	19.5	1.5	1	24	1.5	**XTM-1524-015**
16	30	22	2	1	30	1.5	**XTM-1630-015**
18	32	25	2	1	32	1.5	**XTM-1832-015**
20	36	28	3	1	36	1.5	**XTM-2036-015**
22	38	30	3	1	38	1.5	**XTM-2238-015**
24	42	33	3	1	42	1.5	**XTM-2442-015**
26	44	35	3	1	44	1.5	**XTM-2644-015**
28	48	38	4	1	48	1.5	**XTM-2848-015**
32	54	43	4	1	54	1.5	**XTM-3254-015**
38	62	50	4	1	62	1.5	**XTM-3862-015**
42	66	54	4	1	66	1.5	**XTM-4266-015**
48	74	61	4	1.5	74	2	**XTM-4874-020**
52	78	65	4	1.5	78	2	**XTM-5278-020**
62	90	76	4	1.5	90	2	**XTM-6290-020**

[4] Design without fixing hole



Long service life under extreme conditions

Resistant to wear and impact even at high loads and temperatures

iglidur® Z

When to use it?

- For temperatures up to +250°C long-term or +310°C short-term
- When low wear is required especially under high radial loads
- For high surface speeds
- For edge pressure in connection with high surface pressures

When not to use?

- For low loads and temperatures
  iglidur® P
- When a cost-effective all-round plain bearing is required
  iglidur® G
- When electrically conductive plain bearings are required
  iglidur® F, iglidur® H, iglidur® H370

Bearing technology | Plain bearings | iglidur® Z

Ø
4.0 – 120.0
mm

Also available as:

Bar stock, round bar:
Page 629

Bar stock, plate:
Page 651

tribo-tape liner:
Page 657

Piston rings:
Page 562

Two hole flange bearing:
Page 581

Moulded special parts:
Page 602

igubal® spherical balls:
Page 783

Long service life under extreme conditions: Resistant to wear and impact even at high loads and temperatures

Extremely high compressive strength coupled with high flexibility enables iglidur® Z bearings to attain their prominent properties in association with soft shafts, edge loads and impacts. At the same time the bearings suitable for temperatures up to +250°C.

- Excellent wear resistance especially with high loads
- High temperature resistance
- Suitable for very high loads
- Suitable for high surface speeds
- Suitable for high edge pressures
- Lubrication-free
- Maintenance-free

Typical application areas

- Construction machinery industry
- Mechanical engineering
- Textile industry
- Aerospace engineering
- Glass industry

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® Z
+250°C
150MPa

Technical data

General properties			Testing method
Density	g/cm³	1.40	
Colour		brown	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.3	DIN 53495
Max. moisture absorption	% weight	1.1	
Coefficient of friction, dynamic, against steel	µ	0.06 – 0.14	
pv value, max. (dry)	MPa · m/s	0.84	
Mechanical properties			
Flexural modulus	MPa	2,400	DIN 53457
Flexural strength at +20°C	MPa	95	DIN 53452
Compressive strength	MPa	65	
Max. recommended surface pressure (+20°C)	MPa	150	
Shore D hardness		81	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+250	
Max. application temperature short–term	°C	+310	
Min. application temperature	°C	–100	
Thermal conductivity	W/m · K	0.62	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	4	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{11}$	DIN IEC 93
Surface resistance	Ω	$> 10^{11}$	DIN 53482

Table 01: Material properties table

–100°C up to +250°C

150MPa

V-0

RoHS-II

ISO 3547-1

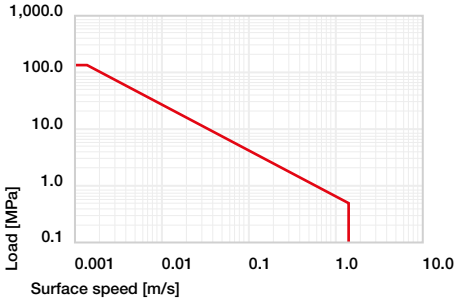


Diagram 01: Permissible pv values for iglidur® Z plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® Z plain bearings is approximately 0.3% weight. The saturation limit in water is 1.1% weight.

Vacuum

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

Radiation resistance

Plain bearings made from iglidur® Z are resistant up to a radiation intensity of $1 \cdot 10^5$Gy.

UV resistance

Exposed to UV radiation, iglidur® Z plain bearings lose approximately 50 % of their tribological properties (wear resistance).

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

+ resistant **0 conditionally resistant** **– not resistant**
All information given at room temperature [+20°C]
Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® Z

In addition to iglidur® X, iglidur® Z is among the best-selling iglidur® high-temperature materials. Specifically worth noting is the outstanding wear behaviour under extreme conditions (high loads and temperatures).

Mechanical properties

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

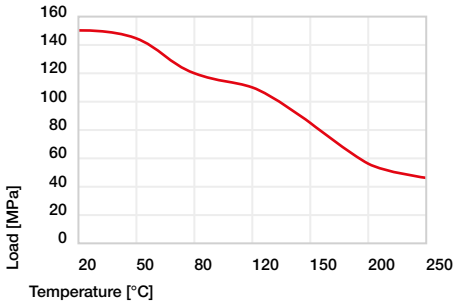


Diagram 02: Maximum recommended surface pressure as a function of temperature (150MPa at +20°C)

iglidur® Z is suitable for both medium and – due to its high heat resistance – high speeds. Diagram 03 shows the elastic deformation of iglidur® Z at radial loads. At the maximum recommended surface pressure of 150MPa the deformation is about 5.5% at room temperature.

Surface pressure, page 41

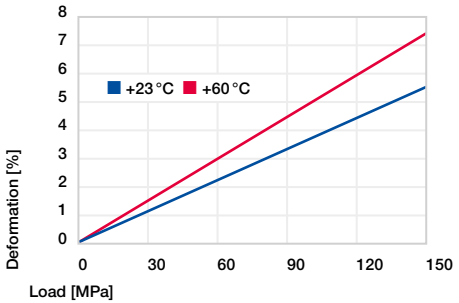


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® Z is a high temperature bearing material, which is suitable for applications involving very high specific loads. The maximum values shown in table 03 can only be achieved at low pressures. At the given speeds, friction can cause a temperature increase to maximum permissible levels. In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.5	1.1	5.0
short-term	**m/s**	3.5	2.5	6.0

Table 03: Maximum surface speeds

Temperature

The iglidur® Z plain bearings can be used in short-term temperatures up to +310°C. The temperatures prevailing in the bearing system also have an influence on the wear. The wear rises with increasing temperatures. At high temperatures iglidur® Z is also the most wear-resistant material in dry operation. For temperatures over +145°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction declines just as the wear resistance with increasing load (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

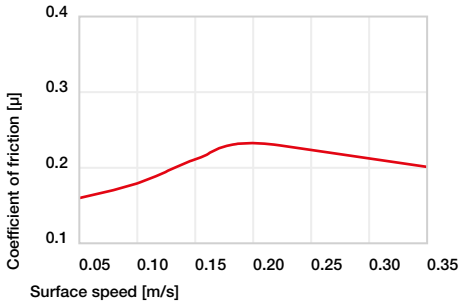


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

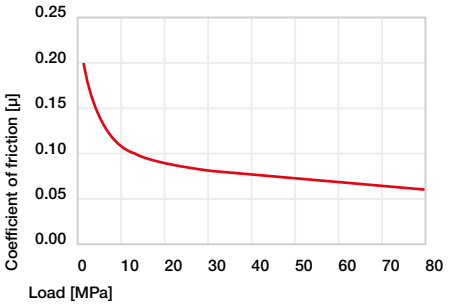


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

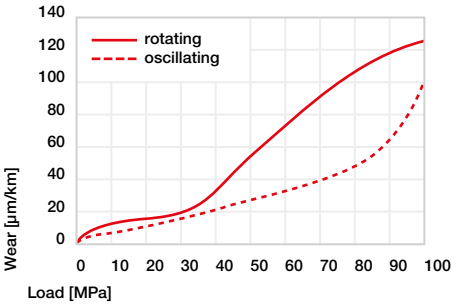


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

Diagram 06 shows wear rates in the lower load range, which are very similar to those of other wear-resistant iglidur® materials. However, in the upper load range iglidur® Z outperforms all other materials in wear resistance. Provided a Cf53 hardened and ground steel shaft is used, the wear is still only 15µm/km at 45MPa. At low loads iglidur® Z plain bearings wear less in pivoting applications than in rotating applications. 304 stainless steel and hard-chromed shafts are of interest here.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.06 – 0.14	0.09	0.04	0.04

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

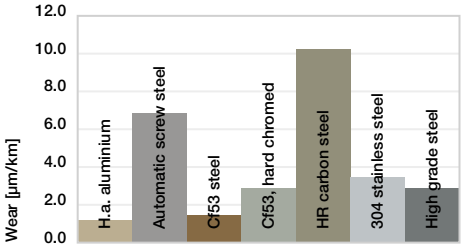


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® Z 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 F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

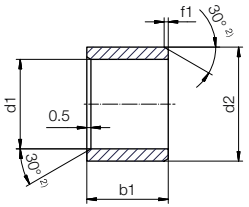
Testing methods, page 57

Ø d1 [mm]	Housing H7 [mm]		Plain bearing F10 [mm]		Shaft h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Bearing technology | Plain bearings | iglidur® Z

Sleeve bearing (form S)



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

Dimensions according to ISO 3547-1 and special dimensions

Order example: ZSM-0405-04 - no minimum order quantity.
Z iglidur® material S Sleeve bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 04 Total length b1

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
4.0	+0.010 +0.058	5.0	8.0	ZSM-0405-08
4.0		5.5	4.0	ZSM-0405-04
4.0		5.5	6.0	ZSM-0405-06
5.0		7.0	5.0	ZSM-0507-05
5.0		7.0	9.0	ZSM-0507-09
5.0		7.0	10.0	ZSM-0507-10
6.0		8.0	6.0	ZSM-0608-06
6.0		8.0	8.0	ZSM-0608-08
6.0		8.0	10.0	ZSM-0608-10
6.0		8.0	12.0	ZSM-0608-12
6.0		10.0	6.0	ZSM-0610-06
8.0	+0.013 +0.071	10.0	6.0	ZSM-0810-06
8.0		10.0	8.0	ZSM-0810-08
8.0		10.0	10.0	ZSM-0810-10
8.0		10.0	12.0	ZSM-0810-12
10.0		12.0	8.0	ZSM-1012-08
10.0		12.0	10.0	ZSM-1012-10
10.0		12.0	12.0	ZSM-1012-12
10.0		12.0	15.0	ZSM-1012-15
10.0		12.0	20.0	ZSM-1012-20
12.0	+0.016 +0.086	14.0	8.0	ZSM-1214-08
12.0		14.0	10.0	ZSM-1214-10
12.0		14.0	12.0	ZSM-1214-12
12.0		14.0	15.0	ZSM-1214-15
12.0		14.0	20.0	ZSM-1214-20
13.0		15.0	10.0	ZSM-1315-10
13.0		15.0	20.0	ZSM-1315-20
14.0		16.0	15.0	ZSM-1416-15
14.0		16.0	20.0	ZSM-1416-20
14.0	+0.016 +0.086	16.0	25.0	ZSM-1416-25
15.0		17.0	15.0	ZSM-1517-15
15.0		17.0	20.0	ZSM-1517-20
15.0		17.0	22.0	ZSM-1517-22
15.0		17.0	25.0	ZSM-1517-25
16.0		18.0	12.0	ZSM-1618-12
16.0		18.0	15.0	ZSM-1618-15
16.0		18.0	20.0	ZSM-1618-20
16.0		18.0	25.0	ZSM-1618-25
18.0		20.0	15.0	ZSM-1820-15
18.0		20.0	20.0	ZSM-1820-20
18.0		20.0	24.0	ZSM-1820-24
18.0		20.0	25.0	ZSM-1820-25
20.0	+0.020 +0.104	23.0	10.0	ZSM-2023-10
20.0		23.0	15.0	ZSM-2023-15
20.0		23.0	20.0	ZSM-2023-20
20.0		23.0	25.0	ZSM-2023-25
20.0		23.0	30.0	ZSM-2023-30
20.0		23.0	35.0	ZSM-2023-35
22.0		24.0	30.0	ZSM-2224-30
22.0	+0.020 +0.104	25.0	15.0	ZSM-2225-15
22.0		25.0	20.0	ZSM-2225-20
22.0		25.0	25.0	ZSM-2225-25
22.0		25.0	30.0	ZSM-2225-30
24.0		27.0	15.0	ZSM-2427-15
24.0		27.0	20.0	ZSM-2427-20
24.0		27.0	25.0	ZSM-2427-25
24.0		27.0	30.0	ZSM-2427-30
25.0		28.0	15.0	ZSM-2528-15

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

iglidur® Z
+250°C
150MPa

Product range

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
25.0	+0.020 +0.104	28.0	20.0	ZSM-2528-20
25.0		28.0	25.0	ZSM-2528-25
25.0		28.0	30.0	ZSM-2528-30
25.0		28.0	48.0	ZSM-2528-48
25.0		30.0	20.0	ZSM-2530-20
26.0		30.0	34.0	ZSM-2630-34
28.0		32.0	20.0	ZSM-2832-20
28.0		32.0	25.0	ZSM-2832-25
28.0		32.0	30.0	ZSM-2832-30
28.0		34.0	29.0	ZSM-2834-29
30.0		34.0	20.0	ZSM-3034-20
30.0		34.0	25.0	ZSM-3034-25
30.0		34.0	30.0	ZSM-3034-30
30.0		34.0	40.0	ZSM-3034-40
32.0	+0.025 +0.125	35.0	44.0	ZSM-3235-44
32.0		36.0	20.0	ZSM-3236-20
32.0		36.0	30.0	ZSM-3236-30
32.0		36.0	40.0	ZSM-3236-40
35.0		39.0	20.0	ZSM-3539-20
35.0		39.0	30.0	ZSM-3539-30
35.0		39.0	40.0	ZSM-3539-40
35.0		39.0	50.0	ZSM-3539-50
40.0		44.0	15.0	ZSM-4044-15
40.0		44.0	20.0	ZSM-4044-20
40.0		44.0	30.0	ZSM-4044-30
40.0	+0.025 +0.125	44.0	40.0	ZSM-4044-40
40.0		44.0	47.0	ZSM-4044-47
40.0		44.0	50.0	ZSM-4044-50
45.0		50.0	20.0	ZSM-4550-20
45.0		50.0	30.0	ZSM-4550-30
45.0		50.0	40.0	ZSM-4550-40
45.0		50.0	50.0	ZSM-4550-50
50.0		55.0	20.0	ZSM-5055-20
50.0		55.0	30.0	ZSM-5055-30
50.0		55.0	40.0	ZSM-5055-40
50.0		55.0	50.0	ZSM-5055-50
50.0		55.0	60.0	ZSM-5055-60
55.0	+0.030 +0.150	60.0	60.0	ZSM-5560-60
60.0		65.0	60.0	ZSM-6065-60
70.0		75.0	70.0	ZSM-7075-70
80.0		85.0	60.0	ZSM-8085-60
80.0		85.0	80.0	ZSM-8085-80
85.0	+0.036 +0.176	90.0	60.0	ZSM-8590-60
85.0		90.0	100.0	ZSM-8590-100
95.0		100.0	60.0	ZSM-95100-60
100.0	+0.072 +0.212	105.0	100.0	ZSM-100105-100
120.0	+0.043 +0.203	125.0	100.0	ZSM-120125-100

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

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25 – 49	200 – 499	2,500 – 4,999

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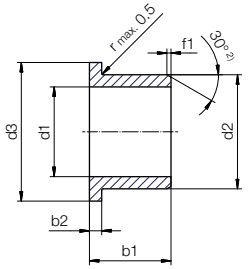
Bearing technology | Plain bearings | iglidur® Z

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: ZFM-0405-04 - no minimum order quantity.
Z iglidur® material F Flange bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 04 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
4.0		5.0	9.0	4.0	0.00	ZFM-0405-04
5.0	+0.010	7.0	11.0	5.0	1.00	ZFM-0507-05
6.0	+0.058	8.0	12.0	4.0	1.00	ZFM-0608-04
6.0		8.0	12.0	8.0	1.00	ZFM-0608-08
8.0		10.0	15.0	5.5	1.00	ZFM-0810-05
8.0		10.0	15.0	7.5	1.00	ZFM-0810-07
8.0		10.0	15.0	9.5	1.00	ZFM-0810-09
9.0		11.0	17.0	20.0	0.00	ZFM-091117-20
10.0		12.0	18.0	5.0	1.00	ZFM-1012-05
10.0	+0.013	12.0	18.0	7.0	1.00	ZFM-1012-07
10.0	+0.071	12.0	18.0	9.0	1.00	ZFM-1012-09
10.0		12.0	18.0	12.0	1.00	ZFM-1012-12
10.0		12.0	18.0	15.0	1.00	ZFM-1012-15
10.0		12.0	18.0	17.0	1.00	ZFM-1012-17
10.0		13.0	15.0	5.0	1.00	ZFM-101315-05
12.0		14.0	20.0	7.0	1.00	ZFM-1214-07
12.0		14.0	20.0	9.0	1.00	ZFM-1214-09
12.0		14.0	20.0	12.0	1.00	ZFM-1214-12
12.0		14.0	20.0	17.0	1.00	ZFM-1214-17
12.0		14.0	20.0	20.0	1.00	ZFM-1214-20
14.0		16.0	22.0	12.0	1.00	ZFM-1416-12
14.0	+0.016	16.0	22.0	17.0	1.00	ZFM-1416-17
15.0	+0.086	17.0	23.0	9.0	1.00	ZFM-1517-09
15.0		17.0	23.0	11.0	1.00	ZFM-1517-11
15.0		17.0	23.0	12.0	1.00	ZFM-1517-12
15.0		17.0	23.0	15.0	1.00	ZFM-1517-15
15.0		17.0	23.0	17.0	1.00	ZFM-1517-17
15.0		17.0	23.0	23.0	1.00	ZFM-151723-23

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
16.0		18.0	24.0	12.0	1.00	ZFM-1618-12
16.0		18.0	24.0	17.0	1.00	ZFM-1618-17
18.0	+0.016	20.0	26.0	4.0	1.00	ZFM-1820-04
18.0	+0.086	20.0	26.0	12.0	1.00	ZFM-1820-12
18.0		20.0	26.0	17.0	1.00	ZFM-1820-17
18.0		20.0	26.0	22.0	1.00	ZFM-1820-22
20.0		22.0	30.0	21.0	1.00	ZFM-2022-21
20.0		23.0	30.0	11.0	1.00	ZFM-2023-11
20.0		23.0	30.0	15.0	1.00	ZFM-2023-155
20.0		23.0	30.0	16.0	1.00	ZFM-2023-16
20.0		23.0	30.0	21.5	1.50	ZFM-2023-21
20.0		23.0	30.0	31.0	1.00	ZFM-2023-31
25.0		28.0	35.0	11.5	1.50	ZFM-2528-11
25.0	+0.020	28.0	35.0	16.5	1.50	ZFM-2528-16
25.0	+0.104	28.0	35.0	21.5	1.50	ZFM-2528-21
25.0		28.0	35.0	31.0	1.00	ZFM-2528-31
30.0		34.0	42.0	13.0	2.00	ZFM-3034-13
30.0		34.0	42.0	16.0	2.00	ZFM-3034-16
30.0		34.0	42.0	20.0	2.00	ZFM-3034-20
30.0		34.0	42.0	26.0	2.00	ZFM-3034-26
30.0		34.0	42.0	37.0	2.00	ZFM-3034-37
35.0		39.0	47.0	16.0	2.00	ZFM-3539-16
35.0		39.0	47.0	26.0	2.00	ZFM-3539-26
40.0	+0.025	44.0	52.0	20.0	2.00	ZFM-4044-20
40.0	+0.125	44.0	52.0	30.0	2.00	ZFM-4044-30
40.0		44.0	52.0	40.0	2.00	ZFM-4044-40
45.0		50.0	58.0	50.0	2.00	ZFM-4550-50
50.0		55.0	63.0	20.0	2.00	ZFM-5055-20

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

Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
50.0	+0.025 +0.125	55.0	63.0	50.0	2.00	ZFM-5055-50
60.0	+0.030 +0.150	65.0	73.0	50.0	2.50	ZFM-6065-50
75.0	+0.030	80.0	88.0	50.0	2.50	ZFM-7580-50
75.0	+0.150	80.0	94.0	65.0	3.00	ZFM-758094-65

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

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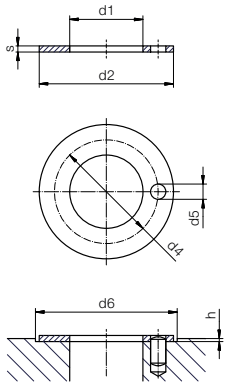
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® Z

Thrust washer (form T)



Dimensions according to ISO 3547-1 and special dimensions

Order example: ZTM-1430-015 - no minimum order quantity.
Z iglidur® material T Thrust washer M Metric 14 Inner Ø d1 30 Outer Ø d2 015 Thickness s

d1 +0.25 [mm]	d2 –0.25 [mm]	d4 –0.12 +0.12 [mm]	d5 +0.375 +0.125 [mm]	h +0.2/–0.2 [mm]	d6 +0.12 [mm]	s –0.05 [mm]	Part No.
14	30	25	2	1	30	1.5	**ZTM-1430-015**[146)]
15	27	[4)]	[4)]	1	27	1.5	**ZTM-1527-015**
15	35	[4)]	[4)]	1	35	1.5	**ZTM-1535-015**
15	40	[4)]	[4)]	1	35	1.5	**ZTM-1540-015**
16	23	[4)]	[4)]	1	23	1.5	**ZTM-1623-015**
20	36	28	3	1	36	1.5	**ZTM-2036-015**
22	38	30	3	1	38	1.5	**ZTM-2238-015**
22	50	30	3	1	38	0.5	**ZTM-2250-005**
22	50	30	3	1	38	1.5	**ZTM-2250-015**
28	38	[4)]	[4)]	1	38	1.5	**ZTM-2838-015**
32	54	43	4	1	54	1.5	**ZTM-3254-015**
62	90	[4)]	[4)]	1.5	90	2	**ZTM-6290-020**

[4)] Design without fixing hole [146)] d4 +/-0,2, d5 +/-0,1

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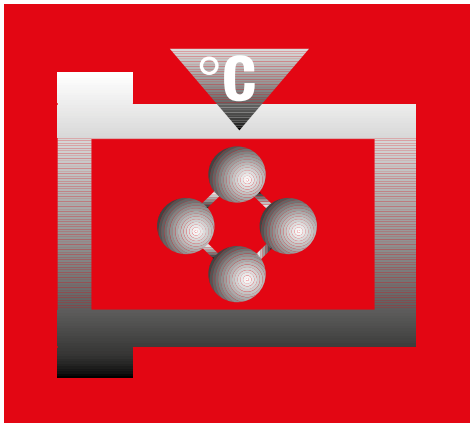


The high temperature specialist up to +250°C

Up to six times more wear-resistant than iglidur® X

iglidur® X6

When to use it?
- When temperatures are higher than +150°C
- When the wear resistance of iglidur® X in pivoting and rotating applications is not sufficient
- When the press-fit should be improved over iglidur® X
- When high media resistance is required
- When a bearing which is free of PTFE is required

When not to use?
- When a cost-effective universal plain bearing is required
  iglidur® G
- When a plain bearing for underwater use is required
  iglidur® UW500, iglidur® H370
- When a wear-resistant high-temperature plain bearing for linear motion is required
  iglidur® Z

Bearing technology | Plain bearings | iglidur® X6

Ø
3.0 – 50.0
mm

Also available as:

The high temperature specialist up to +250°C: Up to six times more wear-resistant than iglidur® X

Due to nanotechnology, iglidur® X6 shows up to six longer service life than iglidur® X in many pivoting and rotating applications - even at temperatures over +100°C.

- Continuous operating temperatures up to +250°C
- Up to 50 % better press-fit than iglidur® X
- High compressive strength
- Extremely high chemical resistance
- PTFE-free
- Lubrication-free
- Maintenance-free

Typical application areas

- Glass industry
- Food industry
- Fluid technology
- Textile industry
- Mechanical engineering

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

Bar stock, round bar: **Page 629**
Bar stock, plate: **Page 651**
tribo-tape liner: **Page 657**
Piston rings: **Page 559**
Two hole flange bearing: **Page 581**
Moulded special parts: **Page 602**
igubal® spherical balls: **Page 783**

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

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

iglidur® X6
+250°C
150MPa

Technical data

General properties			Testing method
Density	g/cm³	1.53	
Colour		dark blue	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.1	DIN 53495
Max. moisture absorption	% weight	0.5	
Coefficient of friction, dynamic, against steel	µ	0.09 – 0.25	
pv value, max. (dry)	MPa · m/s	1.35	
Mechanical properties			
Flexural modulus	MPa	16,000	DIN 53457
Flexural strength at +20°C	MPa	290	DIN 53452
Compressive strength	MPa	190	
Max. recommended surface pressure (+20°C)	MPa	150	
Shore D hardness		89	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+250	
Max. application temperature short–term	°C	+315	
Min. application temperature	°C	–100	
Thermal conductivity	W/m · K	0.55	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	1.1	DIN 53752
Electrical properties[5]			
Specific contact resistance	Ωcm	$< 10^5$	DIN IEC 93
Surface resistance	Ω	$< 10^3$	DIN 53482

[5] The good conductivity of this material can favour the generation of corrosion on the metallic contact components.

Table 01: Material properties table

–100°C up to +250°C
150MPa
V-0
RoHS-II
ISO 3547-1

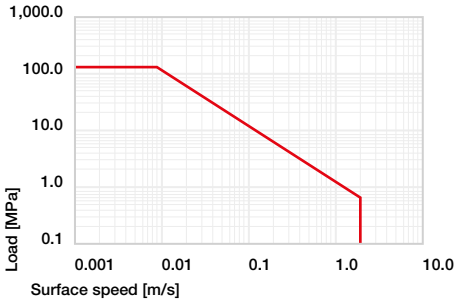


Diagram 01: Permissible pv values for iglidur® X6 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® X6 plain bearings is approximately 0.1% weight. The saturation limit in water is 0.5% weight. These values are so low that a moisture expansion need to be considered only in extreme cases.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is generally possible.

Radiation resistance

Resistant to radiation up to an intensity of $2 \cdot 10^5$Gy.

UV resistance

iglidur® X6 plain bearings are partially resistant to UV radiation.

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

+ resistant 0 conditionally resistant – not resistant
All information given at room temperature [+20°C]
Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® X6

With respect to its general mechanical and thermal specifications, iglidur® X6 is directly comparable to our high-temperature classic, iglidur® X, and may even provide advantages, such as its wear behaviour.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® X6 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

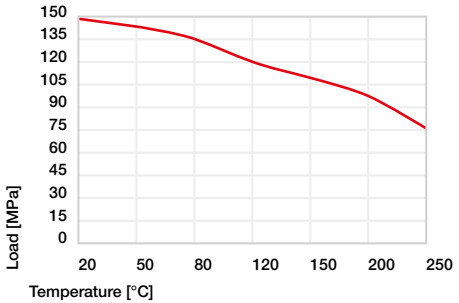


Diagram 02: Maximum recommended surface pressure as a function of temperature (150MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® X6 at radial loads. At the maximum recommended surface pressure of 150MPa the deformation is less than 2%. A possible deformation could be, among others, dependant on the duty cycle of the load.

Surface pressure, page 41

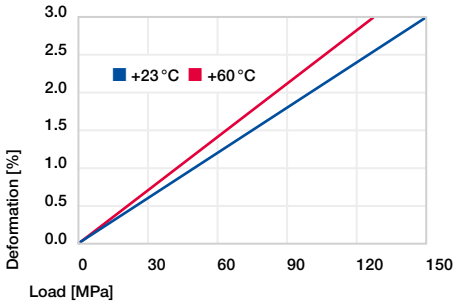


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

The high temperature resistance and good thermal conductivity values mean that iglidur® X6 is suitable for high-speed applications. At the given speeds, friction can cause a temperature increase to maximum permissible levels. In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.5	1.1	5.0
short-term	**m/s**	3.5	2.5	10.0

Table 03: Maximum surface speeds

Temperature

The ambient temperatures strongly influence the properties of plain bearings. With regard to temperature resistance, iglidur® X6 is among the highest in the iglidur® range. In many tests it has shown a six times higher wear resistance compared to the established high-temperature specialist iglidur® X. For temperatures over +165°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the load. The coefficient of friction of iglidur® X6 declines with higher pressure and is practically constant for pressures above 30MPa. A higher speed of the shaft also results in a lower coefficient of friction (diagram 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

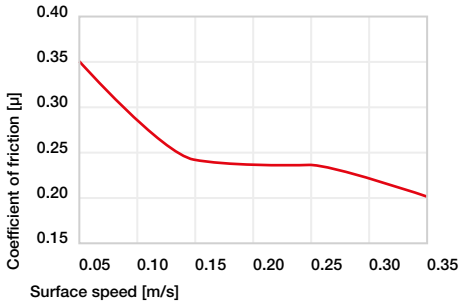


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

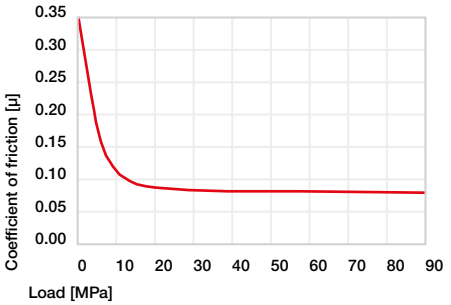


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

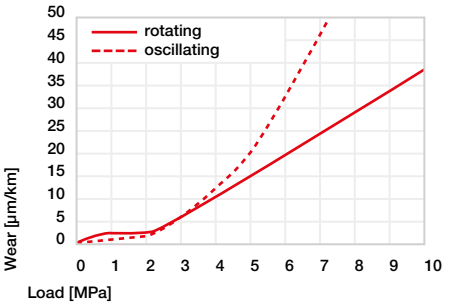


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

The friction and wear are also dependent, to a large degree, on the shaft material. Shafts that are too smooth, increase both the coefficient of friction and the wear of the bearing. The best case for iglidur® X6 is a ground surface with an average surface finish Ra = 0.4 – 0.7μm. Diagram 06 shows the test results of iglidur® X6 plain bearings running against various shaft materials. The best performance is achieved with the plain shaft materials free cutting steel and plain steel 1.0037. At higher loads, we recommend harder steel qualities. Non-hardened steel shafts can be worn by the bearing at pressures over 2MPa. The wear database shows that iglidur® X6 is more suitable for rotating than for pivoting applications (diagram 07). If the shaft material you plan on using is not shown in these test results, please contact us.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.09 – 0.25	0.09	0.04	0.04

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

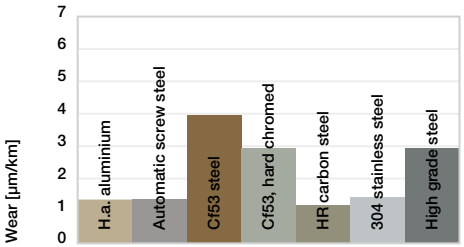


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® X6 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 F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table). In relation to the installation tolerance, the inner diameter changes with the absorption of humidity.

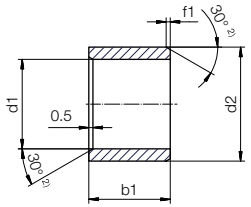
Testing methods, page 57

Ø d1 [mm]	Housing H7 [mm]		Plain bearing F10 [mm]		Shaft h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Bearing technology | Plain bearings | iglidur® X6

Sleeve bearing (form S)



[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

Dimensions according to ISO 3547-1 and special dimensions

Order example: X6SM-0304-03 - no minimum order quantity.
X6 iglidur® material S Sleeve bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 03 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
3.0	+0.010 +0.058	4.5	3.0	X6SM-0304-03
5.0		7.0	5.0	X6SM-0507-05
6.0		8.0	6.0	X6SM-0608-06
8.0	+0.013 +0.071	10.0	10.0	X6SM-0810-10
10.0		12.0	10.0	X6SM-1012-10
12.0	+0.016 +0.086	14.0	12.0	X6SM-1214-12
16.0		18.0	15.0	X6SM-1618-15
20.0	+0.020 +0.104	23.0	20.0	X6SM-2023-20
25.0		28.0	30.0	X6SM-2528-30
30.0		34.0	30.0	X6SM-3034-30
35.0	+0.025 +0.125	39.0	40.0	X6SM-3539-40
40.0		44.0	40.0	X6SM-4044-40
50.0		55.0	40.0	X6SM-5055-40

[3] After press-fit. *Testing methods page 57*

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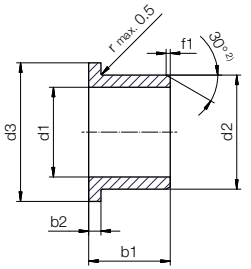
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur® X6
+250°C
150MPa

Bearing technology | Plain bearings | iglidur® X6

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: X6FM-0304-05 - no minimum order quantity.
X6 iglidur® material F Flange bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 05 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
3.0	+0.010 +0.058	4.5	7.5	5.0	0.75	X6FM-0304-05
5.0		7.0	11.0	5.0	1.00	X6FM-0507-05
6.0		8.0	12.0	6.0	1.00	X6FM-0608-06
8.0	+0.013 +0.071	10.0	15.0	10.0	1.00	X6FM-0810-10
10.0		12.0	18.0	10.0	1.00	X6FM-1012-10
10.0		12.0	18.0	25.0	1.00	X6FM-1012-25
12.0	+0.016 +0.086	14.0	20.0	12.0	1.00	X6FM-1214-12
16.0		18.0	24.0	12.0	1.00	X6FM-1618-12
16.0		18.0	24.0	17.0	1.00	X6FM-1618-17
20.0	+0.020 +0.104	23.0	30.0	21.5	1.50	X6FM-2023-21
25.0		28.0	35.0	21.5	1.50	X6FM-2528-21
30.0		34.0	42.0	40.0	2.00	X6FM-3034-40
35.0	+0.025 +0.125	39.0	47.0	26.0	2.00	X6FM-3539-26
40.0		44.0	52.0	40.0	2.00	X6FM-4044-40

[3] After press-fit. *Testing methods page 57*

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No low-quantity surcharges.
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For soft shafts and high temperatures

Wear and media-resistant
iglidur® V400

When to use it?

- When extreme wear resistance is required with soft shafts
- When the highest wear resistance at temperatures above +100°C is required
- When vibrations and edge loads are present
- When the bearing should be resistant to chemicals

When not to use?

- For hardened shafts
  iglidur® W300
- For applications at normal temperatures
  iglidur® G, iglidur® J, iglidur® W300
- When a cost-effective universal plain bearing is required
  iglidur® G

Bearing technology | Plain bearings | iglidur® V400

Ø 6.0 – 20.0 mm

Also available as:

Bar stock, round bar: **Page 629**

Bar stock, plate: **Page 651**

tribo-tape liner: **Page 663**

Piston rings: **Page 559**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 783**

For soft shafts and high temperatures: Wear and media-resistant

Highly wear-resistant bearings for soft shafts and temperatures up to +200°C with low moisture absorption and excellent resistance to chemicals.

- Excellent wear resistance with soft shaft materials and for temperatures up to +200°C
- High chemical resistance
- High elasticity
- Lubrication-free
- Maintenance-free

Typical application areas

- Plant construction
- Automotive industry
- Automation
- Aerospace engineering
- Mechatronics

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

iglidur® V400 +200°C 45MPa

Technical data

General properties			Testing method
Density	g/cm³	1.51	
Colour		cream	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.1	DIN 53495
Max. moisture absorption	% weight	0.2	
Coefficient of friction, dynamic, against steel	μ	0.15 – 0.20	
pv value, max. (dry)	MPa · m/s	0.50	
Mechanical properties			
Flexural modulus	MPa	4,500	DIN 53457
Flexural strength at +20°C	MPa	95	DIN 53452
Compressive strength	MPa	47	
Max. recommended surface pressure (+20°C)	MPa	45	
Shore D hardness		74	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+200	
Max. application temperature short–term	°C	+240	
Min. application temperature	°C	–50	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	3	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{12}$	DIN IEC 93
Surface resistance	Ω	$> 10^{12}$	DIN 53482

Table 01: Material properties table

–50°C up to +200°C

45MPa

V-0

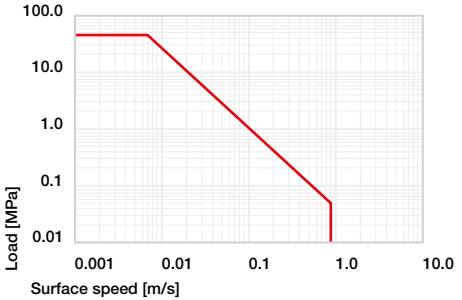


Diagram 01: Permissible pv values for iglidur® V400 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

The moisture absorption of iglidur® V400 plain bearings is only 0.2% weight after saturation in water.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is only possible to a limited extent.

Radiation resistance

Plain bearings made from iglidur® V400 are resistant up to a radiation intensity of $2 \cdot 10^4$Gy. Higher radiation affects their mechanical properties.

UV resistance

iglidur® V400 plain bearings are resistant to UV radiation to a large extent.

Chemicals	Resistance
Alcohols	+
Hydrocarbons	+
Greases, oils without additives	+
Fuels	+
Diluted acids	+
Strong acids	+
Diluted alkalines	+
Strong alkalines	–

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® V400

iglidur® V400 plain bearings are not suitable for high pressures or static high loads. However they are characterised by a high wear resistance all the way up to the maximum recommended surface pressure.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® V400 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

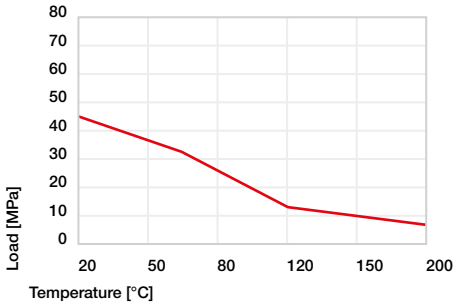


Diagram 02: Maximum recommended surface pressure as a function of temperature (45MPa at +20°C)

Moreover the limit of the permitted loads at +100°C is still very high with 20MPa. The high flexibility is shown in diagram 03.

Surface pressure, page 41

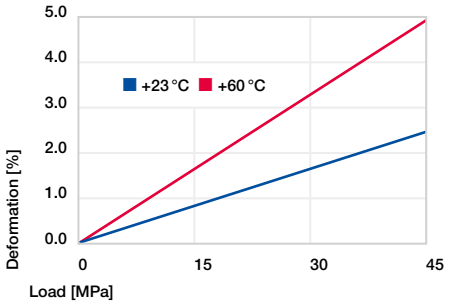


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® V400 also permits high surface speeds due to the high temperature resistance. The very favourable coefficient of friction of the bearing enables maximum surface speeds up to 1.3m/s. In linear applications, the permissible speeds are even higher and can be up to 3.0m/s.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.9	0.6	2.0
short-term	**m/s**	1.3	0.9	3.0

Table 03: Maximum surface speeds

Temperature

The maximum long-term application temperature is +200°C. For temperatures over +100°C an additional securing is required. Then, however, the wear resistance of the bearings is very good and adopts a leading position among all iglidur® materials. With increasing temperatures, the compressive strength of iglidur® V400 plain bearings decreases. Diagram 02 shows this inverse relationship.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction is dependent on the bearing's stressing capacity (diagrams 04 and 05). The coefficient of friction of iglidur® V400 is very constant. No other iglidur® plain bearing material exhibits a lower variance in the coefficient of friction, even when the shaft material is altered.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

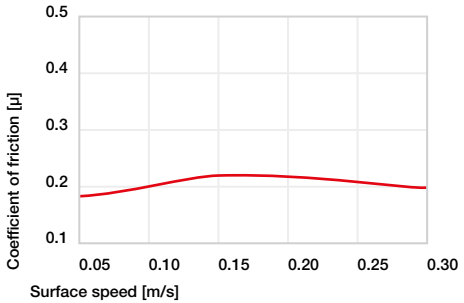


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

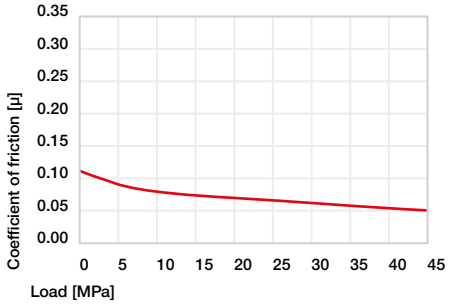


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

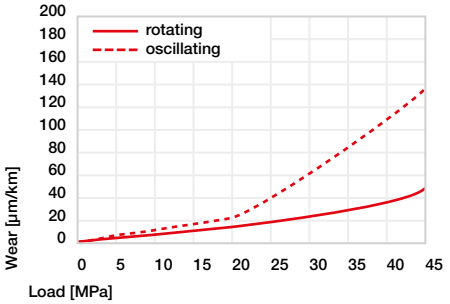


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

The influence of the shaft material on the wear resistance is bigger than on the friction. Here, even at low loads (0.75MPa), significant differences occur, as shown in diagram 06. With regard to wear, iglidur® V400 plain bearings show better values in rotating applications than in pivoting movements (diagram 07).

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.15 – 0.20	0.09	0.04	0.04

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

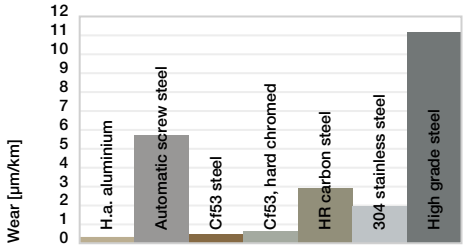


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

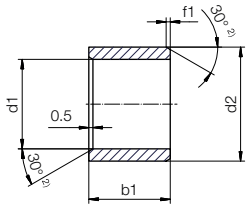
iglidur® V400 plain bearings are standard bearings for shafts with h tolerance (recommended minimum h9). The bearings are designed for press-fit into a housing machined to a H7 tolerance. After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

Testing methods, page 57

Ø d1 [mm]	Housing H7 [mm]		Plain bearing F10 [mm]		Shaft h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Sleeve bearing (form S)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: VSM-0608-06 - no minimum order quantity.
V400 iglidur® material S Sleeve bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
6.0	+0.010 +0.058	8.0	6.0	VSM-0608-06
8.0	+0.013 +0.071	10.0	10.0	VSM-0810-10
10.0		12.0	10.0	VSM-1012-10
12.0	+0.016 +0.086	14.0	12.0	VSM-1214-12
16.0		18.0	15.0	VSM-1618-15
20.0	+0.020 +0.104	23.0	20.0	VSM-2023-20

[3] After press-fit. *Testing methods page 57*

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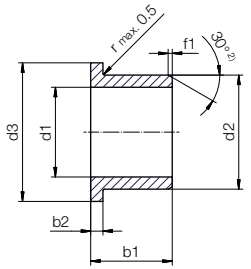
iglidur® V400 +200°C 45MPa

Bearing technology | Plain bearings | iglidur® V400

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: VFM-0608-06 - no minimum order quantity.
V400 iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.010 +0.058	8.0	12.0	6.0	1.00	VFM-0608-06
8.0	+0.013 +0.071	10.0	15.0	10.0	1.00	VFM-0810-10
10.0		12.0	18.0	10.0	1.00	VFM-1012-10
12.0	+0.016 +0.086	14.0	20.0	12.0	1.00	VFM-1214-12
16.0		18.0	24.0	17.0	1.00	VFM-1618-17
18.0	+0.020 +0.104	20.0	26.0	20.0	1.00	VFM-1820-20
20.0		23.0	30.0	21.5	1.50	VFM-2023-21

[3] After press-fit. *Testing methods page 57*

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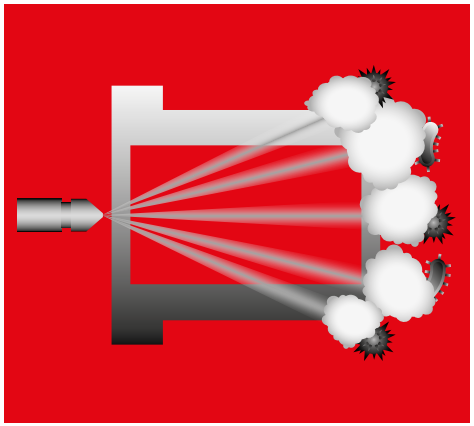


All-rounder for steam sterilisation

Low-cost, media-resistant and hygienic

iglidur® HSD350

When to use it?

- If the bearing point is regularly sterilised with hot steam
- When a low-cost material is required at the same time
- When good chemical resistance is required
- Low moisture absorption

When not to use?

- When high pressures occur
  iglidur® G, iglidur® W300
- When continuous operating temperatures are higher than +180°C
  iglidur® G, iglidur® Z
- When a cost-effective bearing for occasional movements is necessary
  iglidur® G

Bearing technology | Plain bearings | iglidur® HSD350

Ø 6.0 – 20.0 mm

Also available as:

Bar stock, round bar: **Page 642**

Bar stock, plate: **Page 651**

tribo-tape liner: **Page 657**

Piston rings: **Page 559**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 783**

All-rounder for steam sterilisation: Low-cost, media-resistant and hygienic

The new material enables continuous operation where hygiene is important, including regular sterilisation, with an outstanding price-performance ratio.

- Temperature-resistant up to +180°C
- Suitable for wet environments
- High media resistance
- Corrosion-free
- Lubrication-free
- Sterilisable
- Maintenance-free

Typical application areas

- Filling technology
- Medical and laboratory technology

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® HSD350 +180°C 30MPa

Technical data

General properties			Testing method
Density	g/cm³	1.39	DIN EN ISO 1183–1
Colour		beige	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.6	ISO 175
Max. moisture absorption	% weight	1.2	ISO 62
Coefficient of friction, dynamic, against steel	µ	0.07 – 0.23	
pv value, max. (dry)	MPa · m/s	0.30	
Mechanical properties			
Flexural modulus	MPa	2,150	DIN EN ISO 178
Flexural strength at +20°C	MPa	67	DIN EN ISO 178
Compressive strength	MPa	44	
Max. recommended surface pressure (+20°C)	MPa	30	
Shore D hardness		77	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+180	
Max. application temperature short–term	°C	+210	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	7	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{13}$	DIN IEC 93
Surface resistance	Ω	$> 10^{14}$	DIN 53482

Table 01: Material properties table

–40°C up to +180°C

30MPa

V-0

RoHS-II

ISO 3547-1

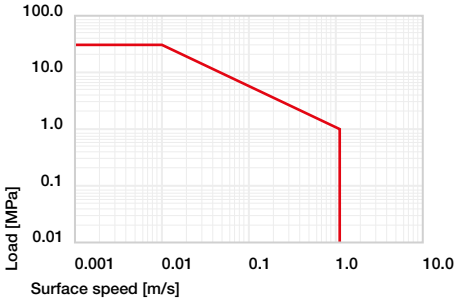


Diagram 01: Permissible pv values for iglidur® HSD350 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® HSD350 plain bearings is approximately 0.6% weight. The saturation limit in water is 1.2% weight. These values are so low that a moisture expansion need to be considered only in extreme cases.

Vacuum

In vacuum, the moisture content is released as vapour. Due to its low moisture absorption, use in a vacuum is possible.

Radiation resistance

Plain bearings made from iglidur® HSD350 are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® HSD350 plain bearings become discoloured when exposed to UV radiation. However, hardness, compressive strength and wear resistance of the material do not change.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

iglidur HSD350 was specially developed for use in applications where decontamination by steam (e.g. in autoclaves) is necessary. iglidur® HSD350 offers an excellent price-performance ratio.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® HSD350 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

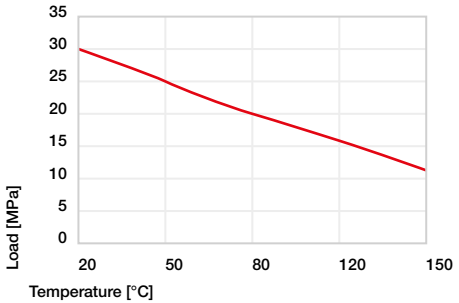


Diagram 02: Maximum recommended surface pressure as a function of temperature (30MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® HSD350 at radial loads. At the maximum recommended surface pressure of 30MPa the deformation is less than 2%. A possible deformation could be, among others, dependant on the duty cycle of the load.

Surface pressure, page 41

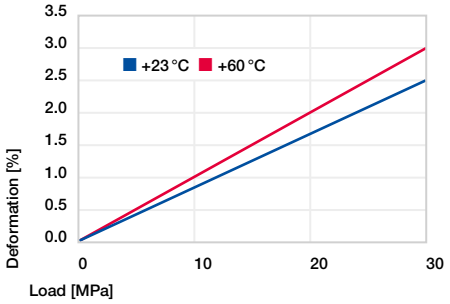


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

Due to its rather good thermal conductivity and thermal resistance, iglidur HSD350 is suitable for speeds in the medium range. The permissible surface speed decreases with increasing surface pressure.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.1	0.8	3.0
short-term	**m/s**	1.2	1.0	3.2

Table 03: Maximum surface speeds

Temperature

The ambient temperatures strongly influence the properties of plain bearings. According to its field of application as autoclavable material, iglidur® HSD350 offers good thermal resistance. For temperatures over +130°C an axial securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction increases constantly and slowly over the speed, but remains below 0.3µ up to a speed of 2.0m/s.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

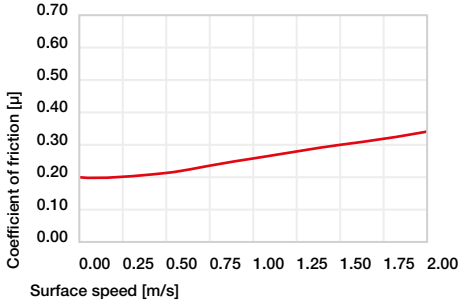


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

Shaft materials

Diagrams 06 and 07 display a summary of the test results with different shaft materials conducted with plain bearings made from iglidur® HSD350. At 0.3m/s and 1MPa surface pressure, a wide variety of shafts are suitable and provide good wear results. Hard-anodised aluminium, free cutting steel, hard-chromed Cf53, 304 stainless steel and high grade steel exhibit low wear. If the shaft material you plan on using is not shown in these test results, please contact us.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.07 – 0.23	0.09	0.04	0.04

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

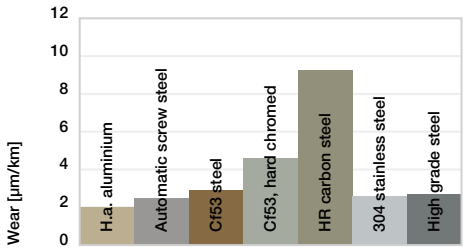


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

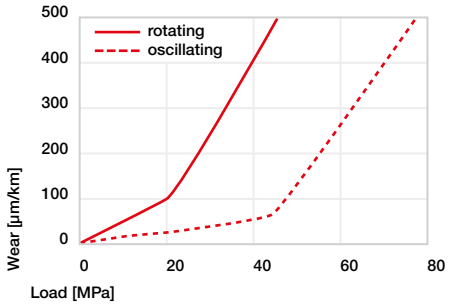


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Installation tolerances

iglidur® HSD350 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 F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table). In relation to the installation tolerance, the inner diameter changes with the absorption of humidity.

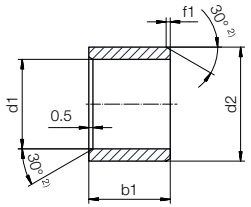
Testing methods, page 57

Ø d1 [mm]	Housing H7 [mm]		Plain bearing F10 [mm]		Shaft h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Bearing technology | Plain bearings | iglidur® HSD350

Sleeve bearing (form S)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 6–12	Ø 12–30
f [mm]	0.5	0.8

Dimensions according to ISO 3547-1 and special dimensions

Order example: HSD350SM-0608-06 - no minimum order quantity.
HSD350 iglidur® material S Sleeve bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
6.0	+0.010 +0.058	8.0	6.0	HSD350SM-0608-06
8.0	+0.013 +0.071	10.0	10.0	HSD350SM-0810-10
10.0		12.0	10.0	HSD350SM-1012-10
12.0	+0.016 +0.086	14.0	12.0	HSD350SM-1214-12
16.0		18.0	15.0	HSD350SM-1618-15
20.0	+0.020 +0.104	23.0	20.0	HSD350SM-2023-20

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/HSD350

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

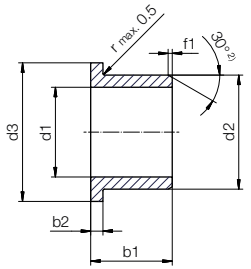
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur®
HSD350
+180°C
30MPa

Bearing technology | Plain bearings | iglidur® HSD350

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 6–12	Ø 12–30
f [mm]	0.5	0.8

Dimensions according to ISO 3547-1 and special dimensions

Order example: HSD350FM-0608-06 - no minimum order quantity.
HSD350 iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.010 +0.058	8.0	12.0	6.0	1.00	HSD350FM-0608-06
8.0	+0.013 +0.071	10.0	15.0	10.0	1.00	HSD350FM-0810-09
10.0		12.0	18.0	9.0	1.00	HSD350FM-1012-09
12.0	+0.016 +0.086	14.0	20.0	12.0	1.00	HSD350FM-1214-12
16.0		18.0	24.0	17.0	1.00	HSD350FM-1618-17
20.0	+0.020 +0.104	23.0	30.0	21.5	1.50	HSD350FM-2023-21

[3] After press-fit. *Testing methods page 57*

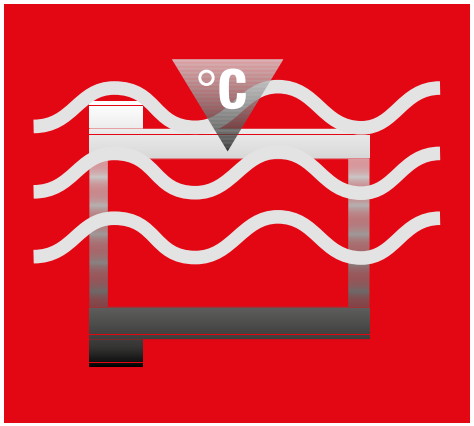
Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/HSD350

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.



For hot liquids

Continuous wear resistance in liquids

iglidur® UW500

When to use it?

- When plain bearings need to be used in liquids
- For high speeds
- For high temperatures
- When a high chemical resistance is required

When not to use?

- When a cost-effective underwater plain bearing for the standard temperature range is required
  iglidur® UW
- When a cost-effective underwater plain bearing is required for rare operations
  iglidur® H
- When a cost-effective universal plain bearing is required
  iglidur® G

Ø
–

Also available as:

Bar stock, round bar: Page 629

Bar stock, plate: Page 651

tribo-tape liner: Page 657

Piston rings: Page 559

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

For hot liquids:
Continuous wear resistance in liquids

iglidur® UW500 was developed for underwater applications at higher temperatures up to +250°C. In addition, the plain bearings will run in chemicals which would act as a lubricant.

- High temperature resistance
- Suitable for high surface speeds
- Lubrication-free
- Suitable for underwater applications
- Maintenance-free

Typical application areas

- Plant construction
- Pumps
- Chemical industry

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® UW500 +250°C 140MPa

Technical data

General properties			Testing method
Density	g/cm³	1.49	
Colour		black	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.1	DIN 53495
Max. moisture absorption[6]	% weight	0.5	
Coefficient of friction, dynamic, against steel	µ	0.20 – 0.36	
pv value, max. (dry)	MPa · m/s	0.35	
Mechanical properties			
Flexural modulus	MPa	16,000	DIN 53457
Flexural strength at +20°C	MPa	260	DIN 53452
Compressive strength	MPa	140	
Max. recommended surface pressure (+20°C)	MPa	140	
Shore D hardness		86	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+250	
Max. application temperature short–term	°C	+300	
Min. application temperature	°C	–100	
Thermal conductivity	W/m · K	0.60	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	4	DIN 53752
Electrical properties[5]			
Specific contact resistance	Ωcm	< 10^9	DIN IEC 93
Surface resistance	Ω	< 10^9	DIN 53482

[5] The good conductivity of this material can favour the generation of corrosion on the metallic contact components.
[6] All results were obtained under laboratory conditions with demineralised water. For application with direct water contact, we recommend tests under real application conditions.

Table 01: Material properties table

–100°C up to +250°C

140MPa

V-0

RoHS-II

ISO 3547-1

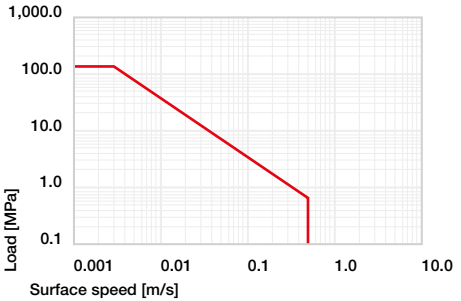


Diagram 01: Permissible pv values for iglidur® UW500 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® UW500 plain bearings is below 0.1% weight. The maximum moisture absorption is 0.5% weight. iglidur® UW500 plain bearings can be used for underwater applications.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is generally possible.

Radiation resistance

Plain bearings made from iglidur® UW500 are resistant up to a radiation intensity of $1 \cdot 10^5$Gy. They resist to hard gamma radiation (1,000Mrad) and alpha or beta radiation (10,000Mrad).

UV resistance

iglidur® UW500 plain bearings are resistant to permanent UV radiation.

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

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® UW500

The plain bearings made from iglidur® UW500 were developed for underwater applications with high temperatures. Examples for this are water pumps in automotive engineering, but also the field of medical engineering and related sectors. Unless the underwater operation is explicitly stated, the information in this chapter describes iglidur® UW500 in dry operation.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® UW500 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

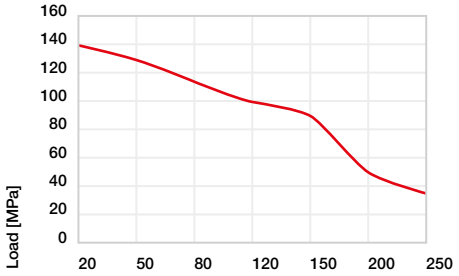


Diagram 02: Maximum recommended surface pressure as a function of temperature (140MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® UW500 at radial loads.

Surface pressure, page 41

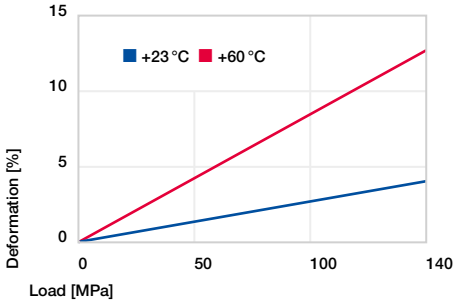


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® UW500 plain bearings can be used in applications involving dry operation as well as in liquids in a wide variety of applications. Due to hydrodynamic lubrication at high speeds, surface speeds far above 1.5m/s can be achieved.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.8	0.6	2.0
short-term	**m/s**	1.5	1.1	3.0

Table 03: Maximum surface speeds

Temperature

iglidur® UW500 can be used in applications where there are continuous temperatures of +150°C. If the bearings are mechanically secured, these temperatures can be even higher than +200°C. iglidur® UW500 belongs to the most temperature-resistant iglidur® materials. For temperatures over +150°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Diagrams 04 and 05 show the coefficient of friction of iglidur® UW500 plain bearings as a function of surface speed and pressure. The friction and wear are also dependent, to a large degree, on the shaft material. Ideal are ground surfaces with an average surface finish of 0.1 – 0.4µm.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

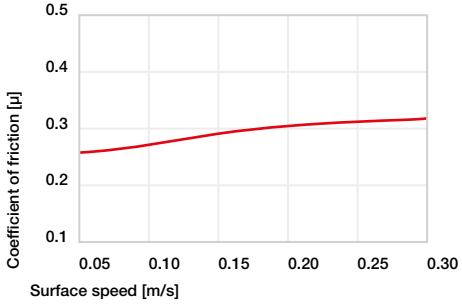


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

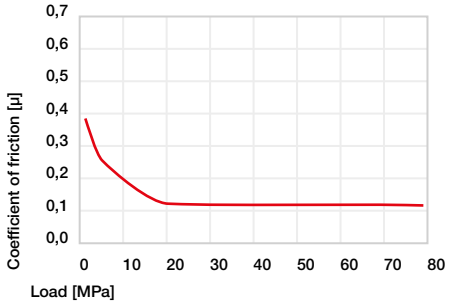


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

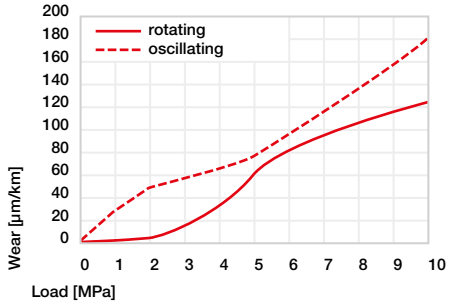


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

Diagram 06 shows results of testing different shaft materials with plain bearings made from iglidur® UW500.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.20 – 0.36	0.09	0.04	0.04

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

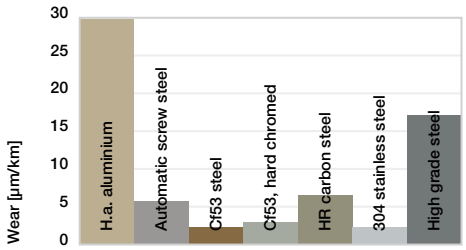


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® UW500 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 F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

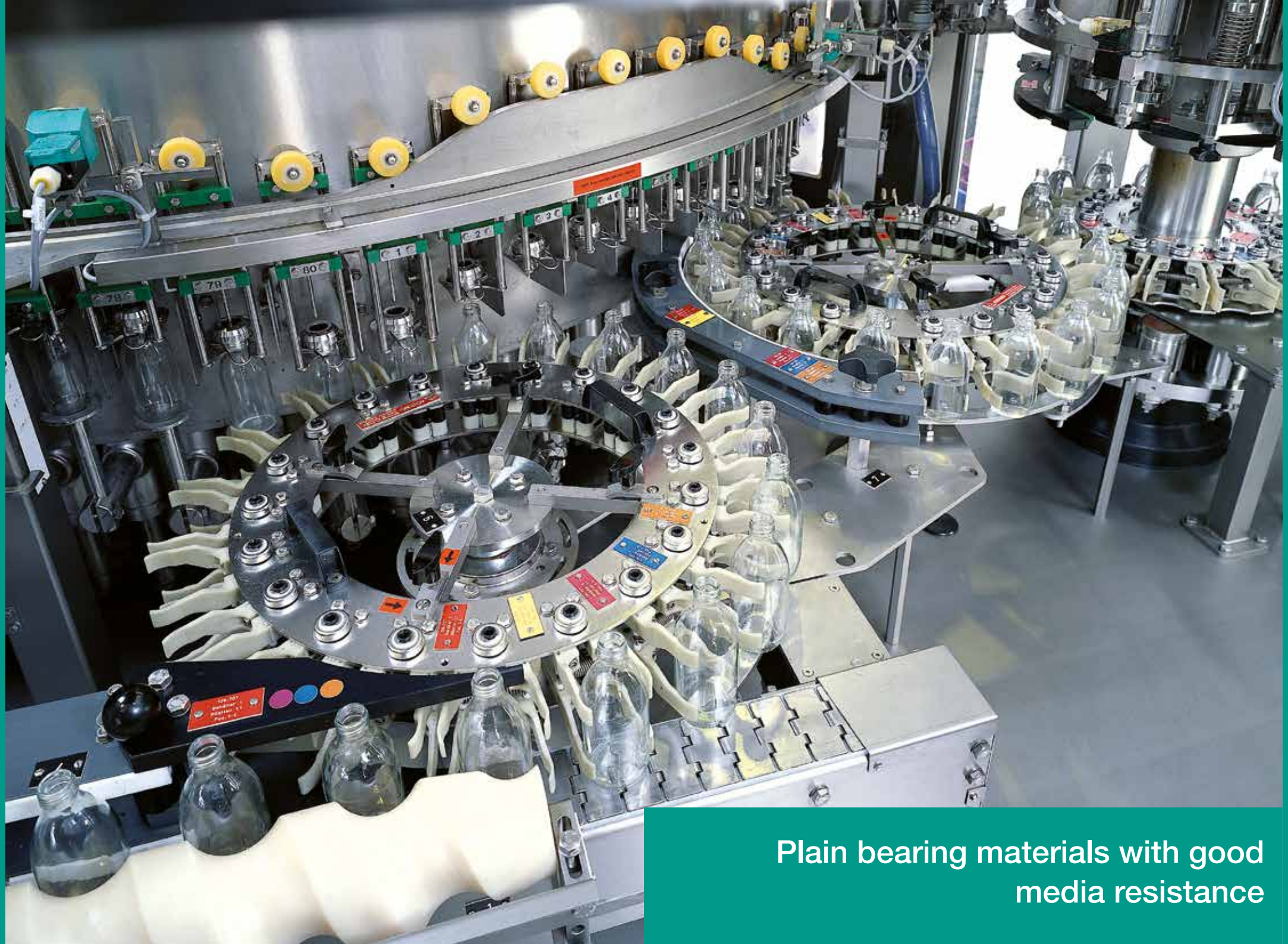
Testing methods, page 57

Ø d1 [mm]	Housing H7 [mm]		Plain bearing F10 [mm]		Shaft h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Product range

iglidur® UW500 plain bearings are manufactured to special order.



Plain bearing materials with good media resistance

Plain bearing materials with good media resistance

Almost at the same level as the previous group in terms of temperatures, the “iglidur® H family” is characterised by a high media resistance and a wide range of applications in wet areas.
iglidur® H370 is the specialist for underwater applications, iglidur® H2 is the media-resistant, low-cost bearing solution for high-volume production with low running performance and iglidur® H1, the endurance runner of this group.

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

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

iglidur® H1:
Endurance runner with high media resistance

Temperature [°C] [123]	+200	–	+
Surface pressure [MPa] [124]	80	–	+
Coefficient of friction [µ] [125]	0.17	–	+
Wear [µm/km] [125]	0.29	–	+
Price index		–	+

iglidur® H370:
Long service life under water

Temperature [°C] [123]	+200	–	+
Surface pressure [MPa] [124]	75	–	+
Coefficient of friction [µ] [125]	0.17	–	+
Wear [µm/km] [125]	1.20	–	+
Price index		–	+

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

Temperature [°C] [123]	+200	–	+
Surface pressure [MPa] [124]	90	–	+
Coefficient of friction [µ] [125]	0.17	–	+
Wear [µm/km] [125]	2.10	–	+
Price index		–	+

iglidur® C500:
High temperature endurance runner

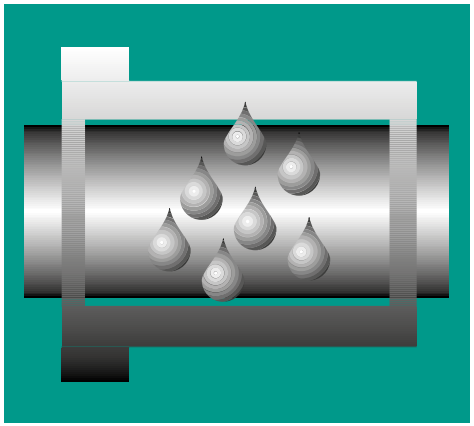
Temperature [°C] [123]	+250	–	+
Surface pressure [MPa] [124]	80	–	+
Coefficient of friction [µ] [125]	0.19	–	+
Wear [µm/km] [125]	0.48	–	+
Price index		–	+

[123] Max. long-term application temperature [124] Max. recommended surface pressure at +20°C [125] Best combination for p = 1MPa, v = 0.3m/s, rotating

High media resistance

iglidur® H2:
The low–cost specialist for chemicals and temperatures

Temperature [°C] [123]	+200	–	+
Surface pressure [MPa] [124]	110	–	+
Coefficient of friction [µ] [125]	0.32	–	+
Wear [µm/km] [125]	4.80	–	+
Price index		–	+



Endurance runner with high media resistance

Excellent coefficient of friction and wear

iglidur® H1

When to use it?

- When extreme service life is required under the influence of temperature and humidity
- When low coefficient of friction at high temperature is important
- When normal aggressive cleaning is required (splashes, steam blasting)
- For under bonnet applications

When not to use?

- When high surface pressures occur
  iglidur® Z
- When the best universal chemical resistance is required
  iglidur® X
- When a cost-effective high-temperature plain bearing is required, not the ideal wear resistance
  iglidur® H2
- When an FDA-compliant plain bearing with high temperature resistance is required
  iglidur® A500

Bearing technology | Plain bearings | iglidur® H1

Ø
3.0 – 50.0
mm

Also available as:

Bar stock, round bar:
Page 643

Bar stock, plate:
Page 651

tribo-tape liner:
Page 657

Piston rings:
Page 562

Two hole flange bearing:
Page 581

Moulded special parts:
Page 602

igubal® spherical balls:
Page 783

Endurance runner with high media resistance: Excellent coefficient of friction and wear

iglidur® H1 is the first choice when long service life is required in extreme environmental conditions. Extreme wear resistance is coupled with excellent resistance to temperature and media - not only in the packaging and food industries or the automotive industry.

- High wear resistance in extreme ambient conditions
- Very low coefficient of friction
- High temperature resistance
- For underbonnet applications
- Lubrication-free
- High chemical resistance
- Maintenance-free

Typical application areas

- Beverage industry
- Automation
- Packaging
- Textile industry
- Optical industry

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® H1
+200°C
80MPa

Technical data

General properties			Testing method
Density	g/cm³	1.53	
Colour		cream	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.1	DIN 53495
Max. moisture absorption	% weight	0.3	
Coefficient of friction, dynamic, against steel	µ	0.06 – 0.20	
pv value, max. (dry)	MPa · m/s	0.80	
Mechanical properties			
Flexural modulus	MPa	2,800	DIN 53457
Flexural strength at +20°C	MPa	55	DIN 53452
Compressive strength	MPa	78	
Max. recommended surface pressure (+20°C)	MPa	80	
Shore D hardness		77	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+200	
Max. application temperature short–term	°C	+240	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	6	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{12}$	DIN IEC 93
Surface resistance	Ω	$> 10^{11}$	DIN 53482

Table 01: Material properties table

–40°C up to +200°C

80MPa

V-0

RoHS-II

ISO 3547-1

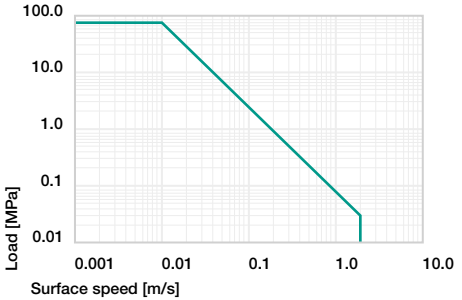


Diagram 01: Permissible pv values for iglidur® H1 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® H1 plain bearings is approximately 0.1% weight. The saturation limit in water is 0.3% weight. Therefore iglidur® H1 is very well suited for use in wet environments.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is generally possible.

Radiation resistance

Resistant to radiation up to an intensity of $2 \cdot 10^2$Gy.

UV resistance

iglidur® H1 plain bearings are partially resistant to UV radiation.

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

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® H1

iglidur® H1 plain bearings have been specially developed for use under extreme environmental conditions. Their strengths are the extremely high wear resistance and the excellent coefficient of friction even in applications in which the bearing is exposed to extreme temperatures and/or aggressive chemicals. iglidur® H1 plain bearings can be used completely free of lubrication; in wet area applications, the surrounding medium acts as additional lubricant.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® H1 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

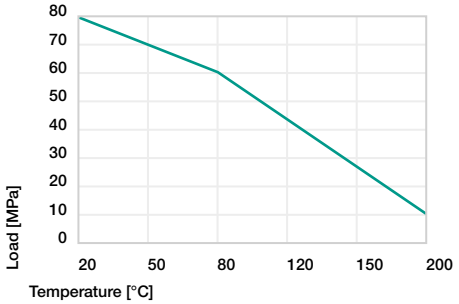


Diagram 02: Maximum recommended surface pressure as a function of temperature (80MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® H1 at radial loads. Among the iglidur® H materials, iglidur® H1 material has the greatest flexibility. This must be considered for applications with high surface pressure or edge loads.

Surface pressure, page 41

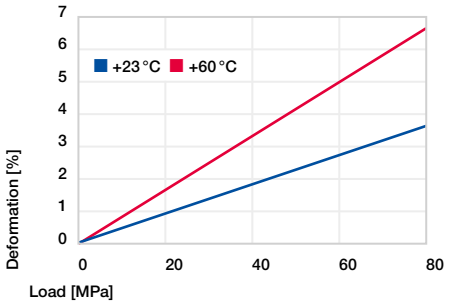


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

Due to their excellent coefficient of friction, rotating surface speeds of up to 2.0m/s are possible with iglidur® H1 plain bearings in dry operation. Linear speeds up to 5.0m/s can be attained. The speeds stated in table 03 are limit values for the lowest bearing loads. With higher loads, the permitted speed drops with the extent of the load due to the limitations by the pv value.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	2.0	1.0	5.0
short-term	**m/s**	2.5	1.5	7.0

Table 03: Maximum surface speeds

Temperature

iglidur® H1 is a very temperature-stable material. The temperatures prevailing in the bearing system also have an influence on the wear. The wear rises with increasing temperatures. In the case of iglidur® H1 in particular, however, this increase is very low. For temperatures over +80°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction alters similarly to the wear resistance with increasing load and surface speed (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

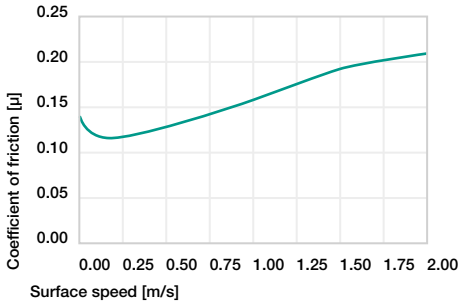


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

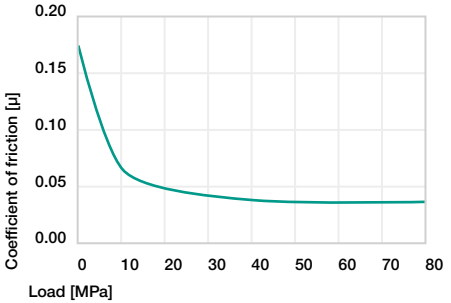


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

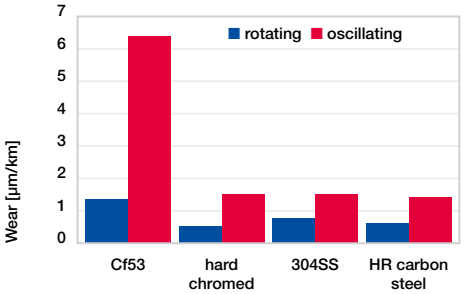


Diagram 07: Wear for rotating and oscillating applications with different shaft materials, p = 2MPa

Shaft materials

Diagrams 06 and 07 show the test results of iglidur® H1 plain bearings running against various shaft materials. The iglidur® H1 plain bearings display excellent wear behaviour in combination with a wide variety of shaft materials both in rotating and pivoting applications. On the 304 stainless steel shafts in particular, iglidur® H1 attains very low wear rates both in rotating and pivoting operations. Even on hard-anodised aluminium shafts, iglidur® H1 plain bearings attain high service life in rotating applications with low to medium loads.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.06 – 0.20	0.09	0.04	0.04

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

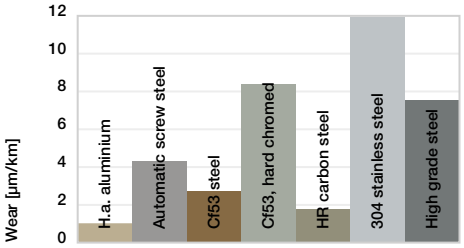


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® H1 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 F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

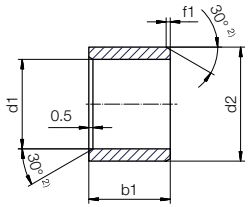
Testing methods, page 57

Ø d1 [mm]	Housing H7 [mm]		Plain bearing F10 [mm]		Shaft h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Bearing technology | Plain bearings | iglidur® H1

Sleeve bearing (form S)



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

Dimensions according to ISO 3547-1 and special dimensions

Order example: H1SM-0304-05 - no minimum order quantity.
H1 iglidur® material S Sleeve bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 05 Total length b1

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
3.0	+0.006 +0.046	4.5	5.0	H1SM-0304-05
4.0		5.5	4.0	H1SM-0405-04
4.0		5.5	6.0	H1SM-0405-06
5.0	+0.010 +0.058	7.0	5.0	H1SM-0507-05
5.0		7.0	10.0	H1SM-0507-10
6.0		8.0	6.0	H1SM-0608-06
6.0		8.0	8.0	H1SM-0608-08
6.0		8.0	10.0	H1SM-0608-10
8.0		10.0	8.0	H1SM-0810-08
8.0		10.0	10.0	H1SM-0810-10
8.0		10.0	12.0	H1SM-0810-12
8.0		10.0	15.0	H1SM-0810-15
10.0	+0.013 +0.071	12.0	8.0	H1SM-1012-08
10.0		12.0	10.0	H1SM-1012-10
10.0		12.0	12.0	H1SM-1012-12
10.0		12.0	15.0	H1SM-1012-15
10.0		12.0	20.0	H1SM-1012-20
12.0		14.0	10.0	H1SM-1214-10
12.0		14.0	12.0	H1SM-1214-12
12.0		14.0	15.0	H1SM-1214-15
12.0		14.0	20.0	H1SM-1214-20
13.0		15.0	10.0	H1SM-1315-10
13.0	+0.016 +0.086	15.0	20.0	H1SM-1315-20
14.0		16.0	15.0	H1SM-1416-15
14.0		16.0	20.0	H1SM-1416-20
14.0		16.0	25.0	H1SM-1416-25
15.0		17.0	15.0	H1SM-1517-15
15.0		17.0	20.0	H1SM-1517-20
15.0	+0.016 +0.086	17.0	25.0	H1SM-1517-25
16.0		18.0	15.0	H1SM-1618-15
16.0		18.0	20.0	H1SM-1618-20
16.0		18.0	25.0	H1SM-1618-25
18.0		20.0	15.0	H1SM-1820-15
18.0		20.0	20.0	H1SM-1820-20
18.0		20.0	25.0	H1SM-1820-25
20.0		23.0	10.0	H1SM-2023-10
20.0		23.0	15.0	H1SM-2023-15
20.0		23.0	20.0	H1SM-2023-20
20.0		23.0	25.0	H1SM-2023-25
20.0		23.0	30.0	H1SM-2023-30
22.0		25.0	15.0	H1SM-2225-15
22.0		25.0	20.0	H1SM-2225-20
22.0		25.0	25.0	H1SM-2225-25
22.0		25.0	30.0	H1SM-2225-30
24.0		27.0	15.0	H1SM-2427-15
24.0	+0.020 +0.104	27.0	20.0	H1SM-2427-20
24.0		27.0	25.0	H1SM-2427-25
24.0		27.0	30.0	H1SM-2427-30
25.0		28.0	15.0	H1SM-2528-15
25.0		28.0	20.0	H1SM-2528-20
25.0		28.0	25.0	H1SM-2528-25
25.0		28.0	30.0	H1SM-2528-30
28.0		32.0	20.0	H1SM-2832-20
28.0		32.0	25.0	H1SM-2832-25
28.0		32.0	30.0	H1SM-2832-30
30.0		34.0	30.0	H1SM-3034-30
30.0		34.0	40.0	H1SM-3034-40

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

Product range

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
32.0		36.0	20.0	H1SM-3236-20
32.0		36.0	30.0	H1SM-3236-30
32.0		36.0	40.0	H1SM-3236-40
35.0		39.0	20.0	H1SM-3539-20
35.0	+0.025	39.0	30.0	H1SM-3539-30
35.0	+0.125	39.0	40.0	H1SM-3539-40
35.0		39.0	50.0	H1SM-3539-50
40.0		44.0	20.0	H1SM-4044-20
40.0		44.0	30.0	H1SM-4044-30
40.0		44.0	40.0	H1SM-4044-40
40.0		44.0	50.0	H1SM-4044-50
45.0		50.0	20.0	H1SM-4550-20
45.0		50.0	30.0	H1SM-4550-30
45.0		50.0	40.0	H1SM-4550-40
45.0	+0.025	50.0	50.0	H1SM-4550-50
50.0	+0.125	55.0	20.0	H1SM-5055-20
50.0		55.0	30.0	H1SM-5055-30
50.0		55.0	40.0	H1SM-5055-40
50.0		55.0	50.0	H1SM-5055-50
50.0		55.0	60.0	H1SM-5055-60

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/H1

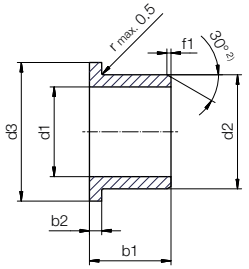
Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® H1

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

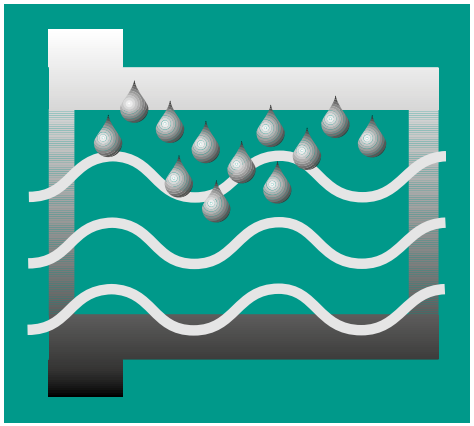
d1 [mm]	Ø 1–6	Ø 6–12	Ø 12–30	Ø > 30
f [mm]	0.3	0.5	0.8	1.2

Dimensions according to ISO 3547-1 and special dimensions

Order example: H1FM-0304-05 - no minimum order quantity.
H1 iglidur® material F Flange bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 05 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
3.0	+0.006 +0.046	4.5	7.5	5.0	0.75	**H1FM-0304-05**
5.0	+0.010 +0.058	7.0	11.0	5.0	1.00	**H1FM-0507-05**
6.0	+0.013 +0.071	8.0	12.0	4.0	1.00	**H1FM-0608-04**
6.0	+0.010 +0.058	8.0	12.0	6.0	1.00	**H1FM-0608-06**
6.0		8.0	12.0	8.0	1.00	**H1FM-0608-08**
6.0		8.0	12.0	10.0	1.00	**H1FM-0608-10**
8.0		10.0	15.0	5.5	1.00	**H1FM-0810-05**
8.0		10.0	15.0	6.5	1.00	**H1FM-0810-065**
8.0		10.0	15.0	7.5	1.00	**H1FM-0810-07**
8.0		10.0	15.0	9.5	1.00	**H1FM-0810-09**
8.0	+0.013	10.0	15.0	10.0	1.00	**H1FM-0810-10**
10.0	+0.071	12.0	18.0	7.0	1.00	**H1FM-1012-07**
10.0		12.0	18.0	9.0	1.00	**H1FM-1012-09**
10.0		12.0	18.0	10.0	1.00	**H1FM-1012-10**
10.0		12.0	18.0	12.0	1.00	**H1FM-1012-12**
10.0		12.0	18.0	17.0	1.00	**H1FM-1012-17**
12.0		14.0	20.0	7.0	1.00	**H1FM-1214-07**
12.0		14.0	20.0	9.0	1.00	**H1FM-1214-09**
12.0	+0.016	14.0	20.0	12.0	1.00	**H1FM-1214-12**
12.0	+0.086	14.0	20.0	17.0	1.00	**H1FM-1214-17**
12.0		14.0	20.0	20.0	1.00	**H1FM-1214-20**
14.0		16.0	22.0	12.0	1.00	**H1FM-1416-12**
14.0		16.0	22.0	17.0	1.00	**H1FM-1416-17**
15.0		17.0	23.0	9.0	1.00	**H1FM-1517-09**
15.0		17.0	23.0	12.0	1.00	**H1FM-1517-12**
15.0		17.0	23.0	17.0	1.00	**H1FM-1517-17**
16.0	+0.016	18.0	24.0	12.0	1.00	**H1FM-1618-12**
16.0	+0.086	18.0	24.0	17.0	1.00	**H1FM-1618-17**
16.0		18.0	24.0	25.0	1.00	**H1FM-1618-25**
18.0		20.0	26.0	12.0	1.00	**H1FM-1820-12**
18.0		20.0	26.0	17.0	1.00	**H1FM-1820-17**
18.0		20.0	26.0	22.0	1.00	**H1FM-1820-22**
20.0		23.0	30.0	11.5	1.50	**H1FM-2023-11**
20.0		23.0	30.0	16.5	1.50	**H1FM-2023-16**
20.0		23.0	30.0	21.5	1.50	**H1FM-2023-21**
20.0	+0.020	23.0	30.0	30.0	1.50	**H1FM-2023-30**
25.0	+0.104	28.0	35.0	11.5	1.50	**H1FM-2528-11**
25.0		28.0	35.0	16.5	1.50	**H1FM-2528-16**
25.0		28.0	35.0	21.5	1.50	**H1FM-2528-21**
30.0		34.0	42.0	16.0	2.00	**H1FM-3034-16**
30.0		34.0	42.0	26.0	2.00	**H1FM-3034-26**
35.0		39.0	47.0	16.0	2.00	**H1FM-3539-16**
35.0	+0.025	39.0	47.0	26.0	2.00	**H1FM-3539-26**
40.0	+0.125	44.0	52.0	30.0	2.00	**H1FM-4044-30**
40.0		44.0	52.0	40.0	2.00	**H1FM-4044-40**
45.0		50.0	58.0	50.0	2.00	**H1FM-4550-50**

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



Long service life under water

High media resistance

iglidur® H370

When to use it?

- For underwater applications
- When high temperature resistance is required
- When high mechanical loading and wear resistance is required
- When good chemical resistance is required

When not to use?

- When mechanical reaming of the bore is necessary
  iglidur® M250
- When high wear resistance in temperatures is required
  iglidur® H1
- For use in dirty surroundings
  iglidur® Z
- When a cost-effective, large-volume solution is required
  iglidur® H2

Bearing technology | Plain bearings | iglidur® H370

Ø 3.0 – 75.0 mm

Also available as:

Bar stock, round bar: Page 629

Bar stock, plate: Page 651

tribo-tape liner: Page 657

Piston rings: Page 562

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

Long service life under water: High media resistance

iglidur® H370 is the right solution for underwater applications. The bearings absorb extremely high loads, are resistant to chemicals and can be used at temperatures up to +200°C.

- Suitable for underwater applications
- Temperature-resistant from –40°C to +200°C
- High chemical resistance
- Lubrication-free
- Maintenance-free

Typical application areas

- Offshore
- Ship building
- Fluid technology
- Packaging
- Plant construction

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® H370 +200°C 75MPa

Technical data

General properties			Testing method
Density	g/cm³	1.66	
Colour		grey	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.1	DIN 53495
Max. moisture absorption	% weight	0.1	
Coefficient of friction, dynamic, against steel	µ	0.07 – 0.17	
pv value, max. (dry)	MPa · m/s	0.74	
Mechanical properties			
Flexural modulus	MPa	11,100	DIN 53457
Flexural strength at +20°C	MPa	135	DIN 53452
Compressive strength	MPa	79	
Max. recommended surface pressure (+20°C)	MPa	75	
Shore D hardness		82	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+200	
Max. application temperature short–term	°C	+240	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.50	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	5	DIN 53752
Electrical properties[5]			
Specific contact resistance	Ωcm	$< 10^5$	DIN IEC 93
Surface resistance	Ω	$< 10^5$	DIN 53482

[5] The good conductivity of this material can favour the generation of corrosion on the metallic contact components.

Table 01: Material properties table

–40°C up to +200°C

75MPa

V-0

RoHS-II

ISO 3547-1

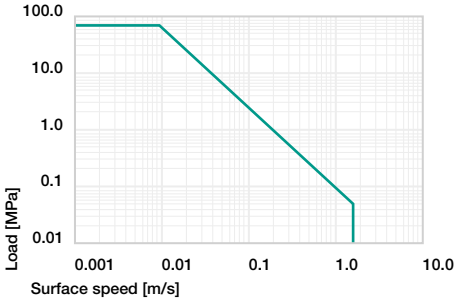


Diagram 01: Permissible pv values for iglidur® H370 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® H370 plain bearings is below 0.1% weight. The saturation limit in water is also below 0.1% weight. For this reason, iglidur® H370 plain bearings are often used for underwater applications.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is generally possible.

Radiation resistance

iglidur® H370 withstands neutron and gamma particle radiation. Plain bearings made from iglidur® H370 are resistant up to a radiation intensity of $2 \cdot 10^2$Gy.

UV resistance

iglidur® H370 plain bearings are resistant to UV radiation.

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

+ resistant 0 conditionally resistant – not resistant

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® H370

iglidur® H370 is an advanced development of the iglidur® H series. The material is characterised by particularly low moisture absorption and clearly enhanced wear resistance. With regard to the mechanical and thermal characteristic values, iglidur® H370 shows the same features as iglidur® H.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® H370 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

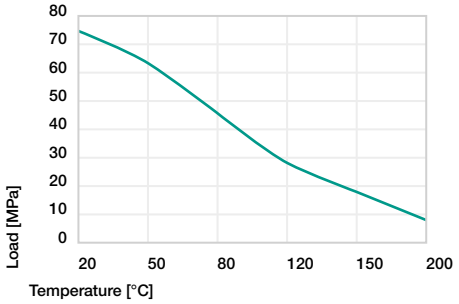


Diagram 02: Maximum recommended surface pressure as a function of temperature (75MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® H370 at radial loads. At the maximum recommended surface pressure of 75MPa at room temperature the deformation is less than 2.5%.

Surface pressure, page 41

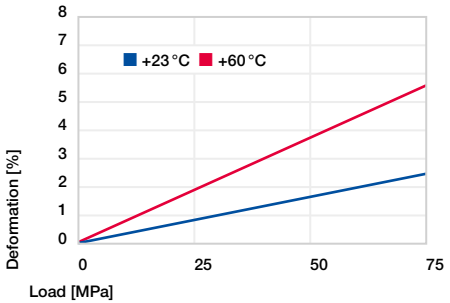


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

The maximum permitted surface speed is dependent on whether the temperature at the bearing point becomes too high or not. iglidur® H370 is suitable for surface speeds of 1.2m/s (rotating) and 4.0m/s (linear) respectively. The maximum values stated in table 03 are valid only with minimum pressure loads and are often not attained in practice.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.2	0.8	4.0
short-term	**m/s**	1.5	1.1	5.0

Table 03: Maximum surface speeds

Temperature

With increasing temperatures, the compressive strength of iglidur® H370 plain bearings decreases. The temperatures prevailing in the bearing system also have an influence on the wear. The wear rises with increasing temperatures. For temperatures over +100°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction alters only little, like the wear resistance with increasing load and surface speed (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

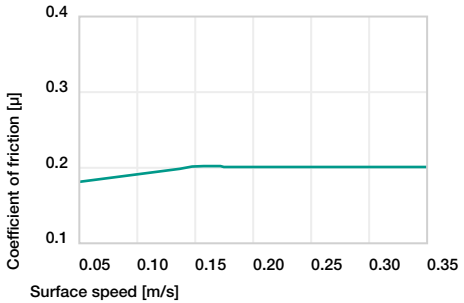


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

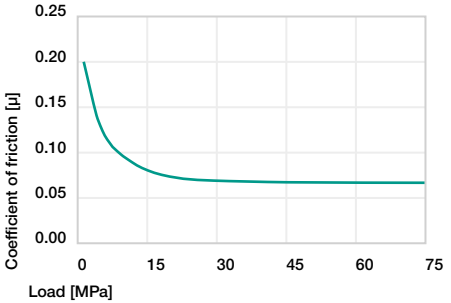


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

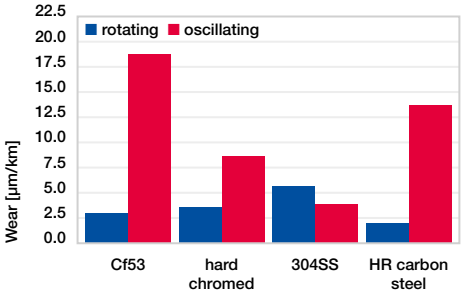


Diagram 07: Wear for rotating and oscillating applications with different shaft materials, p = 2MPa

Shaft materials

Diagrams 06 and 07 show the test results of iglidur® H370 plain bearings running against various shaft materials. For loads up to 2MPa in rotating applications, the hard-chromed shaft is the best material for the iglidur® H370 plain bearings. The high coefficient of wear with 304 stainless steel shafts, which due to their extremely ground surfaces are prone to the stick-slip effect, is striking. Despite same values in the lowest range, the HR carbon steel shaft shows already better values than Cf53 with loads of 2MPa. On the other hand, the 304 stainless steel shaft shows a clear advantage in pivoting movements.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.07 – 0.17	0.09	0.04	0.04

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

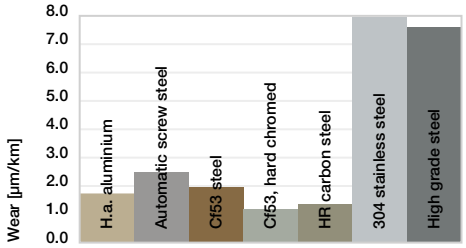


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® H370 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 F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

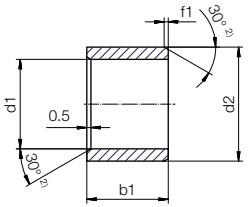
Testing methods, page 57

Ø d1 [mm]	Housing H7 [mm]		Plain bearing F10 [mm]		Shaft h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Bearing technology | Plain bearings | iglidur® H370

Sleeve bearing (form S)



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

Dimensions according to ISO 3547-1 and special dimensions

Order example: H370SM-0304-03 - no minimum order quantity.
H370 iglidur® material S Sleeve bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 03 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
3.0	+0.006 +0.046	4.5	3.0	H370SM-0304-03
4.0		5.5	4.0	H370SM-0405-04
4.0		5.5	6.0	H370SM-0405-06
4.0		5.5	12.0	H370SM-0405-12
5.0	+0.010 +0.058	7.0	5.0	H370SM-0507-05
5.0		7.0	10.0	H370SM-0507-10
6.0		8.0	6.0	H370SM-0608-06
6.0		8.0	8.0	H370SM-0608-08
6.0		8.0	10.0	H370SM-0608-10
8.0		10.0	8.0	H370SM-0810-08
8.0		10.0	10.0	H370SM-0810-10
8.0		10.0	12.0	H370SM-0810-12
8.0		10.0	15.0	H370SM-0810-15
10.0	+0.013 +0.071	12.0	8.0	H370SM-1012-08
10.0		12.0	10.0	H370SM-1012-10
10.0		12.0	12.0	H370SM-1012-12
10.0		12.0	15.0	H370SM-1012-15
10.0		12.0	20.0	H370SM-1012-20
12.0		14.0	10.0	H370SM-1214-10
12.0		14.0	12.0	H370SM-1214-12
12.0		14.0	15.0	H370SM-1214-15
12.0		14.0	20.0	H370SM-1214-20
13.0	+0.016 +0.086	15.0	10.0	H370SM-1315-10
13.0		15.0	20.0	H370SM-1315-20
14.0		16.0	15.0	H370SM-1416-15
14.0		16.0	20.0	H370SM-1416-20
14.0		16.0	25.0	H370SM-1416-25
15.0		17.0	15.0	H370SM-1517-15
15.0	+0.016 +0.086	17.0	20.0	H370SM-1517-20
15.0		17.0	25.0	H370SM-1517-25
16.0		18.0	15.0	H370SM-1618-15
16.0		18.0	20.0	H370SM-1618-20
16.0		18.0	25.0	H370SM-1618-25
18.0		20.0	15.0	H370SM-1820-15
18.0		20.0	20.0	H370SM-1820-20
18.0		20.0	25.0	H370SM-1820-25
20.0		23.0	10.0	H370SM-2023-10
20.0		23.0	15.0	H370SM-2023-15
20.0		23.0	20.0	H370SM-2023-20
20.0		23.0	25.0	H370SM-2023-25
20.0		23.0	30.0	H370SM-2023-30
22.0		25.0	15.0	H370SM-2225-15
22.0		25.0	20.0	H370SM-2225-20
22.0		25.0	25.0	H370SM-2225-25
22.0		25.0	30.0	H370SM-2225-30
24.0	+0.020 +0.104	27.0	15.0	H370SM-2427-15
24.0		27.0	20.0	H370SM-2427-20
24.0		27.0	25.0	H370SM-2427-25
24.0		27.0	30.0	H370SM-2427-30
25.0		28.0	15.0	H370SM-2528-15
25.0		28.0	20.0	H370SM-2528-20
25.0		28.0	25.0	H370SM-2528-25
25.0		28.0	30.0	H370SM-2528-30
28.0		32.0	20.0	H370SM-2832-20
28.0		32.0	25.0	H370SM-2832-25
28.0		32.0	30.0	H370SM-2832-30
30.0		34.0	20.0	H370SM-3034-20

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

Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
30.0	+0.020 +0.104	34.0	25.0	H370SM-3034-25
30.0		34.0	30.0	H370SM-3034-30
30.0		34.0	40.0	H370SM-3034-40
32.0	+0.025 +0.125	36.0	20.0	H370SM-3236-20
32.0		36.0	30.0	H370SM-3236-30
32.0		36.0	40.0	H370SM-3236-40
35.0		39.0	20.0	H370SM-3539-20
35.0		39.0	30.0	H370SM-3539-30
35.0		39.0	40.0	H370SM-3539-40
35.0		39.0	50.0	H370SM-3539-50
40.0		44.0	20.0	H370SM-4044-20
40.0		44.0	30.0	H370SM-4044-30
40.0		44.0	40.0	H370SM-4044-40
40.0	+0.025 +0.125	44.0	50.0	H370SM-4044-50
45.0		50.0	20.0	H370SM-4550-20
45.0		50.0	30.0	H370SM-4550-30
45.0		50.0	40.0	H370SM-4550-40
45.0		50.0	50.0	H370SM-4550-50
50.0	+0.000 +0.100	55.0	20.0	H370SM-5055-20
50.0		55.0	30.0	H370SM-5055-30
50.0		55.0	40.0	H370SM-5055-40
50.0		55.0	50.0	H370SM-5055-50
50.0		55.0	60.0	H370SM-5055-60
55.0	+0.030 +0.150	60.0	26.0	H370SM-5560-26
60.0		65.0	60.0	H370SM-6065-60
75.0		80.0	60.0	H370SM-7580-60

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/H370

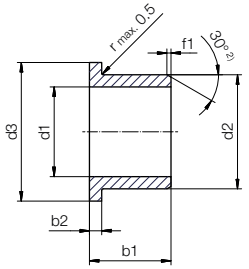
Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® H370

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: H370FM-0405-04 - no minimum order quantity.
H370 iglidur® material F Flange bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 04 Total length b1

d1	d1 Tolerance[3]	d2	d3 d13	b1 h13	b2 –0,14	Part No.
[mm]		[mm]	[mm]	[mm]	[mm]	
4.0		5.5	9.5	4.0	0.75	H370FM-0405-04
5.0	+0.010 +0.058	7.0	11.0	5.0	1.00	H370FM-0507-05
6.0		8.0	12.0	4.0	1.00	H370FM-0608-04
6.0		8.0	12.0	6.0	1.00	H370FM-0608-06
6.0		8.0	12.0	8.0	1.00	H370FM-0608-08
8.0		10.0	15.0	5.5	1.00	H370FM-0810-05
8.0		10.0	15.0	6.0	1.00	H370FM-0810-06
8.0		10.0	15.0	7.5	1.00	H370FM-0810-07
8.0		10.0	15.0	9.5	1.00	H370FM-0810-09
8.0		10.0	15.0	10.0	1.00	H370FM-0810-10
8.0		10.0	15.0	15.0	1.00	H370FM-0810-15
10.0	+0.013 +0.071	12.0	18.0	7.0	1.00	H370FM-1012-07
10.0		12.0	18.0	9.0	1.00	H370FM-1012-09
10.0		12.0	18.0	10.0	1.00	H370FM-1012-10
10.0		12.0	18.0	12.0	1.00	H370FM-1012-12
10.0		12.0	18.0	14.5	1.00	H370FM-1012-145
10.0		12.0	18.0	17.0	1.00	H370FM-1012-17
10.0		12.0	18.0	20.0	1.00	H370FM-1012-20
12.0		14.0	20.0	7.0	1.00	H370FM-1214-07
12.0		14.0	20.0	9.0	1.00	H370FM-1214-09
12.0		14.0	20.0	12.0	1.00	H370FM-1214-12
12.0	+0.016	14.0	20.0	15.0	1.00	H370FM-1214-15
12.0	+0.086	14.0	20.0	17.0	1.00	H370FM-1214-17
12.0		14.0	20.0	20.0	1.00	H370FM-1214-20
14.0		16.0	22.0	12.0	1.00	H370FM-1416-12
14.0		16.0	22.0	17.0	1.00	H370FM-1416-17

d1	d1 Tolerance[3]	d2	d3 d13	b1 h13	b2 –0,14	Part No.
[mm]		[mm]	[mm]	[mm]	[mm]	
15.0		17.0	23.0	9.0	1.00	H370FM-1517-09
15.0		17.0	23.0	12.0	1.00	H370FM-1517-12
15.0		17.0	23.0	17.0	1.00	H370FM-1517-17
16.0		18.0	24.0	10.0	1.00	H370FM-1618-10
16.0		18.0	22.0	10.0	1.00	H370FM-161822-10
16.0	+0.016 +0.086	18.0	24.0	12.0	1.00	H370FM-1618-12
16.0		18.0	24.0	17.0	1.00	H370FM-1618-17
16.0		18.0	24.0	25.0	1.00	H370FM-1618-25
18.0		20.0	26.0	12.0	1.00	H370FM-1820-12
18.0		20.0	26.0	17.0	1.00	H370FM-1820-17
18.0		20.0	26.0	22.0	1.00	H370FM-1820-22
20.0		23.0	30.0	11.5	1.50	H370FM-2023-11
20.0		23.0	30.0	16.5	1.50	H370FM-2023-16
20.0		23.0	30.0	21.5	1.50	H370FM-2023-21
20.0		23.0	30.0	30.0	1.50	H370FM-2023-30
22.0		25.0	32.0	21.5	1.50	H370FM-222532-215
25.0	+0.020	28.0	35.0	11.5	1.50	H370FM-2528-11
25.0	+0.104	28.0	35.0	16.5	1.50	H370FM-2528-16
25.0		28.0	35.0	21.5	1.50	H370FM-2528-21
25.0		28.0	35.0	30.0	1.50	H370FM-2528-30
30.0		34.0	42.0	16.0	2.00	H370FM-3034-16
30.0		34.0	42.0	26.0	2.00	H370FM-3034-26
30.0		34.0	42.0	40.0	2.00	H370FM-3034-40
35.0	+0.025 +0.125	39.0	47.0	16.0	2.00	H370FM-3539-16
35.0		39.0	47.0	26.0	2.00	H370FM-3539-26
40.0		44.0	52.0	30.0	2.00	H370FM-4044-30

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

Product range

d1	d1 Tolerance[3]	d2	d3 d13	b1 h13	b2 –0,14	Part No.
[mm]		[mm]	[mm]	[mm]	[mm]	
40.0	+0.025 +0.125	44.0	52.0	40.0	2.00	H370FM-4044-40
45.0		50.0	58.0	50.0	2.00	H370FM-4550-50
50.0		55.0	63.0	50.0	2.00	H370FM-5055-50

d1	d1 Tolerance[3]	d2	d3 d13	b1 h13	b2 –0,14	Part No.
[mm]		[mm]	[mm]	[mm]	[mm]	
60.0	+0.030 +0.150	65.0	73.0	50.0	2.00	H370FM-6065-50
70.0		75.0	83.0	50.0	2.00	H370FM-7075-50

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

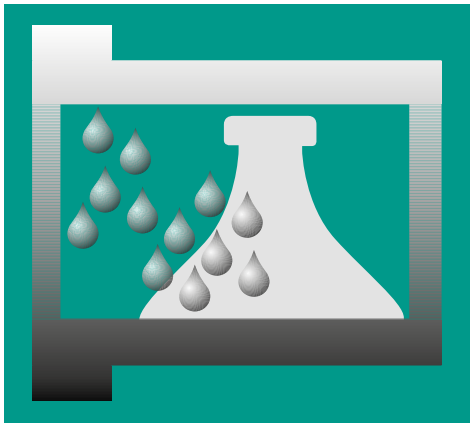
Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/H370

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.



The classic with high resistance to media and temperature

Up to +200°C

iglidur® H

When to use it?

- For underwater applications
- When high temperature resistance is required
- For high mechanical loading
- For applications in contact with chemicals

When not to use?

- When extremely high wear resistance under water is required
  iglidur® H370
- When the best universal resistance to chemicals is required
  iglidur® X
- For the maximum compressive strength at higher temperatures
  iglidur® X, iglidur® Z

Bearing technology | Plain bearings | iglidur® H

Ø
3.0 – 70.0
mm

Also available as:

Bar stock, round bar: **Page 629**

Bar stock, plate: **Page 651**

tribo-tape liner: **Page 657**

Piston rings: **Page 559**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 783**

The classic with high resistance to media and temperature: Up to +200°C

Suitable for temperatures up to +200°C. Very low coefficient of friction when used with hardened shafts.

- Suitable for underwater applications
- High temperature resistance
- Resistant to chemicals
- Lubrication-free
- Maintenance-free

Typical application areas

- Offshore
- Ship building
- Beverage industry
- Medical technology
- Mechatronics

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® H
+200°C
90MPa

Technical data

General properties			Testing method
Density	g/cm³	1.71	
Colour		grey	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.1	DIN 53495
Max. moisture absorption	% weight	0.3	
Coefficient of friction, dynamic, against steel	µ	0.07 – 0.20	
pv value, max. (dry)	MPa · m/s	1.37	
Mechanical properties			
Flexural modulus	MPa	12,500	DIN 53457
Flexural strength at +20°C	MPa	175	DIN 53452
Compressive strength	MPa	81	
Max. recommended surface pressure (+20°C)	MPa	90	
Shore D hardness		87	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+200	
Max. application temperature short–term	°C	+240	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.60	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	4	DIN 53752
Electrical properties[5]			
Specific contact resistance	Ωcm	$< 10^5$	DIN IEC 93
Surface resistance	Ω	$< 10^2$	DIN 53482

[5] The good conductivity of this plastic material under certain circumstances can favour the generation of corrosion on the metallic contact components.

Table 01: Material properties table

–40°C up to +200°C

90MPa

V-0

RoHS-II

ISO 3547-1

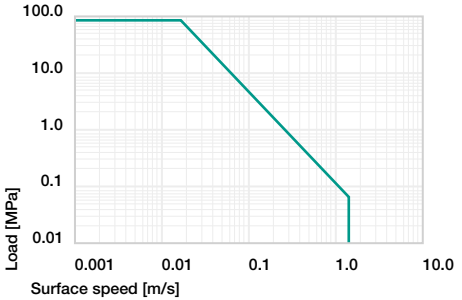


Diagram 01: Permissible pv values for iglidur® H plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® H plain bearings is below 0.1% weight. The saturation limit in water is 0.3% weight. iglidur® H is very well suited for use in wet environments.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is generally possible.

Radiation resistance

iglidur® H withstands neutron and gamma particle radiation. Plain bearings made from iglidur® H are resistant up to a radiation intensity of $2 \cdot 10^2$Gy.

UV resistance

iglidur® H plain bearings are partially resistant to UV radiation.

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

+ resistant 0 conditionally resistant – not resistant

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® H

iglidur® H is a fibre-reinforced thermoplastic material especially developed for applications in high atmospheric humidity or under water. Plain bearings made from iglidur® H can be used completely free of lubrication; in wet applications, the surrounding media acts as additional lubricant.

Mechanical properties

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

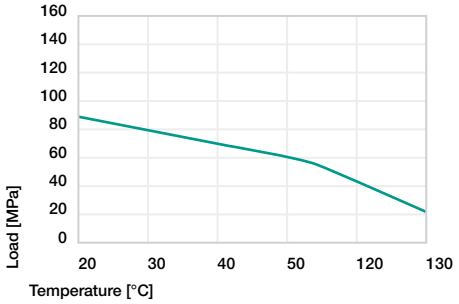


Diagram 02: Maximum recommended surface pressure as a function of temperature (90MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® H at radial loads. At the maximum recommended surface pressure of 90MPa the deformation is about 2.5% at room temperature.

Surface pressure, page 41

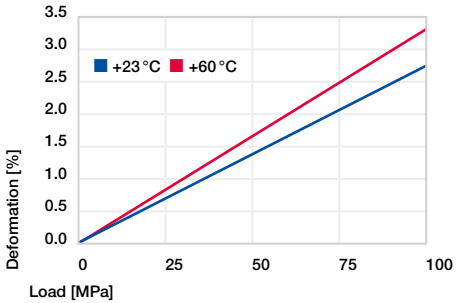


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

The maximum permitted surface speed is dependent on whether the temperature at the bearing point becomes too high or not. iglidur® H is suitable for maximum surface speeds of 1.0m/s (rotating) and 3.0m/s (linear) in dry operation. Linear movements enable higher surface speeds, as a large area of the shaft contributes to the cooling.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.0	0.7	3.0
short-term	**m/s**	1.5	1.1	4.0

Table 03: Maximum surface speeds

Temperature

With increasing temperatures, the compressive strength of iglidur® H plain bearings decreases. Diagram 02 shows this inverse relationship. The temperatures prevailing in the bearing system also have an influence on the wear. For temperatures over +120°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Both the wear resistance and the coefficient of friction change depending on the load. Interestingly, the coefficient of friction μ lowers slightly with the increase of surface speed at constant load (see diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

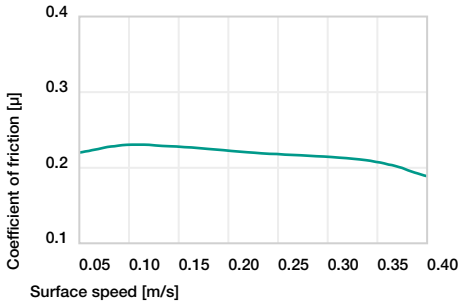


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

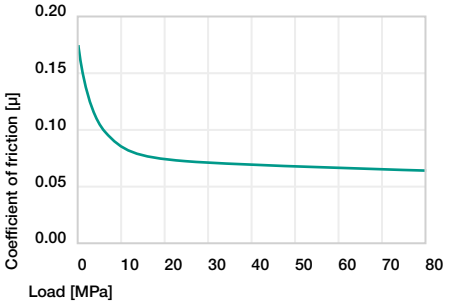


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

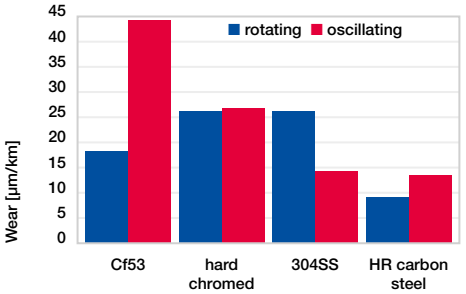


Diagram 07: Wear for rotating and oscillating applications with different shaft materials, p = 2MPa

Shaft materials

Diagrams 06 and 07 show the test results of iglidur® H plain bearings running against various shaft materials. The iglidur® H plain bearings give different results when used in rotating and pivoting applications on different shaft materials. The Cf53 and HR carbon steel shafts give the best wear values in rotating applications, whereas the 304 stainless steel shafts (which are not so good for rotation) give the best results in pivoting applications. Hard-chromed shafts only give an advantage at low pressures when used with iglidur® H bearings.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.07 – 0.20	0.09	0.04	0.04

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

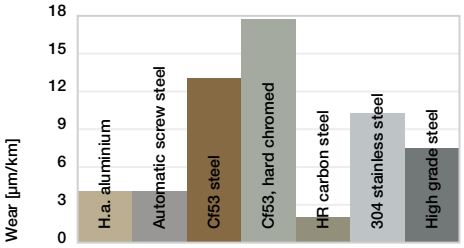


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® H 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 F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

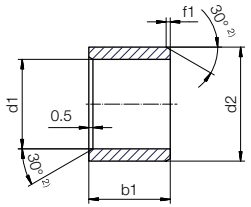
Testing methods, page 57

Ø d1 [mm]	Housing H7 [mm]		Plain bearing F10 [mm]		Shaft h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Bearing technology | Plain bearings | iglidur® H

Sleeve bearing (form S)



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

Dimensions according to ISO 3547-1 and special dimensions

Order example: HSM-0304-03 - no minimum order quantity.
H iglidur® material S Sleeve bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 03 Total length b1

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
3.0	+0.006 +0.046	4.5	3.0	HSM-0304-03
4.0		5.5	4.0	HSM-0405-04
5.0	+0.010	7.0	5.0	HSM-0507-05
6.0	+0.058	8.0	3.0	HSM-0608-03
6.0		8.0	6.0	HSM-0608-06
8.0		10.0	8.0	HSM-0810-08
8.0	+0.013	10.0	10.0	HSM-0810-10
10.0	+0.071	12.0	6.0	HSM-1012-06
10.0		12.0	10.0	HSM-1012-10
12.0		14.0	10.0	HSM-1214-10
12.0		14.0	12.0	HSM-1214-12
12.0		14.0	15.0	HSM-1214-15
12.0		14.0	20.0	HSM-1214-20
14.0	+0.016 +0.086	16.0	20.0	HSM-1416-20
15.0		17.0	15.0	HSM-1517-15
16.0		18.0	15.0	HSM-1618-15
16.0		18.0	20.0	HSM-1618-20
16.0		18.0	25.0	HSM-1618-25

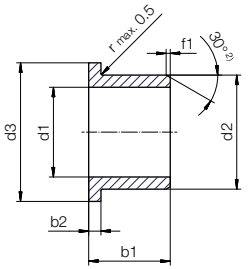
d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
18.0	+0.016	20.0	15.0	HSM-1820-15
18.0	+0.086	20.0	25.0	HSM-1820-25
20.0		23.0	20.0	HSM-2023-20
20.0		23.0	30.0	HSM-2023-30
22.0		25.0	20.0	HSM-2225-20
25.0	+0.020	28.0	15.0	HSM-2528-15
25.0	+0.104	28.0	20.0	HSM-2528-20
30.0		34.0	20.0	HSM-3034-20
30.0		34.0	30.0	HSM-3034-30
30.0		34.0	40.0	HSM-3034-40
32.0		36.0	30.0	HSM-3236-30
35.0		39.0	40.0	HSM-3539-40
40.0	+0.025	44.0	20.0	HSM-4044-20
40.0	+0.125	44.0	50.0	HSM-4044-50
45.0		50.0	30.0	HSM-4550-30
50.0		55.0	40.0	HSM-5055-40
55.0	+0.030	60.0	26.0	HSM-5560-26
60.0	+0.150	65.0	60.0	HSM-6065-60
70.0		75.0	50.0	HSM-7075-50

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

iglidur® H
+200°C
90MPa

Bearing technology | Plain bearings | iglidur® H

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: HFM-0405-04 - no minimum order quantity.
H iglidur® material F Flange bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 04 Total length b1

d1 [mm]	d1 Tolerance 3)	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
4.0		5.5	9.5	4.0	0.75	HFM-0405-04
5.0		7.0	11.0	5.0	1.00	HFM-0507-05
5.0	+0.010	7.0	11.0	8.0	1.00	HFM-0507-08
6.0	+0.058	8.0	12.0	4.0	1.00	HFM-0608-04
6.0		8.0	12.0	6.0	1.00	HFM-0608-06
6.0		8.0	12.0	10.0	1.00	HFM-0608-10
8.0		10.0	15.0	7.0	1.00	HFM-0810-07
8.0		10.0	15.0	10.0	1.00	HFM-0810-10
8.0	+0.013	10.0	15.0	15.0	1.00	HFM-0810-15
10.0	+0.071	12.0	18.0	4.0	1.00	HFM-1012-04
10.0		12.0	18.0	9.0	1.00	HFM-1012-09
10.0		12.0	18.0	15.0	1.00	HFM-1012-15
10.0		12.0	18.0	20.0	1.00	HFM-1012-20
12.0		14.0	20.0	7.0	1.00	HFM-1214-07
12.0	+0.016	14.0	20.0	10.0	1.00	HFM-1214-10
12.0	+0.086	14.0	20.0	15.0	1.00	HFM-1214-15
14.0		16.0	22.0	12.0	1.00	HFM-1416-12

d1 [mm]	d1 Tolerance 3)	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
15.0		17.0	23.0	17.0	1.00	HFM-1517-17
16.0	+0.016	18.0	24.0	13.0	1.00	HFM-1618-13
16.0	+0.086	18.0	24.0	17.0	1.00	HFM-1618-17
18.0		20.0	26.0	17.0	1.00	HFM-1820-17
20.0		23.0	30.0	7.0	1.50	HFM-2023-07
20.0		23.0	30.0	16.5	1.50	HFM-2023-16
20.0	+0.020	23.0	30.0	30.0	1.50	HFM-2023-30
25.0	+0.104	28.0	35.0	30.0	1.50	HFM-2528-30
27.0		30.0	38.0	20.0	1.50	HFM-2730-20
30.0		34.0	42.0	40.0	2.00	HFM-3034-40
34.0		38.0	46.0	13.0	2.00	HFM-3438-13
35.0	+0.025	39.0	47.0	26.0	2.00	HFM-3539-26
40.0	+0.125	44.0	52.0	40.0	2.00	HFM-4044-40
45.0		50.0	58.0	50.0	2.00	HFM-4550-50
50.0		55.0	63.0	50.0	2.00	HFM-5055-50
60.0	+0.030	65.0	73.0	50.0	2.00	HFM-6065-50
70.0	+0.150	75.0	83.0	50.0	2.00	HFM-7075-50

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

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Online ordering
including delivery times, prices, online tools
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Discount scaling		
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10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
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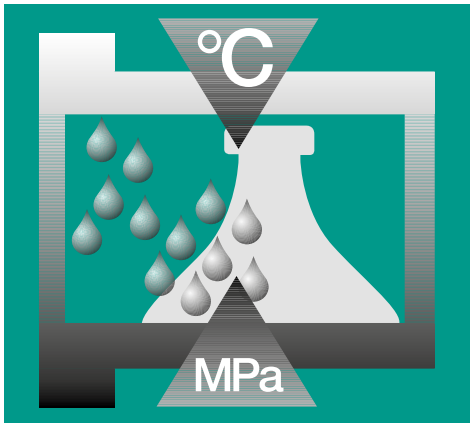


High temperature endurance runner

Extreme wear and media resistance
up to +250°C

iglidur® C500

When to use it?

- When an extremely media-resistant plain bearing with high flexibility is required
- When a wear-resistant and media-resistant plain bearing is required

When not to use?

- When an FDA-compliant high-temperature plain bearing is required
  iglidur® A500
- When a media-resistant, high-temperature plain bearing with the largest possible range of dimensions is required
  iglidur® X

Bearing technology | Plain bearings | iglidur® C500

Ø 6.0 – 40.0 mm

Also available as:

Bar stock, round bar: Page 643

Bar stock, plate: Page 651

tribo-tape liner: Page 657

Piston rings: Page 559

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

High temperature endurance runner: Extreme wear and media resistance up to +250°C

iglidur® C500 can be used up to +250°C and is extremely media-resistant (even in cleaning processes using hydrogen peroxide). It is also wear-resistant and has low coefficient of friction. Also suitable for various special designs. The colour represents extreme environmental conditions.

- High temperature resistance
- Resistant to water vapour
- Low coefficient of friction
- Lubrication-free
- High wear resistance
- High media resistance
- Maintenance-free

Typical application areas

- Plant construction
- Valves
- Chemical industry
- Process technology

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® C500 +250°C 80MPa

Technical data

General properties			Testing method
Density	g/cm³	1.37	
Colour		magenta	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.3	DIN 53495
Max. moisture absorption	% weight	0.5	
Coefficient of friction, dynamic, against steel	µ	0.07 – 0.19	
pv value, max. (dry)	MPa · m/s	0.70	
Mechanical properties			
Flexural modulus	MPa	3,300	DIN 53457
Flexural strength at +20°C	MPa	100	DIN 53452
Compressive strength	MPa	110	
Max. recommended surface pressure (+20°C)	MPa	80	
Shore D hardness		80	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+250	
Max. application temperature short–term	°C	+300	
Min. application temperature	°C	–100	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	9	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{14}$	DIN IEC 93
Surface resistance	Ω	$> 10^{13}$	DIN 53482

Table 01: Material properties table

–100°C up to +250°C

80MPa

V-0

RoHS-II

ISO 3547-1

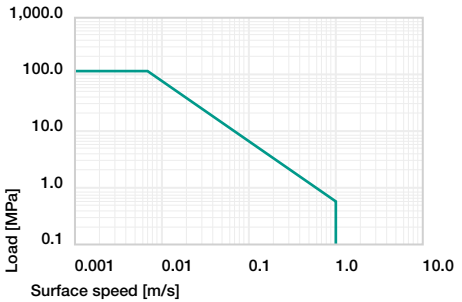


Diagram 01: Permissible pv values for iglidur® C500 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® C500 plain bearings is below 0.3% weight. The saturation limit in water is also below 0.5% weight.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is generally possible.

Radiation resistance

iglidur® C500 withstands neutron and gamma particle radiation without detectable losses of its excellent mechanical properties. Plain bearings made from iglidur® C500 are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® C500 plain bearings are resistant to permanent UV radiation.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® C500

iglidur® C500 is a member of the family of extremely media and temperature-resistant iglidur® materials X, X6 and A500. This material is characterised by improved wear resistance and increased design freedom.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® C500 plain bearings decreases. Diagram 02 shows this inverse relationship. However, at an operation temperature of +200°C the permissible surface pressure is close to 20MPa. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

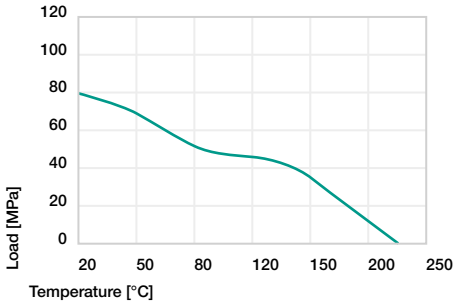


Diagram 02: Maximum recommended surface pressure as a function of temperature (80MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® C500 at radial loads. At the maximum recommended surface pressure of 80MPa the deformation is less than 4.5%.

Surface pressure, page 41

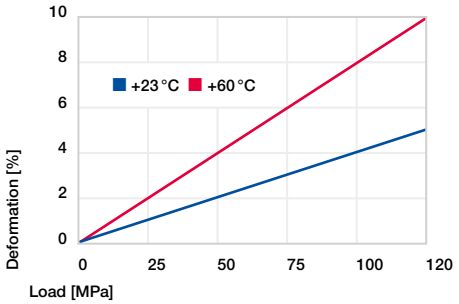


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

The maximum recommended surface speed is based on the friction heat generated at the bearing surface. The temperature should only be permitted to increase to a value that will ensure a sustainable use of the bearing with respect to wear and dimensional integrity. The maximum values stated in table 03 are valid only with minimum pressure loads and are often not attained in practice.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.9	0.7	2.4
short-term	**m/s**	1.1	1.0	2.8

Table 03: Maximum surface speeds

Temperature

iglidur® C500 belongs to the most temperature-resistant iglidur® materials. As in the case of all thermoplastics, the compression strength of iglidur® C500 decreases when temperatures rise. The temperatures prevailing in the bearing system also have an influence on the wear. The wear rises with increasing temperatures. For temperatures over +130°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction and wear in iglidur® C500 are more favourable than in the other high temperature materials iglidur® X and A500. The coefficient of friction increases moderately as the sliding speed increases. The coefficient of friction initially drops rapidly to less than 0.1 under loads of up to approximately 20MPa, and then only marginally increases as loads continue to increase. The friction and wear are also dependent, to a large degree, on the shaft material. Shafts that are too smooth, increase both the coefficient of friction and the wear of the bearing. Ideal are ground surfaces with an average surface finish of 0.6 – 0.8µm.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

Technical data

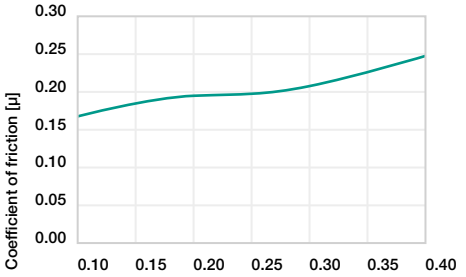


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

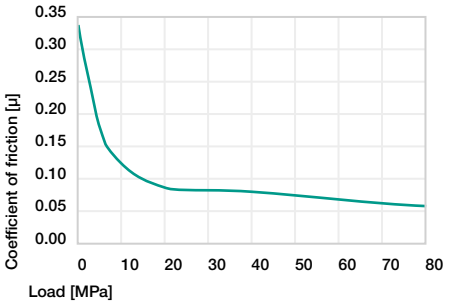


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

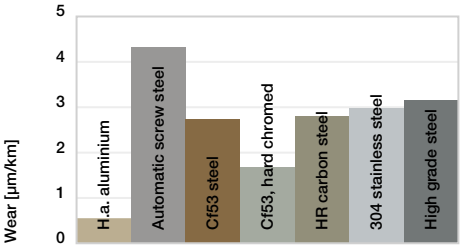


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

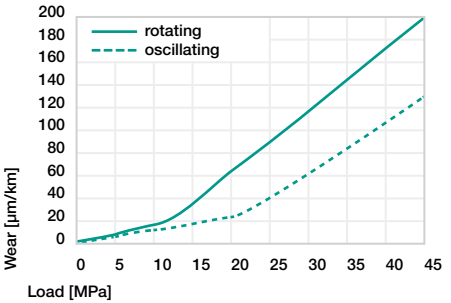


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

Diagram 06 shows the test results of iglidur® C500 plain bearings running against various shaft materials. Using the example of a rotating motion at 1MPa and a speed of 0.3m/s, it becomes apparent that iglidur® C500 has very consistent wear characteristics across a variety of shaft types. This wear rate spikes in combination with free cutting steel, and, notably so, reduces in combination with HC aluminium. The wear under rotational loads is higher, specifically with increasing radial loads as compared to pivoting movements (diagram 07).

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.07 – 0.19	0.09	0.04	0.04

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

Installation tolerances

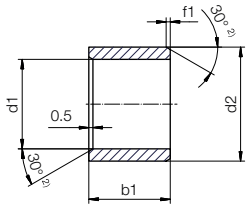
iglidur® C500 plain bearings are standard bearings for shafts with h tolerance (recommended minimum h9). The bearings are designed for press-fit into a housing machined to a H7 tolerance. After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the F10 tolerances.

Testing methods, page 57

Ø d1 [mm]	Housing H7 [mm]		Plain bearing F10 [mm]		Shaft h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Sleeve bearing (form S)



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

Dimensions according to ISO 3547-1 and special dimensions

Order example: C500SM-0608-06 - no minimum order quantity.
C500 iglidur® material S Sleeve bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
6.0	+0.010 +0.058	8.0	6.0	C500SM-0608-06
8.0	+0.013 +0.071	10.0	10.0	C500SM-0810-10
10.0		12.0	10.0	C500SM-1012-10
12.0	+0.016 +0.086	14.0	12.0	C500SM-1214-12
16.0		18.0	15.0	C500SM-1618-15
20.0	+0.020 +0.104	23.0	20.0	C500SM-2023-20
40.0	+0.025 +0.125	44.0	30.0	C500SM-4044-30

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/C500

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
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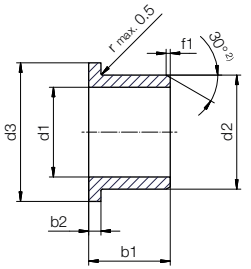
Bearing technology | Plain bearings | iglidur® C500

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 6–12	Ø 12–30
f [mm]	0.5	0.8

Dimensions according to ISO 3547-1 and special dimensions

Order example: C500FM-0608-06 - no minimum order quantity.
C500 iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.010 +0.058	8.0	12.0	6.0	1.00	C500FM-0608-06
8.0	+0.013 +0.071	10.0	15.0	10.0	1.00	C500FM-0810-10
10.0		12.0	18.0	10.0	1.00	C500FM-1012-10
12.0	+0.016 +0.086	14.0	20.0	12.0	1.00	C500FM-1214-12
16.0		18.0	24.0	17.0	1.00	C500FM-1618-17
20.0	+0.020 +0.104	23.0	30.0	21.5	1.50	C500FM-2023-21

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
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Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
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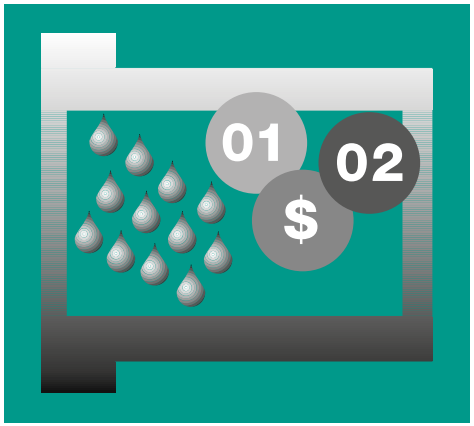

The low-cost specialist for chemicals and temperatures

Up to +200°C, most capable under static load

iglidur® H2

When to use it?

- For underwater applications
- When a cost-effective plain bearing for high temperatures is required
- For applications with fuels, oils, etc.

When not to use?

- When the highest wear resistance is required
  iglidur® H1, iglidur® H4, iglidur® W300
- When vibration dampening is necessary
  iglidur® B, iglidur® M250
- When neither increased temperatures nor media contact occur
  iglidur® GLW

Bearing technology | Plain bearings | iglidur® H2

Ø
–

Also available as:

Bar stock, round bar: **Page 629**

Bar stock, plate: **Page 651**

tribo-tape liner: **Page 657**

Piston rings: **Page 559**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 783**

The low-cost specialist for chemicals and temperatures:
Up to +200°C, most capable under static load

For applications with high temperature requirements. Can be conditionally used in dry operation; excellent properties with additional lubrication.

- Suitable for underwater applications
- Cost-effective
- Resistant to chemicals
- High temperature resistance
- Lubrication-free
- Maintenance-free

Typical application areas

- Automotive industry
- Actuator
- Bicycle industry

Descriptive technical specifications			
Wear resistance at +23°C	–		+
Wear resistance at +90°C	–		+
Wear resistance at +150°C	–		+
Low coefficient of friction	–		+
Low moisture absorption	–		+
Wear resistance under water	–		+
High media resistance	–		+
Resistant to edge pressures	–		+
Suitable for shock and impact loads	–		+
Resistant to dirt	–		+

Online product finder
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Online service life calculation
www.igus.eu/iglidur-expert

iglidur® H2
+200°C
110MPa

Technical data

General properties			Testing method
Density	g/cm³	1.72	
Colour		brown	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.1	DIN 53495
Max. moisture absorption	% weight	0.2	
Coefficient of friction, dynamic, against steel	µ	0.07 – 0.30	
pv value, max. (dry)	MPa · m/s	0.58	
Mechanical properties			
Flexural modulus	MPa	10,300	DIN 53457
Flexural strength at +20°C	MPa	210	DIN 53452
Compressive strength	MPa	109	
Max. recommended surface pressure (+20°C)	MPa	110	
Shore D hardness		88	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+200	
Max. application temperature short–term	°C	+240	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	4	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{15}$	DIN IEC 93
Surface resistance	Ω	$> 10^{14}$	DIN 53482

Table 01: Material properties table

–40°C up to +200°C

110MPa

V-0

RoHS-II

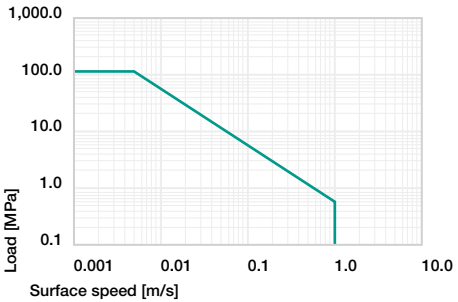


Diagram 01: Permissible pv values for iglidur® H2 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® H2 plain bearings is below 0.1% weight. The saturation limit in water is 0.2% weight. iglidur® H2 is an ideal material for wet environments.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is generally possible.

Radiation resistance

iglidur® H2 withstands neutron and gamma particle radiation. Plain bearings made from iglidur® H2 are resistant up to a radiation intensity of $2 \cdot 10^2$Gy.

UV resistance

The use of iglidur® H2 in applications that are permanently exposed to UV should be closely investigated.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® H2

In applications with iglidur® H2 plain bearings, economical aspects are in focus. It is the first time that it is possible to offer such a high-performance bearing for high volume applications with these technical advantages at such a low price: temperatures up to +200°C, permitted surface pressure up to 110N/mm², and excellent chemical resistance. The iglidur® H2 plain bearings are self-lubricating and suitable for all motions.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® H2 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

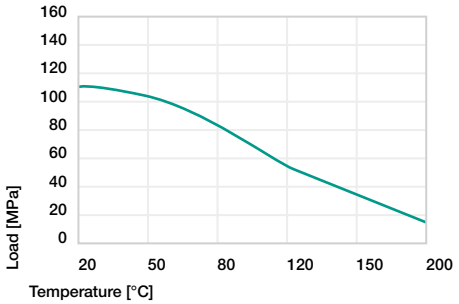


Diagram 02: Maximum recommended surface pressure as a function of temperature (110MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® H2 at radial loads. At the maximum recommended surface pressure of 110MPa at room temperature the deformation is less than 3%. The values for tensile and compressive strength are higher than those of iglidur® H at room temperature.

Surface pressure, page 41

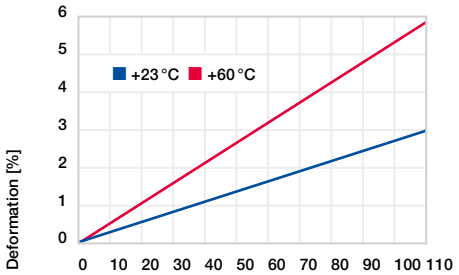


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

During the development of iglidur® H2, costs and mechanical stability were the main considerations. The permitted surface speeds of this bearing are rather low, which primarily permits an application with slow movements or in intermittent service.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.9	0.6	2.5
short-term	**m/s**	1.0	0.7	3.0

Table 03: Maximum surface speeds

Temperature

iglidur® H2 is an extremely temperature-resistant material. The short-term maximum permissible temperature is +240°C and allows the use of iglidur® H2 plain bearings in applications where the bearings are not subjected to any additional load such as a paint drying process. The temperatures prevailing in the bearing system also have an influence on the wear. The wear rises with increasing temperatures. For temperatures over +110°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction of iglidur® H2 plain bearings changes with different surface speeds, loads and surface finishes, as indicated in the diagrams 04 and 05.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

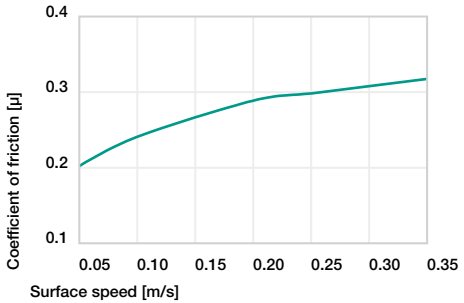


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

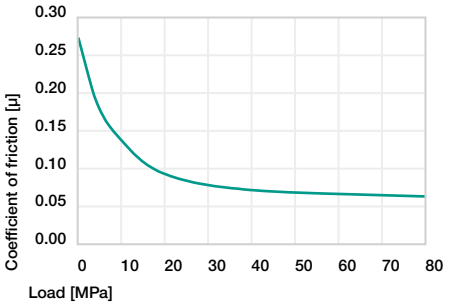


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

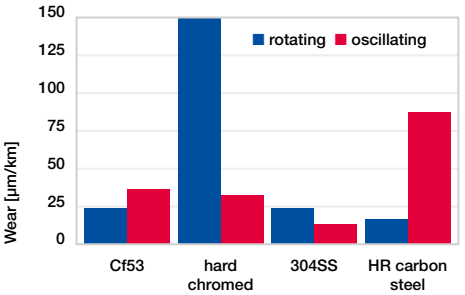


Diagram 07: Wear for rotating and oscillating applications with different shaft materials, p = 2MPa

Shaft materials

Regarding the wear resistance of combinations with iglidur® H2, it must be indicated once again that this bearing was developed for statically high mechanical stability. The wear resistance however does not attain, with none of the bearing-shaft combinations, the values of iglidur® H370 with the corresponding shaft. When the iglidur® H2 bearings are used, they should not be combined with hard-chromed shafts. Shafts made from Cf53 steel and 304 stainless steel are essentially better, as is found in diagrams 06 and 07.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.07 – 0.30	0.09	0.04	0.04

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

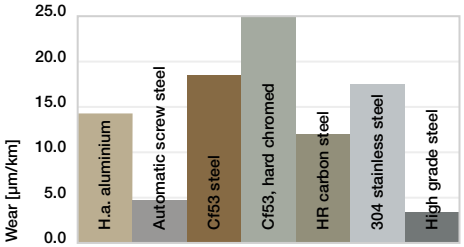


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® H2 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 F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

Testing methods, page 57

Ø d1 [mm]	Housing H7 [mm]		Plain bearing F10 [mm]		Shaft h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Product range

iglidur® H2 plain bearings are manufactured to special order. Please request iglidur® H2 plain bearings as an alternative to iglidur® H and iglidur® H4 bearings in high volume applications.

Plain bearing materials for contact with food

Plain bearing materials for contact with food

The iglidur® materials are most at home when they are not lubricated and the highest hygiene is required. Where is this more true than in food handling and processing?
This group comprises FDA-compliant materials for the most varied operating conditions in terms of moisture and temperature, including iglidur® T220, a material suitable even for the tobacco industry.

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

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

iglidur® A181:
The universal bearing for food contact

Temperature [°C] [123]	+90	– +
Surface pressure [MPa] [124]	31	– +
Coefficient of friction [µ] [125]	0.18	– +
Wear [µm/km] [125]	0.48	– +
Price index		– +

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

Temperature [°C] [123]	+180	– +
Surface pressure [MPa] [124]	60	– +
Coefficient of friction [µ] [125]	0.17	– +
Wear [µm/km] [125]	1.79	– +
Price index		– +

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

Temperature [°C] [123]	+250	– +
Surface pressure [MPa] [124]	120	– +
Coefficient of friction [µ] [125]	0.36	– +
Wear [µm/km] [125]	4.10	– +
Price index		– +

iglidur® A180:
The all–rounder for food

Temperature [°C] [123]	+90	– +
Surface pressure [MPa] [124]	28	– +
Coefficient of friction [µ] [125]	0.17	– +
Wear [µm/km] [125]	0.50	– +
Price index		– +

[123] Max. long-term application temperature [124] Max. recommended surface pressure at +20°C [125] Best combination for p = 1 MPa, v = 0.3m/s, rotating

iglidur® A200:
The “food–classic” for low duty

Temperature [°C] [123]	+80	– +
Surface pressure [MPa] [124]	18	– +
Coefficient of friction [µ] [125]	0.45	– +
Wear [µm/km] [125]	1.62	– +
Price index		– +

iglidur® A160:
“Food” bearing with media resistance up to +90°C

Temperature [°C] [123]	+90	– +
Surface pressure [MPa] [124]	15	– +
Coefficient of friction [µ] [125]	0.09	– +
Wear [µm/km] [125]	0.33	– +
Price index		– +

iglidur® A290:
The robust one with high abrasion resistance

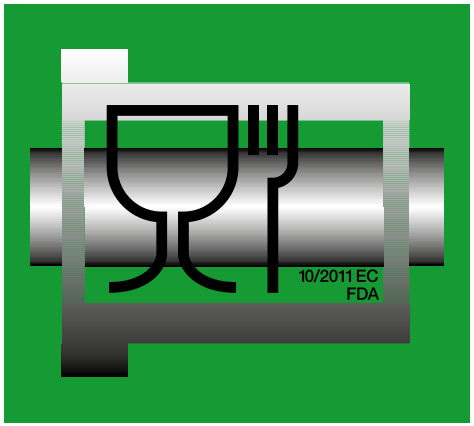
Temperature [°C] [123]	+140	– +
Surface pressure [MPa] [124]	70	– +
Coefficient of friction [µ] [125]	0.33	– +
Wear [µm/km] [125]	4.78	– +
Price index		– +

iglidur® UW160:
Suitable for contact with drinking water

Temperature [°C] [123]	+90	– +
Surface pressure [MPa] [124]	15	– +
Coefficient of friction [µ] [125]	0.17	– +
Wear [µm/km] [125]	2.00	– +
Price index		– +

iglidur® T220:
For the tobacco industry

Temperature [°C] [123]	+100	– +
Surface pressure [MPa] [124]	40	– +
Coefficient of friction [µ] [125]	0.36	– +
Wear [µm/km] [125]	0.80	– +



The universal bearing for food contact

Compliant with Regulation (EU) No. 10/2011 and FDA guidelines

iglidur® A181

When to use it?

- When FDA compliance is required
- When a material compliant in accordance with Regulation (EU) No. 10/2011 is required
- When an universal material suitable for direct contact with food is required

When not to use?

- When Regulation (EU) No. 10/2011 and FDA compliance are not required
  iglidur® J
- When continuous operating temperatures are higher than +90°C
  iglidur® A350
- When a cost-effective universal plain bearing is required
  iglidur® G, iglidur® P

Bearing technology | Plain bearings | iglidur® A181

Ø 4.0 – 50.0 mm

Also available as:

Bar stock, round bar: Page 629

Bar stock, plate: Page 651

tribo-tape liner: Page 657

Piston rings: Page 562

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

The universal bearing for food contact: Compliant with Regulation (EU) No. 10/2011 and FDA guidelines

The iglidur® A181 material is compliant with Regulation (EU) No. 10/2011 and also with FDA specifications. The blue colour also facilitates the often required “optical detectability” in the food industry.

- Compliant with Regulation (EU) No. 10/2011
- FDA-compliant
- Universal installation
- High media resistance
- Wear-resistant
- Lubrication-free
- Maintenance-free

Typical application areas

- Food industry
- Beverage technology
- Medical technology

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® A181 +90°C 31MPa

Technical data

General properties			Testing method
Density	g/cm³	1.38	
Colour		blue	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.2	DIN 53495
Max. moisture absorption	% weight	1.3	
Coefficient of friction, dynamic, against steel	µ	0.10 – 0.21	
pv value, max. (dry)	MPa · m/s	0.31	
Mechanical properties			
Flexural modulus	MPa	1,913	DIN 53457
Flexural strength at +20°C	MPa	48	DIN 53452
Compressive strength	MPa	60	
Max. recommended surface pressure (+20°C)	MPa	31	
Shore D hardness		76	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+90	
Max. application temperature short–term	°C	+110	
Min. application temperature	°C	–50	
Thermal conductivity	W/m · K	0.25	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	11	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{12}$	DIN IEC 93
Surface resistance	Ω	$> 10^{12}$	DIN 53482

Table 01: Material properties table

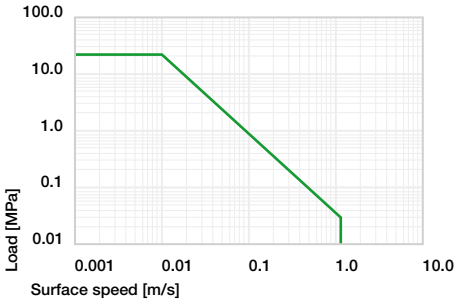


Diagram 01: Permissible pv values for iglidur® A181 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® A181 plain bearings is approximately 0.2% weight. The saturation limit in water is 1.3% weight. This must be taken into account for these types of applications.

Vacuum

In vacuum, any present moisture is released as vapour. Use in vacuum is only possible with dehumidified iglidur® A181 bearings.

Radiation resistance

Plain bearings made from iglidur® A181 are resistant up to a radiation intensity of $2 \cdot 10^2$Gy.

UV resistance

iglidur® A181 plain bearings are partially resistant to UV radiation.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

–50°C up to +90°C

31MPa

Bearing technology | Plain bearings | iglidur® A181

Due to their technical specifications and their conformity with the relevant regulations, iglidur® A181 plain bearings are predestined for applications in food technology. Compared to iglidur® A180 with regard to the mechanical properties, temperature and media resistance, iglidur® A181 is more suitable with respect to the wear resistance in most cases.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® A181 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

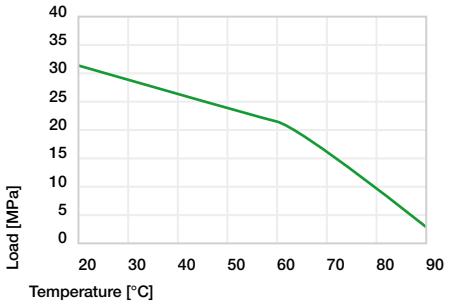


Diagram 02: Maximum recommended surface pressure as a function of temperature (31MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® A181 at radial loads.

Surface pressure, page 41

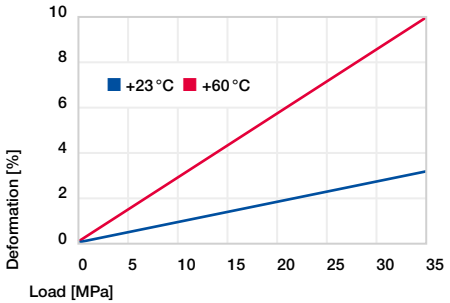


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® A181 was developed for low surface speeds. Maximum speeds of up to 0.8m/s (rotating) and 3.5m/s (linear), respectively, are permissible during continuous dry operation. The given values in table 03 indicate the limits at which an increase up to the continuous permissible temperature occurs. This increase is a result of friction. In practice, though, this level is rarely reached, due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.8	0.6	3.5
short-term	**m/s**	1.2	1.0	5.0

Table 03: Maximum surface speeds

Temperature

The long-term upper temperature limit of +90°C permits the broad use in applications with direct contact with food. As shown in diagram 02, with increasing temperatures, the compressive strength decreases. When considering temperatures, the additional frictional heat in the bearing system must be taken into account. For temperatures over +60°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the surface speed and load (diagrams 04 and 05). For iglidur® A181 plain bearings, the alteration of the coefficient of friction μ depends on surface speed and the shaft surface finish.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

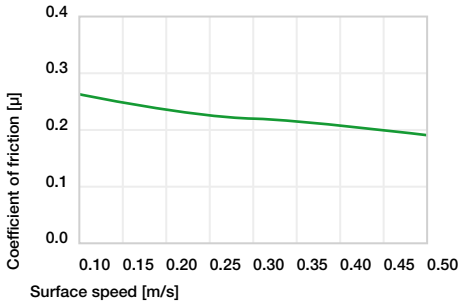


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

Technical data

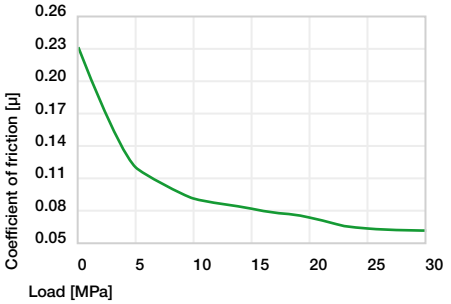


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

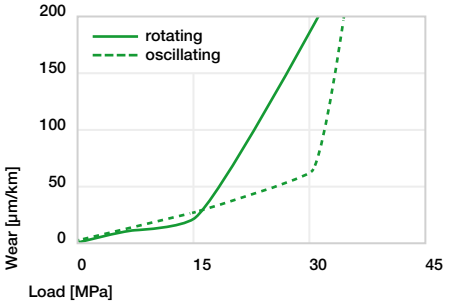


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

Diagram 06 shows results of testing different shaft materials with plain bearings made from iglidur® A181. Particular attention is paid in the food industry to the corrosion-resistant shaft types. Diagram 06 shows that very low wear rates can be achieved in combination with these shafts. As with many of the iglidur® materials, wear rate increases with otherwise identical parameters in rotation (diagram 07).

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.10 – 0.21	0.08	0.03	0.04

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

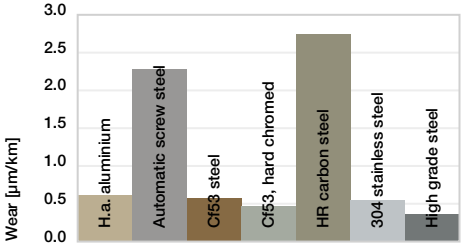


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® A181 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 E10 tolerances.

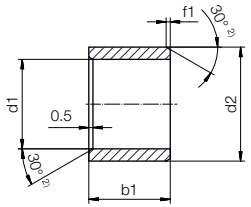
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® A181

Sleeve bearing (form S)



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

Dimensions according to ISO 3547-1 and special dimensions

Order example: A181SM-0405-04 - no minimum order quantity.
A181 iglidur® material S Sleeve bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 04 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
4.0		5.5	4.0	A181SM-0405-04
4.0		5.5	6.0	A181SM-0405-06
5.0		7.0	5.0	A181SM-0507-05
5.0	+0.020 +0.068	7.0	10.0	A181SM-0507-10
6.0		8.0	6.0	A181SM-0608-06
6.0		8.0	8.0	A181SM-0608-08
6.0		8.0	10.0	A181SM-0608-10
8.0		10.0	8.0	A181SM-0810-08
8.0		10.0	10.0	A181SM-0810-10
8.0		10.0	12.0	A181SM-0810-12
10.0	+0.025	12.0	8.0	A181SM-1012-08
10.0	+0.083	12.0	10.0	A181SM-1012-10
10.0		12.0	12.0	A181SM-1012-12
10.0		12.0	15.0	A181SM-1012-15
10.0		12.0	20.0	A181SM-1012-20
12.0		14.0	12.0	A181SM-1214-12
12.0		14.0	15.0	A181SM-1214-15
12.0		14.0	20.0	A181SM-1214-20
13.0		15.0	10.0	A181SM-1315-10
13.0		15.0	20.0	A181SM-1315-20
14.0		16.0	15.0	A181SM-1416-15
14.0	+0.032	16.0	20.0	A181SM-1416-20
14.0	+0.102	16.0	25.0	A181SM-1416-25
15.0		17.0	15.0	A181SM-1517-15
15.0		17.0	20.0	A181SM-1517-20
15.0		17.0	25.0	A181SM-1517-25
16.0		18.0	15.0	A181SM-1618-15
16.0		18.0	20.0	A181SM-1618-20
16.0		18.0	25.0	A181SM-1618-25
18.0		20.0	15.0	A181SM-1820-15
18.0	+0.032 +0.102	20.0	20.0	A181SM-1820-20
18.0		20.0	25.0	A181SM-1820-25
20.0		23.0	10.0	A181SM-2023-10
20.0		23.0	15.0	A181SM-2023-15
20.0		23.0	20.0	A181SM-2023-20
20.0		23.0	25.0	A181SM-2023-25
20.0		23.0	30.0	A181SM-2023-30
22.0		25.0	15.0	A181SM-2225-15
22.0		25.0	20.0	A181SM-2225-20
22.0		25.0	25.0	A181SM-2225-25
22.0		25.0	30.0	A181SM-2225-30
24.0		27.0	15.0	A181SM-2427-15
24.0		27.0	20.0	A181SM-2427-20
24.0	+0.040	27.0	25.0	A181SM-2427-25
24.0	+0.124	27.0	30.0	A181SM-2427-30
25.0		28.0	15.0	A181SM-2528-15
25.0		28.0	20.0	A181SM-2528-20
25.0		28.0	25.0	A181SM-2528-25
25.0		28.0	30.0	A181SM-2528-30
28.0		32.0	20.0	A181SM-2832-20
28.0		32.0	20.0	A181SM-3034-20
28.0		32.0	25.0	A181SM-2832-25
28.0		32.0	30.0	A181SM-2832-30
30.0		34.0	25.0	A181SM-3034-25
30.0		34.0	30.0	A181SM-3034-30
30.0		34.0	40.0	A181SM-3034-40
32.0	+0.050	36.0	20.0	A181SM-3236-20
32.0	+0.150	36.0	30.0	A181SM-3236-30

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

Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
32.0		36.0	40.0	A181SM-3236-40
35.0		39.0	20.0	A181SM-3539-20
35.0		39.0	30.0	A181SM-3539-30
35.0		39.0	40.0	A181SM-3539-40
35.0	+0.050 +0.150	39.0	50.0	A181SM-3539-50
40.0		44.0	20.0	A181SM-4044-20
40.0		44.0	30.0	A181SM-4044-30
40.0		44.0	40.0	A181SM-4044-40
40.0		44.0	50.0	A181SM-4044-50
45.0		50.0	20.0	A181SM-4550-20
45.0		50.0	30.0	A181SM-4550-30
45.0		50.0	40.0	A181SM-4550-40
45.0		50.0	50.0	A181SM-4550-50
50.0	+0.050 +0.150	55.0	20.0	A181SM-5055-20
50.0		55.0	30.0	A181SM-5055-30
50.0		55.0	40.0	A181SM-5055-40
50.0		55.0	50.0	A181SM-5055-50
50.0		55.0	60.0	A181SM-5055-60

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/A181

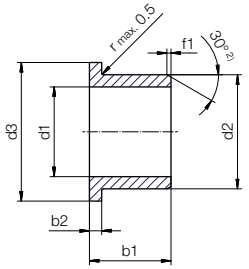
Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® A181

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

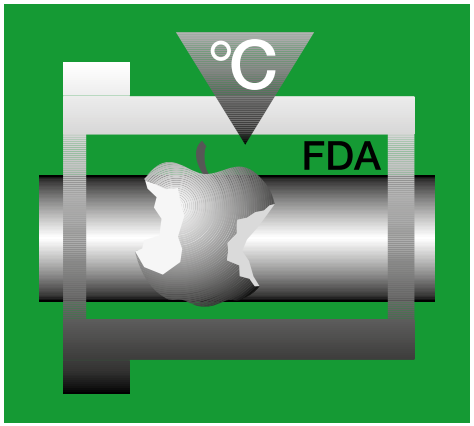
d1 [mm]	Ø 6–12	Ø 12–30	Ø > 30
f [mm]	0.5	0.8	1.2

Dimensions according to ISO 3547-1 and special dimensions

Order example: A181FM-0608-04 - no minimum order quantity.
A181 iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 04 Total length b1

d1 [mm]	d1 Tolerance3)	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.020 +0.068	8.0	12.0	4.0	1.00	A181FM-0608-04
6.0		8.0	12.0	6.0	1.00	A181FM-0608-06
6.0		8.0	12.0	8.0	1.00	A181FM-0608-08
8.0	+0.025 +0.083	10.0	15.0	5.5	1.00	A181FM-0810-05
8.0		10.0	15.0	7.5	1.00	A181FM-0810-07
8.0		10.0	15.0	9.5	1.00	A181FM-0810-09
8.0		10.0	15.0	10.0	1.00	A181FM-0810-10
10.0		12.0	18.0	7.0	1.00	A181FM-1012-07
10.0		12.0	18.0	9.0	1.00	A181FM-1012-09
10.0		12.0	18.0	10.0	1.00	A181FM-1012-10
10.0		12.0	18.0	12.0	1.00	A181FM-1012-12
10.0		12.0	18.0	17.0	1.00	A181FM-1012-17
12.0	+0.032 +0.102	14.0	20.0	7.0	1.00	A181FM-1214-07
12.0		14.0	20.0	9.0	1.00	A181FM-1214-09
12.0		14.0	20.0	12.0	1.00	A181FM-1214-12
12.0		14.0	20.0	17.0	1.00	A181FM-1214-17
14.0		16.0	22.0	12.0	1.00	A181FM-1416-12
14.0		16.0	22.0	17.0	1.00	A181FM-1416-17
15.0		17.0	23.0	9.0	1.00	A181FM-1517-09
15.0		17.0	23.0	12.0	1.00	A181FM-1517-12
15.0	+0.032 +0.102	17.0	23.0	17.0	1.00	A181FM-1517-17
16.0		18.0	24.0	12.0	1.00	A181FM-1618-12
16.0		18.0	24.0	17.0	1.00	A181FM-1618-17
18.0		20.0	26.0	12.0	1.00	A181FM-1820-12
18.0		20.0	26.0	17.0	1.00	A181FM-1820-17
18.0		20.0	26.0	22.0	1.00	A181FM-1820-22
20.0	+0.040 +0.124	23.0	30.0	11.5	1.50	A181FM-2023-11
20.0		23.0	30.0	16.5	1.50	A181FM-2023-16
20.0		23.0	30.0	21.5	1.50	A181FM-2023-21
25.0		28.0	35.0	11.5	1.50	A181FM-2528-11
25.0		28.0	35.0	16.5	1.50	A181FM-2528-16
25.0		28.0	35.0	21.5	1.50	A181FM-2528-21
30.0		34.0	42.0	16.0	2.00	A181FM-3034-16
30.0		34.0	42.0	26.0	2.00	A181FM-3034-26
35.0		39.0	47.0	16.0	2.00	A181FM-3539-16
35.0		39.0	47.0	26.0	2.00	A181FM-3539-26
40.0		44.0	52.0	30.0	2.00	A181FM-4044-30
40.0		44.0	52.0	40.0	2.00	A181FM-4044-40
45.0		50.0	58.0	50.0	2.50	A181FM-4550-50

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



The endurance runner at higher temperatures in the food sector

Compliant with Regulation (EU) No. 10/2011 and FDA guidelines

iglidur® A350

When to use it?

- When FDA compliance is required
- When wear resistance and FDA-compliance are necessary at high loads
- When the bearing is used in acid environments

When not to use?

- When continuous operating temperatures are higher than +180°C
  iglidur® A500
- When the maximum wear resistance is necessary
  iglidur® J
- When a cost-effective FDA-compliant plain bearing is required
  iglidur® A200, iglidur® A180
- For high speeds
  iglidur® J

Bearing technology | Plain bearings | iglidur® A350

Ø 4.0 – 50.0 mm

Also available as:

Bar stock, round bar: **Page 644**

Bar stock, plate: **Page 653**

tribo-tape liner: **Page 657**

Piston rings: **Page 562**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 783**

The endurance runner at higher temperatures in the food sector: Compliant with Regulation (EU) No. 10/2011 and FDA guidelines

A universal plain bearing for use in the area of food and pharmaceutical industries. Composition of FDA-compliant materials allows the use in areas where other plain bearings cannot be used due to the contact with food. With good tribological and mechanical properties, iglidur® A350 plain bearings are suitable for all-round use in and around food machinery.

- Compliant with Regulation (EU) No. 10/2011
- FDA-compliant
- Temperature-resistant up to +180°C
- Suitable for medium and high loads
- Suitable for pivoting applications
- Lubrication-free
- Standard range from stock
- Suitable for rotating applications
- Maintenance-free

Typical application areas

- Food industry
- Beverage technology
- Medical technology

Descriptive technical specifications			
Wear resistance at +23°C	–	■■■□□	+
Wear resistance at +90°C	–	■■■□□	+
Wear resistance at +150°C	–	■■■□□	+
Low coefficient of friction	–	■■■■□	+
Low moisture absorption	–	■■■■□	+
Wear resistance under water	–	■■■■□	+
High media resistance	–	■■■■□	+
Resistant to edge pressures	–	■■■□□	+
Suitable for shock and impact loads	–	■■■□□	+
Resistant to dirt	–	■■■□□	+

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

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

Technical data

General properties			Testing method
Density	g/cm³	1.42	
Colour		blue	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.6	DIN 53495
Max. moisture absorption	% weight	1.9	
Coefficient of friction, dynamic, against steel	μ	0.10 – 0.20	
pv value, max. (dry)	MPa · m/s	0.40	
Mechanical properties			
Flexural modulus	MPa	2,000	DIN 53457
Flexural strength at +20°C	MPa	110	DIN 53452
Compressive strength	MPa	78	
Max. recommended surface pressure (+20°C)	MPa	60	
Shore D hardness		76	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+180	
Max. application temperature short–term	°C	+210	
Min. application temperature	°C	–100	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	8	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{11}$	DIN IEC 93
Surface resistance	Ω	$> 10^{11}$	DIN 53482

Table 01: Material properties table

–100°C up to +180°C

60MPa

V-0

FDA EU/10/2011

RoHS-II

ISO 3547-1

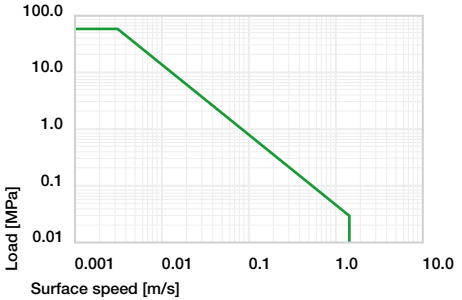


Diagram 01: Permissible pv values for iglidur® A350 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

The moisture absorption of iglidur® A350 is low and can be ignored when using standard plain bearings. Even when saturated with water, iglidur® A350 does not absorb more than 1.9% weight of water (by weight).

Vacuum

In vacuum, any present moisture is released as vapour. Use in vacuum is only possible with dehumidified iglidur® A350 bearings.

Radiation resistance

Plain bearings made from iglidur® A350 are resistant up to a radiation intensity of $2 \cdot 10^2$Gy.

UV resistance

iglidur® A350 plain bearings are resistant to UV radiation.

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

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® A350

iglidur® A350 plain bearings are made for practically all loads in food and packaging machinery. Even high loads, often seen in lifting equipment, are taken easily and the bearings work flawlessly without any external lubrication.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® A350 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

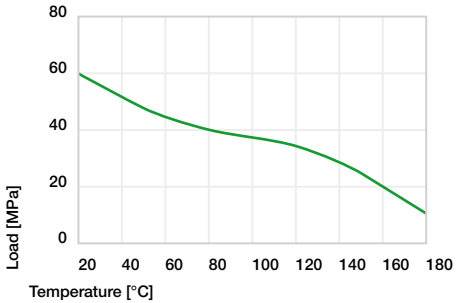


Diagram 02: Maximum recommended surface pressure as a function of temperature (60MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® A350 at radial loads. At the maximum recommended surface pressure of 60MPa at room temperature the deformation is less than 5%.

Surface pressure, page 41

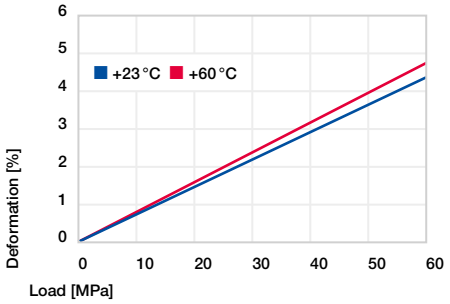


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® A350 plain bearings are suitable for low and medium speeds in rotating and oscillating applications. iglidur® A350 is also excellent for linear movements. In the case of high surface speeds it should be tested whether iglidur® J or iglidur® L250 can be used, as the wear rate of these bearings is lower.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.0	0.8	2.5
short-term	**m/s**	1.2	0.9	3.0

Table 03: Maximum surface speeds

Temperature

Its temperature resistance makes iglidur® A350 the ideal material for plain bearing used in the food area. For temperatures over +140°C an additional securing is required. The wear rate of iglidur® A350 plain bearings rises only little with higher temperatures. Tests have shown good wear results at +100°C on all tested shaft materials.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction of iglidur® A350 on a steel shaft is in the mid range (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

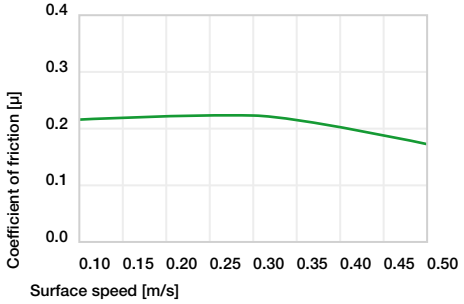


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

Technical data

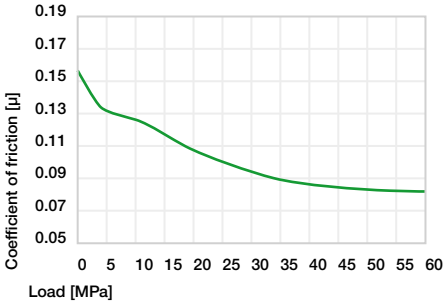


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

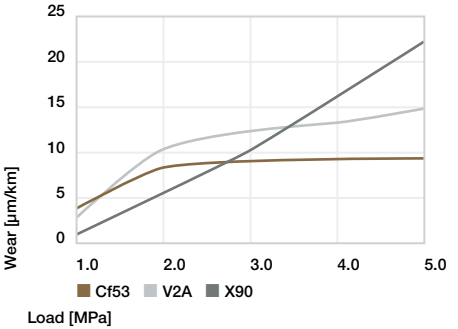


Diagram 07: Wear, rotating with different shaft materials, as a function of the load

Shaft materials

The corrosion-resistant steels are rather considered a natural choice for use in the food industry. The trials were therefore carried out especially on such materials. It has been shown that there is no clear favourite and 304 stainless steel, high grade steel and hard-chromed steel are all suitable. Hard-anodised aluminium is also well suited for both linear and rotational movements.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.10 – 0.20	0.09	0.04	0.04

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

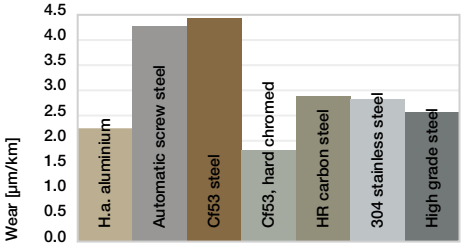


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® A350 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 F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

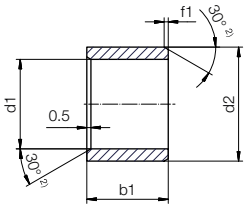
Testing methods, page 57

	Housing		Plain bearing		Shaft	
Ø d1 [mm]	H7 [mm]		F10 [mm]		h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Bearing technology | Plain bearings | iglidur® A350

Sleeve bearing (form S)



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

Dimensions according to ISO 3547-1 and special dimensions

Order example: A350SM-0405-06 - no minimum order quantity.
A350 iglidur® material S Sleeve bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
4.0		5.5	4.0	A350SM-0405-04
4.0		5.5	6.0	A350SM-0405-06
5.0	+0.010	7.0	5.0	A350SM-0507-05
5.0	+0.058	7.0	10.0	A350SM-0507-10
6.0		8.0	6.0	A350SM-0608-06
6.0		8.0	8.0	A350SM-0608-08
6.0		8.0	10.0	A350SM-0608-10
8.0		10.0	8.0	A350SM-0810-08
8.0		10.0	10.0	A350SM-0810-10
8.0		10.0	12.0	A350SM-0810-12
10.0	+0.013	12.0	8.0	A350SM-1012-08
10.0	+0.071	12.0	10.0	A350SM-1012-10
10.0		12.0	12.0	A350SM-1012-12
10.0		12.0	15.0	A350SM-1012-15
10.0		12.0	20.0	A350SM-1012-20
12.0		14.0	10.0	A350SM-1214-10
12.0		14.0	12.0	A350SM-1214-12
12.0		14.0	15.0	A350SM-1214-15
12.0		14.0	20.0	A350SM-1214-20
13.0		15.0	10.0	A350SM-1315-10
13.0		15.0	20.0	A350SM-1315-20
14.0	+0.016	16.0	15.0	A350SM-1416-15
14.0	+0.086	16.0	20.0	A350SM-1416-20
14.0		16.0	25.0	A350SM-1416-25
15.0		17.0	15.0	A350SM-1517-15
15.0		17.0	20.0	A350SM-1517-20
15.0		17.0	25.0	A350SM-1517-25
16.0		18.0	15.0	A350SM-1618-15
16.0		18.0	20.0	A350SM-1618-20

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
16.0		18.0	25.0	A350SM-1618-25
18.0	+0.016	20.0	15.0	A350SM-1820-15
18.0	+0.086	20.0	20.0	A350SM-1820-20
18.0		20.0	25.0	A350SM-1820-25
20.0		23.0	10.0	A350SM-2023-10
20.0		23.0	15.0	A350SM-2023-15
20.0		23.0	20.0	A350SM-2023-20
20.0		23.0	25.0	A350SM-2023-25
20.0		23.0	30.0	A350SM-2023-30
22.0		25.0	15.0	A350SM-2225-15
22.0		25.0	20.0	A350SM-2225-20
22.0		25.0	25.0	A350SM-2225-25
22.0		25.0	30.0	A350SM-2225-30
24.0		27.0	15.0	A350SM-2427-15
24.0		27.0	20.0	A350SM-2427-20
24.0	+0.020	27.0	25.0	A350SM-2427-25
24.0	+0.104	27.0	30.0	A350SM-2427-30
24.0		28.0	30.0	A350SM-2428-30
25.0		28.0	15.0	A350SM-2528-15
25.0		28.0	20.0	A350SM-2528-20
25.0		28.0	25.0	A350SM-2528-25
25.0		28.0	30.0	A350SM-2528-30
28.0		32.0	20.0	A350SM-2832-20
28.0		32.0	25.0	A350SM-2832-25
28.0		32.0	30.0	A350SM-2832-30
30.0		34.0	20.0	A350SM-3034-20
30.0		34.0	25.0	A350SM-3034-25
30.0		34.0	30.0	A350SM-3034-30
30.0		34.0	40.0	A350SM-3034-40

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

Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
32.0		36.0	20.0	A350SM-3236-20
32.0		36.0	30.0	A350SM-3236-30
32.0		36.0	40.0	A350SM-3236-40
35.0		39.0	20.0	A350SM-3539-20
35.0	+0.025	39.0	30.0	A350SM-3539-30
35.0	+0.125	39.0	40.0	A350SM-3539-40
35.0		39.0	50.0	A350SM-3539-50
40.0		44.0	20.0	A350SM-4044-20
40.0		44.0	30.0	A350SM-4044-30
40.0		44.0	40.0	A350SM-4044-40
40.0		44.0	50.0	A350SM-4044-50
45.0		50.0	20.0	A350SM-4550-20
45.0		50.0	30.0	A350SM-4550-30
45.0		50.0	40.0	A350SM-4550-40
45.0	+0.025	50.0	50.0	A350SM-4550-50
50.0	+0.125	55.0	20.0	A350SM-5055-20
50.0		55.0	30.0	A350SM-5055-30
50.0		55.0	40.0	A350SM-5055-40
50.0		55.0	50.0	A350SM-5055-50
50.0		55.0	60.0	A350SM-5055-60

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/A350

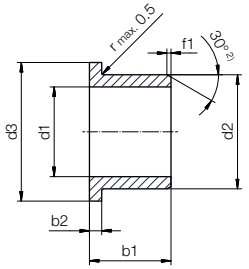
Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® A350

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

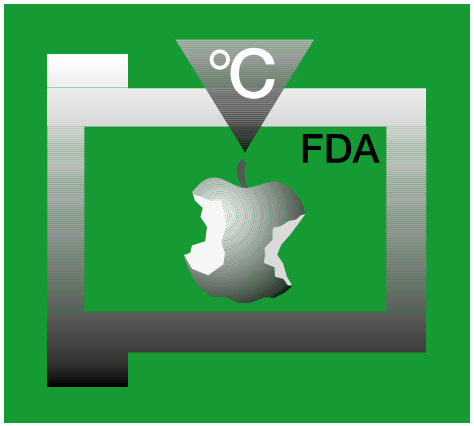
Dimensions according to ISO 3547-1 and special dimensions

Order example: A350FM-0507-05 - no minimum order quantity.
A350 iglidur® material F Flange bearing M Metric 05 Inner Ø d1 07 Outer Ø d2 05 Total length b1

d1	d1 Tolerance3)	d2	d3 d13	b1 h13	b2 –0,14	Part No.
[mm]		[mm]	[mm]	[mm]	[mm]	
5.0		7.0	11.0	5.0	1.00	**A350FM-0507-05**
6.0	+0.010	8.0	12.0	4.0	1.00	**A350FM-0608-04**
6.0	+0.058	8.0	12.0	6.0	1.00	**A350FM-0608-06**
6.0		8.0	12.0	8.0	1.00	**A350FM-0608-08**
8.0		10.0	15.0	5.5	1.00	**A350FM-0810-05**
8.0		10.0	15.0	7.5	1.00	**A350FM-0810-07**
8.0		10.0	15.0	9.5	1.00	**A350FM-0810-09**
10.0	+0.013	10.0	15.0	10.0	1.00	**A350FM-0810-10**
10.0	+0.071	12.0	18.0	7.0	1.00	**A350FM-1012-07**
10.0		12.0	18.0	9.0	1.00	**A350FM-1012-09**
10.0		12.0	18.0	10.0	1.00	**A350FM-1012-10**
10.0		12.0	18.0	12.0	1.00	**A350FM-1012-12**
10.0		12.0	18.0	17.0	1.00	**A350FM-1012-17**
12.0		14.0	20.0	7.0	1.00	**A350FM-1214-07**
12.0		14.0	20.0	9.0	1.00	**A350FM-1214-09**
12.0		14.0	20.0	12.0	1.00	**A350FM-1214-12**
12.0	+0.016	14.0	20.0	17.0	1.00	**A350FM-1214-17**
14.0	+0.086	16.0	22.0	12.0	1.00	**A350FM-1416-12**
14.0		16.0	22.0	17.0	1.00	**A350FM-1416-17**
15.0		17.0	23.0	9.0	1.00	**A350FM-1517-09**

d1	d1 Tolerance3)	d2	d3 d13	b1 h13	b2 –0,14	Part No.
[mm]		[mm]	[mm]	[mm]	[mm]	
15.0		17.0	23.0	12.0	1.00	**A350FM-1517-12**
15.0		17.0	23.0	17.0	1.00	**A350FM-1517-17**
16.0	+0.016	18.0	24.0	12.0	1.00	**A350FM-1618-12**
16.0	+0.086	18.0	24.0	17.0	1.00	**A350FM-1618-17**
18.0		20.0	26.0	12.0	1.00	**A350FM-1820-12**
18.0		20.0	26.0	17.0	1.00	**A350FM-1820-17**
20.0		23.0	30.0	11.5	1.50	**A350FM-2023-11**
20.0		23.0	30.0	16.5	1.50	**A350FM-2023-16**
20.0		23.0	30.0	21.5	1.50	**A350FM-2023-21**
25.0	+0.020	28.0	35.0	11.5	1.50	**A350FM-2528-11**
25.0	+0.104	28.0	35.0	16.5	1.50	**A350FM-2528-16**
25.0		28.0	35.0	21.5	1.50	**A350FM-2528-21**
30.0		34.0	42.0	16.0	2.00	**A350FM-3034-16**
30.0		34.0	42.0	26.0	2.00	**A350FM-3034-26**
35.0		39.0	47.0	16.0	2.00	**A350FM-3539-16**
35.0	+0.025	39.0	47.0	26.0	2.00	**A350FM-3539-26**
40.0	+0.125	44.0	52.0	30.0	2.00	**A350FM-4044-30**
40.0		44.0	52.0	40.0	2.00	**A350FM-4044-40**
45.0		50.0	58.0	50.0	2.00	**A350FM-4550-50**

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



The media and temperature specialist in the food sector

Compliant with Regulation (EU) No. 10/2011 and FDA guidelines

iglidur® A500

When to use it?

- When FDA compliance is required
- When a high chemical resistance is required
- Good abrasion resistance
- Temperature-resistant from –100°C to +250°C

When not to use?

- When the highest wear resistance is required
  iglidur® X6, iglidur® Z
- When no resistance to temperature or chemicals is required
  iglidur® A180, iglidur® A200
- When a cost-effective universal plain bearing is required
  iglidur® G, iglidur® P

Bearing technology | Plain bearings | iglidur® A500

Ø 4.0 – 50.0 mm

Also available as:

Bar stock, round bar: **Page 645**

Bar stock, plate: **Page 651**

tribo-tape liner: **Page 657**

Piston rings: **Page 562**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 783**

The media and temperature specialist in the food sector:
Compliant with Regulation (EU) No. 10/2011 and FDA guidelines

Plain bearings made from iglidur® A500 can be exposed to extremely high temperatures and are suitable for direct contact with food (FDA-compliant).

- Compliant with Regulation (EU) No. 10/2011
- FDA-compliant
- Temperature-resistant from –100°C to +250°C
- High chemical resistance
- Lubrication-free
- Maintenance-free

Typical application areas

- Food industry
- Beverage technology
- Medical technology

Descriptive technical specifications			
Wear resistance at +23°C	–	■■□□□	+
Wear resistance at +90°C	–	■■□□□	+
Wear resistance at +150°C	–	■■■□□	+
Low coefficient of friction	–	■■□□□	+
Low moisture absorption	–	■■■■■	+
Wear resistance under water	–	■■■■□	+
High media resistance	–	■■■■■	+
Resistant to edge pressures	–	■■■■□	+
Suitable for shock and impact loads	–	■■■■□	+
Resistant to dirt	–	■■■□□	+

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

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

iglidur® A500 +250°C 120MPa

Technical data

General properties			Testing method
Density	g/cm³	1.28	
Colour		brown	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.3	DIN 53495
Max. moisture absorption	% weight	0.5	
Coefficient of friction, dynamic, against steel	µ	0.26 – 0.41	
pv value, max. (dry)	MPa · m/s	0.28	
Mechanical properties			
Flexural modulus	MPa	3,600	DIN 53457
Flexural strength at +20°C	MPa	140	DIN 53452
Compressive strength	MPa	118	
Max. recommended surface pressure (+20°C)	MPa	120	
Shore D hardness		83	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+250	
Max. application temperature short–term	°C	+300	
Min. application temperature	°C	–100	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	9	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{14}$	DIN IEC 93
Surface resistance	Ω	$> 10^{13}$	DIN 53482

Table 01: Material properties table

–100°C up to +250°C

120MPa

V-1

FDA EU/10/2011

RoHS-II

ISO 3547-1

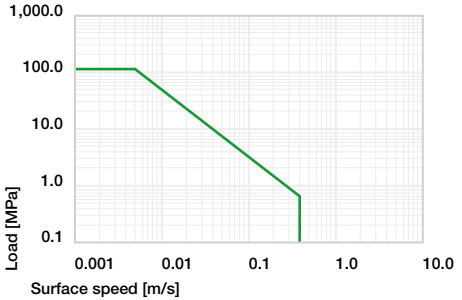


Diagram 01: Permissible pv values for iglidur® A500 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

The moisture absorption of iglidur® A500 plain bearings is only 0.5% weight after saturation in water.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is only possible to a limited extent.

Radiation resistance

Plain bearings made from iglidur® A500 are resistant up to a radiation intensity of $2 \cdot 10^5$Gy.

UV resistance

iglidur® A500 plain bearings are resistant to UV radiation to a large extent.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® A500

Plain bearings made from iglidur® A500 can be used at high temperatures and are permitted for use in direct contact with food (FDA-compliant). They exhibit an exceptionally good chemical resistance and are suitable for heavy-duty use in and around machinery for the food industry. Though iglidur® A500 is a soft material, it possesses an excellent compressive strength even at high temperatures.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® A500 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

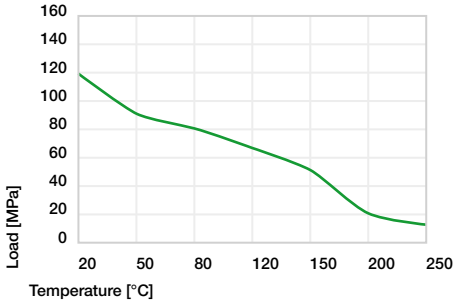


Diagram 02: Maximum recommended surface pressure as a function of temperature (120MPa at +20°C)

Diagram 02 shows the maximum recommended surface pressure of the bearing as a function of the temperature. The combination of high stability and high flexibility acts very positively during vibrations and edge loads. As the wear of the plain bearing rapidly escalates from pressures of 10 to 20MPa, we recommend a particularly accurate testing of the application above these limits.

Surface pressure, page 41

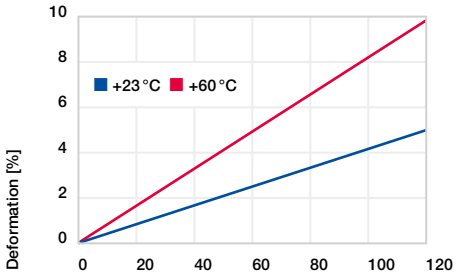


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® A500 also permits high surface speeds due to the high temperature resistance. The coefficient of friction rises however by these high speeds leading to a higher heating up of the bearing. Tests show that plain bearings made from iglidur® A500 are more wear-resistant in pivoting movements, and the permitted pv values are also higher in pivoting applications.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.6	0.4	1.0
short-term	**m/s**	1.0	0.7	2.0

Table 03: Maximum surface speeds

Temperature

The iglidur® A500 plain bearings can be used in short-term temperatures up to +300°C. With increasing temperatures, the compressive strength of iglidur® A500 plain bearings decreases. Diagram 02 shows this inverse relationship. The temperatures prevailing in the bearing system also have an influence on the wear. For temperatures over +130°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction is dependent on the load that acts on the bearing (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

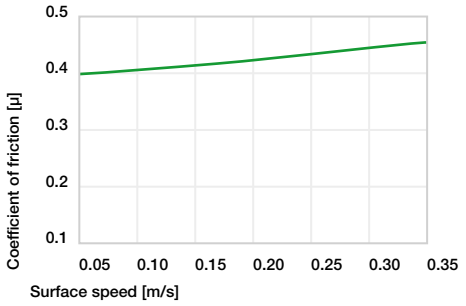


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

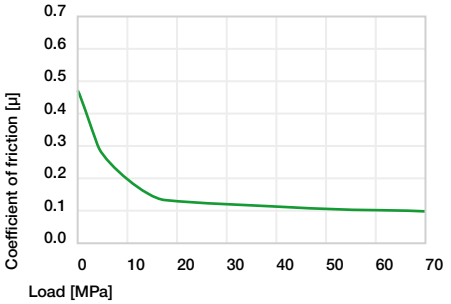


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

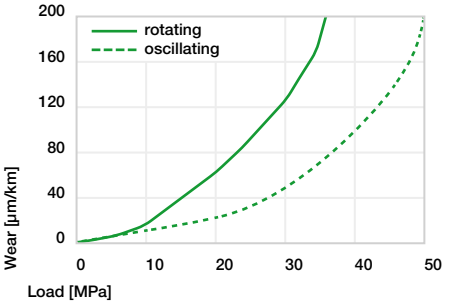


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

Diagram 06 shows results of testing different shaft materials with plain bearings made from iglidur® A500. The combination "iglidur® A500/hard-chromed shaft" clearly stands out in rotating application. Up to about 2.0MPa, the wear of this combination remains largely independent of load. In pivoting applications with Cf53 shafts, the wear resistance is better than in rotations under equal load. If the shaft material you plan on using is not shown in these test results, please contact us.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.26 – 0.41	0.09	0.04	0.04

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

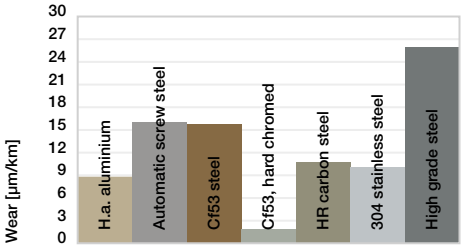


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® A500 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 F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

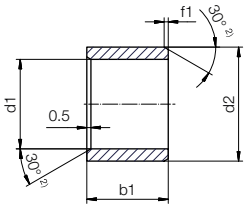
Testing methods, page 57

Ø d1 [mm]	Housing H7 [mm]		Plain bearing F10 [mm]		Shaft h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Bearing technology | Plain bearings | iglidur® A500

Sleeve bearing (form S)



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

Dimensions according to ISO 3547-1 and special dimensions

Order example: A500SM-0405-06 - no minimum order quantity.
A500 iglidur® material S Sleeve bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
4.0	+0.010 +0.058	5.5	4.0	A500SM-0405-04
4.0		5.5	6.0	A500SM-0405-06
5.0		7.0	5.0	A500SM-0507-05
5.0		7.0	10.0	A500SM-0507-10
6.0		8.0	6.0	A500SM-0608-06
6.0		8.0	8.0	A500SM-0608-08
6.0		8.0	10.0	A500SM-0608-10
8.0	+0.013 +0.071	10.0	6.0	A500SM-0810-06
8.0		10.0	8.0	A500SM-0810-08
8.0		10.0	10.0	A500SM-0810-10
8.0		10.0	12.0	A500SM-0810-12
10.0		12.0	8.0	A500SM-1012-08
10.0		12.0	10.0	A500SM-1012-10
10.0		12.0	12.0	A500SM-1012-12
10.0		12.0	15.0	A500SM-1012-15
10.0		12.0	20.0	A500SM-1012-20
12.0	+0.016 +0.086	14.0	10.0	A500SM-1214-10
12.0		14.0	12.0	A500SM-1214-12
12.0		14.0	15.0	A500SM-1214-15
12.0		14.0	20.0	A500SM-1214-20
12.0		15.0	15.0	A500SM-1215-15
13.0		15.0	10.0	A500SM-1315-10
13.0		15.0	20.0	A500SM-1315-20
14.0		16.0	15.0	A500SM-1416-15
14.0		16.0	16.0	A500SM-1416-16
14.0		16.0	20.0	A500SM-1416-20
14.0		16.0	25.0	A500SM-1416-25
15.0		17.0	15.0	A500SM-1517-15
15.0		17.0	20.0	A500SM-1517-20
15.0	+0.016 +0.086	17.0	25.0	A500SM-1517-25
16.0		18.0	15.0	A500SM-1618-15
16.0		18.0	20.0	A500SM-1618-20
16.0		18.0	25.0	A500SM-1618-25
18.0		20.0	15.0	A500SM-1820-15
18.0		20.0	20.0	A500SM-1820-20
18.0		20.0	25.0	A500SM-1820-25
20.0	+0.020 +0.104	23.0	10.0	A500SM-2023-10
20.0		23.0	15.0	A500SM-2023-15
20.0		23.0	20.0	A500SM-2023-20
20.0		23.0	25.0	A500SM-2023-25
20.0		23.0	30.0	A500SM-2023-30
22.0		25.0	15.0	A500SM-2225-15
22.0		25.0	20.0	A500SM-2225-20
22.0		25.0	25.0	A500SM-2225-25
22.0		25.0	30.0	A500SM-2225-30
24.0		27.0	15.0	A500SM-2427-15
24.0		27.0	20.0	A500SM-2427-20
24.0		27.0	25.0	A500SM-2427-25
24.0		27.0	30.0	A500SM-2427-30
25.0		28.0	15.0	A500SM-2528-15
25.0		28.0	20.0	A500SM-2528-20
25.0		28.0	25.0	A500SM-2528-25
25.0		28.0	30.0	A500SM-2528-30
28.0		32.0	20.0	A500SM-2832-20
28.0		32.0	25.0	A500SM-2832-25
28.0		32.0	30.0	A500SM-2832-30
30.0		34.0	20.0	A500SM-3034-20
30.0		34.0	25.0	A500SM-3034-25

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

iglidur®
A500
+250°C
120MPa

Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
30.0	+0.020	34.0	30.0	A500SM-3034-30
30.0	+0.104	34.0	40.0	A500SM-3034-40
32.0	+0.025 +0.125	36.0	20.0	A500SM-3236-20
32.0		36.0	30.0	A500SM-3236-30
32.0		36.0	40.0	A500SM-3236-40
35.0		39.0	20.0	A500SM-3539-20
35.0		39.0	30.0	A500SM-3539-30
35.0		39.0	40.0	A500SM-3539-40
35.0		39.0	50.0	A500SM-3539-50
40.0		44.0	20.0	A500SM-4044-20
40.0		44.0	30.0	A500SM-4044-30
40.0	+0.025 +0.125	44.0	40.0	A500SM-4044-40
40.0		44.0	50.0	A500SM-4044-50
45.0		50.0	20.0	A500SM-4550-20
45.0		50.0	30.0	A500SM-4550-30
45.0		50.0	40.0	A500SM-4550-40
45.0		50.0	50.0	A500SM-4550-50
50.0		55.0	20.0	A500SM-5055-20
50.0		55.0	30.0	A500SM-5055-30
50.0		55.0	40.0	A500SM-5055-40
50.0		55.0	50.0	A500SM-5055-50
50.0		55.0	60.0	A500SM-5055-60

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/A500

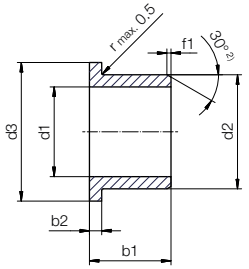
Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® A500

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

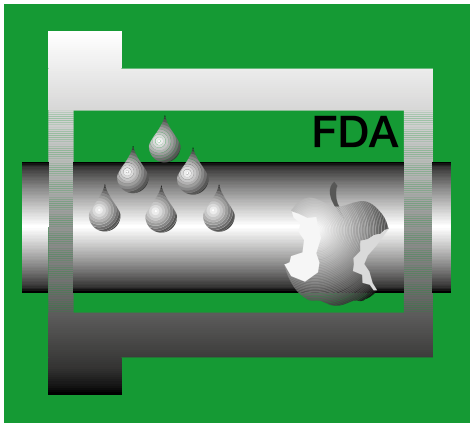
d1 [mm]	Ø 1–6	Ø 6–12	Ø 12–30	Ø > 30
f [mm]	0.3	0.5	0.8	1.2

Dimensions according to ISO 3547-1 and special dimensions

Order example: A500FM-0408-06 - no minimum order quantity.
A500 iglidur® material F Flange bearing M Metric 04 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
4.0	+0.010 +0.058	5.5	9.5	4.0	2.00	A500FM-0405-04
4.0		8.0	12.0	6.0	2.00	A500FM-0408-06
6.0		8.0	12.0	4.0	1.00	A500FM-0608-04
6.0		8.0	12.0	6.0	1.00	A500FM-0608-06
6.0		8.0	12.0	8.0	1.00	A500FM-0608-08
8.0	+0.013 +0.071	10.0	15.0	5.5	1.00	A500FM-0810-05
8.0		10.0	15.0	7.5	1.00	A500FM-0810-07
8.0		10.0	15.0	9.5	1.00	A500FM-0810-09
8.0		10.0	15.0	10.0	1.00	A500FM-0810-10
10.0		12.0	18.0	7.0	1.00	A500FM-1012-07
10.0		12.0	18.0	9.0	1.00	A500FM-1012-09
10.0		12.0	18.0	12.0	1.00	A500FM-1012-12
10.0		12.0	18.0	15.0	1.00	A500FM-1012-15
10.0		12.0	18.0	17.0	1.00	A500FM-1012-17
12.0	+0.016 +0.086	14.0	20.0	7.0	1.00	A500FM-1214-07
12.0		14.0	20.0	9.0	1.00	A500FM-1214-09
12.0		14.0	20.0	12.0	1.00	A500FM-1214-12
12.0		14.0	20.0	13.0	1.00	A500FM-1214-13
12.0		14.0	20.0	15.0	1.00	A500FM-1214-15
12.0		14.0	20.0	17.0	1.00	A500FM-1214-17
14.0		16.0	22.0	12.0	1.00	A500FM-1416-12
14.0		16.0	22.0	17.0	1.00	A500FM-1416-17
15.0		17.0	23.0	9.0	1.00	A500FM-1517-09
15.0		17.0	23.0	12.0	1.00	A500FM-1517-12
15.0		17.0	23.0	17.0	1.00	A500FM-1517-17
16.0	+0.016 +0.086	18.0	24.0	12.0	1.00	A500FM-1618-12
16.0		18.0	24.0	17.0	1.00	A500FM-1618-17
18.0		20.0	26.0	12.0	1.00	A500FM-1820-12
18.0		20.0	26.0	17.0	1.00	A500FM-1820-17
18.0		20.0	26.0	22.0	1.00	A500FM-1820-22
20.0	+0.020 +0.104	23.0	30.0	11.5	1.50	A500FM-2023-11
20.0		23.0	30.0	16.5	1.50	A500FM-2023-16
20.0		23.0	30.0	21.5	1.50	A500FM-2023-21
25.0		28.0	35.0	11.5	1.50	A500FM-2528-11
25.0		28.0	35.0	16.5	1.50	A500FM-2528-16
25.0		28.0	35.0	21.5	1.50	A500FM-2528-21
30.0		34.0	42.0	16.0	2.00	A500FM-3034-16
30.0		34.0	42.0	26.0	2.00	A500FM-3034-26
30.0		34.0	42.0	40.0	2.00	A500FM-3034-40
35.0	+0.025 +0.125	39.0	47.0	16.0	2.00	A500FM-3539-16
35.0		39.0	47.0	26.0	2.00	A500FM-3539-26
35.0		39.0	47.0	40.0	2.00	A500FM-3539-40
40.0		44.0	52.0	30.0	2.00	A500FM-4044-30
40.0		44.0	52.0	40.0	2.00	A500FM-4044-40
45.0		50.0	58.0	50.0	2.00	A500FM-4550-50

[3] After press-fit. *Testing methods page 57*



The all-rounder for food

FDA-compliant

iglidur® A180

When to use it?

- When the bearings have direct contact with food
- When FDA compliance is required
- When a low noise level is required
- When low moisture absorption is fundamental

When not to use?

- When the maximum wear resistance is necessary
  iglidur® J
- When continuous operating temperatures are higher than +80°C
  iglidur® A350, iglidur® A500
- When a cost-effective universal plain bearing is required
  iglidur® G, iglidur® P

Bearing technology | Plain bearings | iglidur® A180

Ø 6.0 – 30.0 mm

Also available as:

Bar stock, round bar: Page 645

Bar stock, plate: Page 653

tribo-tape liner: Page 657

Piston rings: Page 559

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

The all-rounder for food: FDA-compliant

FDA-compliant material for applications with low to medium loads in immediate environments of (or contact with) food or drugs, as well as humidity.

- FDA-compliant
- Compliant with Regulation (EU) No. 10/2011
- High media resistance
- Suitable for wet environments
- High wear resistance
- Lubrication-free
- Maintenance-free

Typical application areas

- Food industry
- Beverage technology
- Medical technology

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® A180 +90°C 28MPa

Technical data

General properties			Testing method
Density	g/cm³	1.46	
Colour		white	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.2	DIN 53495
Max. moisture absorption	% weight	1.3	
Coefficient of friction, dynamic, against steel	µ	0.05 – 0.23	
pv value, max. (dry)	MPa · m/s	0.31	
Mechanical properties			
Flexural modulus	MPa	2,300	DIN 53457
Flexural strength at +20°C	MPa	88	DIN 53452
Compressive strength	MPa	78	
Max. recommended surface pressure (+20°C)	MPa	28	
Shore D hardness		76	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+90	
Max. application temperature short–term	°C	+110	
Min. application temperature	°C	–50	
Thermal conductivity	W/m · K	0.25	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	11	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{12}$	DIN IEC 93
Surface resistance	Ω	$> 10^{11}$	DIN 53482

Table 01: Material properties table

–50°C up to +90°C

28MPa

HB

FDA EU/10/2011

RoHS-II

ISO 3547-1

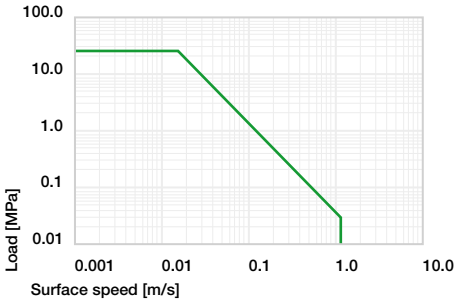


Diagram 01: Permissible pv values for iglidur® A180 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® A180 plain bearings is approximately 0.2% weight. The saturation limit in water is 1.3% weight. This must be taken into account for these types of applications.

Vacuum

In vacuum, any present moisture is released as vapour. Use in vacuum is only possible with dehumidified iglidur® A180 bearings.

Radiation resistance

Plain bearings made from iglidur® A180 are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® A180 plain bearings are resistant to UV radiation, but the tribological properties are reduced by permanent exposure.

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

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® A180

Plain bearings made from iglidur® A180 are suitable for application in direct contact with food. Hence they are the ideal solution for bearing locations on machines for the food and packaging industries, the medical equipment manufacturing, for small equipment for households, etc. The iglidur® A180 distinguishes itself also in wet cleaning or where process-dependent contact with wet media is the business of the day by its extremely low humidity absorption.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® A180 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

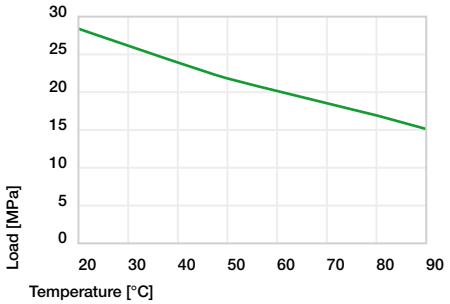


Diagram 02: Maximum recommended surface pressure as a function of temperature (28MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® A180 at radial loads. At the maximum recommended surface pressure of 28MPa the deformation is less than 2.5%. A plastic deformation can be negligible up to this value. However, it is also dependent on the service time.

Surface pressure, page 41

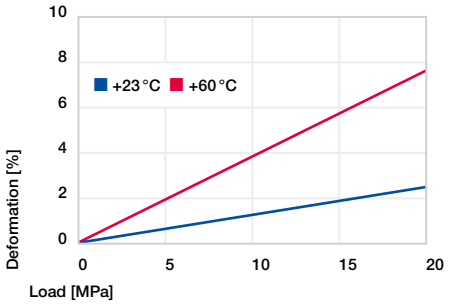


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® A180 was developed for low surface speeds. The given values in table 03 indicate the limits at which an increase up to the continuous permissible temperature occurs. This increase is a result of friction. In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.8	0.6	3.5
short-term	**m/s**	1.2	1.0	5.0

Table 03: Maximum surface speeds

Temperature

The iglidur® A180 plain bearings can be used in short-term temperatures up to +110°C. With increasing temperatures, the compressive strength of iglidur® A180 plain bearings decreases. Diagram 02 shows this inverse relationship. The temperatures prevailing in the bearing system also have an influence on the wear. For temperatures over +60°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the surface speed and load (diagrams 04 and 05). The coefficient of friction decreases with increasing load.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

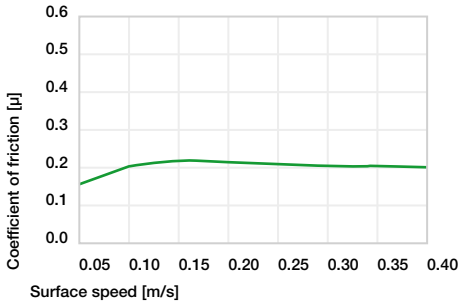


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

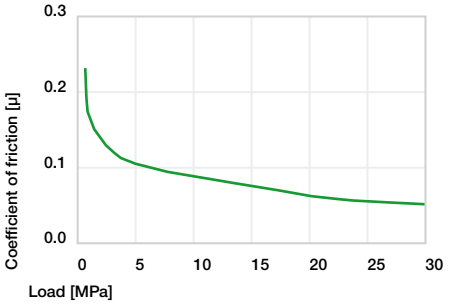


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

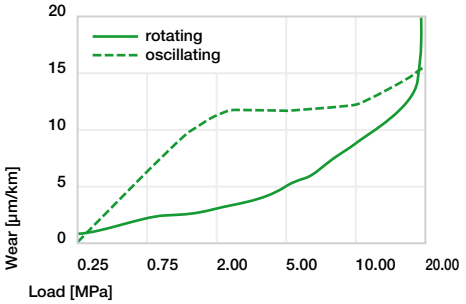


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

Diagram 06 shows the test results of iglidur® A180 plain bearings running against various shaft materials. The combination "iglidur® A180/hard-anodised aluminium" clearly stands out. It attains good to excellent wear rates also with other shafts. With Cf53 shafts, the higher wear in pivoting applications is exemplary compared to rotating applications (diagram 07).

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.05 – 0.23	0.09	0.04	0.04

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

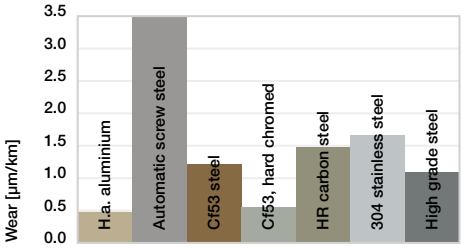


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® A180 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 E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

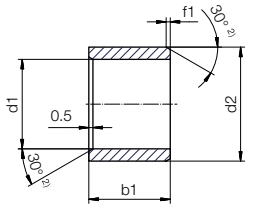
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® A180

Sleeve bearing (form S)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 6–12	Ø 12–30
f [mm]	0.5	0.8

Dimensions according to ISO 3547-1 and special dimensions

Order example: A180SM-0608-10 - no minimum order quantity.
A180 iglidur® material S Sleeve bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 10 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
6.0	+0.020 +0.068	8.0	10.0	**A180SM-0608-10**
8.0	+0.025 +0.083	10.0	10.0	**A180SM-0810-10**
10.0		12.0	10.0	**A180SM-1012-10**
12.0	+0.032 +0.102	14.0	15.0	**A180SM-1214-15**
16.0		18.0	15.0	**A180SM-1618-15**
20.0	+0.040 +0.124	23.0	20.0	**A180SM-2023-20**
25.0		28.0	30.0	**A180SM-2528-30**
30.0		34.0	20.0	**A180SM-3034-20**

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/A180

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

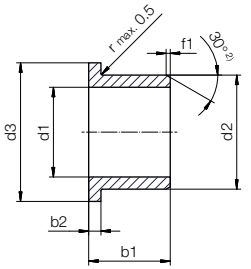
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur® A180 +90°C 28MPa

Bearing technology | Plain bearings | iglidur® A180

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: A180FM-0608-06 - no minimum order quantity.
A180 iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance [3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.020 +0.068	8.0	12.0	6.0	1.00	**A180FM-0608-06**
8.0	+0.025 +0.083	10.0	15.0	10.0	1.00	**A180FM-0810-10**
10.0		12.0	18.0	10.0	1.00	**A180FM-1012-10**
12.0	+0.032 +0.102	14.0	20.0	15.0	1.00	**A180FM-1214-15**
16.0		18.0	24.0	17.0	1.00	**A180FM-1618-17**
20.0	+0.040 +0.124	23.0	30.0	21.5	1.50	**A180FM-2023-21**
25.0		28.0	35.0	21.5	1.50	**A180FM-2528-21**
30.0		34.0	42.0	26.0	2.00	**A180FM-3034-26**

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/A180

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling
1 – 9 | 50 – 99 | 500 – 999
10 – 24 | 100 – 199 | 1,000 – 2,499
25 – 49 | 200 – 499 | 2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

The “food-classic” for low duty

FDA-compliant

iglidur® A200

When to use it?

- Suitable for contact with food
- When a low noise level is required
- When dirt needs to become embedded
- When FDA compliance is required

When not to use?

- When the maximum wear resistance is necessary
  iglidur® W300
- When continuous operating temperatures are higher than +80°C
  iglidur® A350, iglidur® A500
- When a cost-effective universal plain bearing is required
  iglidur® G
- For operations in wet environments
  iglidur® A180

Bearing technology | Plain bearings | iglidur® A200

Ø 1.0 – 32.0 mm

Also available as:

Bar stock, round bar: Page 629

Bar stock, plate: Page 651

tribo-tape liner: Page 657

Piston rings: Page 559

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

The “food-classic” for low duty: FDA-compliant

FDA-compliant material for applications with low to medium loads in immediate environs of (or contact) with food or drugs.

- FDA-compliant
- Suitable for contact with food
- Suitable for low surface speeds
- Lubrication-free
- Standard range from stock
- Maintenance-free
- Thrust washers available only in imperial sizes, page 1507

Typical application areas

- Food industry

Descriptive technical specifications			
Wear resistance at +23°C	–	■■□□□	+
Wear resistance at +90°C	–	■□□□□	+
Wear resistance at +150°C	–	■□□□□	+
Low coefficient of friction	–	■■□□□	+
Low moisture absorption	–	■□□□□	+
Wear resistance under water	–	■□□□□	+
High media resistance	–	■■□□□	+
Resistant to edge pressures	–	■■■■■	+
Suitable for shock and impact loads	–	■■■■□	+
Resistant to dirt	–	■■■■□	+

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

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

iglidur® A200 +80°C 18MPa

Technical data

General properties			Testing method
Density	g/cm³	1.14	
Colour		white	
Max. moisture absorption at +23°C and 50% r.h.	% weight	1.5	DIN 53495
Max. moisture absorption	% weight	7.6	
Coefficient of friction, dynamic, against steel	µ	0.10 – 0.40	
pv value, max. (dry)	MPa · m/s	0.09	
Mechanical properties			
Flexural modulus	MPa	2,500	DIN 53457
Flexural strength at +20°C	MPa	116	DIN 53452
Compressive strength	MPa	54	
Max. recommended surface pressure (+20°C)	MPa	18	
Shore D hardness		81	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+80	
Max. application temperature short–term	°C	+170	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	10	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{13}$	DIN IEC 93
Surface resistance	Ω	$> 10^{12}$	DIN 53482

Table 01: Material properties table

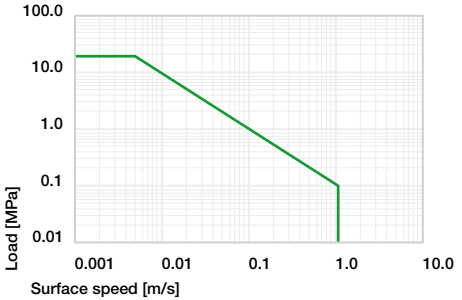


Diagram 01: Permissible pv values for iglidur® A200 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® A200 plain bearings is approximately 1.5% weight. The saturation limit in water is 7.6% weight. This must be taken into account for these types of applications.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is only possible to a limited extent.

Radiation resistance

Plain bearings made from iglidur® A200 are resistant up to a radiation intensity of $1 \cdot 10^4$Gy.

UV resistance

iglidur® A200 plain bearings are resistant to UV radiation.

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

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

Table 02: Chemical resistance

Chemical table, page 1542

–40°C up to +80°C

18MPa

Bearing technology | Plain bearings | iglidur® A200

Plain bearings made from iglidur® A200 are suitable for application in direct contact with food. Hence they are the ideal solution for bearing requirements in machines for the food industry, medical equipment manufacturing, for small equipment for households, etc. As the incorporation of solid lubricants is dispensed with in favour of food compatibility, the thermoplastic composition of iglidur® A200 is especially adjusted for abrasion resistance. In addition the iglidur® A200 is characterised by its capacity to embed dirt and by its quiet operating behaviour. The good wear properties, dirt resistance and the possibility for dry operation allow to replace elaborately sealed, lubricated bearings for little costs.

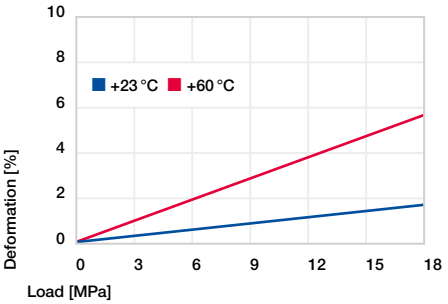


Diagram 03: Deformation under pressure and temperature

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® A200 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

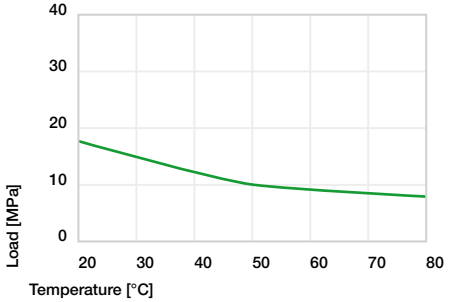


Diagram 02: Maximum recommended surface pressure as a function of temperature (18MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® A200 at radial loads. At the maximum recommended surface pressure of 18MPa the deformation is less than 2%. A plastic deformation can be negligible up to this value. However, it is also dependent on the service time.

Surface pressure, page 41

Permissible surface speeds

iglidur® A200 was developed for low surface speeds. The given values in table 03 indicate the limits at which an increase up to the continuous permissible temperature occurs. This increase is a result of friction. In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.8	0.6	2.0
short-term	**m/s**	1.5	1.1	3.0

Table 03: Maximum surface speeds

Temperature

The iglidur® A200 plain bearings can be used in short-term temperatures up to +170°C. The temperatures prevailing in the bearing system also have an influence on the wear. For temperatures over +50°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the surface speed and load (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

iglidur® A200 +80°C 18MPa

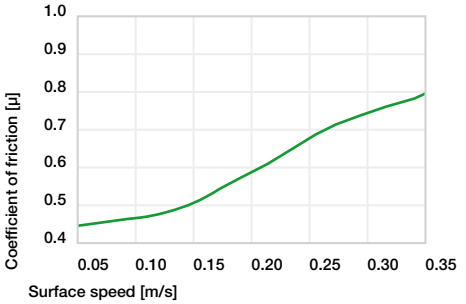


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

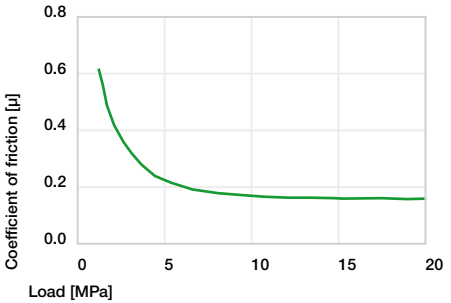


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

Shaft materials

Diagrams 06 and 07 show the test results of iglidur® A200 plain bearings running against various shaft materials. In pivoting applications below a load of 2MPa, the wear of iglidur® A200 plain bearings is higher than in rotating applications with equal load. Here the HR carbon steel shaft is a positive exception.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.10 – 0.40	0.09	0.04	0.04

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

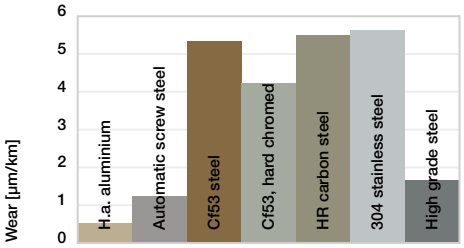


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

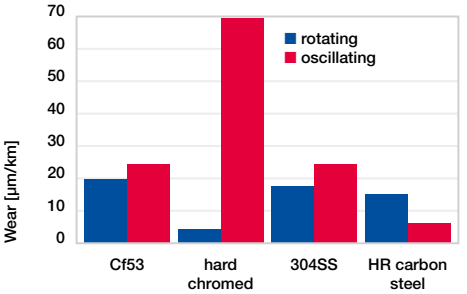


Diagram 07: Wear for rotating and oscillating applications with different shaft materials, p = 2MPa

Installation tolerances

iglidur® A200 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 D11 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

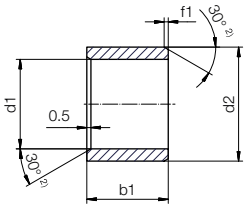
Testing methods, page 57

	Housing		Plain bearing		Shaft	
Ø d1 [mm]	H7 [mm]		D11 [mm]		h9 [mm]	
0 – 3	+0.000	+0.010	+0.020	+0.080	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.030	+0.105	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.040	+0.130	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.050	+0.160	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.065	+0.195	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.080	+0.240	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.100	+0.290	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.120	+0.340	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.145	+0.395	–0.100	+0.000

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

Bearing technology | Plain bearings | iglidur® A200

Sleeve bearing (form S)



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

Dimensions according to ISO 3547-1 and special dimensions

Order example: ASM-0103-02 - no minimum order quantity.
A200 iglidur® material S Sleeve bearing M Metric 01 Inner Ø d1 03 Outer Ø d2 02 Total length b1

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
1.0		3.0	2.0	ASM-0103-02
1.5		4.0	2.0	ASM-0104-02
2.0		5.0	2.0	ASM-0205-02
2.0		5.0	3.0	ASM-0205-03
2.5	+0.020 +0.080	6.0	3.0	ASM-0206-03
3.0		5.0	3.0	ASM-0305-03
3.0		5.0	4.0	ASM-0305-04
3.0		6.0	3.0	ASM-0306-03
3.0		6.0	4.0	ASM-0306-04
4.0		7.0	3.0	ASM-0407-03
4.0		7.0	4.0	ASM-0407-04
4.0		7.0	6.0	ASM-0407-06
4.0		8.0	6.0	ASM-0408-06
5.0		8.0	4.0	ASM-0508-04
5.0		8.0	5.0	ASM-0508-05
5.0		8.0	8.0	ASM-0508-08
5.0	+0.030	9.0	5.0	ASM-0509-05
5.0	+0.105	9.0	8.0	ASM-0509-08
6.0		8.0	10.0	ASM-0608-10
6.0		9.0	6.0	ASM-0609-06
6.0		10.0	4.0	ASM-0610-04
6.0		10.0	6.0	ASM-0610-06
6.0		10.0	10.0	ASM-0610-10
6.0		12.0	6.0	ASM-0612-06
6.0		12.0	10.0	ASM-0612-10
7.0		10.0	5.0	ASM-0710-05
7.0	+0.040	10.0	8.0	ASM-0710-08
8.0	+0.130	10.0	6.0	ASM-0810-06
8.0		10.0	8.0	ASM-0810-08

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
8.0		10.0	10.0	ASM-0810-10
8.0		11.0	8.0	ASM-0811-08
8.0		11.0	12.0	ASM-0811-12
8.0		12.0	6.0	ASM-0812-06
8.0		12.0	8.0	ASM-0812-08
8.0		12.0	10.0	ASM-0812-10
8.0		12.0	12.0	ASM-0812-12
8.0		14.0	6.0	ASM-0814-06
8.0	+0.040	14.0	10.0	ASM-0814-10
9.0	+0.130	12.0	14.0	ASM-0912-14
10.0		12.0	10.0	ASM-1012-10
10.0		14.0	6.0	ASM-1014-06
10.0		14.0	8.0	ASM-1014-08
10.0		14.0	10.0	ASM-1014-10
10.0		14.0	16.0	ASM-1014-16
10.0		16.0	6.0	ASM-1016-06
10.0		16.0	10.0	ASM-1016-10
10.0		16.0	16.0	ASM-1016-16
12.0		14.0	20.0	ASM-1214-20
12.0		16.0	15.0	ASM-1216-15
12.0		16.0	20.0	ASM-1216-20
12.0		18.0	8.0	ASM-1218-08
12.0		18.0	10.0	ASM-1218-10
12.0	+0.050 +0.160	18.0	15.0	ASM-1218-15
12.0		18.0	20.0	ASM-1218-20
14.0		16.0	10.0	ASM-1416-10
14.0		16.0	15.0	ASM-1416-15
14.0		16.0	20.0	ASM-1416-20
14.0		20.0	10.0	ASM-1420-10

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

Product range

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
14.0		20.0	15.0	ASM-1420-15
14.0		20.0	20.0	ASM-1420-20
15.0		17.0	10.0	ASM-1517-10
15.0		17.0	15.0	ASM-1517-15
15.0		21.0	10.0	ASM-1521-10
15.0		21.0	15.0	ASM-1521-15
15.0		21.0	20.0	ASM-1521-20
16.0		18.0	12.0	ASM-1618-12
16.0	+0.050	18.0	20.0	ASM-1618-20
16.0	+0.160	20.0	20.0	ASM-1620-20
16.0		20.0	25.0	ASM-1620-25
16.0		22.0	12.0	ASM-1622-12
16.0		22.0	15.0	ASM-1622-15
16.0		22.0	16.0	ASM-1622-16
16.0		22.0	20.0	ASM-1622-20
16.0		22.0	25.0	ASM-1622-25
18.0		24.0	12.0	ASM-1824-12
18.0		24.0	20.0	ASM-1824-20
18.0		24.0	30.0	ASM-1824-30
20.0		23.0	15.0	ASM-2023-15
20.0		23.0	20.0	ASM-2023-20
20.0		25.0	15.0	ASM-2025-15
20.0		25.0	20.0	ASM-2025-20
20.0	+0.065	25.0	30.0	ASM-2025-30
20.0	+0.195	26.0	15.0	ASM-2026-15
20.0		26.0	20.0	ASM-2026-20
20.0		26.0	30.0	ASM-2026-30
22.0		26.0	15.0	ASM-2226-15
22.0		28.0	10.0	ASM-2228-10

d1 [mm]	d1 Tolerance 3)	d2 [mm]	b1 h13 [mm]	Part No.
22.0		28.0	15.0	ASM-2228-15
22.0		28.0	20.0	ASM-2228-20
22.0		28.0	30.0	ASM-2228-30
24.0		30.0	15.0	ASM-2430-15
24.0		30.0	20.0	ASM-2430-20
24.0		30.0	30.0	ASM-2430-30
25.0		28.0	12.0	ASM-2528-12
25.0		28.0	20.0	ASM-2528-20
25.0		30.0	20.0	ASM-2530-20
25.0		30.0	30.0	ASM-2530-30
25.0		30.0	40.0	ASM-2530-40
25.0		32.0	20.0	ASM-2532-20
25.0	+0.065	32.0	30.0	ASM-2532-30
25.0	+0.195	32.0	40.0	ASM-2532-40
26.0		30.0	20.0	ASM-2630-20
26.0		32.0	30.0	ASM-2632-30
27.0		34.0	20.0	ASM-2734-20
27.0		34.0	30.0	ASM-2734-30
27.0		34.0	40.0	ASM-2734-40
28.0		33.0	20.0	ASM-2833-20
28.0		36.0	20.0	ASM-2836-20
28.0		36.0	30.0	ASM-2836-30
28.0		36.0	40.0	ASM-2836-40
30.0		38.0	20.0	ASM-3038-20
30.0		38.0	30.0	ASM-3038-30
30.0		38.0	40.0	ASM-3038-40
32.0	+0.080	40.0	20.0	ASM-3240-20
32.0	+0.240	40.0	30.0	ASM-3240-30
32.0		40.0	40.0	ASM-3240-40

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

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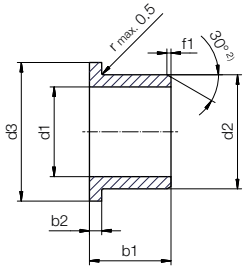
No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® A200

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: AFM-0103-02 - no minimum order quantity.
A200 iglidur® material F Flange bearing M Metric 01 Inner Ø d1 03 Outer Ø d2 02 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
1.0		3.0	5.0	2.0	1.00	AFM-0103-02
1.5	+0.020	4.0	6.0	2.0	1.00	AFM-0104-02
2.0	+0.080	5.0	8.0	3.0	1.50	AFM-0205-03
2.5		6.0	9.0	3.0	1.50	AFM-0206-03
3.0		6.0	9.0	4.0	1.50	AFM-0306-04
4.0		8.0	12.0	4.0	2.00	AFM-0408-04
4.0		8.0	12.0	6.0	2.00	AFM-0408-06
5.0		7.0	11.0	5.0	1.00	AFM-0507-05
5.0		9.0	13.0	5.0	2.00	AFM-0509-05
5.0		9.0	13.0	6.0	2.00	AFM-0509-06
5.0	+0.030	9.0	13.0	8.0	2.00	AFM-0509-08
6.0	+0.105	10.0	14.0	4.0	2.00	AFM-0610-04
6.0		10.0	14.0	6.0	2.00	AFM-0610-06
6.0		10.0	14.0	10.0	2.00	AFM-0610-10
6.0		12.0	14.0	6.0	3.00	AFM-0612-06
6.0		12.0	14.0	10.0	3.00	AFM-0612-10
7.0		11.0	15.0	8.0	2.00	AFM-0711-08
8.0		11.0	13.0	8.0	2.00	AFM-0811-08
8.0		12.0	16.0	6.0	2.00	AFM-0812-06
8.0		12.0	16.0	8.0	2.00	AFM-0812-08
8.0		12.0	16.0	12.0	2.00	AFM-0812-12
8.0	+0.040	12.0	16.0	22.0	2.00	AFM-0812-22
8.0	+0.130	14.0	18.0	6.0	3.00	AFM-0814-06
8.0		14.0	18.0	10.0	3.00	AFM-0814-10
9.0		14.0	19.0	6.0	2.00	AFM-0914-06
9.0		14.0	19.0	10.0	2.00	AFM-0914-10
9.0		14.0	19.0	14.0	2.00	AFM-0914-14
10.0		16.0	22.0	6.0	3.00	AFM-1016-06

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
10.0		16.0	22.0	8.0	3.00	AFM-1016-08
10.0	+0.040	16.0	20.0	10.0	3.00	AFM-101620-10
10.0	+0.130	16.0	22.0	10.0	3.00	AFM-1016-10
10.0		16.0	22.0	16.0	3.00	AFM-1016-16
12.0		14.0	20.0	12.0	1.00	AFM-1214-12
12.0		18.0	24.0	8.0	3.00	AFM-1218-08
12.0		18.0	22.0	10.0	3.00	AFM-1218-10
12.0		18.0	24.0	12.0	3.00	AFM-1218-12
12.0		18.0	22.0	15.0	3.00	AFM-1218-15
12.0		18.0	22.0	20.0	3.00	AFM-1218-20
14.0		20.0	25.0	10.0	3.00	AFM-1420-10
14.0		20.0	25.0	15.0	3.00	AFM-1420-15
14.0		20.0	25.0	20.0	3.00	AFM-1420-20
15.0	+0.050	21.0	27.0	10.0	3.00	AFM-1521-10
15.0	+0.160	21.0	27.0	15.0	3.00	AFM-1521-15
15.0		21.0	27.0	20.0	3.00	AFM-1521-20
15.0		21.0	27.0	25.0	3.00	AFM-1521-25
16.0		22.0	28.0	12.0	3.00	AFM-1622-12
16.0		22.0	28.0	15.0	3.00	AFM-1622-15
16.0		22.0	28.0	20.0	3.00	AFM-1622-20
16.0		22.0	28.0	25.0	3.00	AFM-1622-25
18.0		24.0	30.0	12.0	3.00	AFM-1824-12
18.0		24.0	30.0	18.0	3.00	AFM-1824-18
18.0		24.0	30.0	20.0	3.00	AFM-1824-20
18.0		24.0	30.0	30.0	3.00	AFM-1824-30
20.0		26.0	32.0	15.0	3.00	AFM-2026-15
20.0	+0.065	26.0	32.0	20.0	3.00	AFM-2026-20
20.0	+0.195	26.0	32.0	30.0	3.00	AFM-2026-30

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

Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
22.0		28.0	34.0	15.0	3.00	AFM-2228-15
22.0		28.0	34.0	20.0	3.00	AFM-2228-20
22.0		28.0	34.0	30.0	3.00	AFM-2228-30
24.0		30.0	36.0	15.0	3.00	AFM-2430-15
24.0		30.0	36.0	20.0	3.00	AFM-2430-20
24.0	+0.065	30.0	36.0	30.0	3.00	AFM-2430-30
25.0	+0.195	32.0	38.0	20.0	4.00	AFM-2532-20
25.0		32.0	38.0	30.0	4.00	AFM-2532-30
25.0		32.0	38.0	40.0	4.00	AFM-2532-40
27.0		34.0	40.0	20.0	4.00	AFM-2734-20
27.0		34.0	40.0	30.0	4.00	AFM-2734-30

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
27.0		34.0	40.0	40.0	4.00	AFM-2734-40
28.0		36.0	42.0	20.0	4.00	AFM-2836-20
28.0		36.0	42.0	30.0	4.00	AFM-2836-30
28.0	+0.065	36.0	42.0	40.0	4.00	AFM-2836-40
30.0	+0.195	38.0	44.0	20.0	4.00	AFM-3038-20
30.0		38.0	44.0	30.0	4.00	AFM-3038-30
30.0		38.0	44.0	40.0	4.00	AFM-3038-40
32.0	+0.080	40.0	46.0	20.0	4.00	AFM-3240-20
32.0	+0.240	40.0	46.0	30.0	4.00	AFM-3240-30
32.0		40.0	46.0	40.0	4.00	AFM-3240-40

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

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including delivery times, prices, online tools
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Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

“Food” bearing with media resistance up to +90°C

Compliant with Regulation (EU) No. 10/2011 and FDA guidelines

iglidur® A160

When to use it?

- When a plain bearing with maximum media resistance is required
- When a cost-effective plain bearing with high media resistance is required
- When a material compliant in accordance with Regulation (EU) No. 10/2011 is required

When not to use?

- When a universal material for the food industry is required
  iglidur® A180, iglidur® A181
- When a media-resistant plain bearing is required for applications at more than +90°C
  iglidur® A500, iglidur® X
- When a low-cost material with high wear resistance is required for dry operation
  iglidur® R

Bearing technology | Plain bearings | iglidur® A160

Ø 6.0 – 20.0 mm

Also available as:

Bar stock, round bar: Page 646

Bar stock, plate: Page 653

tribo-tape liner: Page 660

Piston rings: Page 559

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

“Food” bearing with media resistance up to +90°C:

Compliant with Regulation (EU) No. 10/2011 and FDA guidelines

iglidur® A160 offers maximum media resistance in the medium temperature range and is therefore a true low-cost iglidur®. The profile of properties is completed by the suitability for applications in the food industry.

- Compliant with Regulation (EU) No. 10/2011
- FDA-compliant
- High media resistance
- Cost-effective
- Lubrication-free
- Maintenance-free

Typical application areas

- Food industry
- Beverage technology
- Medical technology

Descriptive technical specifications			
Wear resistance at +23°C	–	■■■□□	+
Wear resistance at +90°C	–	■□□□□	+
Wear resistance at +150°C	–	■□□□□	+
Low coefficient of friction	–	■■■■□	+
Low moisture absorption	–	■■■■■	+
Wear resistance under water	–	■■■□□	+
High media resistance	–	■■■■□	+
Resistant to edge pressures	–	■■■□□	+
Suitable for shock and impact loads	–	■■■■□	+
Resistant to dirt	–	■■■■□	+

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

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

iglidur® A160 +90°C 15MPa

Technical data

General properties			Testing method
Density	g/cm³	1.00	
Colour		blue	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.1	DIN 53495
Max. moisture absorption	% weight	0.1	
Coefficient of friction, dynamic, against steel	µ	0.09 – 0.19	
pv value, max. (dry)	MPa · m/s	0.25	
Mechanical properties			
Flexural modulus	MPa	1,151	DIN 53457
Flexural strength at +20°C	MPa	19	DIN 53452
Compressive strength	MPa	37	
Max. recommended surface pressure (+20°C)	MPa	15	
Shore D hardness		60	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+90	
Max. application temperature short–term	°C	+100	
Min. application temperature	°C	–50	
Thermal conductivity	W/m · K	0.30	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	11	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{12}$	DIN IEC 93
Surface resistance	Ω	$> 10^{12}$	DIN 53482

Table 01: Material properties table

–50°C up to +90°C

15MPa

HB

FDA EU/10/2011

RoHS-II

ISO 3547-1

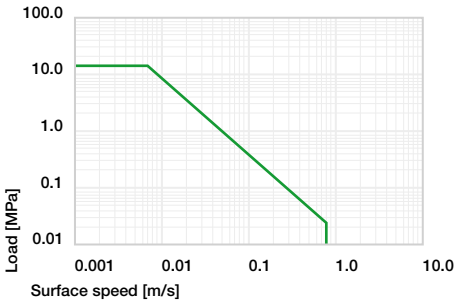


Diagram 01: Permissible pv values for iglidur® A160 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® A160 plain bearings is approximately 0.1% weight. The saturation limit submerged in water is also approximately 0.1% weight.

Vacuum

In vacuum, any present moisture is released as vapour. Use in vacuum is only possible with dehumidified iglidur® A160 bearings.

Radiation resistance

Plain bearings made from iglidur® A160 are resistant up to a radiation intensity of $1 \cdot 10^5$Gy.

UV resistance

iglidur® A160 plain bearings are partially resistant to UV radiation.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® A160

iglidur® A160 plain bearings are characterised by extreme media resistance at a low cost. Tribologically optimised, the material can be used in temperatures up to +90°C and also conforms to demands of the food processing sector. The profile of properties is completed by the "optical detectability", i.e. the blue colour, often required in the industry.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® A160 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

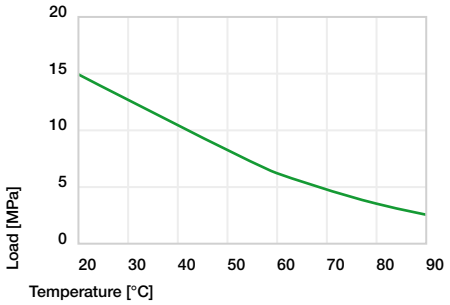


Diagram 02: Maximum recommended surface pressure as a function of temperature (15MPa at +20 °C)

Diagram 03 shows the elastic deformation of iglidur® A160 at radial loads. Plastic deformation is minimal up to a radial load of 15MPa. However, it is also dependent on the service time.

Surface pressure, page 41

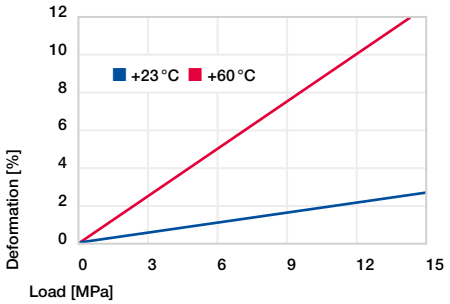


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® A160 was developed for low surface speeds. Maximum speeds of up to 0.5m/s (rotating) and 2.0m/s (linear), respectively, are permissible during continuous dry operation. The given values in table 03 indicate the limits at which an increase up to the continuous permissible temperature occurs. This increase is a result of friction. In practice, though, this level is rarely reached, due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.5	0.4	2.0
short-term	**m/s**	0.7	0.6	3.0

Table 03: Maximum surface speeds

Temperature

The temperatures prevailing in the bearing system also have an influence on the wear. For temperatures over +60°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Coefficient of friction and wear resistance are dependent on the application parameters (diagrams 04 and 05). For iglidur® A160 plain bearings, the alteration of the coefficient of friction μ as a function of surface speed is less distinct. The coefficient of friction decreases with increasing load. Surface finishes (Ra) of the shaft between 0.6 – 0.7μm are ideal.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

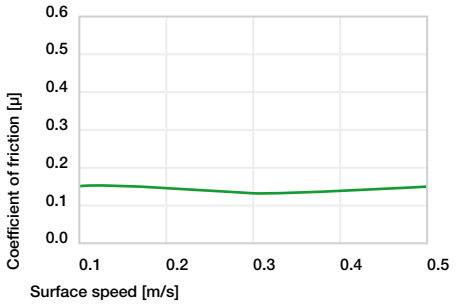


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

Technical data

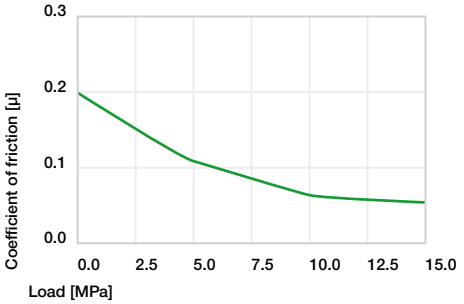


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

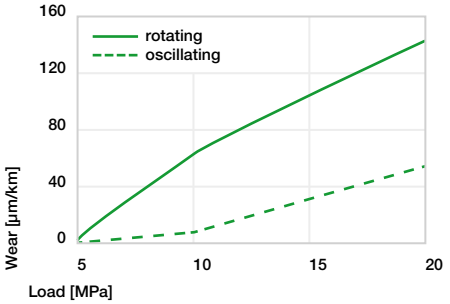


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

Diagram 06 shows results of testing different shaft materials with plain bearings made from iglidur® A160. For rotational applications with low loads, the most interesting, media and corrosion-resistant shaft materials 304 stainless steel, high grade steel and hard-chromed steel reveal themselves as particularly good counter partners. On high grade steel shafts, however, the wear increases the fastest with the load (diagram 06). With Cf53 shafts, the wear in pivoting applications is exemplary compared to rotating applications. In rotation the wear, as with many other iglidur® materials, is higher than when pivoting (diagram 07).

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.09 – 0.19	0.08	0.03	0.04

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

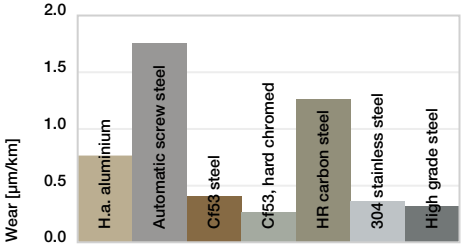


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

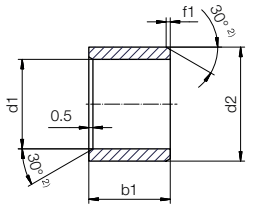
iglidur® A160 plain bearings are standard bearings for shafts with h tolerance (recommended minimum h9). The bearings are designed for press-fit into a housing machined to a H7 tolerance. After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the E10 tolerances.

Testing methods, page 57

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

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

Sleeve bearing (form S)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 6–12	Ø 12–30
f [mm]	0.5	0.8

Dimensions according to ISO 3547-1 and special dimensions

Order example: A160SM-0608-06 - no minimum order quantity.
A160 iglidur® material S Sleeve bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
6.0	+0.020 +0.068	8.0	6.0	**A160SM-0608-06**
8.0	+0.025 +0.083	10.0	10.0	**A160SM-0810-10**
10.0		12.0	10.0	**A160SM-1012-10**
12.0	+0.032 +0.102	14.0	12.0	**A160SM-1214-12**
16.0		18.0	15.0	**A160SM-1618-15**
20.0	+0.040 +0.124	23.0	20.0	**A160SM-2023-20**

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

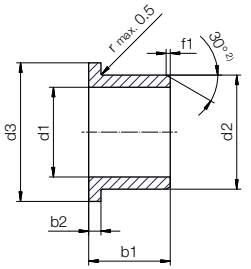
Online ordering
including delivery times, prices, online tools
www.igus.eu/A160

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 6–12	Ø 12–30
f [mm]	0.5	0.8

Dimensions according to ISO 3547-1 and special dimensions

Order example: A160FM-0608-06 - no minimum order quantity.
A160 iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.020 +0.068	8.0	12.0	6.0	1.00	**A160FM-0608-06**
8.0	+0.025 +0.083	10.0	15.0	10.0	1.00	**A160FM-0810-10**
10.0		12.0	18.0	10.0	1.00	**A160FM-1012-10**
12.0	+0.032 +0.102	14.0	20.0	12.0	1.00	**A160FM-1214-12**
16.0		18.0	24.0	17.0	1.00	**A160FM-1618-17**
20.0	+0.040 +0.124	23.0	30.0	21.5	1.50	**A160FM-2023-21**

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/A160

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
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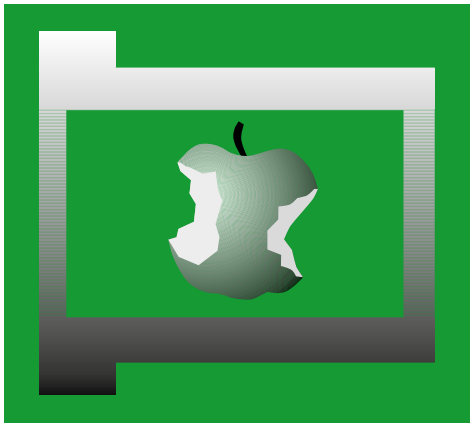


The robust one with high abrasion resistance
iglidur® A290

When to use it?

- For low speeds
- When a low noise level is required
- When the bearing is supposed to be physiologically safe
- Very good mechanical properties

When not to use?

- When FDA compliance is required
  iglidur® A180, iglidur® A200, iglidur® A500
- When the highest wear resistance is required
  iglidur® W300
- When continuous operating temperatures are higher than +140°C
  iglidur® A500, iglidur® H, iglidur® X
- When a cost-effective universal plain bearing is required
  iglidur® G

Bearing technology | Plain bearings | iglidur® A290

Ø 3.0 – 50.0 mm

Also available as:

Bar stock, round bar: Page 629

Bar stock, plate: Page 651

tribo-tape liner: Page 657

Piston rings: Page 559

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

The robust one with high abrasion resistance

iglidur® A290 plain bearings were developed for high abrasion resistance and quiet operation.

- High wear resistance
- Silent
- Lubrication-free
- Maintenance-free
- Standard product range from stock

Typical application areas

- Food industry

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® A290 +140°C 70MPa

Technical data

General properties			Testing method
Density	g/cm³	1.41	
Colour		white	
Max. moisture absorption at +23°C and 50% r.h.	% weight	1.7	DIN 53495
Max. moisture absorption	% weight	7.3	
Coefficient of friction, dynamic, against steel	µ	0.13 – 0.40	
pv value, max. (dry)	MPa · m/s	0.23	
Mechanical properties			
Flexural modulus	MPa	8,800	DIN 53457
Flexural strength at +20°C	MPa	250	DIN 53452
Compressive strength	MPa	91	
Max. recommended surface pressure (+20°C)	MPa	70	
Shore D hardness		88	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+140	
Max. application temperature short–term	°C	+180	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	7	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{11}$	DIN IEC 93
Surface resistance	Ω	$> 10^{11}$	DIN 53482

Table 01: Material properties table

–40°C up to +140°C

70MPa

HB

FDA

RoHS-II

ISO 3547-1

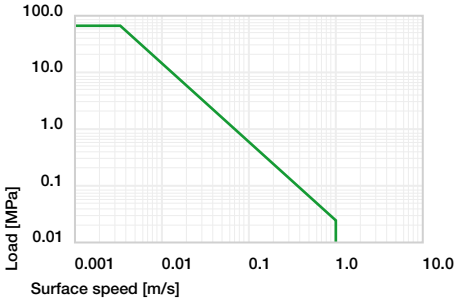


Diagram 01: Permissible pv values for iglidur® A290 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® A290 plain bearings is approximately 1.7% weight. The saturation limit in water is 7.3% weight. A disadvantage which must be accounted for by all means in applications in humid and wet areas.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is only possible to a limited extent.

Radiation resistance

Plain bearings made from iglidur® A290 are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

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

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® A290

iglidur® A290 plain bearings were developed for high abrasion resistance and quiet operation. Compared to the bearings made from iglidur® A200, the tribological properties could be significantly improved.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® A290 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

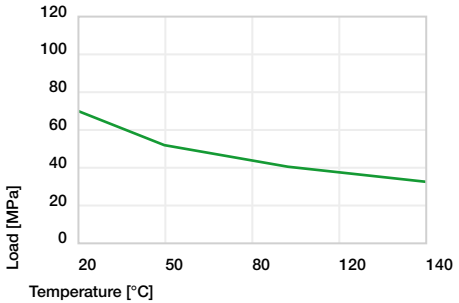


Diagram 02: Maximum recommended surface pressure as a function of temperature (70MPa at +20°C)

At this load, the deformation is only about 2.5% at room temperature. A plastic deformation can be negligible up to this value. However, it is also dependent on the service time. Diagram 03 shows the elastic deformation of iglidur® A290 at radial loads.

Surface pressure, page 41

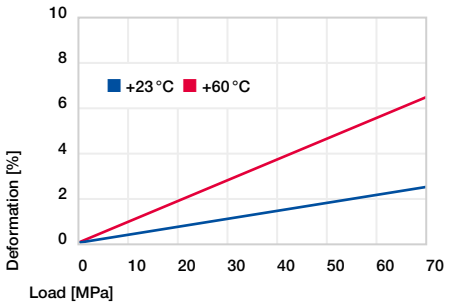


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® A290 was developed for low surface speeds. Due to the relatively high friction particularly in the low load range, the temperature of the iglidur® A290 plain bearings increases more than other bearings. With higher speeds, the friction also increases.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.0	0.7	3.0
short-term	**m/s**	2.0	1.4	4.0

Table 03: Maximum surface speeds

Temperature

The temperatures prevailing in the bearing system also have an influence on the wear. With increasing temperatures, the wear increases and this effect is significant when temperatures rise over +120°C. For temperatures over +110°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction alters similarly to the wear resistance with increasing load and surface speed (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

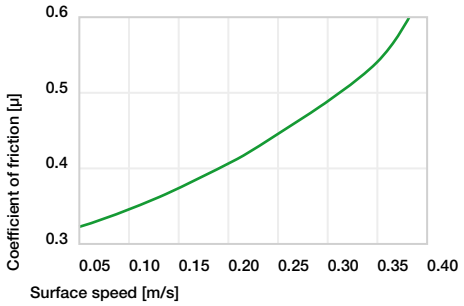


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

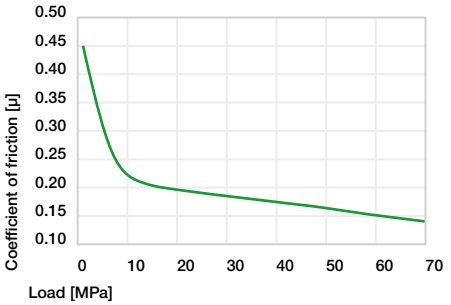


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

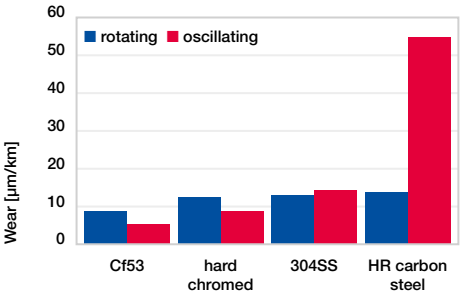


Diagram 07: Wear for rotating and oscillating applications with different shaft materials, p = 2MPa

Shaft materials

Diagrams 06 and 07 show the test results of iglidur® A290 plain bearings running against various shaft materials. Compared to iglidur® A200, the improved tribological properties of iglidur® A290 are also reflected in the coefficient of wear. At low loads, the differences in the wear resistance of the combinations of iglidur® A290 with different shaft materials are very distinct.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.13 – 0.40	0.09	0.04	0.04

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

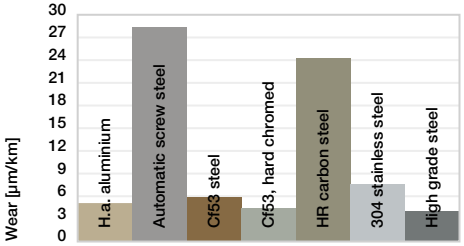


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® A290 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 D11 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

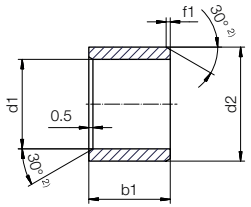
Testing methods, page 57

	Housing		Plain bearing		Shaft	
Ø d1 [mm]	H7 [mm]		D11 [mm]		h9 [mm]	
0 – 3	+0.000	+0.010	+0.020	+0.080	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.030	+0.105	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.040	+0.130	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.050	+0.160	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.065	+0.195	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.080	+0.240	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.100	+0.290	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.120	+0.340	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.145	+0.395	–0.100	+0.000

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

Bearing technology | Plain bearings | iglidur® A290

Sleeve bearing (form S)



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

Dimensions according to ISO 3547-1 and special dimensions

Order example: A290SM-0304-03 - no minimum order quantity.
A290 iglidur® material S Sleeve bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 03 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
3.0	+0.020 +0.080	4.5	3.0	A290SM-0304-03
4.0	+0.030 +0.105	5.5	4.0	A290SM-0405-04
5.0		7.0	5.0	A290SM-0507-05
6.0		8.0	6.0	A290SM-0608-06
8.0	+0.040 +0.130	10.0	8.0	A290SM-0810-08
10.0		12.0	10.0	A290SM-1012-10
12.0	+0.050 +0.160	14.0	15.0	A290SM-1214-15
15.0		17.0	15.0	A290SM-1517-15
16.0		18.0	15.0	A290SM-1618-15
18.0		20.0	15.0	A290SM-1820-15
20.0	+0.065 +0.195	23.0	20.0	A290SM-2023-20
25.0		28.0	20.0	A290SM-2528-20
30.0		34.0	30.0	A290SM-3034-30
35.0	+0.080 +0.240	39.0	40.0	A290SM-3539-40
40.0		44.0	50.0	A290SM-4044-50
50.0		55.0	40.0	A290SM-5055-40

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

Available from stock
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Online ordering
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www.igus.eu/A290

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

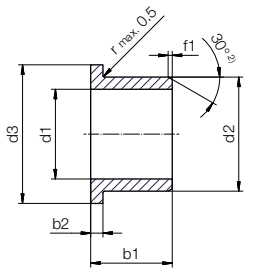
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur®
A290
+140°C
70MPa

Bearing technology | Plain bearings | iglidur® A290

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: A290FM-0405-06 - no minimum order quantity.
A290 iglidur® material F Flange bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
4.0	+0.030 +0.105	5.5	9.5	6.0	0.75	A290FM-0405-06
5.0		7.0	11.0	5.0	1.00	A290FM-0507-05
6.0		8.0	12.0	8.0	1.00	A290FM-0608-08
8.0	+0.040 +0.130	10.0	15.0	9.0	1.00	A290FM-0810-09
10.0		12.0	18.0	9.0	1.00	A290FM-1012-09
12.0	+0.050 +0.160	14.0	20.0	12.0	1.00	A290FM-1214-12
15.0		17.0	23.0	17.0	1.00	A290FM-1517-17
16.0		18.0	24.0	17.0	1.00	A290FM-1618-17
20.0	+0.065 +0.195	23.0	30.0	21.0	1.50	A290FM-2023-21
25.0		28.0	35.0	21.0	1.50	A290FM-2528-21
30.0		34.0	42.0	26.0	2.00	A290FM-3034-26
35.0	+0.080 +0.240	39.0	47.0	26.0	2.00	A290FM-3539-26
40.0		44.0	52.0	40.0	2.00	A290FM-4044-40
50.0		55.0	63.0	40.0	2.00	A290FM-5055-40

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

Available from stock
Detailed information about delivery time online.
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including delivery times, prices, online tools
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Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Suitable for contact with drinking water

KTW-compliant

iglidur® UW160

When to use it?

- When a KTW-compliant material is required
- When a wear-resistant material for continuous operation in liquid is required

When not to use?

- When a recurring media-resistant plain bearing with intermittent dry operation is required
  iglidur® A160
- When a media and temperature-resistant universal plain bearing is required
  iglidur® X
- When a standard plain bearing is required for use in a moist environment
  iglidur® P

Bearing technology | Plain bearings | iglidur® UW160

Ø 3.0 – 10.0 mm

Also available as:

Bar stock, round bar: **Page 646**

Bar stock, plate: **Page 651**

tribo-tape liner: **Page 657**

Piston rings: **Page 559**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 783**

Suitable for contact with drinking water: KTW-compliant

iglidur® UW160 is tribologically optimised for continuous operation in liquid media. Its superior media resistance not only permits uses with potable water contact.

- Suitable for applications in liquids
- Suitable for contact with drinking water (KTW-compliant)
- High media resistance
- Lubrication-free
- Maintenance-free

Typical application areas

- Fluid technology
- Pumps
- Water meters

Descriptive technical specifications			
Wear resistance at +23°C	–	■■■□□	+
Wear resistance at +90°C	–	■□□□□	+
Wear resistance at +150°C	–	■□□□□	+
Low coefficient of friction	–	■■□□□	+
Low moisture absorption	–	■■■■■	+
Wear resistance under water	–	■■■■■	+
High media resistance	–	■■■■□	+
Resistant to edge pressures	–	■■■□□	+
Suitable for shock and impact loads	–	■■■□□	+
Resistant to dirt	–	■■■□□	+

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

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

Technical data

General properties			Testing method
Density	g/cm³	1.04	
Colour		grey	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.1	DIN 53495
Max. moisture absorption	% weight	0.1	
Coefficient of friction, dynamic, against steel	µ	0.17 – 0.31	
pv value, max. (dry)	MPa · m/s	0.22	
Mechanical properties			
Flexural modulus	MPa	1,349	DIN 53457
Flexural strength at +20°C	MPa	22	DIN 53452
Compressive strength	MPa	32	
Max. recommended surface pressure (+20°C)	MPa	15	
Shore D hardness		60	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+90	
Max. application temperature short–term	°C	+100	
Min. application temperature	°C	–50	
Thermal conductivity	W/m · K	0.50	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	18	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{12}$	DIN IEC 93
Surface resistance	Ω	$> 10^{12}$	DIN 53482

Table 01: Material properties table

–50°C up to +90°C

15MPa

HB

FDA

RoHS-II

ISO 3547-1

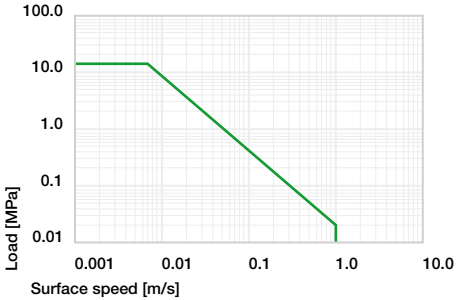


Diagram 01: Permissible pv values for iglidur® UW160 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® UW160 plain bearings is approximately 0.1% weight. The saturation limit in water is 0.1% weight.

Vacuum

In vacuum, any present moisture is released as vapour. Use in vacuum is only possible with dehumidified iglidur® UW160 bearings.

Radiation resistance

Plain bearings made from iglidur® UW160 are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® UW160 plain bearings are partially resistant to UV radiation.

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

+ resistant 0 conditionally resistant – not resistant

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

Table 02: Chemical resistance

Chemical table, page 1542

iglidur® UW160 was developed quite specifically with regard to maximum wear resistance in media-based continuous operation. In such applications, low radial loads and medium temperatures usually occur. The suitability for contact with drinking water and very good durability complete the profile of properties.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® UW160 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

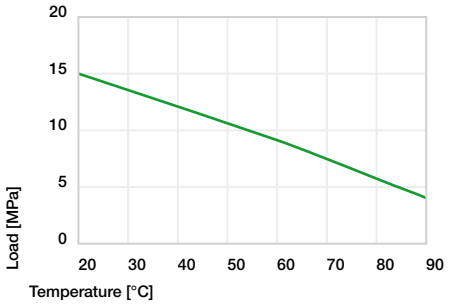


Diagram 02: Maximum recommended surface pressure as a function of temperature (15MPa at +20 °C)

Diagram 03 shows the elastic deformation of iglidur® UW160 at radial loads.

Surface pressure, page 41

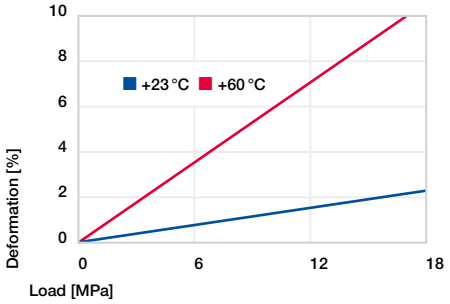


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

The maximum recommended surface speed is based on the friction heat generated at the bearing surface. The temperature should only be permitted to increase to a value that will ensure a sustainable use of the bearing with respect to wear and dimensional integrity. The maximum values specified in table 03 are for the dry operation. In media-based application, sometimes significantly higher speeds are achieved due to reduced heat generation depending on the installation.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.3	0.3	1.0
short-term	**m/s**	0.5	0.4	2.5

Table 03: Maximum surface speeds

Temperature

iglidur® UW160 was developed for use in liquid media in the normal and medium temperature range. As in the case of all thermoplastics, the compression strength of iglidur® UW160 decreases when temperatures rise. The temperatures prevailing in the bearing system also have an influence on the wear. The wear rises with increasing temperatures. For temperatures over +70°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the surface speed and load (diagrams 04 and 05). The influence of surface speed and surface finish of the shaft on the friction coefficient is low, but with increasing radial load the coefficient of friction decreases significantly, mainly in the range of up to 7.5MPa.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

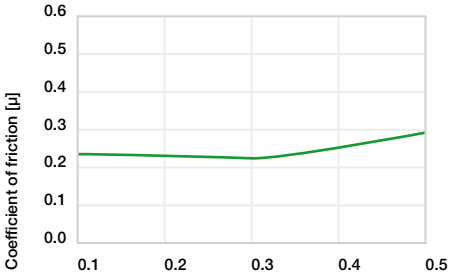


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

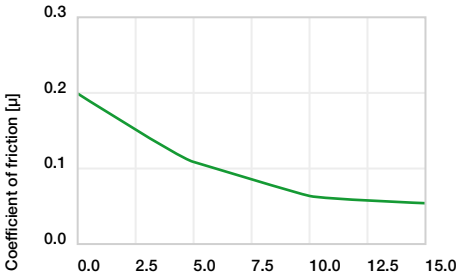


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

Shaft materials

Diagram 06 shows results of testing different shaft materials with plain bearings made from iglidur® UW160. In the example of a rotational movement with radial loads of 1MPa and a speed of 0.3m/s, it becomes clear that iglidur® UW160 achieves good coefficient of wear with the most varied shafts. It is also clear that there are better iglidur® materials for dry operation. As with many other iglidur® materials in dry operation, diagram 07 shows the significantly higher wear in rotation than in pivoting with otherwise identical parameters.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.17 – 0.31	0.08	0.03	0.03

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

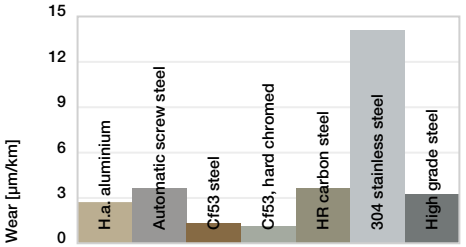


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

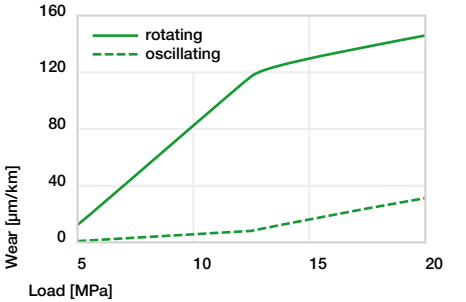


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Installation tolerances

iglidur® UW160 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 E10 tolerances.

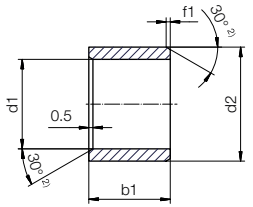
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® UW160

Sleeve bearing (form S)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 1–6	Ø 6–12
f [mm]	0.3	0.5

Dimensions according to ISO 3547-1 and special dimensions

Order example: UW160SM-0304-03 - no minimum order quantity.
UW160 iglidur® material S Sleeve bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 03 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
3.0	+0.014 +0.054	4.0	3.0	**UW160SM-0304-03**
4.0		5.0	4.0	**UW160SM-0405-04**
5.0	+0.020 +0.068	7.0	5.0	**UW160SM-0507-05**
6.0		8.0	6.0	**UW160SM-0608-06**
8.0	+0.025 +0.083	10.0	10.0	**UW160SM-0810-10**
10.0		12.0	10.0	**UW160SM-1012-10**

[3] After press-fit. *Testing methods page 57*

Available from stock
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Ordering note
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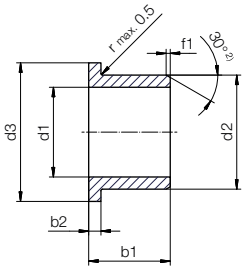
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur® UW160 +90°C 15MPa

Bearing technology | Plain bearings | iglidur® UW160

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 1–6	Ø 6–12
f [mm]	0.3	0.5

Dimensions according to ISO 3547-1 and special dimensions

Order example: UW160FM-0304-05 - no minimum order quantity.
UW160 iglidur® material F Flange bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 05 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
3.0	+0.014 +0.054	4.5	7.5	5.0	0.75	**UW160FM-0304-05**
4.0		5.5	9.5	6.0	0.75	**UW160FM-0405-06**
5.0	+0.020 +0.068	7.0	11.0	7.0	1.00	**UW160FM-0507-07**
6.0		8.0	12.0	6.0	1.00	**UW160FM-0608-06**
8.0	+0.025 +0.083	10.0	14.0	10.0	1.00	**UW160FM-0810-10**
10.0		12.0	18.0	10.0	1.00	**UW160FM-1012-10**

[3] After press-fit. *Testing methods page 57*

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Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

For the tobacco industry

FDA-compliant

iglidur® T220

When to use it?

- When you need a bearing free from non-permitted materials in the tobacco industry
- When FDA compliance is required

When not to use?

- When high surface pressures occur
  iglidur® Z
- When a cost-effective all-round plain bearing is required
  iglidur® G, iglidur® M250
- When the highest wear resistance at low pressures is required
  iglidur® J
- When the bearing should merely be free from PTFE and silicone
  iglidur® C, iglidur® R

Bearing technology | Plain bearings | iglidur® T220

For the tobacco industry: FDA-compliant

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

- Free from banned ingredients as requested by main manufacturers of tobacco products
- FDA-compliant
- Lubrication-free
- Maintenance-free

Typical application areas

- Tobacco industry

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

Ø –

Also available as:

Bar stock, round bar: Page 647

Bar stock, plate: Page 651

tribo-tape liner: Page 657

Piston rings: Page 559

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

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

iglidur® T220 +100°C 40MPa

Technical data

General properties			Testing method
Density	g/cm³	1.28	
Colour		white	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.3	DIN 53495
Max. moisture absorption	% weight	0.5	
Coefficient of friction, dynamic, against steel	µ	0.20 – 0.32	
pv value, max. (dry)	MPa · m/s	0.28	
Mechanical properties			
Flexural modulus	MPa	1,800	DIN 53457
Flexural strength at +20°C	MPa	65	DIN 53452
Compressive strength	MPa	55	
Max. recommended surface pressure (+20°C)	MPa	40	
Shore D hardness		76	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+100	
Max. application temperature short–term	°C	+160	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	11	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{10}$	DIN IEC 93
Surface resistance	Ω	$> 10^{10}$	DIN 53482

Table 01: Material properties table

–40°C up to +100°C

40MPa

HB

FDA EU/10/2011

RoHS-II

ISO 3547-1

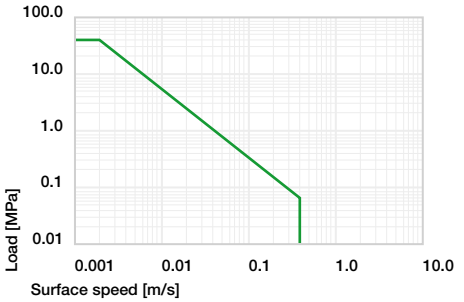


Diagram 01: Permissible pv values for iglidur® T220 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® T220 plain bearings is approximately 0.3% weight. The saturation limit in water is 0.5% weight. These values are so low that consideration of expansion by moisture absorption is only required under extreme circumstances.

Vacuum

In vacuum, any present moisture is released as vapour. Use in vacuum is only possible with dehumidified iglidur® T220 bearings.

Radiation resistance

Plain bearings made from iglidur® T220 are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

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

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® T220

iglidur® T220 is a special material for applications in the tobacco processing industry. It fulfils the demands of the tobacco industry (engineering database). The material is free of undesirable or banned ingredients, as requested by reputed manufacturers from 2004 onward.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® T220 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

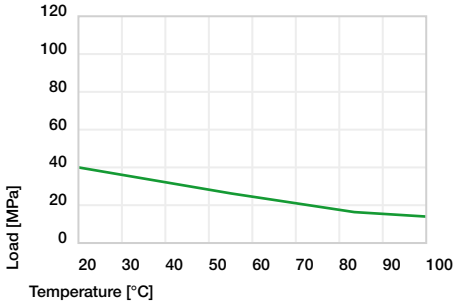


Diagram 02: Maximum recommended surface pressure as a function of temperature (40MPa at +20 °C)

iglidur® T220 plain bearings can be stressed up to the permitted limit of 40MPa, the elastic deformation is less than 2% at room temperature. The permitted load is limited by higher temperatures (diagram 03).

Surface pressure, page 41

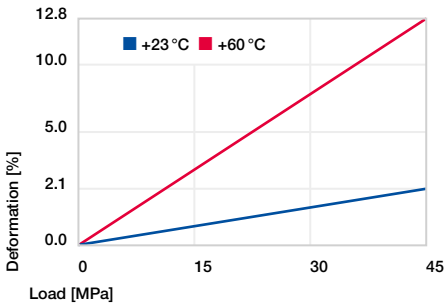


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

The maximum speeds of iglidur® T220 plain bearings when rotating continuously is 0.4m/s. The friction and the associated temperature increase limit the permissible speeds. From this it follows that intermittent service or in linear movements, higher speeds can be attained.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.4	0.3	1.0
short-term	**m/s**	1.0	0.7	2.0

Table 03: Maximum surface speeds

Temperature

The flexibility of the bearings depends on the temperature. Even temperatures as low as +60°C lead to a considerable increase in flexibility. For temperatures over +50°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

By the observance of the tobacco processing industry specifications, the coefficient of friction and wear of iglidur® T220 plain bearings remain behind those of the best iglidur® plain bearings. The coefficient of friction decreases with the load and increases only slightly with higher speeds.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

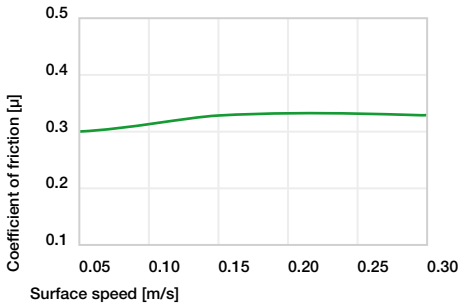


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

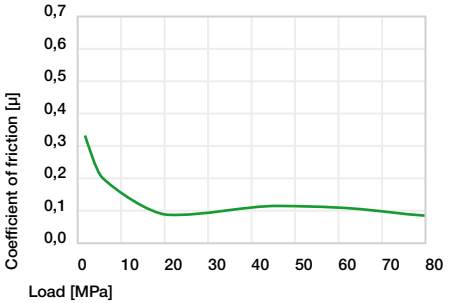


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

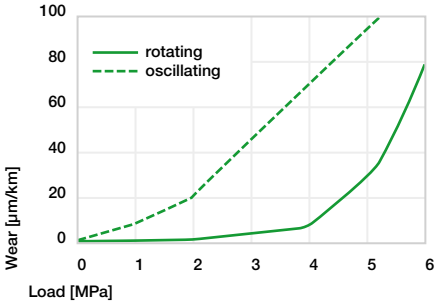


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

Diagram 06 shows the test results of iglidur® T220 plain bearings running against various shaft materials. Diagram 07 shows that the bearings react with a heavy increase in wear when the load is increased. Therefore care should be taken to maintain the loads under 5MPa through adequate dimensioning of the bearing.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.20 – 0.32	0.09	0.04	0.04

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

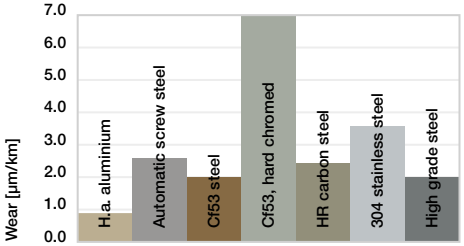


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® T220 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 E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

Testing methods, page 57

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

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

Product range

iglidur® T220 plain bearings are manufactured to special order.

Plain bearing materials for heavy-duty applications

Plain bearing materials for heavy-duty applications

The iglidur® plain bearings for high loads combine high wear resistance and the ability to withstand high (static) loads, impacts and edge loads.
Within these properties they all have their own special strengths. High load means radial surface pressure starting from 30MPa up to more than 100MPa (100MPa means 1,000kg on a 10 x 10mm plain bearing).

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

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

iglidur® Q2:
The durable heavy–duty bearing

Temperature [°C] [123]	+130	–	+
Surface pressure [MPa] [124]	120	–	+
Coefficient of friction [µ] [125]	0.17	–	+
Wear [µm/km] [125]	1.50	–	+
Price index		–	+

iglidur® Q:
The peak of stability

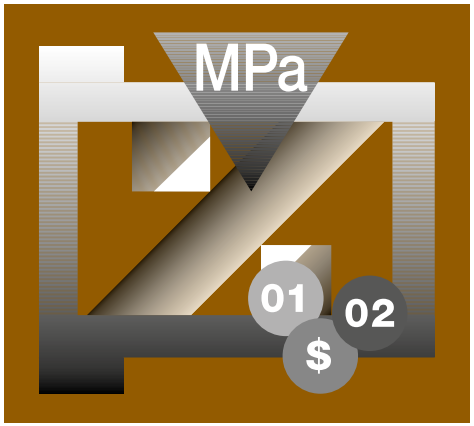
Temperature [°C] [123]	+135	–	+
Surface pressure [MPa] [124]	100	–	+
Coefficient of friction [µ] [125]	0.19	–	+
Wear [µm/km] [125]	1.90	–	+
Price index		–	+

iglidur® Q290:
Heavy–duty on soft shafts

Temperature [°C] [123]	+140	–	+
Surface pressure [MPa] [124]	55	–	+
Coefficient of friction [µ] [125]	0.12	–	+
Wear [µm/km] [125]	0.48	–	+
Price index		–	+

iglidur® TX1:
The heavy–duty bearing for up to 200MPa static and 140MPa dynamic

[123] Max. long-term application temperature [124] Max. recommended surface pressure at +20°C [125] Best combination for p = 1MPa, v = 0.3m/s, rotating



The durable heavy-duty bearing

Combined wear resistance and compressive strength at high loads

iglidur® Q2

When to use it?

- When high dynamic loads occur
- When dirt occurs in addition to high shock and impact loads
- For highly loaded pivoting movements

When not to use?

- When only static loads occur
  iglidur® X, iglidur® H2
- When high pv values occur in conjunction with high speeds
  iglidur® Z
- When a cost-effective all-round plain bearing is required
  iglidur® G
- When soft shafts are in use
  iglidur® W300

Bearing technology | Plain bearings | iglidur® Q2

Ø
4.0 – 120.0
mm

Also available as:

The durable heavy-duty bearing:
Combined wear resistance and compressive strength at high loads

Where previous iglidur® bearing solutions are limited within the scope of extreme loads and strong impact forces, the iglidur® Q2 starts. Made for heavy-duty pivoting applications under extreme conditions.

- Wear-resistant
- Good price-performance ratio
- Lubrication-free
- Maintenance-free
- High rigidity
- Suitable for high loads

Typical application areas

- Agricultural engineering
- Utility and construction vehicles
- Mechanical engineering

Descriptive technical specifications			
Wear resistance at +23°C	–		+
Wear resistance at +90°C	–		+
Wear resistance at +150°C	–		+
Low coefficient of friction	–		+
Low moisture absorption	–		+
Wear resistance under water	–		+
High media resistance	–		+
Resistant to edge pressures	–		+
Suitable for shock and impact loads	–		+
Resistant to dirt	–		+

Bar stock, round bar: **Page 649**
Bar stock, plate: **Page 651**
tribo-tape liner: **Page 657**
Piston rings: **Page 562**
Two hole flange bearing: **Page 581**
Moulded special parts: **Page 602**
igubal® spherical balls: **Page 783**

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

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

iglidur® Q2
+130°C
120MPa

Technical data

General properties			Testing method
Density	g/cm³	1.46	
Colour		beige–brown	
Max. moisture absorption at +23°C and 50% r.h.	% weight	1.1	DIN 53495
Max. moisture absorption	% weight	4.6	
Coefficient of friction, dynamic, against steel	µ	0.22 – 0.42	
pv value, max. (dry)	MPa · m/s	0.70	
Mechanical properties			
Flexural modulus	MPa	8,370	DIN 53457
Flexural strength at +20°C	MPa	240	DIN 53452
Compressive strength	MPa	130	
Max. recommended surface pressure (+20°C)	MPa	120	
Shore D hardness		80	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+130	
Max. application temperature short–term	°C	+200	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	8	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{13}$	DIN IEC 93
Surface resistance	Ω	$> 10^{11}$	DIN 53482

Table 01: Material properties table

–40°C up to +130°C
120MPa
HB
FDA
RoHS-II
ISO 3547-1

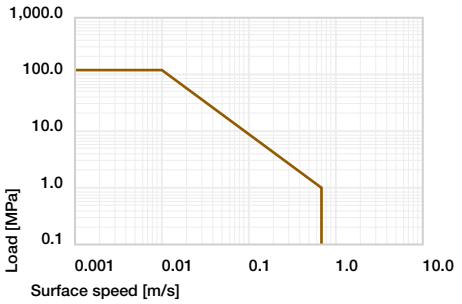


Diagram 01: Permissible pv values for iglidur® Q2 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® Q2 plain bearings is approximately 1.1% weight. The saturation limit in water is 4.6% weight. This must be taken into account for these types of applications.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is only possible to a limited extent.

Radiation resistance

Plain bearings made from iglidur® Q2 are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® Q2 plain bearings are resistant to permanent UV radiation.

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

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® Q2

iglidur® Q2 plain bearings represent high load capacities and good abrasion resistance at high loads. The price-performance ratio is outstanding. Solid lubricants reduce the coefficient of friction and improve the resistance to wear, which was markedly improved as compared to other iglidur® plain bearings, especially for heavily loaded pivoting applications.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® Q2 plain bearings decreases. Diagram 02 shows this inverse relationship. However, at the long-term maximum temperature of +130°C the permissible surface pressure is around 20MPa. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

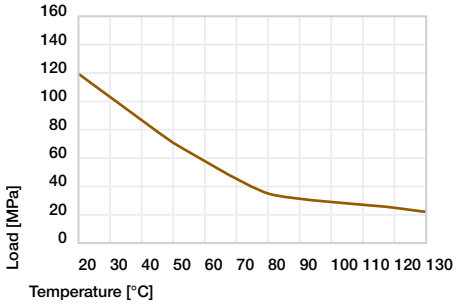


Diagram 02: Maximum recommended surface pressure as a function of temperature (120MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® Q2 at radial loads.

Surface pressure, page 41

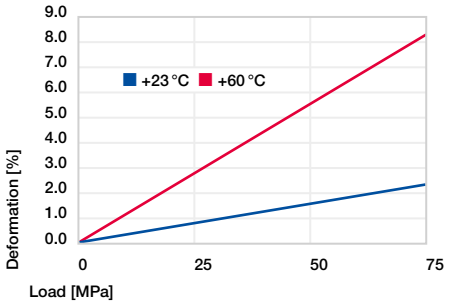


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

Typical applications for iglidur® Q2 plain bearings are pivoting movements under high loads at comparatively low speeds. However, relatively high speeds are still attainable. The speeds stated in table 03 are limit values for the lowest bearing loads. With higher loads, the permitted speed drops with the extent of the load due to the limitations by the pv value.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.0	0.7	4.0
short-term	**m/s**	2.0	1.4	5.0

Table 03: Maximum surface speeds

Temperature

iglidur® Q2 is a very temperature-stable material. The long-term upper temperature limit of +130°C permits the broad use in applications typical for the agricultural, utility vehicle or construction equipment sectors. With increasing temperatures, the compressive strength of iglidur® Q2 plain bearings decreases. For temperatures over +70°C an additional securing is required. When considering temperatures, the additional frictional heat in the bearing system must be taken into account.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

iglidur® Q2 has a low coefficient of friction. Please note that a sliding surface with a rough surface finish will increase the friction. The highest coefficient of friction occurs at Ra = 1µm. Surface finishes (Ra) of the shaft between 0.1 – 0.4µm are ideal. Furthermore, the coefficient of friction of iglidur® Q2 plain bearings largely depends on the speed and load. As the surface speed increases, the coefficient of friction will quickly increase as well. However, as the load is reduced, the coefficient of friction initially drops significantly, then moderately.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

iglidur® Q2
+130°C
120MPa

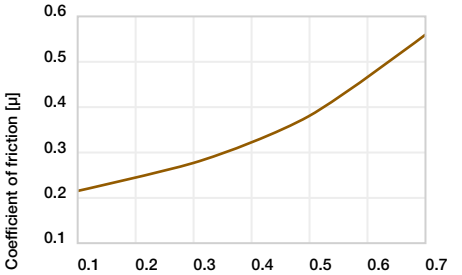


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

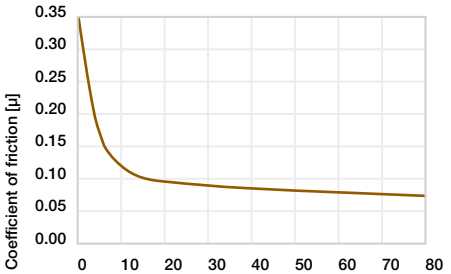


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

Shaft materials

In high load applications, we generally recommend the use of hardened shafts. Furthermore, even at low to medium loads, iglidur® Q2 will attain increased service life with "hard" shafts as compared to "soft" shafts. But for low load applications, the results are outstanding with free cutting steel as well. For high loads, the wear in pivoting applications is much lower than for rotation. If the shaft material you plan on using is not shown in these test results, please contact us.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.22 – 0.42	0.09	0.04	0.04

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

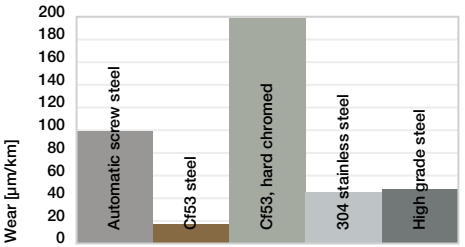


Diagram 06: Wear, pivoting with different shaft materials, pressure p = 45MPa, v = 0.01m/s

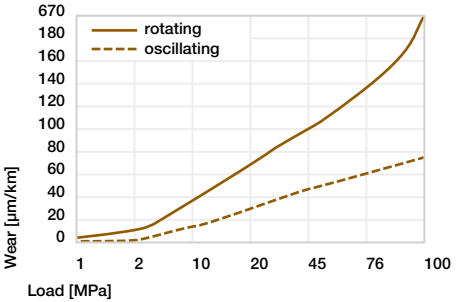


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Installation tolerances

iglidur® Q2 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 E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

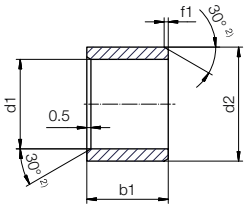
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® Q2

Sleeve bearing (form S)



[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

Dimensions according to ISO 3547-1 and special dimensions

Order example: Q2SM-0405-04 - no minimum order quantity.
Q2 iglidur® material S Sleeve bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 04 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
4.0		5.5	4.0	Q2SM-0405-04
4.0		5.5	6.0	Q2SM-0405-06
5.0	+0.020	7.0	5.0	Q2SM-0507-05
5.0	+0.068	7.0	10.0	Q2SM-0507-10
6.0		8.0	6.0	Q2SM-0608-06
6.0		8.0	8.0	Q2SM-0608-08
6.0		8.0	10.0	Q2SM-0608-10
8.0		10.0	8.0	Q2SM-0810-08
8.0		10.0	10.0	Q2SM-0810-10
8.0		10.0	12.0	Q2SM-0810-12
10.0	+0.025	12.0	8.0	Q2SM-1012-08
10.0	+0.083	12.0	10.0	Q2SM-1012-10
10.0		12.0	12.0	Q2SM-1012-12
10.0		12.0	15.0	Q2SM-1012-15
10.0		12.0	20.0	Q2SM-1012-20
12.0		14.0	10.0	Q2SM-1214-10
12.0		14.0	12.0	Q2SM-1214-12
12.0		14.0	15.0	Q2SM-1214-15
12.0		14.0	20.0	Q2SM-1214-20
13.0		15.0	10.0	Q2SM-1315-10
13.0		15.0	20.0	Q2SM-1315-20
14.0	+0.032	16.0	15.0	Q2SM-1416-15
14.0	+0.102	16.0	20.0	Q2SM-1416-20
14.0		16.0	25.0	Q2SM-1416-25
15.0		17.0	15.0	Q2SM-1517-15
15.0		17.0	20.0	Q2SM-1517-20
15.0		17.0	25.0	Q2SM-1517-25
16.0		18.0	15.0	Q2SM-1618-15
16.0		18.0	20.0	Q2SM-1618-20
16.0		18.0	25.0	Q2SM-1618-25
18.0	+0.032	20.0	15.0	Q2SM-1820-15
18.0	+0.102	20.0	20.0	Q2SM-1820-20
18.0		20.0	25.0	Q2SM-1820-25
20.0		23.0	10.0	Q2SM-2023-10
20.0		23.0	15.0	Q2SM-2023-15
20.0		23.0	20.0	Q2SM-2023-20
20.0		23.0	25.0	Q2SM-2023-25
20.0		23.0	30.0	Q2SM-2023-30
22.0		25.0	15.0	Q2SM-2225-15
22.0		25.0	20.0	Q2SM-2225-20
22.0		25.0	25.0	Q2SM-2225-25
22.0		25.0	30.0	Q2SM-2225-30
24.0		27.0	15.0	Q2SM-2427-15
24.0	+0.040	27.0	20.0	Q2SM-2427-20
24.0	+0.124	27.0	25.0	Q2SM-2427-25
24.0		27.0	30.0	Q2SM-2427-30
25.0		28.0	15.0	Q2SM-2528-15
25.0		28.0	20.0	Q2SM-2528-20
25.0		28.0	25.0	Q2SM-2528-25
25.0		28.0	30.0	Q2SM-2528-30
28.0		32.0	30.0	Q2SM-2832-30
30.0		34.0	20.0	Q2SM-3034-20
30.0		34.0	25.0	Q2SM-3034-25
30.0		34.0	30.0	Q2SM-3034-30
30.0		34.0	40.0	Q2SM-3034-40
30.0		35.0	40.0	Q2SM-3035-40
32.0	+0.050	36.0	20.0	Q2SM-3236-20
32.0	+0.150	36.0	30.0	Q2SM-3236-30

[3] After press-fit. *Testing methods page 57*

Product range

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
32.0		36.0	40.0	Q2SM-3236-40
32.0		40.0	40.0	Q2SM-3240-40
35.0		39.0	20.0	Q2SM-3539-20
35.0		39.0	30.0	Q2SM-3539-30
35.0		39.0	40.0	Q2SM-3539-40
35.0	+0.050	39.0	50.0	Q2SM-3539-50
40.0	+0.150	44.0	20.0	Q2SM-4044-20
40.0		44.0	30.0	Q2SM-4044-30
40.0		44.0	40.0	Q2SM-4044-40
40.0		44.0	50.0	Q2SM-4044-50
45.0		50.0	20.0	Q2SM-4550-20
45.0		50.0	30.0	Q2SM-4550-30
45.0		50.0	40.0	Q2SM-4550-40
45.0		50.0	50.0	Q2SM-4550-50
50.0		55.0	20.0	Q2SM-5055-20
50.0	+0.050	55.0	30.0	Q2SM-5055-30
50.0	+0.150	55.0	40.0	Q2SM-5055-40
50.0		55.0	50.0	Q2SM-5055-50
50.0		55.0	60.0	Q2SM-5055-60
60.0		65.0	60.0	Q2SM-6065-60
65.0	+0.060	70.0	60.0	Q2SM-6570-60
70.0	+0.180	75.0	60.0	Q2SM-7075-60
75.0		80.0	40.0	Q2SM-7580-40

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/Q2

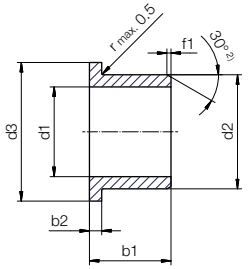
Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® Q2

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

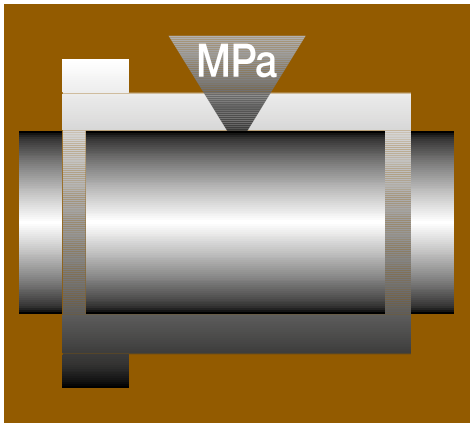
d1 [mm]	Ø 1–6	Ø 6–12	Ø 12–30	Ø > 30
f [mm]	0.3	0.5	0.8	1.2

Dimensions according to ISO 3547-1 and special dimensions

Order example: Q2FM-0507-05 - no minimum order quantity.
Q2 iglidur® material F Flange bearing M Metric 05 Inner Ø d1 07 Outer Ø d2 05 Total length b1

d1 [mm]	d1 Tolerance 3)	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
5.0		7.0	11.0	5.0	1.00	**Q2FM-0507-05**
6.0	+0.020	8.0	12.0	4.0	1.00	**Q2FM-0608-04**
6.0	+0.068	8.0	12.0	6.0	1.00	**Q2FM-0608-06**
6.0		8.0	12.0	8.0	1.00	**Q2FM-0608-08**
8.0		10.0	15.0	3.0	1.00	**Q2FM-0810-03**
8.0		10.0	15.0	5.5	1.00	**Q2FM-0810-05**
8.0		10.0	15.0	7.5	1.00	**Q2FM-0810-07**
8.0		10.0	15.0	9.5	1.00	**Q2FM-0810-09**
8.0	+0.025	10.0	15.0	10.0	1.00	**Q2FM-0810-10**
10.0	+0.083	12.0	18.0	7.0	1.00	**Q2FM-1012-07**
10.0		12.0	18.0	9.0	1.00	**Q2FM-1012-09**
10.0		12.0	18.0	10.0	1.00	**Q2FM-1012-10**
10.0		12.0	18.0	12.0	1.00	**Q2FM-1012-12**
10.0		12.0	18.0	17.0	1.00	**Q2FM-1012-17**
12.0		14.0	20.0	7.0	1.00	**Q2FM-1214-07**
12.0		14.0	20.0	9.0	1.00	**Q2FM-1214-09**
12.0		14.0	20.0	12.0	1.00	**Q2FM-1214-12**
12.0		14.0	20.0	17.0	1.00	**Q2FM-1214-17**
14.0		16.0	22.0	5.0	1.00	**Q2FM-1416-05**
14.0	+0.032	16.0	22.0	12.0	1.00	**Q2FM-1416-12**
14.0	+0.102	16.0	22.0	17.0	1.00	**Q2FM-1416-17**
15.0		17.0	23.0	9.0	1.00	**Q2FM-1517-09**
15.0		17.0	23.0	12.0	1.00	**Q2FM-1517-12**
15.0		17.0	23.0	17.0	1.00	**Q2FM-1517-17**
16.0		18.0	24.0	12.0	1.00	**Q2FM-1618-12**
16.0		18.0	24.0	17.0	1.00	**Q2FM-1618-17**
18.0		20.0	26.0	12.0	1.00	**Q2FM-1820-12**
18.0	+0.032	20.0	26.0	17.0	1.00	**Q2FM-1820-17**
18.0	+0.102	20.0	26.0	22.0	1.00	**Q2FM-1820-22**
20.0		23.0	30.0	11.5	1.50	**Q2FM-2023-11**
20.0		23.0	30.0	12.0	1.50	**Q2FM-2023-12**
20.0		23.0	30.0	16.5	1.50	**Q2FM-2023-16**
20.0		23.0	30.0	21.5	1.50	**Q2FM-2023-21**
25.0	+0.040	28.0	35.0	11.5	1.50	**Q2FM-2528-11**
25.0	+0.124	28.0	35.0	16.5	1.50	**Q2FM-2528-16**
25.0		28.0	35.0	21.5	1.50	**Q2FM-2528-21**
30.0		34.0	42.0	16.0	2.00	**Q2FM-3034-16**
30.0		34.0	42.0	26.0	2.00	**Q2FM-3034-26**
30.0		34.0	42.0	37.0	2.00	**Q2FM-3034-37**
30.0		34.0	42.0	40.0	2.00	**Q2FM-3034-40**
35.0		39.0	47.0	16.0	2.00	**Q2FM-3539-16**
35.0		39.0	47.0	26.0	2.00	**Q2FM-3539-26**
35.0		39.0	47.0	40.0	2.00	**Q2FM-3539-40**
40.0	+0.050	44.0	52.0	30.0	2.00	**Q2FM-4044-30**
40.0	+0.150	44.0	52.0	40.0	2.00	**Q2FM-4044-40**
45.0		50.0	58.0	50.0	2.00	**Q2FM-4550-50**
50.0		55.0	63.0	10.0	2.00	**Q2FM-5055-10**
50.0		55.0	63.0	50.0	2.00	**Q2FM-5055-50**
60.0	+0.060	65.0	73.0	60.0	2.00	**Q2FM-6065-60**
80.0	+0.180	85.0	93.0	100.0	2.50	**Q2FM-8085-100**
100.0	+0.072 +0.212	105.0	125.0	90.0	2.50	**Q2FM-100105125-90**
120.0	+0.085 +0.245	125.0	145.0	90.0	2.50	**Q2FM-120125145-90**

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



The peak of stability

Long service life at medium to high loads

iglidur® Q

When to use it?

- For pivoting applications
- For excellent wear resistance, especially for extreme loads
- For extreme pv values
- When dirt-resistant bearings is required

When not to use?

- For underwater applications
  iglidur® H370
- When continuous operating temperatures are higher than +135°C
  iglidur® H, iglidur® X, iglidur® Z
- In situations involving high edge loads or strong impact loads
  iglidur® Q2

Bearing technology | Plain bearings | iglidur® Q

Ø
6.0 – 90.0
mm

The peak of stability:
Long service life at medium to high loads

iglidur® Q is the cost-effective solution for heavy-duty cycles with extreme loads. Plain bearings made from this material can be used in all types of motion, but is best suited for pivoting applications.

- Very wear-resistant
- Very high pv values
- Low coefficient of friction
- Resistant to dirt
- Lubrication-free
- Standard range from stock
- Maintenance-free

Typical application areas

- Construction machinery industry
- Sheet metal industry
- Agricultural machines
- Railway technology
- Doors and gates

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

Also available as:
Bar stock, round bar: Page 629
Bar stock, plate: Page 651
tribo-tape liner: Page 657
Piston rings: Page 559
Two hole flange bearing: Page 581
Moulded special parts: Page 602
igubal® spherical balls: Page 783

Technical data

General properties			Testing method
Density	g/cm³	1.40	
Colour		black	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.9	DIN 53495
Max. moisture absorption	% weight	4.9	
Coefficient of friction, dynamic, against steel	µ	0.05 – 0.15	
pv value, max. (dry)	MPa · m/s	0.55	
Mechanical properties			
Flexural modulus	MPa	4,500	DIN 53457
Flexural strength at +20°C	MPa	120	DIN 53452
Compressive strength	MPa	89	
Max. recommended surface pressure (+20°C)	MPa	100	
Shore D hardness		83	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+135	
Max. application temperature short–term	°C	+155	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.23	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	5	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{15}$	DIN IEC 93
Surface resistance	Ω	$> 10^{12}$	DIN 53482

Table 01: Material properties table

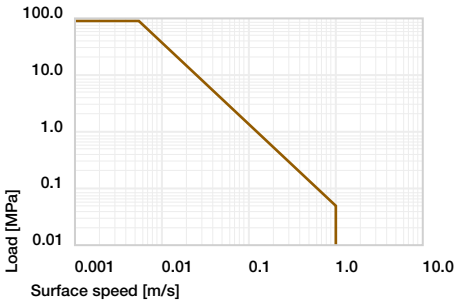


Diagram 01: Permissible pv values for iglidur® Q plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® Q plain bearings is approximately 0.9% weight. The saturation limit in water is 4.9% weight. This must be taken into account for these types of applications.

Vacuum

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

Radiation resistance

Plain bearings made from iglidur® Q are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

The tribological properties of iglidur® Q plain bearings stay constant for the most part under weathering effects.

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

+ resistant **0 conditionally resistant** **– not resistant**
All information given at room temperature [+20°C]
Table 02: Chemical resistance

Chemical table, page 1542

–40°C up to +135°C
100MPa

Bearing technology | Plain bearings | iglidur® Q

iglidur® Q plain bearings were developed especially for extreme loads. Under high loads, iglidur® Q figures among the iglidur® materials that display the best wear resistance. From a radial pressure of 25MPa, it outclasses even bearings made from the extremely abrasion-resistant iglidur® W300. Specific solid lubricants, precisely integrated into the material, ensure that the maintenance-free dry operation is guaranteed under any load.

Mechanical properties

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

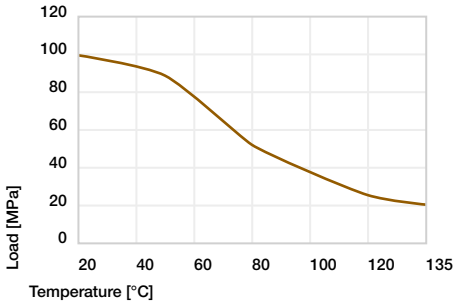


Diagram 02: Maximum recommended surface pressure as a function of temperature (100MPa at +20°C)

iglidur® Q is a material used when high pv values are reached with high loads. Diagram 03 shows the elastic deformation of iglidur® Q at radial loads. At the maximum recommended surface pressure of 100MPa the deformation is less than 3%.

Surface pressure, page 41

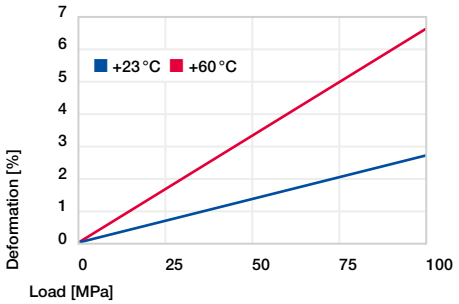


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

Under extreme radial loads, the iglidur® Q plain bearings can reach the maximum pv values which are possible during dry operation with plain bearings. Although iglidur® Q plain bearings have the greatest advantages under high loads and at low speeds, high surface speeds are also attainable due to the excellent coefficient of friction of these bearings. The given values in table 03 indicate the limits at which an increase up to the continuous permissible temperature occurs. This increase is a result of friction.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.0	0.7	5.0
short-term	**m/s**	2.0	1.4	6.0

Table 03: Maximum surface speeds

Temperature

Plain bearings made from iglidur® Q retain their excellent wear resistance even at high temperatures. For temperatures over +50°C an additional securing is required. It should also be noted that the coefficient of friction increases considerably at temperatures above approximately +100°C.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Many plastic bearings feature decreasing coefficient of friction with increasing pressure in dry operation. iglidur® Q goes further than most, under high pressures the material gives excellent low coefficient of friction (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

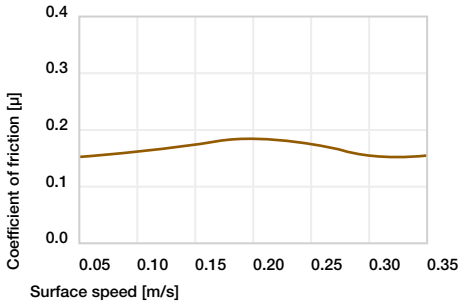


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

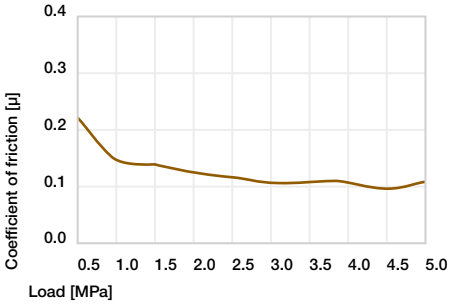


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

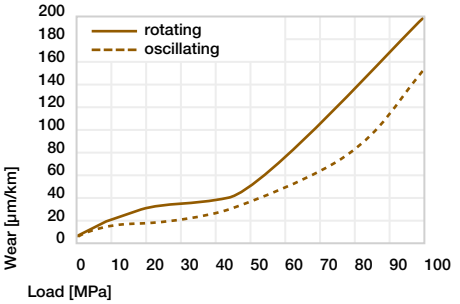


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

Diagram 06 shows results of testing different shaft materials with plain bearings made from iglidur® Q. The strengths offered by iglidur® heavy-duty materials become clear from 30MPa. iglidur® Q stands out in particular. Other heavy-duty materials such as iglidur® Q2 and TX1 only offer the best performances in terms of wear when subjected to even higher loads. iglidur® Q offers strikingly good wear properties on many different shaft materials.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.05 – 0.15	0.09	0.04	0.04

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

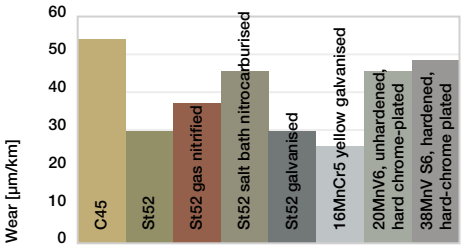


Diagram 06: wear, pivoting with different shaft materials, pressure p = 30MPa, v = 0.01m/s

Installation tolerances

iglidur® Q plain bearings are standard bearings for shafts with h tolerance (recommended minimum h9). After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

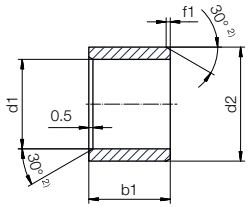
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® Q

Sleeve bearing (form S)



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

Dimensions according to ISO 3547-1 and special dimensions

Order example: QSM-0608-10 - no minimum order quantity.
Q iglidur® material S Sleeve bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 10 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
6.0	+0.020 +0.068	8.0	10.0	QSM-0608-10
8.0	+0.025	10.0	8.0	QSM-0810-08
10.0	+0.083	12.0	10.0	QSM-1012-10
12.0		14.0	10.0	QSM-1214-10
12.0		14.0	20.0	QSM-1214-20
16.0	+0.032	18.0	8.0	QSM-1618-08
16.0	+0.102	18.0	12.5	QSM-1618-12
16.0		18.0	20.0	QSM-1618-20
18.0		20.0	20.0	QSM-1820-20
20.0		22.0	15.0	QSM-2022-15
20.0		23.0	15.0	QSM-2023-15
20.0		23.0	20.0	QSM-2023-20
20.0		23.0	25.0	QSM-2023-25
20.0	+0.040	23.0	30.0	QSM-2023-30
25.0	+0.124	28.0	25.0	QSM-2528-25
25.0		28.0	48.0	QSM-2528-48
30.0		34.0	20.0	QSM-3034-20
30.0		34.0	35.0	QSM-3034-35
30.0		34.0	40.0	QSM-3034-40

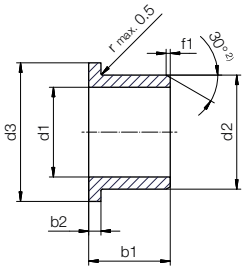
d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
35.0		39.0	15.0	QSM-3539-15
35.0		39.0	30.0	QSM-3539-30
35.0		39.0	35.0	QSM-3539-35
35.0		39.0	50.0	QSM-3539-50
40.0		44.0	30.0	QSM-4044-30
40.0	+0.050	44.0	40.0	QSM-4044-40
40.0	+0.150	44.0	47.0	QSM-4044-47
45.0		50.0	25.2	QSM-4550-252
45.0		50.0	50.0	QSM-4550-50
50.0		55.0	50.0	QSM-5055-50
50.0		55.0	60.0	QSM-5055-60
50.0		55.0	80.0	QSM-5055-80
55.0		60.0	50.0	QSM-5560-50
60.0		65.0	50.0	QSM-6065-50
65.0	+0.060	70.0	34.0	QSM-6570-34
70.0	+0.180	75.0	50.0	QSM-7075-50
75.0		80.0	40.0	QSM-7580-40
80.0		85.0	60.0	QSM-8085-60
90.0	+0.072 +0.212	95.0	50.0	QSM-9095-50

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

iglidur® Q
+135°C
100MPa

Bearing technology | Plain bearings | iglidur® Q

Flange bearing (form F)



2) Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: QFM-0608-03 - no minimum order quantity.
Q iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 03 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.020	8.0	12.0	3.0	1.00	QFM-0608-03
6.0	+0.068	8.0	12.0	4.0	1.00	QFM-0608-04
8.0		10.0	15.0	5.5	1.00	QFM-0810-05
8.0		10.0	15.0	6.0	1.00	QFM-0810-06
10.0	+0.025	12.0	15.0	3.5	1.00	QFM-101215-035
10.0	+0.083	12.0	18.0	6.0	1.00	QFM-1012-06
10.0		12.0	15.0	8.0	1.00	QFM-101215-08
10.0		12.0	18.0	10.0	1.00	QFM-1012-10
12.0		14.0	20.0	8.0	1.00	QFM-1214-08
12.0		14.0	20.0	12.0	1.00	QFM-1214-12
12.0	+0.032	14.0	20.0	20.0	1.00	QFM-1214-20
14.0	+0.102	16.0	22.0	12.0	1.00	QFM-1416-12
16.0		18.0	24.0	17.0	1.00	QFM-1618-17
18.0		20.0	26.0	5.0	1.00	QFM-182026-051
18.0		20.0	26.0	12.0	1.00	QFM-1820-12

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
20.0		23.0	30.0	21.5	1.50	QFM-2023-21
25.0	+0.040	28.0	35.0	21.5	1.50	QFM-2528-21
26.0	+0.124	29.0	35.0	5.0	1.50	QFM-2629-05
27.0		30.0	38.0	20.0	1.50	QFM-2730-20
30.0		34.0	42.0	37.0	2.00	QFM-3034-37
35.0		39.0	47.0	26.0	2.00	QFM-3539-26
35.0		39.0	50.0	35.0	2.00	QFM-353950-35
40.0	+0.050	44.0	52.0	14.0	2.00	QFM-4044-14
40.0	+0.150	44.0	52.0	40.0	2.00	QFM-4044-40
50.0		55.0	63.0	10.0	2.00	QFM-5055-10
50.0		55.0	63.0	50.0	2.00	QFM-5055-50
60.0	+0.060	65.0	78.0	50.0	2.00	QFM-6065-50
70.0	+0.180	75.0	83.0	50.0	2.00	QFM-7075-50

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

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/Q

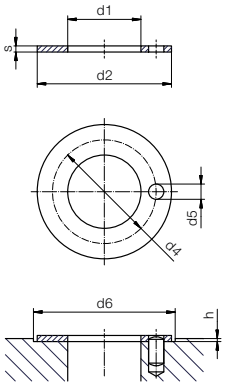
Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

Bearing technology | Plain bearings | iglidur® Q

Thrust washer (form T)



Dimensions according to ISO 3547-1 and special dimensions

Order example: QTM-2842-015 - no minimum order quantity.
Q iglidur® material **T** Thrust washer **M** Metric **28** Inner Ø d1 **42** Outer Ø d2 **015** Thickness s

d1	d2	d4	d5	h	d6	s	Part No.
+0.25	–0.25	–0.12 +0.12	+0.375 +0.125	+0.2/–0.2	+0.12	–0.05	
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
28	42	35	4	1	42	1.5	**QTM-2842-015**
32	54	[4]	4	1	54	1.5	**QTM-3254-015**

[4] Design without fixing hole

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/Q

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
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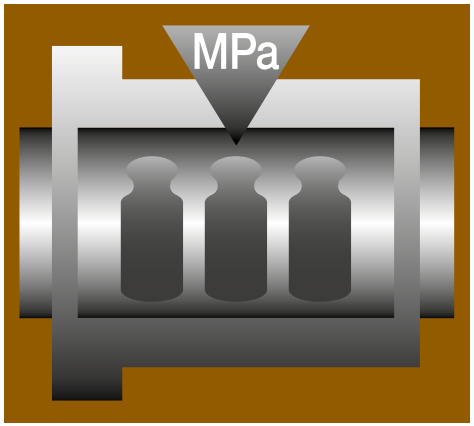


Heavy-duty on soft shafts

For medium to high loads, especially on soft shafts

iglidur® Q290

When to use it?
- If a long-lasting plain bearing is required for tough operating conditions (agricultural equipment, construction machinery, etc.) with medium to high dynamic loads on “soft” shafts

When not to use?
- When permanent static loads higher than 55MPa occur
  iglidur® G, iglidur® Q, iglidur® Q2
- When an very wear-resistant plain bearing is required on “soft” shafts for minor loads
  iglidur® J, iglidur® J3
- When continuous operating temperatures are higher than +140°C
  iglidur® J350, iglidur® Z

Bearing technology | Plain bearings | iglidur® Q290

Ø 20.0 – 80.0 mm

Also available as:

Bar stock, round bar: Page 629

Bar stock, plate: Page 651

tribo-tape liner: Page 657

Piston rings: Page 559

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

Heavy-duty on soft shafts:
For medium to high loads, especially on soft shafts

iglidur® Q290 shows outstanding service life in tough pivoting applications, as they are frequently found in agricultural machinery, especially on “soft” coated shafts (e.g. galvanised). The wear on the shafts is minimal.

- Recommended for soft shafts
- Suitable for high edge pressures
- Temperature-resistant up to +140°C
- Good price-performance ratio
- Lubrication-free
- Maintenance-free

Typical application areas

- Agricultural engineering
- Utility and construction vehicles

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® Q290 +140°C 55MPa

Technical data

General properties			Testing method
Density	g/cm³	1.27	
Colour		black	
Max. moisture absorption at +23°C and 50% r.h.	% weight	3	DIN 53495
Max. moisture absorption	% weight	9.3	
Coefficient of friction, dynamic, against steel	µ	0.14 – 0.26	
pv value, max. (dry)	MPa · m/s	0.70	
Mechanical properties			
Flexural modulus	MPa	3,074	DIN 53457
Flexural strength at +20°C	MPa	97	DIN 53452
Compressive strength	MPa	68	
Max. recommended surface pressure (+20°C)	MPa	55	
Shore D hardness		80	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+140	
Max. application temperature short–term	°C	+180	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	7	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{12}$	DIN IEC 93
Surface resistance	Ω	$> 10^{12}$	DIN 53482

Table 01: Material properties table

–40°C up to +140°C

55MPa

HB

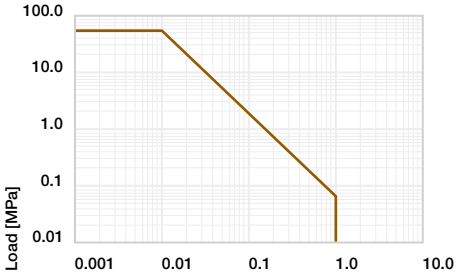


Diagram 01: Permissible pv values for iglidur® Q290 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® Q290 plain bearings is 3% weight. The saturation limit in water is 9.3% weight.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is only possible to a limited extent.

Radiation resistance

Plain bearings made from iglidur® Q290 are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® Q290 plain bearings have a good resistance to UV radiation and other weathering effects.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® Q290

iglidur® Q290 plain bearings do not have the highest static load capacity within the iglidur® product range, instead the material shows its strengths at medium to high dynamic loads: outstanding service life is achieved for tough pivoting applications, e.g. in agricultural or construction machinery, and especially on “soft” shafts, for both the shafts and bearings!

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® Q290 plain bearings decreases. Diagram 02 shows this inverse relationship. At the short-term permitted application temperature of +180°C, the permitted surface pressure is still 10MPa. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

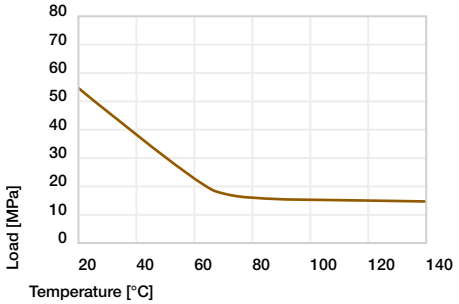


Diagram 02: Maximum recommended surface pressure as a function of temperature (55MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® Q290 at radial loads. These high elastic deformation values, even for loads of more than 50MPa, contribute significantly to the long service life under tough environmental conditions such as edge loads, collisions and impacts.

Surface pressure, page 41

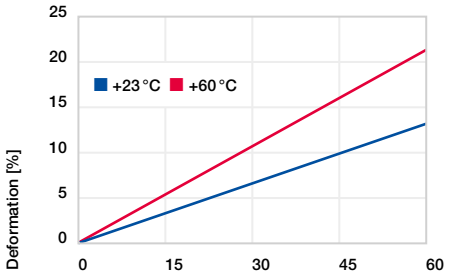


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

Typical applications for iglidur® Q290 plain bearings include medium to high-load pivoting movements at comparatively slow speeds. However, relatively high speeds are still attainable. The speeds shown in table 03 are threshold values for low bearing loads. They do not provide any indication of the wear resistance under these parameters.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.8	0.6	1.0
short-term	**m/s**	2.0	1.4	2.0

Table 03: Maximum surface speeds

Temperature

The long-term upper temperature limit of +140°C permits the broad use in applications typical for the agricultural, utility vehicle or construction equipment sectors. For temperatures over +80°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Please note that a sliding surface with a rough surface finish will increase the friction. The coefficient of friction of iglidur® Q290 increases as the speed increases (diagram 04). In contrast, the coefficient of friction drops continually with the radial load, as illustrated by diagram 05.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

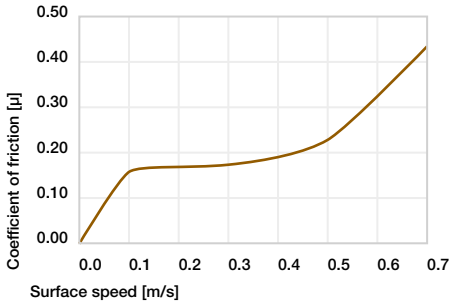


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

Technical data

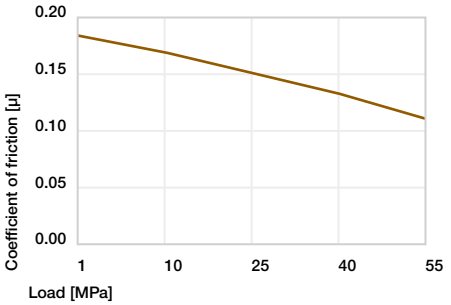


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s against Cf53

Shaft materials

Generally, the use of hardened shafts is recommended for higher loads starting at approximately 10MPa. This is, however, often not the case in practice, especially in connection with corrosion-resistant coating methods. Thus, the iglidur® Q290 material has a lot of importance in such applications. Diagram 08 shows this very clearly in connection with galvanised shafts. The special suitability for pivoting applications is shown in diagram 07.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.14 – 0.26	0.09	0.04	0.04

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

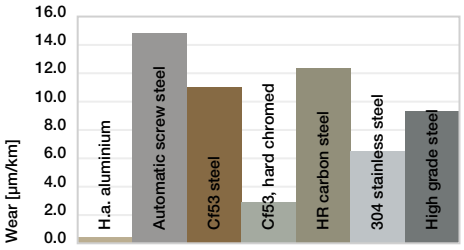


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

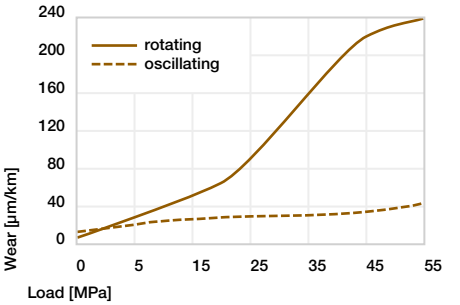


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

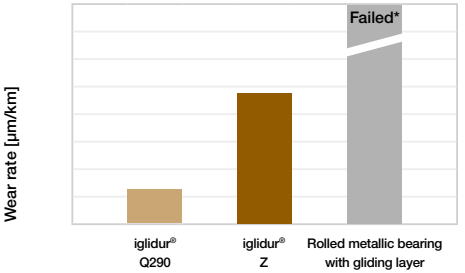


Diagram 08: Wear, pivoting applications on galvanised shafts, p > 50MPa, v = 0.01m/s

*** Shafts St52 galvanised. Cycle frequency 60,000. Tested with bearing diameter 20mm and 20mm length. The force in the test was 30,400N**

Installation tolerances

iglidur® Q290 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 E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

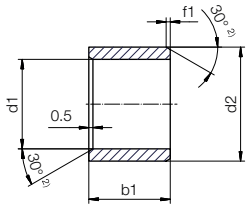
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® Q290

Sleeve bearing (form S)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 12–30	Ø > 30
f [mm]	0.8	1.2

Dimensions according to ISO 3547-1 and special dimensions

Order example: Q290SM-2023-20 - no minimum order quantity.
Q290 iglidur® material S Sleeve bearing M Metric 20 Inner Ø d1 23 Outer Ø d2 20 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
20.0	+0.040 +0.124	23.0	20.0	**Q290SM-2023-20**
25.0		28.0	30.0	**Q290SM-2528-30**
30.0		34.0	30.0	**Q290SM-3034-30**
30.0		34.0	40.0	**Q290SM-3034-40**
35.0	+0.050 +0.150	39.0	30.0	**Q290SM-3539-30**
35.0		39.0	40.0	**Q290SM-3539-40**
35.0		39.0	50.0	**Q290SM-3539-50**
40.0		44.0	40.0	**Q290SM-4044-40**
50.0		55.0	50.0	**Q290SM-5055-50**
60.0	+0.060 +0.180	65.0	60.0	**Q290SM-6065-60**
65.0		70.0	60.0	**Q290SM-6570-60**
70.0		75.0	60.0	**Q290SM-7075-60**
80.0		85.0	100.0	**Q290SM-8085-100**

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/Q290

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

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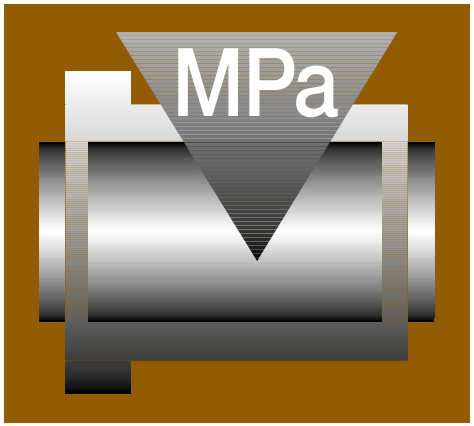


The heavy-duty bearing for up to 200MPa static and 140MPa dynamic

For pivoting applications under extreme loads

iglidur® TX1

When to use it?
- When very high permanent static loads occur
- For highly loaded pivoting movements
- When not only high loads but also high temperatures and media resistance are required

When not to use?
- When loads of far less than 100MPa occur
  iglidur® G, iglidur® Q2, iglidur® Q
- For rotational movements during continuous operation
  iglidur® W300, iglidur® Z, iglidur® G
- For high-temperature applications with average load levels
  iglidur® X, iglidur® J350, iglidur® H

Bearing technology | Plain bearings | iglidur® TX1

Ø
20.0 – 80.0
mm

Also available as:

Bar stock, round bar:
Page 629

Bar stock, plate:
Page 651

tribo-tape liner:
Page 657

Piston rings:
Page 559

Two hole flange bearing:
Page 581

Moulded special parts:
Page 602

igubal® spherical balls:
Page 783

The heavy-duty bearing for up to 200MPa static and 140MPa dynamic:
For pivoting applications under extreme loads

Outstanding rigidity and durability especially under high radial loads during pivoting operations characterise the plain bearings in the new iglidur® TX1 series. Thanks to the closed-loop wound structure, excellent dimensional stability is achieved in cases of major jolts and impacts.

- Suitable for static loads up to 200MPa
- Wear-resistant
- High media resistance
- Lubrication-free
- Suitable for dynamic loads up to 140MPa
- Maintenance-free
- High rigidity

Typical application areas

- Agricultural engineering
- Utility and construction vehicles
- Heavy equipments

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

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

iglidur® TX1
+120°C
200MPa

Technical data

General properties			Testing method
Density	g/cm³	2.10	
Colour		grey–green	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.2	DIN 53495
Max. moisture absorption	% weight	0.5	
Coefficient of friction, dynamic, against steel	µ	0.09 – 0.37	
pv value, max. (dry)	MPa · m/s	0.89	
Mechanical properties			
Flexural modulus	MPa	12,000	DIN 53457
Flexural strength at +20°C	MPa	55	DIN 53452
Compressive strength	MPa	220	
Max. recommended surface pressure (+20°C)	MPa	200	
Shore D hardness		94	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+120	
Max. application temperature short–term	°C	+170	
Min. application temperature	°C	–60	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	3	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	> 1 x 10^{11}	DIN IEC 93
Surface resistance	Ω	> 1 x 10^{13}	DIN 53482

Table 01: Material properties table

–60°C up to +120°C

200MPa

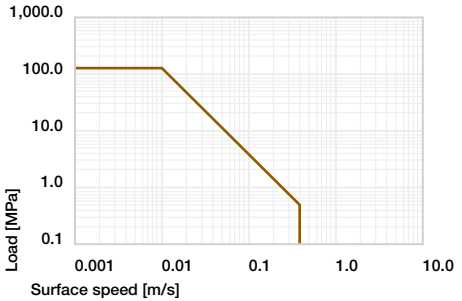


Diagram 01: Permissible pv values for iglidur® TX1 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® TX1 plain bearings is 0.2% weight. The saturation limit in water is 0.5% weight.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is only possible to a limited extent.

Radiation resistance

Plain bearings made from iglidur® TX1 are resistant up to a radiation intensity of 2 · 10^2Gy.

UV resistance

iglidur® TX1 plain bearings are resistant to permanent UV radiation.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® TX1

iglidur® TX1 plain bearings represent excellent load bearing capacity under high radial loads coupled with good abrasion resistance. The special design not only ensures excellent dimensional stability due to the long-fibre winding but also allows lubrication and maintenance-free operation thanks to solid lubricants. High dirt and media resistance round off the list of properties.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® TX1 plain bearings decreases. Diagram 02 shows this inverse relationship. At the short-term permitted application temperature of +170°C, the permitted surface pressure is still 100MPa. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

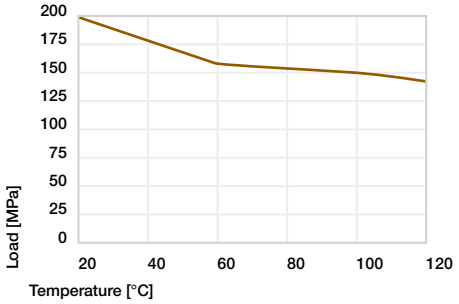


Diagram 02: Maximum recommended surface pressure as a function of temperature (200MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® TX1 at radial loads.

Surface pressure, page 41

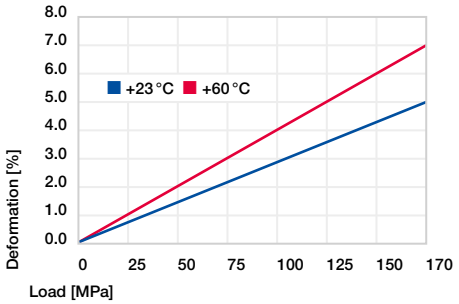


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

Typical applications for iglidur® TX1 plain bearings are pivoting movements under high loads at comparatively low speeds. However, relatively high speeds are still attainable. The speeds shown in table 03 are threshold values for low bearing loads. They do not provide any indication of the wear resistance under these parameters.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.4	0.2	1.0
short-term	**m/s**	0.9	0.5	2.0

Table 03: Maximum surface speeds

Temperature

iglidur® TX1 is a very temperature-stable material. The long-term upper temperature limit of +120°C permits the broad use in applications typical for the agricultural, utility vehicle or construction equipment sectors. The press-in and press-out forces of iglidur® TX1 plain bearings are very high over the entire temperature range. As a result, additional axial securing is usually not necessary. Although these forces remain very high, a certain decrease can be observed at temperatures above +100°C and, in some cases axial securing is therefore recommended above this temperature. When considering temperatures, the additional frictional heat in the bearing system must be taken into account.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Please note that a sliding surface with a rough surface finish will increase the friction. Shafts that are too smooth also increase the coefficient of friction of the bearing. Surface finishes (Ra) of the shaft between 0.4 – 0.7µm are ideal. Furthermore, the coefficient of friction of iglidur® TX1 plain bearings largely depends on the speed and load. As the surface speed increases, the coefficient of friction will quickly increase as well. With increasing load, the coefficient of friction however decreases continuously.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

Technical data

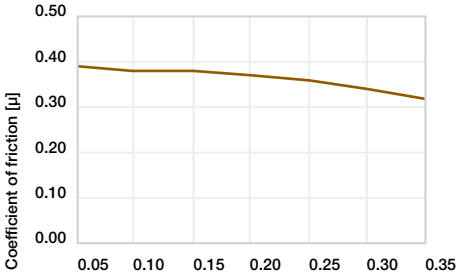


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

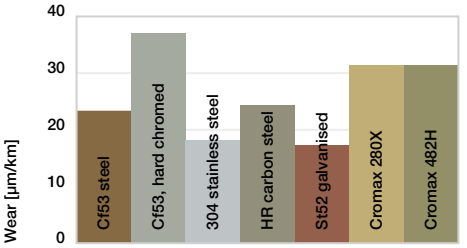


Diagram 06: Wear, rotating with different shaft materials, p = 76MPa, v = 0.01m/s

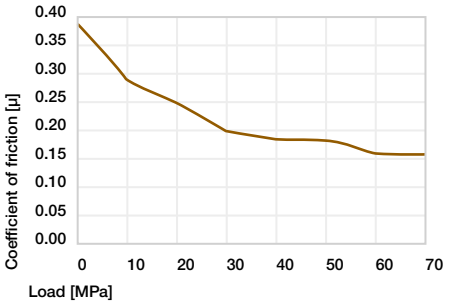


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

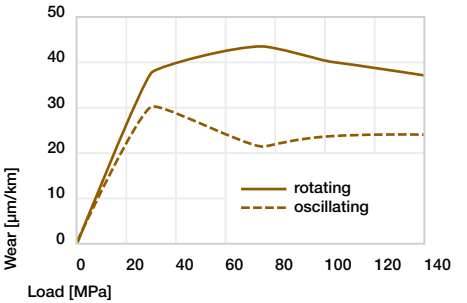


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

In high load applications, we generally recommend the use of hardened shafts. This particularly applies when using iglidur® TX1. However, acceptable wear rates are also achieved on soft shafts with heavy-duty pivoting of less than 100MPa. The comparison of the wear rate during rotation and pivoting shown in Diagram 07 highlights that the strength of iglidur® TX1 lies in heavy-duty pivoting.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.09 – 0.37	0.09	0.04	0.04

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

Installation tolerances

iglidur® TX1 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 tolerances as stated.

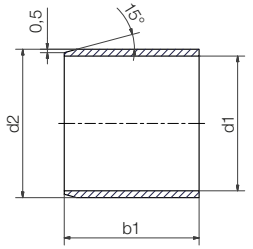
Testing methods, page 57

Ø d1 [mm]	Housing H7 [mm]		Plain bearing [mm]		Shaft h9 [mm]	
20 – 40	+0.000	+0.021	+0.020	+0.150	–0.052	+0.000
> 40 – 70	+0.000	+0.025	+0.025	+0.175	–0.062	+0.000
> 70 – 80	+0.000	+0.030	+0.050	+0.200	–0.074	+0.000

Table 05: Important tolerances for plain bearings according to ISO 3547-1 after press-fit without possible expansion of the housing bore

Bearing technology | Plain bearings | iglidur® TX1

Sleeve bearing (form S)

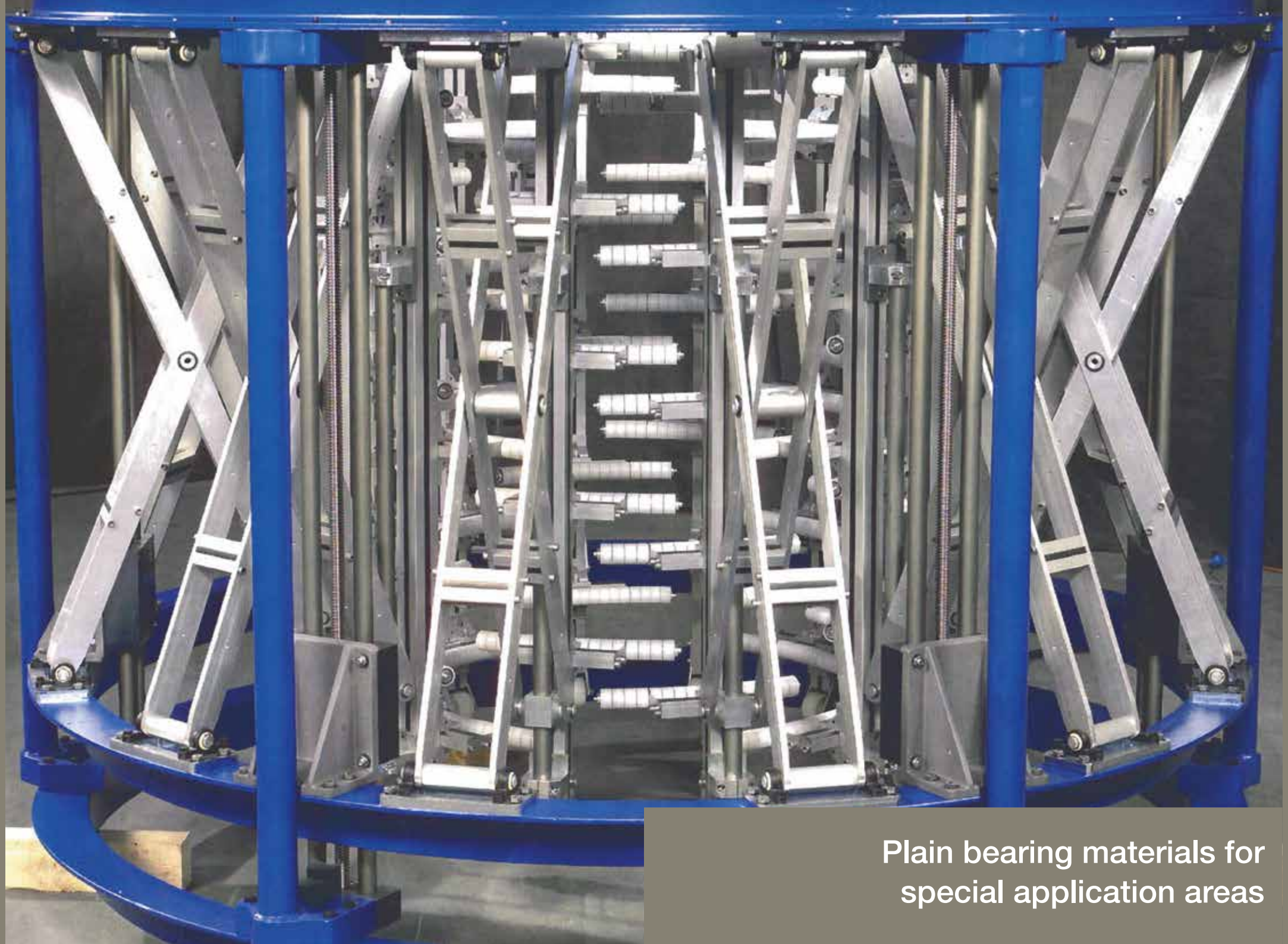


[2] Thickness < 0.6mm: Chamfer = 20°

Order example: TX1SM-2030-30 - no minimum order quantity.
TX1 iglidur® material **S** Sleeve bearing **M** Metric **20** Inner Ø d1 **30** Outer Ø d2 **30** Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
20.0		25.0	20.0	**TX1SM-2025-20**
20.0		25.0	30.0	**TX1SM-2025-30**
20.0		25.0	40.0	**TX1SM-2025-40**
20.0		30.0	30.0	**TX1SM-2030-30**
25.0		30.0	20.0	**TX1SM-2530-20**
25.0	+0.020 +0.150	30.0	30.0	**TX1SM-2530-30**
25.0		30.0	40.0	**TX1SM-2530-40**
30.0		35.0	30.0	**TX1SM-3035-30**
30.0		35.0	40.0	**TX1SM-3035-40**
30.0		40.0	40.0	**TX1SM-3040-40**
40.0		45.0	40.0	**TX1SM-4045-40**
40.0		50.0	50.0	**TX1SM-4050-50**
50.0		55.0	50.0	**TX1SM-5055-50**
50.0	+0.025 +0.175	60.0	60.0	**TX1SM-5060-60**
60.0		65.0	60.0	**TX1SM-6065-60**
60.0		70.0	80.0	**TX1SM-6070-80**
70.0		75.0	60.0	**TX1SM-7075-60**
70.0		80.0	100.0	**TX1SM-7080-100**
80.0	+0.050 +0.200	85.0	100.0	**TX1SM-8085-100**
80.0		90.0	100.0	**TX1SM-8090-100**

[3] After press-fit of the bearing in a housing with nominal dimension



Plain bearing materials for special application areas

Plain bearing materials for special application areas

This group brings together the iglidur® materials for very special cases. Those who have not yet found a suitable bearing, will find it here.
Electrical conductivity, free from PTFE and silicone or fast rotation under water: one iglidur® material for all requirements.

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

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

iglidur® F:
Electrically conductive

Temperature [°C] [123]	+140	– +
Surface pressure [MPa] [124]	105	– +
Coefficient of friction [µ] [125]	0.37	– +
Wear [µm/km] [125]	1.00	– +
Price index		– +

iglidur® F2:
ESD–compatible all–rounder:

Temperature [°C] [123]	+120	– +
Surface pressure [MPa] [124]	47	– +
Coefficient of friction [µ] [125]	0.16	– +
Wear [µm/km] [125]	1.53	– +
Price index		– +

iglidur® H4:
The automotive standard

Temperature [°C] [123]	+200	– +
Surface pressure [MPa] [124]	65	– +
Coefficient of friction [µ] [125]	0.21	– +
Wear [µm/km] [125]	2.10	– +
Price index		– +

iglidur® UW:
For fast rotation under water

Temperature [°C] [123]	+90	– +
Surface pressure [MPa] [124]	40	– +
Coefficient of friction [µ] [125]	0.24	– +
Wear [µm/km] [125]	1.80	– +
Price index		– +

[123] Max. long-term application temperature [124] Max. recommended surface pressure at +20°C [125] Best combination for p = 1 MPa, v = 0.3m/s, rotating

iglidur® N54:
The biopolymer

Temperature [°C] [123]	+80	– +
Surface pressure [MPa] [124]	36	– +
Coefficient of friction [µ] [125]	0.14	– +
Wear [µm/km] [125]	0.20	– +
Price index		– +

iglidur® G V0:
Low–cost all–rounder for fire protection

Temperature [°C] [123]	+130	– +
Surface pressure [MPa] [124]	75	– +
Coefficient of friction [µ] [125]	0.20	– +
Wear [µm/km] [125]	2.10	– +
Price index		– +

iglidur® J2:
Versatile and cost–effective

Temperature [°C] [123]	+90	– +
Surface pressure [MPa] [124]	46	– +
Coefficient of friction [µ] [125]	0.18	– +
Wear [µm/km] [125]	5.00	– +
Price index		– +

iglidur® AB:
The first antibacterial iglidur® plain bearing

Temperature [°C] [123]	+70	– +
Surface pressure [MPa] [124]	25	– +
Coefficient of friction [µ] [125]	0.18	– +
Wear [µm/km] [125]	1.00	– +
Price index		– +

iglidur® RW370:
For the rail industry, complies with DIN EN 45545 HL3, R22/R23

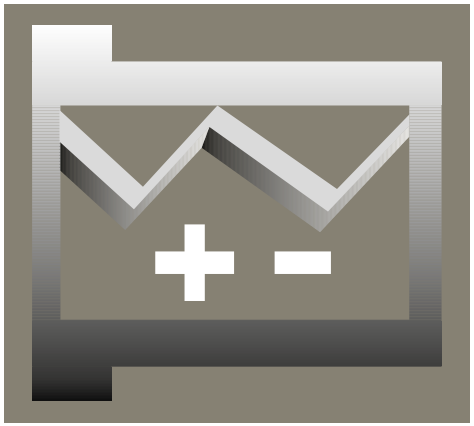
Temperature [°C] [123]	+170	– +
Surface pressure [MPa] [124]	75	– +
Coefficient of friction [µ] [125]	0.13	– +
Wear [µm/km] [125]	1.15	– +
Price index		– +

iglidur® B:
The flexible one

Temperature [°C] [123]	+100	– +
Surface pressure [MPa] [124]	40	– +
Coefficient of friction [µ] [125]	0.27	– +
Wear [µm/km] [125]	1.72	– +

iglidur® C:
Free from PTFE and silicone

Temperature [°C] [123]	+90	– +
Surface pressure [MPa] [124]	40	– +
Coefficient of friction [µ] [125]	0.23	– +
Wear [µm/km] [125]	1.73	– +



Electrically conductive
Pressure-resistant
iglidur® F

When to use it?

- When the bearing should be electrically conductive
- For high static loads

When not to use?

- When mechanical reaming of the bore is necessary
  iglidur® M250
- When the highest wear resistance is required
  iglidur® W300
- When very low coefficient of friction in dry operation is required
  iglidur® J
- For underwater applications
  iglidur® H370
- When a universal plain bearing is required
  iglidur® G

Bearing technology | Plain bearings | iglidur® F

Ø
2.0 – 70.0
mm

Electrically conductive: Pressure-resistant

Outstanding rigidity and hardness as well as high conductivity: iglidur® F plain bearings can only be used in dry operations to a limited extent, but offer their fully mechanical benefits when lubricated with oil and grease.

- Electrically conductive
- High compressive strength
- High temperature resistance
- High pv values
- High chemical resistance

Typical application areas

- Textile industry
- Automotive industry

Descriptive technical specifications			
Wear resistance at +23°C	–		+
Wear resistance at +90°C	–		+
Wear resistance at +150°C	–		+
Low coefficient of friction	–		+
Low moisture absorption	–		+
Wear resistance under water	–		+
High media resistance	–		+
Resistant to edge pressures	–		+
Suitable for shock and impact loads	–		+
Resistant to dirt	–		+

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

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

Also available as:

Bar stock, round bar: **Page 629**

Bar stock, plate: **Page 651**

tribo-tape liner: **Page 657**

Piston rings: **Page 559**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 783**

iglidur® F
+140°C
105MPa

Technical data

General properties			Testing method
Density	g/cm³	1.25	
Colour		black	
Max. moisture absorption at +23°C and 50% r.h.	% weight	1.8	DIN 53495
Max. moisture absorption	% weight	8.4	
Coefficient of friction, dynamic, against steel	µ	0.10 – 0.39	
pv value, max. (dry)	MPa · m/s	0.34	
Mechanical properties			
Flexural modulus	MPa	11,600	DIN 53457
Flexural strength at +20°C	MPa	260	DIN 53452
Compressive strength	MPa	98	
Max. recommended surface pressure (+20°C)	MPa	105	
Shore D hardness		84	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+140	
Max. application temperature short–term	°C	+180	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.65	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	12	DIN 53752
Electrical properties[5]			
Specific contact resistance	Ωcm	< 10^3	DIN IEC 93
Surface resistance	Ω	< 10^2	DIN 53482

[5] The good conductivity of this material can favour the generation of corrosion on the metallic contact components.

Table 01: Material properties table

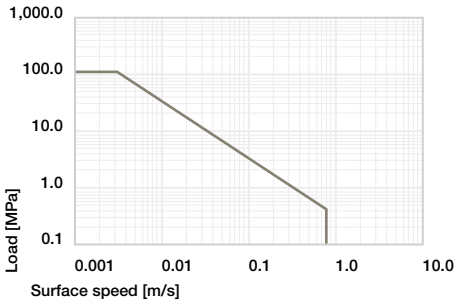


Diagram 01: Permissible pv values for iglidur® F plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® F plain bearings is approximately 1.8% weight. The saturation limit in water is 8.4% weight. This must be taken into account for these types of applications.

Vacuum

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

Radiation resistance

Plain bearings made from iglidur® F are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® F plain bearings are resistant to permanent UV radiation.

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

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® F

When plain bearings need to be electrically conductive, especially in applications that should keep out static, iglidur® F is the right choice. Moreover, the iglidur® F plain bearings are extremely pressure-resistant. At room temperature, they could be statically loaded up to 105MPa.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® F plain bearings decreases. Diagram 02 shows this inverse relationship. However, at the long-term maximum temperature of +140°C the permissible surface pressure is around 50MPa. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

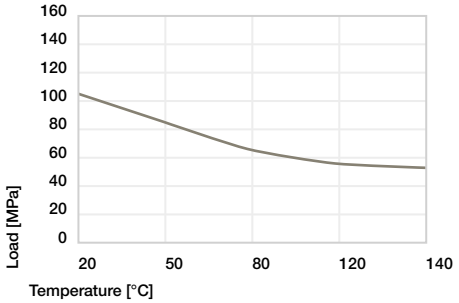


Diagram 02: Maximum recommended surface pressure as a function of temperature (105MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® F at radial loads. At the maximum recommended surface pressure of 105MPa at room temperature the deformation is less than 3%. A plastic deformation can be negligible up to this value. However, it is also dependent on the service time.

Surface pressure, page 41

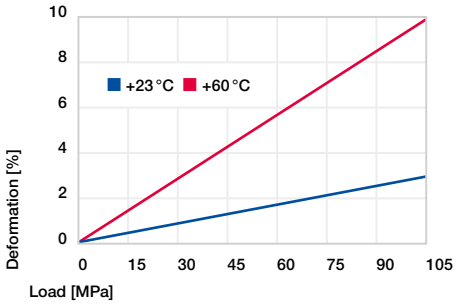


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

The maximum permitted surface speeds are based on the operation period and the type of motion. A plain bearing is the most stressed in long-term rotating motions. Here the maximum speed for the iglidur® F plain bearing is 0.8m/s. The speeds stated in table 03 are limit values for the lowest bearing loads. In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.8	0.6	3.0
short-term	**m/s**	1.5	1.1	6.0

Table 03: Maximum surface speeds

Temperature

The ambient temperatures strongly influence the properties of plain bearings. With increasing temperatures, the compressive strength of iglidur® F plain bearings decreases. The wear also increases. For temperatures over +105°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

In dry operation, The coefficient of friction of iglidur® F plain bearings are not as favourable as those of many other iglidur® materials. However iglidur® plain bearings can be lubricated without any problems, and iglidur® F bearings attain excellent results among the lubricated iglidur® bearings.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

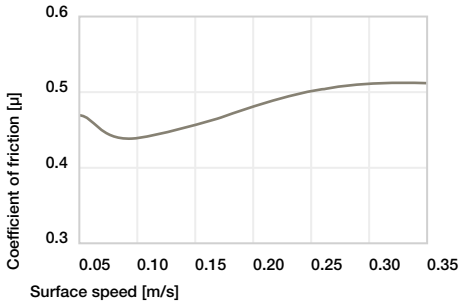


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

iglidur® F
+140°C
105MPa

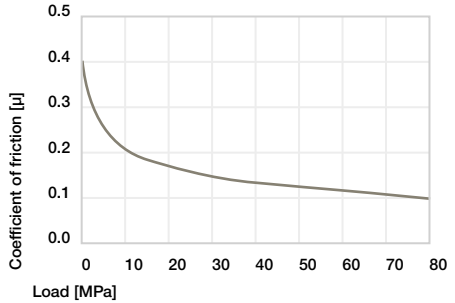


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

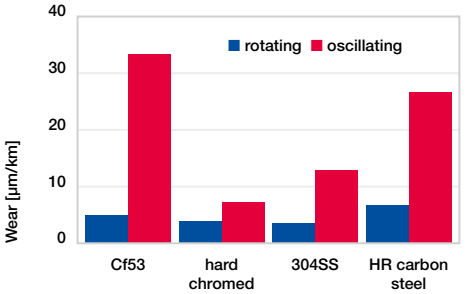


Diagram 07: Wear for rotating and oscillating applications with different shaft materials, p = 2MPa

Shaft materials

Diagrams 06 and 07 show the test results of iglidur® F plain bearings running against various shaft materials. In the lowest load range, the hard-chromed shafts prove to be the most suitable shaft in rotating applications with iglidur® F bearings.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.10 – 0.39	0.09	0.04	0.04

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

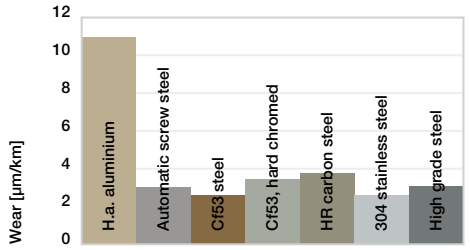


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® F plain bearings are standard bearings for shafts with h tolerance (recommended minimum h9). After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the D11 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

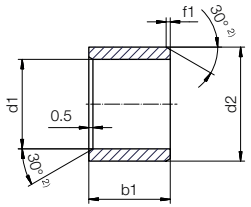
Testing methods, page 57

Ø d1 [mm]	Housing H7 [mm]		Plain bearing D11 [mm]		Shaft h9 [mm]	
0 – 3	+0.000	+0.010	+0.020	+0.080	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.030	+0.105	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.040	+0.130	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.050	+0.160	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.065	+0.195	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.080	+0.240	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.100	+0.290	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.120	+0.340	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.145	+0.395	–0.100	+0.000

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

Bearing technology | Plain bearings | iglidur® F

Sleeve bearing (form S)



[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

Dimensions according to ISO 3547-1 and special dimensions

Order example: FSM-0203-03 - **no minimum order quantity.**
F iglidur® material S Sleeve bearing M Metric 02 Inner Ø d1 03 Outer Ø d2 03 Total length b1

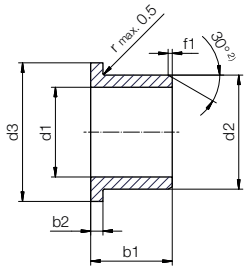
d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
2.0	+0.020 +0.080	3.5	3.0	FSM-0203-03
3.0		4.5	3.0	FSM-0304-03
4.0	+0.030 +0.105	5.5	4.0	FSM-0405-04
5.0		7.0	5.0	FSM-0507-05
5.0		7.0	8.0	FSM-0507-08
6.0		8.0	6.0	FSM-0608-06
6.0		8.0	8.0	FSM-0608-08
6.0		8.0	10.0	FSM-0608-10
6.0		8.0	13.8	FSM-0608-13
7.0	+0.040 +0.130	9.0	10.0	FSM-0709-10
7.0		9.0	12.0	FSM-0709-12
8.0		10.0	8.0	FSM-0810-08
8.0		10.0	10.0	FSM-0810-10
8.0		10.0	15.0	FSM-0810-15
10.0		12.0	6.0	FSM-1012-06
10.0		12.0	9.0	FSM-1012-09
10.0		12.0	10.0	FSM-1012-10
12.0	+0.050 +0.160	14.0	10.0	FSM-1214-10
12.0		14.0	15.0	FSM-1214-15
13.0		15.0	20.0	FSM-1315-20
14.0		16.0	15.0	FSM-1416-15
15.0		17.0	15.0	FSM-1517-15
15.0		17.0	20.0	FSM-1517-20
16.0		18.0	15.0	FSM-1618-15
18.0	+0.050 +0.160	20.0	12.0	FSM-1820-12
18.0		20.0	15.0	FSM-1820-15
18.0		20.0	20.0	FSM-1820-20
20.0	+0.065 +0.195	22.0	14.5	FSM-2022-14
20.0		22.0	20.0	FSM-2022-20
20.0		23.0	15.0	FSM-2023-15
20.0		23.0	20.0	FSM-2023-20
22.0		25.0	15.0	FSM-2225-15
25.0		28.0	20.0	FSM-2528-20
28.0		32.0	20.0	FSM-2832-20
28.0		32.0	30.0	FSM-2832-30
30.0		34.0	20.0	FSM-3034-20
30.0		34.0	30.0	FSM-3034-30
30.0		34.0	40.0	FSM-3034-40
32.0	+0.080 +0.240	36.0	30.0	FSM-3236-30
35.0		39.0	30.0	FSM-3539-30
35.0		39.0	40.0	FSM-3539-40
40.0		44.0	30.0	FSM-4044-30
40.0		44.0	50.0	FSM-4044-50
45.0		50.0	50.0	FSM-4550-50
50.0		55.0	40.0	FSM-5055-40
55.0	+0.100	60.0	50.0	FSM-5560-50
60.0	+0.290	65.0	60.0	FSM-6065-60

[3] After press-fit. *Testing methods page 57*

iglidur® F
+140°C
105MPa

Bearing technology | Plain bearings | iglidur® F

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: FFM-0405-06 - **no minimum order quantity.**
F iglidur® material F Flange bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
4.0	+0.030 +0.105	5.5	9.5	4.0	0.75	FFM-0405-04
4.0		5.5	9.5	6.0	0.75	FFM-0405-06
5.0		7.0	11.0	5.0	1.00	FFM-0507-05
6.0		8.0	12.0	6.0	1.00	FFM-0608-06
6.0		8.0	12.0	8.0	1.00	FFM-0608-08
8.0	+0.040 +0.130	10.0	15.0	6.0	1.00	FFM-0810-06
8.0		10.0	15.0	9.0	1.00	FFM-0810-09
10.0		12.0	18.0	6.0	1.00	FFM-1012-06
10.0		12.0	18.0	8.0	1.00	FFM-1012-08
10.0		12.0	18.0	9.0	1.00	FFM-1012-09
10.0		12.0	18.0	15.0	1.00	FFM-1012-15
10.0		12.0	18.0	18.0	1.00	FFM-1012-18
12.0	+0.050 +0.160	14.0	20.0	9.0	1.00	FFM-1214-09
12.0		14.0	20.0	12.0	1.00	FFM-1214-12
14.0		16.0	22.0	12.0	1.00	FFM-1416-12
14.0		16.0	22.0	17.0	1.00	FFM-1416-17
15.0		17.0	23.0	12.0	1.00	FFM-1517-12
15.0		17.0	23.0	17.0	1.00	FFM-1517-17

[3] After press-fit. *Testing methods page 57*

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
16.0	+0.050 +0.160	18.0	24.0	17.0	1.00	FFM-1618-17
18.0		20.0	26.0	12.0	1.00	FFM-1820-12
18.0		20.0	26.0	17.0	1.00	FFM-1820-17
20.0	+0.065 +0.195	23.0	30.0	21.0	1.50	FFM-2023-21
25.0		28.0	35.0	21.0	1.50	FFM-2528-21
30.0		34.0	42.0	26.0	2.00	FFM-3034-26
32.0	+0.080 +0.240	36.0	45.0	26.0	2.00	FFM-3236-26
35.0		39.0	47.0	6.0	2.00	FFM-3539-06
35.0		39.0	47.0	16.0	2.00	FFM-3539-16
35.0		39.0	47.0	26.0	2.00	FFM-3539-26
40.0		44.0	52.0	30.0	2.00	FFM-4044-30
40.0		44.0	52.0	40.0	2.00	FFM-4044-40
45.0		50.0	58.0	50.0	2.00	FFM-4550-50
50.0		55.0	63.0	10.0	2.00	FFM-5055-10
50.0		55.0	63.0	40.0	2.00	FFM-5055-40
60.0	+0.100	65.0	73.0	40.0	2.00	FFM-6065-40
70.0	+0.290	75.0	83.0	40.0	2.00	FFM-7075-40

ESD-compatible all-rounder:
Electrically conductive
iglidur® F2

When to use it?

- When the bearing should be electrically discharging
- When a universal plain bearing is required

When not to use?

- When a universal plain bearing without electrostatic discharge capacity is required
  iglidur® G, iglidur® P
- For underwater use
  iglidur® H370
- When the highest wear resistance is required
  iglidur® J, iglidur® W300

Bearing technology | Plain bearings | iglidur® F2

Ø
5.0 – 20.0
mm

Also available as:

Bar stock, round bar:
Page 647

Bar stock, plate:
Page 651

tribo-tape liner:
Page 657

Piston rings:
Page 559

Two hole flange bearing:
Page 581

Moulded special parts:
Page 602

igubal® spherical balls:
Page 783

ESD-compatible all-rounder:
Electrically conductive

iglidur® F2 helps to prevent the build-up of electrostatic charges. Good resistance to media and temperature, suitable even in wet conditions due to low moisture absorption and good universal coefficient of wear pave the way for a wide range of applications.

- Used to prevent electro-static charges
- Suitable for wet environments
- Lubrication-free
- Maintenance-free

Typical application areas

- Mechanical engineering
- Jig construction
- Industrial handling

Descriptive technical specifications			
Wear resistance at +23°C	–	■■■□□	+
Wear resistance at +90°C	–	■■□□□	+
Wear resistance at +150°C	–	■□□□□	+
Low coefficient of friction	–	■■■□□	+
Low moisture absorption	–	■■■□□	+
Wear resistance under water	–	■□□□□	+
High media resistance	–	■■■□□	+
Resistant to edge pressures	–	■■■□□	+
Suitable for shock and impact loads	–	■■■□□	+
Resistant to dirt	–	■■■□□	+

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

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

Technical data

General properties			Testing method
Density	g/cm³	1.52	
Colour		black	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.2	DIN 53495
Max. moisture absorption	% weight	0.4	
Coefficient of friction, dynamic, against steel	μ	0.16 – 0.22	
pv value, max. (dry)	MPa · m/s	0.31	
Mechanical properties			
Flexural modulus	MPa	7,418	DIN 53457
Flexural strength at +20°C	MPa	93	DIN 53452
Compressive strength	MPa	61	
Max. recommended surface pressure (+20°C)	MPa	47	
Shore D hardness		72	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+120	
Max. application temperature short–term	°C	+165	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.61	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	5	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	> 10^9	DIN IEC 93
Surface resistance	Ω	> 10^9	DIN 53482

Table 01: Material properties table

–40°C up to +120°C

47MPa

HB

RoHS-II

ISO 3547-1

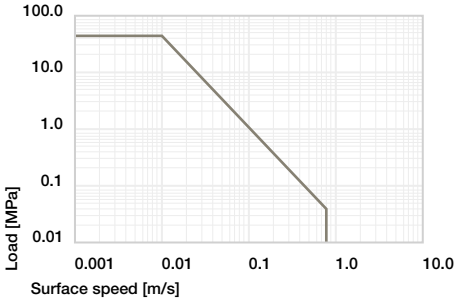


Diagram 01: Permissible pv values for iglidur® F2 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® F2 plain bearings is approximately 0.2% weight. The saturation limit in water is 0.4% weight.

Vacuum

In vacuum, any present moisture is released as vapour. Use in vacuum is only possible with dehumidified iglidur® F2 bearings.

Radiation resistance

Plain bearings made from iglidur® F2 are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® F2 plain bearings are partially resistant to UV radiation.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® F2

The prevention of electrostatic charge is an important requirement in many application areas. At the same time other technical application parameters such as wear resistance, media and temperature resistance, suitability in a wet environment etc. cannot be neglected. iglidur® F2 with its wide range of properties constitutes another universal bearing for numerous “ESD-suitable” applications.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® F2 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

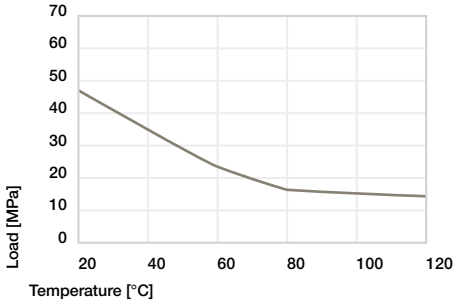


Diagram 02: Maximum recommended surface pressure as a function of temperature (47MPa at +20 °C)

Diagram 03 shows the elastic deformation of iglidur® F2 at radial loads. A plastic deformation can be negligible up to this value. However, it is also dependent on the service time.

Surface pressure, page 41

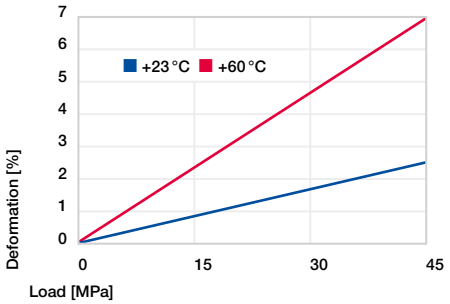


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

The maximum permitted surface speeds are based on the operation period and the type of motion. A plain bearing is the most stressed in long-term rotating motions. Here the maximum speed for the iglidur® F2 plain bearing is 0.8m/s.In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.8	0.7	3.0
short-term	**m/s**	1.4	1.1	5.0

Table 03: Maximum surface speeds

Temperature

The ambient temperatures strongly influence the properties of plain bearings. With increasing temperatures, the compressive strength of iglidur® F2 plain bearings decreases. Diagram 02 shows this inverse relationship. For temperatures over +70°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Coefficient of friction and wear resistance are dependent on the application parameters (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

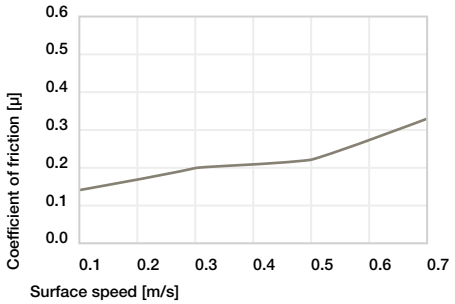


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

Technical data

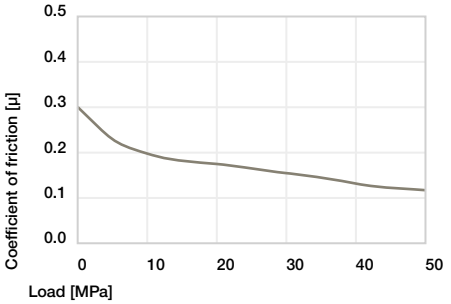


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

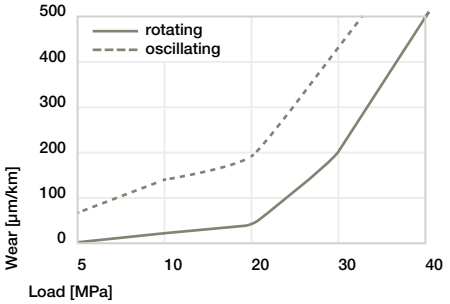


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

Diagram 06 shows the test results of iglidur® F2 plain bearings running against various shaft materials. In the lower region of the load, free cutting steel and hard-anodised aluminium shafts, as well as HR carbon steel and hard-chromed steel shafts prove to be the most favourable in rotating applications with iglidur® F2 plain bearings with respect to wear. Diagram 07 shows significantly less wear in rotation compared to pivoting movements over the entire load range.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.16 – 0.22	0.01	0.05	0.03

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

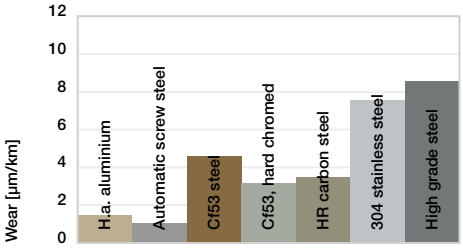


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® F2 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 E10 tolerances.

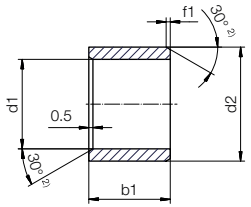
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® F2

Sleeve bearing (form S)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: F2SM-0507-10 - no minimum order quantity.
F2 iglidur® material S Sleeve bearing M Metric 05 Inner Ø d1 07 Outer Ø d2 10 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
5.0	+0.020 +0.068	7.0	10.0	**F2SM-0507-10**
6.0		8.0	6.0	**F2SM-0608-06**
7.0	+0.025 +0.083	9.0	10.0	**F2SM-0709-10**
8.0		10.0	10.0	**F2SM-0810-10**
10.0		12.0	10.0	**F2SM-1012-10**
10.0		12.0	15.0	**F2SM-1012-15**
12.0	+0.032 +0.102	14.0	12.0	**F2SM-1214-12**
16.0		18.0	15.0	**F2SM-1618-15**
20.0	+0.040 +0.124	23.0	20.0	**F2SM-2023-20**

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/F2

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

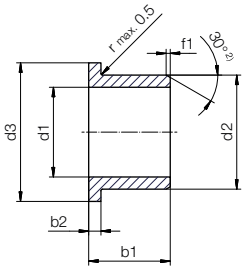
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur® F2
+120°C
47MPa

Bearing technology | Plain bearings | iglidur® F2

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: F2FM-0608-06 - no minimum order quantity.
F2 iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.020 +0.068	8.0	12.0	6.0	1.00	**F2FM-0608-06**
8.0	+0.025 +0.083	10.0	15.0	10.0	1.00	**F2FM-0810-10**
10.0		12.0	18.0	10.0	1.00	**F2FM-1012-10**
12.0	+0.032 +0.102	14.0	20.0	12.0	1.00	**F2FM-1214-12**
16.0		18.0	24.0	17.0	1.00	**F2FM-1618-17**
20.0	+0.040 +0.124	23.0	30.0	21.5	1.50	**F2FM-2023-21**

[3] After press-fit. *Testing methods page 57*

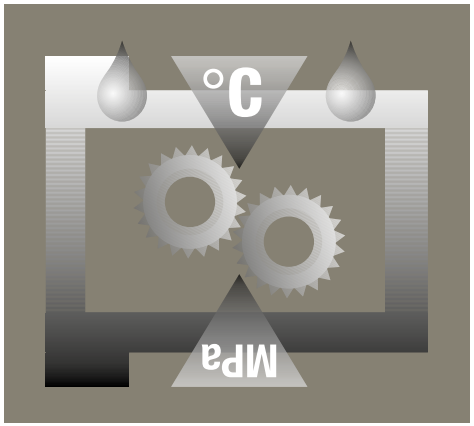
Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/F2

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.



The automotive standard

Up to +200°C, media-resistant

iglidur® H4

When to use it?

- For application with fuels, oils, etc.
- When high wear resistance is required
- For low coefficient of friction
- For high temperature resistance from –40°C to +200°C
- For high chemical resistance

When not to use?

- For underwater use
  iglidur® H370
- When a cost-effective universal plain bearing is required
  iglidur® G
- When a temperature and media-resistant plain bearing for static applications is required
  iglidur® H2

Bearing technology | Plain bearings | iglidur® H4

Ø
4.0 – 40.0
mm

Also available as:

Bar stock, round bar: Page 629

Bar stock, plate: Page 651

tribo-tape liner: Page 657

Piston rings: Page 559

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

The automotive standard:
Up to +200°C, media-resistant

Cost-effective high-temperature material with good dry-operation properties and “engine compartment resistance”.

- Low coefficient of friction
- High wear resistance
- Temperature-resistant from –40°C to +200°C
- High chemical resistance
- Lubrication-free
- Maintenance-free

Typical application areas

- Automotive industry
- Automation
- Packaging

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® H4
+200°C
65MPa

Technical data

General properties			Testing method
Density	g/cm³	1.79	
Colour		brown	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.1	DIN 53495
Max. moisture absorption	% weight	0.2	
Coefficient of friction, dynamic, against steel	µ	0.08 – 0.25	
pv value, max. (dry)	MPa · m/s	0.70	
Mechanical properties			
Flexural modulus	MPa	7,500	DIN 53457
Flexural strength at +20°C	MPa	120	DIN 53452
Compressive strength	MPa	50	
Max. recommended surface pressure (+20°C)	MPa	65	
Shore D hardness		80	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+200	
Max. application temperature short–term	°C	+240	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	5	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{13}$	DIN IEC 93
Surface resistance	Ω	$> 10^{12}$	DIN 53482

Table 01: Material properties table

–40°C up to +200°C

65MPa

V-0

RoHS-II

ISO 3547-1

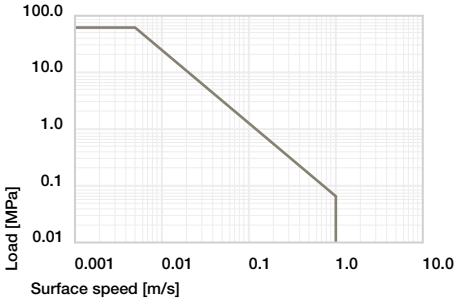


Diagram 01: Permissible pv values for iglidur® H4 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® H4 plain bearings is below 0.1% weight. The saturation limit in water is 0.2% weight. iglidur® H4 is therefore an ideal material for wet environments.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is generally possible.

Radiation resistance

Plain bearings made from iglidur® H4 are resistant up to a radiation intensity of $2 \cdot 10^2$Gy.

UV resistance

iglidur® H4 plain bearings change under the influence of UV radiation and other weathering effects.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® H4

iglidur® H4 plain bearings stand for high carrying capacity, good abrasion resistance and good temperature resistance, besides the obvious economic factors. Temperatures up to +200°C, permitted surface pressure up to 65MPa, and excellent chemical resistance are only some of the essential attributes. Solid lubricants lower the coefficient of friction and support the wear resistance, which was considerably improved compared to the likewise cost-effective iglidur® H2 plain bearings. iglidur® H4 bearings are self-lubricating and suitable for all motions.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® H4 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

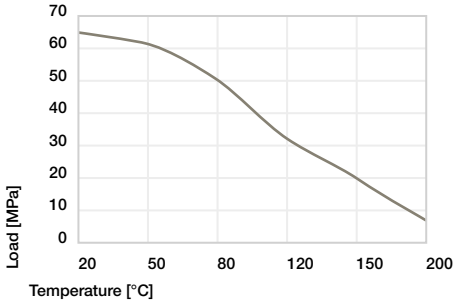


Diagram 02: Maximum recommended surface pressure as a function of temperature (65MPa at +20 °C)

Diagram 03 shows the elastic deformation of iglidur® H4 at radial loads.

Surface pressure, page 41

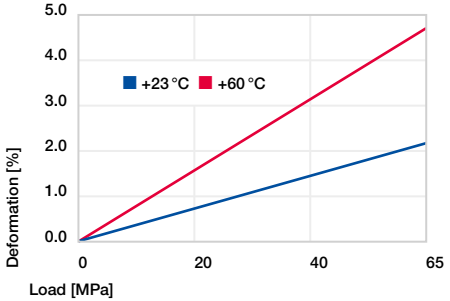


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

In contrast to the similarly cost-effective iglidur® H2 plain bearings, iglidur® H4 has an essentially favourable coefficient of friction. This accounts for the higher permitted surface speeds that can be attained with these bearings. The speeds stated in table 03 are limit values for the lowest bearing loads. With higher loads, the permitted speed drops with the extent of the load due to the limitations by the pv value.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.0	0.7	1.0
short-term	**m/s**	1.5	1.1	2.0

Table 03: Maximum surface speeds

Temperature

iglidur® H4 is a temperature-resistant material and therefore iglidur® H4 plain bearings can be used in applications where the bearings for instance undergo a drying process without further load. With increasing temperatures, the compressive strength of iglidur® H4 plain bearings decreases. When considering temperatures, the additional frictional heat in the bearing system must be taken into account. For temperatures over +110°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction of the iglidur® H4 plain bearings is very low (diagrams 04 and 05). Please note that a sliding surface with a rough surface finish will increase the friction.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

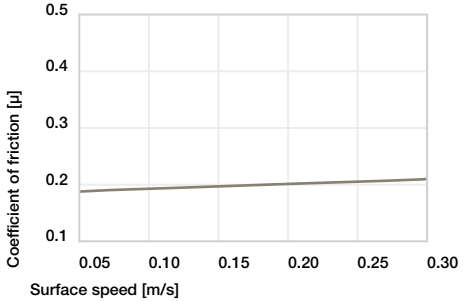


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

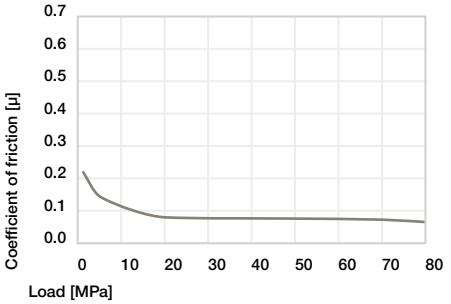


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

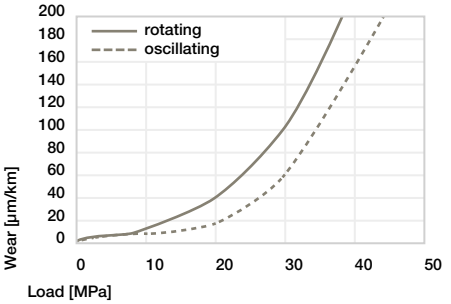


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

With many of the suitable shaft materials, iglidur® H4 is the economical alternative to many other high-temperature bearings. The important thing is however the selection of the suitable shaft material. It cannot be generally stated that iglidur® H4 is suitable for use with hard or soft shafts. Tests have however shown that pivoting applications yield better wear data. In rotating applications, the wear increases markedly from 10MPa.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.08 – 0.25	0.09	0.04	0.04

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

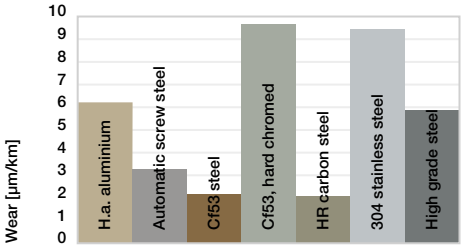


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® H4 plain bearings are standard bearings for shafts with h tolerance (recommended minimum h9). After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

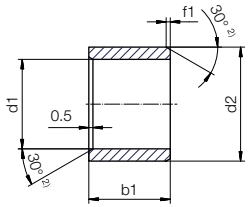
Testing methods, page 57

	Housing		Plain bearing		Shaft	
Ø d1 [mm]	H7 [mm]		F10 [mm]		h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Bearing technology | Plain bearings | iglidur® H4

Sleeve bearing (form S)



[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

Dimensions according to ISO 3547-1 and special dimensions

Order example: H4SM-0405-04 **- no minimum order quantity.**
H4 iglidur® material S Sleeve bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 04 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
4.0	+0.010 +0.058	5.5	4.0	**H4SM-0405-04**
6.0		8.0	8.0	**H4SM-0608-08**
8.0	+0.013 +0.071	10.0	10.0	**H4SM-0810-10**
8.0		10.0	20.0	**H4SM-0810-20**
16.0	+0.016 +0.086	18.0	20.0	**H4SM-1618-20**
18.0		20.0	15.0	**H4SM-1820-15**
20.0	+0.020 +0.104	22.0	15.0	**H4SM-2022-15**
39.0	+0.025 +0.125	43.0	40.0	**H4SM-3943-40**

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
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Online ordering
including delivery times, prices, online tools
www.igus.eu/H4

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

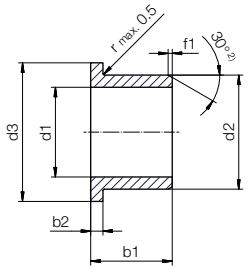
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur® H4
+200°C
65MPa

Bearing technology | Plain bearings | iglidur® H4

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: H4FM-0405-04 **- no minimum order quantity.**
H4 iglidur® material F Flange bearing M Metric 04 Inner Ø d1 05 Outer Ø d2 04 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
4.0	+0.010 +0.058	5.5	9.5	4.0	0.75	**H4FM-0405-04**
6.0		8.0	12.0	8.0	1.00	**H4FM-0608-08**
6.0		10.0	12.0	20.0	1.00	**H4FM-060810-20**
8.0	+0.013 +0.071	10.0	15.0	10.0	1.00	**H4FM-0810-10**
10.0		12.0	18.0	5.0	1.00	**H4FM-1012-05**
10.0		12.0	18.0	12.0	1.00	**H4FM-1012-12**
10.0		12.0	18.0	25.0	1.00	**H4FM-101218-25**
12.0	+0.016 +0.086	14.0	20.0	12.0	1.00	**H4FM-1214-12**
15.0		17.0	23.0	12.0	1.00	**H4FM-1517-12**
16.0		18.0	24.0	17.0	1.00	**H4FM-1618-17**
18.0		20.0	26.0	17.0	1.00	**H4FM-1820-17**
20.0	+0.020 +0.104	23.0	30.0	21.5	1.50	**H4FM-2023-21**
25.0		28.0	35.0	21.5	1.50	**H4FM-2528-21**
30.0		34.0	40.0	30.0	2.00	**H4FM-3034-30**
40.0	+0.030 +0.150	44.0	52.0	40.0	2.00	**H4FM-4044-40**

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
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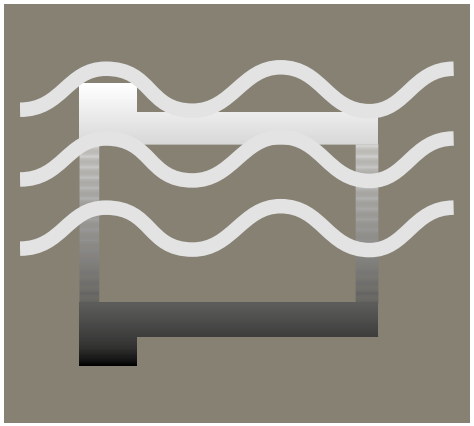
Online ordering
including delivery times, prices, online tools
www.igus.eu/H4

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.



For fast rotation under water

Extreme wear resistance in liquid under continuous operation

iglidur® UW

When to use it?

- For underwater applications and in liquid media
- For low loads
- For high rotational speeds
- For extreme wear resistance in media-lubricated continuous operation

When not to use?

- When continuous operating temperatures are higher than +90 °C
  iglidur® UW500
- When high loads occur
  iglidur® H370, iglidur® UW500, iglidur® X
- When only dry operation is feasible
  iglidur® J

Bearing technology | Plain bearings | iglidur® UW

Ø
3.0 – 20.0
mm

For fast rotation under water:
Extreme wear resistance in liquid under continuous operation

The best iglidur® plain bearing for underwater applications. Extremely wear-resistant under water, tested and maintenance-free. The first choice for pumping applications.

- Suitable for underwater applications
- For fast and constant rotation
- Long service life
- Lubrication-free
- Maintenance-free

Typical application areas

- Fluid technology
- Pumps

Also available as:

Bar stock, round bar: **Page 629**

Bar stock, plate: **Page 651**

tribo-tape liner: **Page 657**

Piston rings: **Page 559**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 783**

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

Online product finder
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Online service life calculation
www.igus.eu/iglidur-expert

iglidur® UW
+90°C
40MPa

Technical data

General properties			Testing method
Density	g/cm³	1.52	
Colour		black	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.2	DIN 53495
Max. moisture absorption[6]	% weight	0.8	
Coefficient of friction, dynamic, against steel	µ	0.15 – 0.35	
pv value, max. (dry)	MPa · m/s	0.11	
Mechanical properties			
Flexural modulus	MPa	9,600	DIN 53457
Flexural strength at +20°C	MPa	90	DIN 53452
Compressive strength	MPa	70	
Max. recommended surface pressure (+20°C)	MPa	40	
Shore D hardness		78	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+90	
Max. application temperature short–term	°C	+110	
Min. application temperature	°C	–50	
Thermal conductivity	W/m · K	0.60	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	6	DIN 53752
Electrical properties[5]			
Specific contact resistance	Ωcm	$< 10^5$	DIN IEC 93
Surface resistance	Ω	$< 10^5$	DIN 53482

[5] The good conductivity of this material can favour the generation of corrosion on the metallic contact components.
[6] All results were obtained under laboratory conditions with demineralised water. For application with direct water contact, we recommend tests under real application conditions.

Table 01: Material properties table

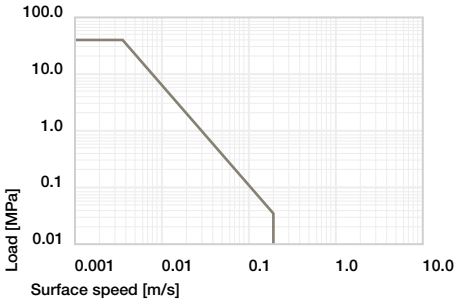


Diagram 01: Permissible pv values for iglidur® UW plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® UW plain bearings is approximately 0.2% weight. The saturation limit in water is 0.8% weight. These values are so low that a moisture expansion need to be considered only in extreme cases.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is only possible to a limited extent.

Radiation resistance

Plain bearings made from iglidur® UW are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® UW plain bearings are resistant to UV radiation.

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

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

Table 02: Chemical resistance

Chemical table, page 1542

–50°C up to +90°C

40MPa

Bearing technology | Plain bearings | iglidur® UW

iglidur® UW was developed for underwater applications in which the maximum temperatures are lower than +100°C. For application temperatures above this limit, the plain bearings made from iglidur® UW500 are available. Though iglidur® UW was developed for application in liquids, it is also suitable for dry operation. This one is particularly important in applications that call for both dry and wet operations. These applications can be seen often in practice. The features of the bearings made from iglidur® UW described in this section apply to the dry operation. Unless it is expressly mentioned otherwise.

Mechanical properties

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

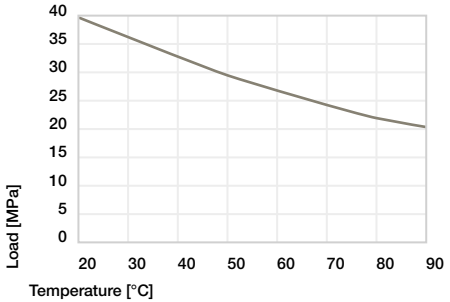


Diagram 02: Maximum recommended surface pressure as a function of temperature (40MPa at +20 °C)

Diagram 03 shows the elastic deformation of iglidur® UW at radial loads. At the maximum recommended surface pressure of 40MPa the deformation is less than 1%.

Surface pressure, page 41

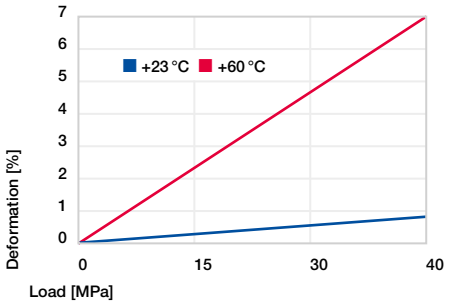


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® UW is very good in both wet and dry operation. Due to hydrodynamic lubrication at high speeds, surface speeds far above 2m/s can be achieved. In dry operation the iglidur® UW plain bearings can be used up to 1.5m/s short-term.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.5	0.4	2.0
short-term	**m/s**	1.5	1.1	3.0

Table 03: Maximum surface speeds

Temperature

As stated earlier, iglidur® UW plain bearings are required for use in the low temperature range. As the liquid usually dissipates heat in underwater applications the temperature of the liquid is very important. For temperatures over +80°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The surface finish of the shafts should not be extremely smooth in order to prevent a high adhesion effect and the related increase of the coefficient of friction. Please contact us for the specifications of shaft surface finishes in underwater applications.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

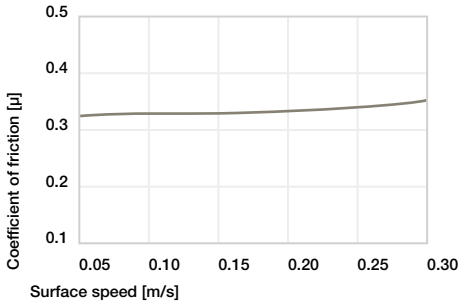


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

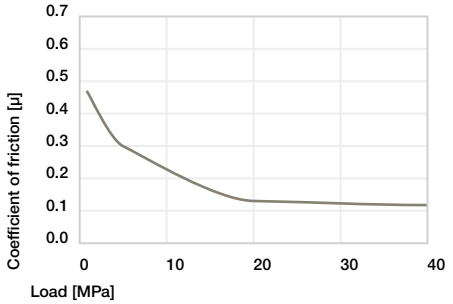


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

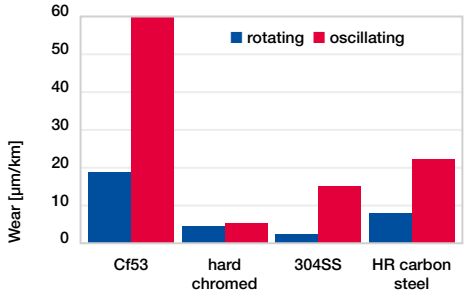


Diagram 07: Wear for rotating and oscillating applications with different shaft materials, p = 2MPa

Shaft materials

Diagrams 06 and 07 show the test results of iglidur® UW plain bearings running against various shaft materials. For low loads with rotation, the combinations achieve the best coefficient of wear with high grade steel and 304 stainless steel. The conditions shift with increasing loads. It is also important to note that the wear rate increases significantly from loads > 5MPa.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.15 – 0.35	0.09	0.04	0.04

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

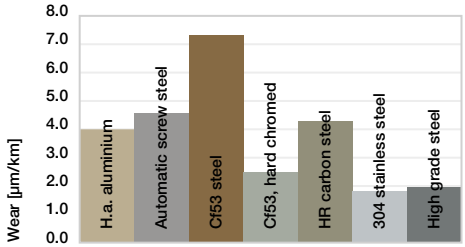


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® UW plain bearings are standard bearings for shafts with h tolerance (recommended minimum h9). After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

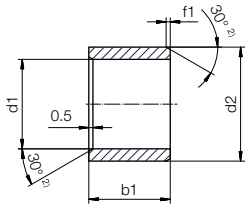
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® UW

Sleeve bearing (form S)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: UWSM-0304-05 - no minimum order quantity.
UW iglidur® material S Sleeve bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 05 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
3.0	+0.014 +0.054	4.5	5.0	**UWSM-0304-05**
4.0	+0.020 +0.068	5.5	6.0	**UWSM-0405-06**
5.0		7.0	8.0	**UWSM-0507-08**
6.0		8.0	8.0	**UWSM-0608-08**
8.0	+0.025 +0.083	10.0	10.0	**UWSM-0810-10**
10.0		12.0	10.0	**UWSM-1012-10**
12.0	+0.032 +0.102	14.0	12.0	**UWSM-1214-12**
16.0		18.0	12.0	**UWSM-1618-12**
18.0		20.0	15.0	**UWSM-1820-15**

[3] After press-fit. *Testing methods page 57*

Available from stock
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Online ordering
including delivery times, prices, online tools
www.igus.eu/UW

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

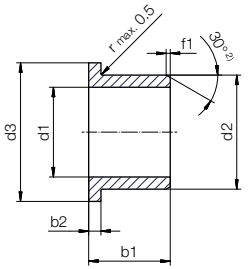
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur® UW
+90°C
40MPa

Bearing technology | Plain bearings | iglidur® UW

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: UWFM-0304-05 - no minimum order quantity.
UW iglidur® material F Flange bearing M Metric 03 Inner Ø d1 04 Outer Ø d2 05 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
3.0	+0.014 +0.054	4.5	7.5	5.0	0.75	**UWFM-0304-05**
4.0	+0.020 +0.068	5.5	9.5	6.0	0.75	**UWFM-0405-06**
5.0		7.0	11.0	5.0	1.00	**UWFM-0507-05**
6.0		8.0	12.0	6.0	1.00	**UWFM-0608-06**
8.0	+0.025 +0.083	10.0	15.0	10.0	1.00	**UWFM-0810-10**
10.0		12.0	18.0	10.0	1.00	**UWFM-1012-10**
12.0	+0.032 +0.102	14.0	20.0	12.0	1.00	**UWFM-1214-12**
16.0		18.0	24.0	17.0	1.00	**UWFM-1618-17**
20.0	+0.040 +0.124	23.0	30.0	21.5	1.50	**UWFM-2023-21**

[3] After press-fit. *Testing methods page 57*

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10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

The biopolymer

Based on renewable resources

iglidur® N54

When to use it?

- For applications with infrequent movement at low to medium loads
- At static loads
- When the environmental impact of a product needs to be optimised

When not to use?

- When a universal standard plain bearing is required
  iglidur® G
- When dealing with high motion frequencies and continuous operation
  iglidur® J
- When dealing with high temperatures
  iglidur® J350

Bearing technology | Plain bearings | iglidur® N54

Ø
6.0 – 20.0
mm

Also available as:

Bar stock, round bar:
Page 629

Bar stock, plate:
Page 651

tribo-tape liner:
Page 657

Piston rings:
Page 559

Two hole flange bearing:
Page 581

Moulded special parts:
Page 602

igubal® spherical balls:
Page 783

The biopolymer:
Based on renewable resources

Based on 54% renewable resources, this material also meets high technical requirements.

- Based on renewable resources
- Universal installation
- Lubrication-free
- Maintenance-free

Typical application areas

- Consumer products
- General mechanical engineering
- Furniture industry
- Industrial design

Descriptive technical specifications			
Wear resistance at +23°C	–		+
Wear resistance at +90°C	–		+
Wear resistance at +150°C	–		+
Low coefficient of friction	–		+
Low moisture absorption	–		+
Wear resistance under water	–		+
High media resistance	–		+
Resistant to edge pressures	–		+
Suitable for shock and impact loads	–		+
Resistant to dirt	–		+

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

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

iglidur® N54
+80°C
36MPa

Technical data

General properties			Testing method
Density	g/cm³	1.13	
Colour		green	
Max. moisture absorption at +23°C and 50% r.h.	% weight	1.6	DIN 53495
Max. moisture absorption	% weight	3.6	
Coefficient of friction, dynamic, against steel	µ	0.15 – 0.23	
pv value, max. (dry)	MPa · m/s	0.50	
Mechanical properties			
Flexural modulus	MPa	1,800	DIN 53457
Flexural strength at +20°C	MPa	70	DIN 53452
Compressive strength	MPa	30	
Max. recommended surface pressure (+20°C)	MPa	36	
Shore D hardness		74	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+80	
Max. application temperature short–term	°C	+120	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	9	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{13}$	DIN IEC 93
Surface resistance	Ω	$> 10^{11}$	DIN 53482

Table 01: Material properties table

–40°C up to +80°C

36MPa

HB

RoHS-II

ISO 3547-1

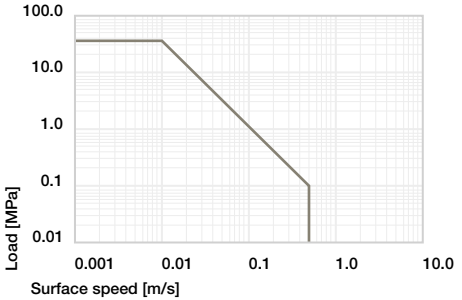


Diagram 01: Permissible pv values for iglidur® N54 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® N54 plain bearings is below 1.6% weight. The saturation limit in water is 3.6% weight.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is only possible to a limited extent.

Radiation resistance

Plain bearings made from iglidur® N54 have limited use under radioactive radiation. They are resistant to radiation up to an intensity of $1 \cdot 10^4$Gy.

UV resistance

iglidur® N54 plain bearings are resistant to UV radiation.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® N54

iglidur® N54 is the first iglidur® material based largely on biopolymers. In addition to the proven lubrication-free properties of all iglidur® materials, this is one further contribution to positive environmental stewardship. The low coefficient of friction in conjunction with long service life ensure that this material has a permanent place in the iglidur® product range.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® N54 plain bearings decreases. Diagram 02 shows this inverse relationship. However, at the long-term maximum temperature of +80°C the permissible surface pressure is around 10MPa. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

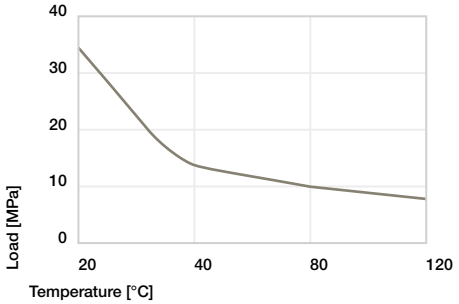


Diagram 02: Maximum recommended surface pressure as a function of temperature (36MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® N54 at radial loads.

Surface pressure, page 41

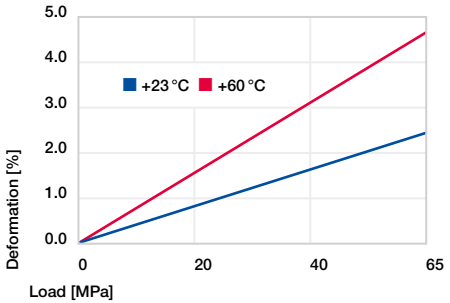


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

Although the typical applications of iglidur® N54 plain bearings are generally in the area of intermittent operation, the maximum attainable speeds can be quite high, depending on the type of motion. The speeds stated in table 03 are limit values for the lowest bearing loads. With higher loads, the permitted speed drops with the extent of the load due to the limitations by the pv value.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.8	0.6	1.0
short-term	**m/s**	1.5	1.1	2.0

Table 03: Maximum surface speeds

Temperature

The short-term permissible temperature limit is +120°C, which allows the use of iglidur® N54 plain bearings in all applications involving elevated ambient temperatures. With increasing temperatures, the compressive strength of iglidur® N54 plain bearings decreases. When considering temperatures, the additional frictional heat in the bearing system must be taken into account. For temperatures over +60°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

iglidur® N54 has a low coefficient of friction. Please note that a sliding surface with a rough surface finish will increase the friction. Surface finishes (Ra) of the shaft between 0.1 – 0.4µm are ideal. The coefficient of friction of iglidur® N54 plain bearings is only marginally dependent on the surface speed. The influence of the load is greater; an increase in load lowers the coefficient of friction to as low as 0.8.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

Technical data

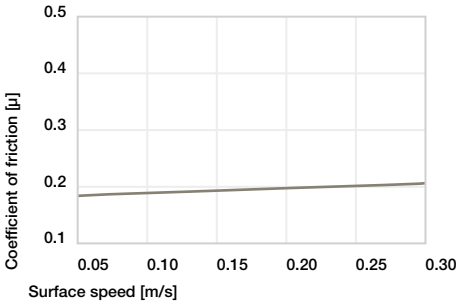


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

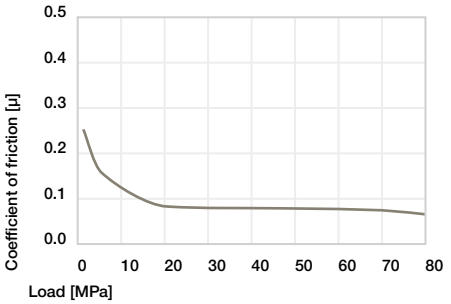


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

Shaft materials

It is important to select a suitable shaft material. As a rule, iglidur® N54 is suitable for use with hard or soft shafts, but “hard” shaft surfaces tend to give better service life. Starting at loads of 1MPa, wear increases measurably and continuously. If the shaft material you plan on using is not shown in these test results, please contact us.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.15 – 0.23	0.09	0.04	0.04

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

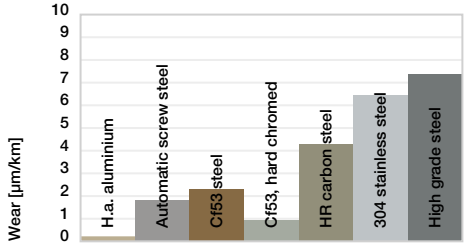


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

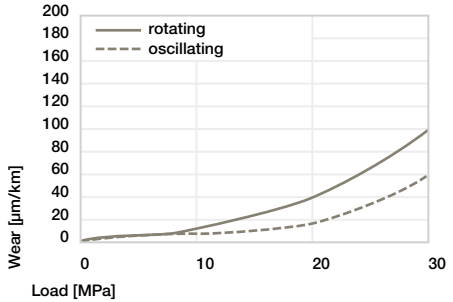


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Installation tolerances

iglidur® N54 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 E10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

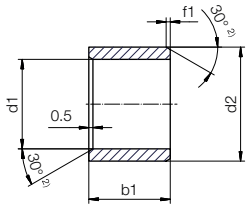
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® N54

Sleeve bearing (form S)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 6–12	Ø 12–30
f [mm]	0.5	0.8

Dimensions according to ISO 3547-1 and special dimensions

Order example: N54SM-0608-06 - no minimum order quantity.
N54 iglidur® material S Sleeve bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
6.0	+0.020 +0.068	8.0	6.0	**N54SM-0608-06**
8.0	+0.025 +0.083	10.0	10.0	**N54SM-0810-10**
10.0		12.0	10.0	**N54SM-1012-10**
12.0	+0.032 +0.102	14.0	12.0	**N54SM-1214-12**
16.0		18.0	15.0	**N54SM-1618-15**
20.0	+0.040 +0.124	23.0	20.0	**N54SM-2023-20**

[3] After press-fit. *Testing methods page 57*

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Ordering note
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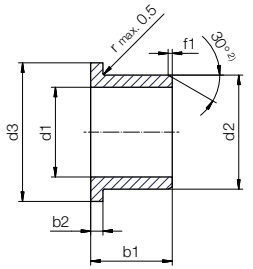
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur® N54
+80°C
36MPa

Bearing technology | Plain bearings | iglidur® N54

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 6–12	Ø 12–30
f [mm]	0.5	0.8

Dimensions according to ISO 3547-1 and special dimensions

Order example: N54FM-0608-06 - no minimum order quantity.
N54 iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.020 +0.068	8.0	12.0	6.0	1.00	**N54FM-0608-06**
8.0	+0.025 +0.083	10.0	15.0	10.0	1.00	**N54FM-0810-10**
10.0		12.0	18.0	10.0	1.00	**N54FM-1012-10**
12.0	+0.032 +0.102	14.0	20.0	12.0	1.00	**N54FM-1214-12**
16.0		18.0	24.0	17.0	1.00	**N54FM-1618-17**
20.0	+0.040 +0.124	23.0	30.0	21.5	1.50	**N54FM-2023-21**

[3] After press-fit. *Testing methods page 57*

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Detailed information about delivery time online.
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Online ordering
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Ordering note
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Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

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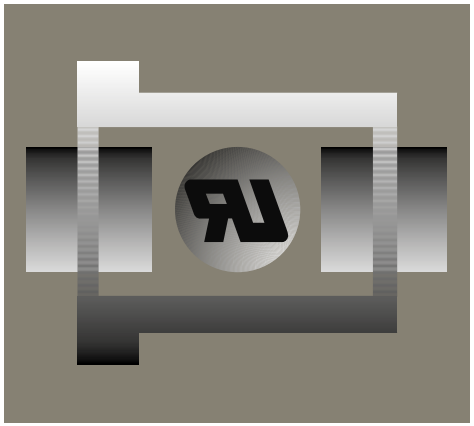

Low-cost all-rounder for fire protection

UL94 V0 rating

iglidur® G V0

When to use it?

- When a UL94 V0 classified plain bearing for normal environmental conditions is required
- When an economic UL94 V0 classified plain bearing is required

When not to use?

- When a UL94 V0 classified plain bearing for high-temperature applications is required
  iglidur® X
- When a standard plain bearing without having to meet special fire codes is required
  iglidur® G

Bearing technology | Plain bearings | iglidur® G V0

Ø 6.0 – 40.0 mm

Also available as:

Bar stock, round bar: Page 629

Bar stock, plate: Page 651

tribo-tape liner: Page 657

Piston rings: Page 559

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

Low-cost all-rounder for fire protection: UL94 V0 rating

The material achieves the UL94 V0 rating and is therefore ideally suited for applications with stringent fire protection regulations (vehicle and aircraft interiors, building interior systems, etc.). Other properties are similar to the all-rounder material iglidur® G.

- UL94 V0-compliant
- High wear resistance
- Universal installation
- Lubrication-free
- Maintenance-free

Typical application areas

- Passenger seats
- Elevators
- Escalators
- Switch cabinets
- Hinges

Descriptive technical specifications			
Wear resistance at +23°C	–		+
Wear resistance at +90°C	–		+
Wear resistance at +150°C	–		+
Low coefficient of friction	–		+
Low moisture absorption	–		+
Wear resistance under water	–		+
High media resistance	–		+
Resistant to edge pressures	–		+
Suitable for shock and impact loads	–		+
Resistant to dirt	–		+

Online product finder
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Online service life calculation
www.igus.eu/iglidur-expert

iglidur® G V0 +130°C 75MPa

Technical data

General properties			Testing method
Density	g/cm³	1.53	
Colour		black	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.7	DIN 53495
Max. moisture absorption	% weight	4.0	
Coefficient of friction, dynamic, against steel	µ	0.07 – 0.20	
pv value, max. (dry)	MPa · m/s	0.50	
Mechanical properties			
Flexural modulus	MPa	7,900	DIN 53457
Flexural strength at +20°C	MPa	140	DIN 53452
Compressive strength	MPa	100	
Max. recommended surface pressure (+20°C)	MPa	75	
Shore D hardness		80	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+130	
Max. application temperature short–term	°C	+210	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.25	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	9	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{12}$	DIN IEC 93
Surface resistance	Ω	$> 10^{11}$	DIN 53482

Table 01: Material properties table

–40°C up to +130°C

75MPa

V-0

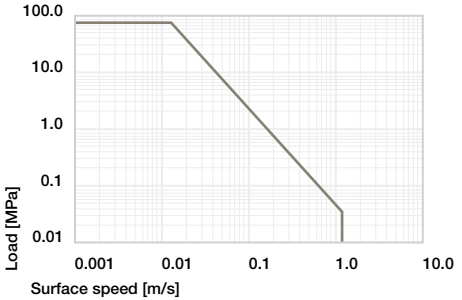


Diagram 01: Permissible pv values for iglidur® G V0 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® G V0 plain bearings is approximately 0.7% weight. The saturation limit in water is 4.0% weight. This must be taken into account for these types of applications.

Vacuum

In vacuum, any present moisture is released as vapour. Use in vacuum is only possible with dehumidified iglidur® G V0 bearings.

Radiation resistance

Plain bearings made from iglidur® G V0 are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® G V0 plain bearings are resistant to permanent UV radiation.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® G V0

iglidur® GV0 is the first iglidur® material with a UL94 V0 rating for universal use in the normal temperature range. All other iglidur® materials with V0 rating are part of the high-temperature segment. The general mechanical and thermal properties are largely comparable to the all-rounder, iglidur® G.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® G V0 plain bearings decreases. Diagram 02 shows this inverse relationship. However, at the long-term maximum temperature of +130°C the permissible surface pressure is around 35MPa. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

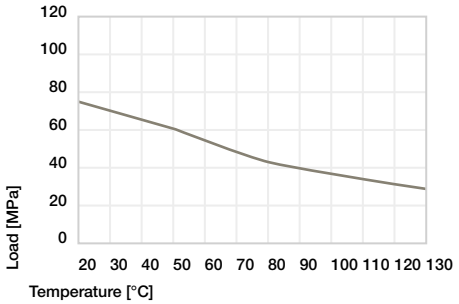


Diagram 02: Maximum recommended surface pressure as a function of temperature (75MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® G V0 at radial loads. The plastic deformation is minimal up to a pressure of approximately 100MPa. However, it is also dependent on the service time.

Surface pressure, page 41

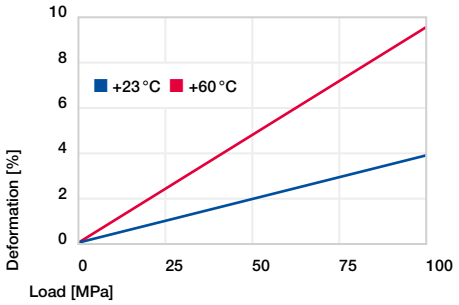


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® G V0 has been developed for low to medium surface speeds. The maximum values shown in table 03 can only be achieved at low pressures. In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.0	0.7	4.0
short-term	**m/s**	2.0	1.4	5.0

Table 03: Maximum surface speeds

Temperature

The ambient temperatures strongly influence the properties of plain bearings. The short-term maximum permissible temperature is +210°C and allows the use of iglidur® G V0 plain bearings in applications where the bearings are not subjected to any additional load such as a paint drying process. The temperatures prevailing in the bearing system also have an influence on the wear. With increasing temperatures, the wear increases and this effect is significant when temperatures rise over +120°C. For temperatures over +100°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Similar to wear resistance, the coefficient of friction μ also changes with the load. The coefficient of friction decreases considerably with increasing loads, whereas a slight increase in surface speed causes an increase of the coefficient of friction. This relationship explains the excellent results of iglidur® G V0 plain bearings for high loads and low speeds (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

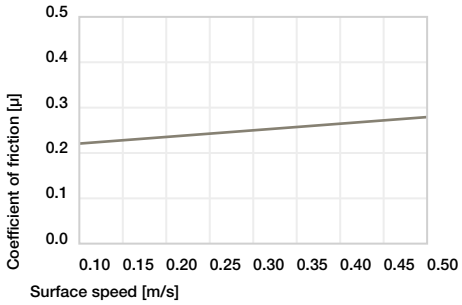


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

Technical data

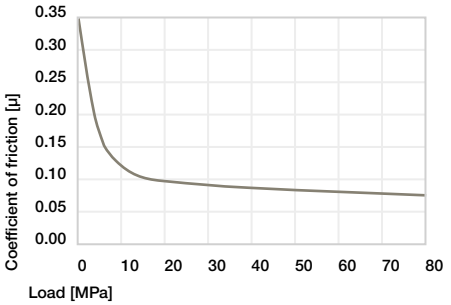


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

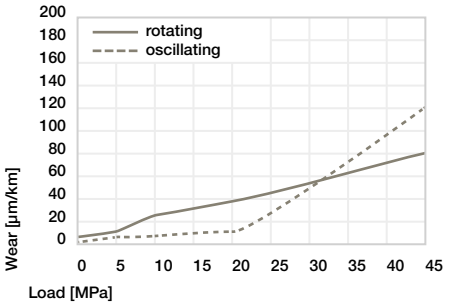


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

The friction and wear are also dependent, to a large degree, on the shaft material. Shafts that are too smooth, increase both the coefficient of friction and the wear of the bearing. For iglidur® G V0 a ground surface with an average surface finish Ra = 0.6 – 0.8 μm is recommended. Diagram 06 shows results of testing different shaft materials with plain bearings made from iglidur® G V0. It is important to notice that with increasing loads, the recommended hardness of the shaft increases. The "soft" shafts tend to wear more easily and thus the wear of the overall system increases. If the loads exceed 2MPa it is important to recognise that the wear rate (the gradient of the curves) clearly decreases with the hard shaft materials. The comparison of rotation and pivoting shows that iglidur® G V0 provides advantages in pivoting movements (diagram 07). If the shaft material you plan on using is not shown in these test results, please contact us.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [μ]	0.07 – 0.20	0.09	0.04	0.04

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

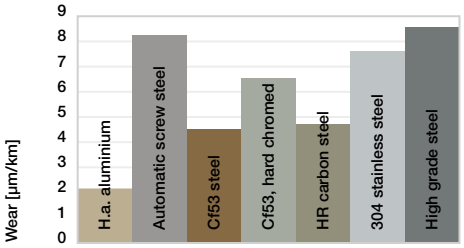


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® G V0 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 E10 tolerances.

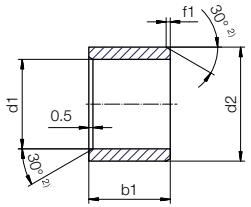
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® G V0

Sleeve bearing (form S)



[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

Dimensions according to ISO 3547-1 and special dimensions

Order example: GV0SM-0608-06 **- no minimum order quantity.**
G V0 iglidur® material S Sleeve bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
6.0	+0.020 +0.068	8.0	6.0	**GV0SM-0608-06**
8.0	+0.025 +0.083	10.0	10.0	**GV0SM-0810-10**
10.0		12.0	8.0	**GV0SM-1012-08**
10.0		12.0	9.0	**GV0SM-1012-09**
10.0		12.0	10.0	**GV0SM-1012-10**
10.0		12.0	15.0	**GV0SM-1012-15**
10.0		12.0	17.0	**GV0SM-1012-17**
12.0	+0.032 +0.102	14.0	12.0	**GV0SM-1214-12**
16.0		18.0	15.0	**GV0SM-1618-15**
20.0	+0.040 +0.124	23.0	20.0	**GV0SM-2023-20**
25.0		28.0	20.0	**GV0SM-2528-20**
30.0		34.0	30.0	**GV0SM-3034-30**
35.0	+0.050 +0.150	39.0	40.0	**GV0SM-3539-40**
40.0		44.0	40.0	**GV0SM-4044-40**

[3] After press-fit. *Testing methods page 57*

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Online ordering
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Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

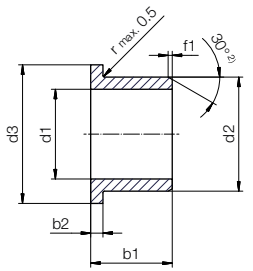
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur®
G V0
+130°C
75MPa

Bearing technology | Plain bearings | iglidur® G V0

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: GV0FM-0608-06 **- no minimum order quantity.**
G V0 iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.020 +0.068	8.0	12.0	6.0	1.00	**GV0FM-0608-06**
8.0	+0.025 +0.083	10.0	15.0	10.0	1.00	**GV0FM-0810-10**
10.0		12.0	18.0	10.0	1.00	**GV0FM-1012-10**
12.0	+0.032 +0.102	14.0	20.0	12.0	1.00	**GV0FM-1214-12**
16.0		18.0	24.0	17.0	1.00	**GV0FM-1618-17**
20.0	+0.040 +0.124	23.0	30.0	21.5	1.50	**GV0FM-2023-21**
25.0		28.0	35.0	21.0	1.50	**GV0FM-2528-21**
30.0		34.0	42.0	37.0	2.00	**GV0FM-3034-37**
35.0	+0.050 +0.150	39.0	47.0	36.0	2.00	**GV0FM-3539-36**
40.0		44.0	52.0	40.0	2.00	**GV0FM-4044-40**

[3] After press-fit. *Testing methods page 57*

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Online ordering
including delivery times, prices, online tools
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Ordering note
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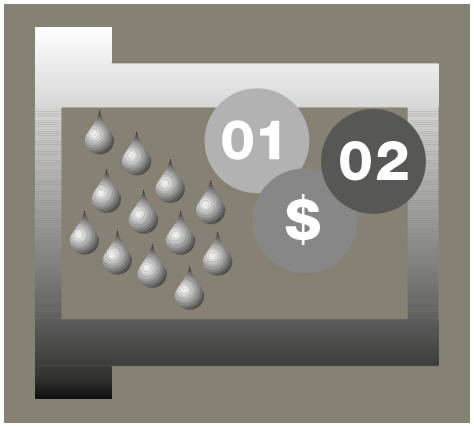


Versatile and cost-effective

For applications with infrequent movement or continuous lubrication

iglidur® J2

When to use it?

- When low moisture absorption and good media resistance is required for static load
- When a cost-effective plain bearing is required for use in a wet environment with low pv values
- When there is basic lubrication of the plain bearing

When not to use?

- When a wear-resistant plain bearing is required for continuous dry operation
  iglidur® J3
- When low moisture absorption and media resistance play a minor role
  iglidur® M250
- When a resistance to high temperatures and chemicals is required
  iglidur® X

Bearing technology | Plain bearings | iglidur® J2

Ø
6.0 – 25.0
mm

Also available as:

Bar stock, round bar: Page 648

Bar stock, plate: Page 651

tribo-tape liner: Page 657

Piston rings: Page 559

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

Versatile and cost-effective:
For applications with infrequent movement or continuous lubrication

iglidur® J2 has good universal media resistance, comparable to that of iglidur® J and similar materials. The mechanical specifications in sporadically moved applications are better although, in comparison, clear compromises have to be made with regard to friction and wear. Like all iglidur® materials, iglidur® J2 is PFOA-free.

- Robust
- Cost-effective
- High media resistance
- Lubrication-free
- Maintenance-free

Typical application areas

- Jig construction
- Industrial handling

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® J2
+90°C
46MPa

Technical data

General properties			Testing method
Density	g/cm³	1.44	
Colour		light yellow	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.2	DIN 53495
Max. moisture absorption	% weight	1.3	
Coefficient of friction, dynamic, against steel	µ	0.11 – 0.27	
pv value, max. (dry)	MPa · m/s	0.23	
Mechanical properties			
Flexural modulus	MPa	3,605	DIN 53457
Flexural strength at +20°C	MPa	101	DIN 53452
Compressive strength	MPa	77	
Max. recommended surface pressure (+20°C)	MPa	46	
Shore D hardness		74	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+90	
Max. application temperature short–term	°C	+110	
Min. application temperature	°C	–50	
Thermal conductivity	W/m · K	0.25	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	7	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{13}$	DIN IEC 93
Surface resistance	Ω	$> 10^{12}$	DIN 53482

Table 01: Material properties table

–50°C up to +90°C

46MPa

HB

RoHS-II

ISO 3547-1

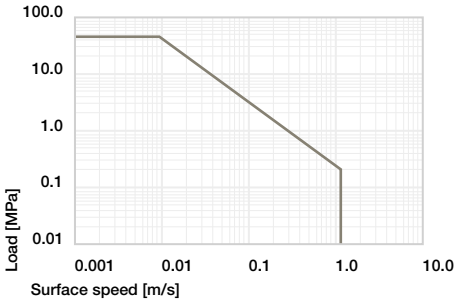


Diagram 01: Permissible pv values for iglidur® J2 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® J2 plain bearings is approximately 0.2% weight. The saturation limit in water is 1.3% weight. These values are so low that a moisture expansion need to be considered only in extreme cases.

Vacuum

In vacuum, any present moisture is released as vapour. Use in vacuum is only possible with dehumidified iglidur® J2 bearings.

Radiation resistance

Plain bearings made from iglidur® J2 are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® J2 plain bearings become discoloured when exposed to UV radiation. However, hardness, compressive strength and wear resistance of the material do not change.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® J2

With respect to its general mechanical and thermal specifications, iglidur® J2 is directly comparable to our classic, iglidur® J. Therefore the iglidur® J2 is superior to iglidur® J with respect to the mechanical properties, such as maximum recommended surface pressure. However, wear resistance is reduced in dry operation.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® J2 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

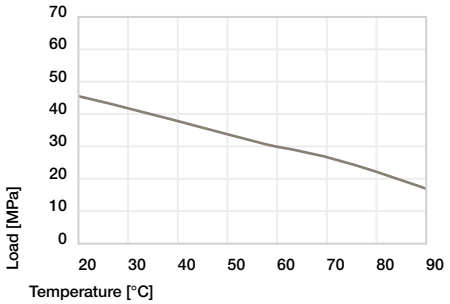


Diagram 02: Maximum recommended surface pressure as a function of temperature (46MPa at +20 °C)

Diagram 03 shows the elastic deformation of iglidur® J2 at radial loads. A possible deformation could be, among others, dependant on the duty cycle of the load.

Surface pressure, page 41

Permissible surface speeds

iglidur® J2 is mainly suitable for low surface speeds in dry operation, but the specified values shown in table 03 can only be achieved at very low pressures. At the given speeds, friction can cause a temperature increase to maximum permissible levels. In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.8	0.7	3.0
short-term	**m/s**	1.9	1.1	5.0

Table 03: Maximum surface speeds

Temperature

The temperatures prevailing in the bearing system also have an influence on the wear. With increasing temperatures, the wear increases and this effect is significant when temperatures rise over +90°C. For temperatures over +60°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Coefficient of friction and wear resistance are dependent on the application parameters (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

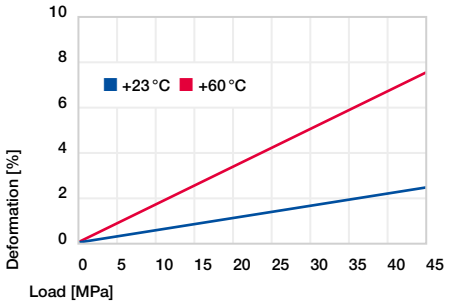


Diagram 03: Deformation under pressure and temperature

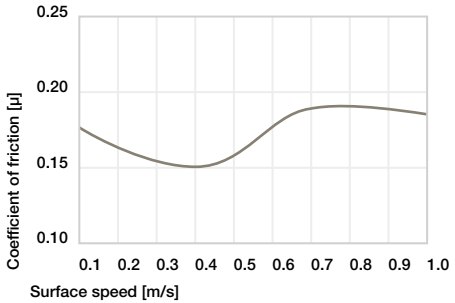


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

Technical data

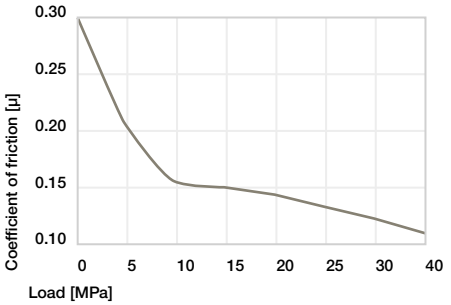


Diagram 05: Coefficient of friction as a function of the load, v = 0.01 m/s

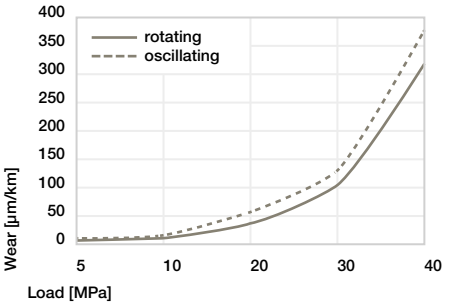


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

The friction and wear are also dependent, to a large degree, on the shaft material. Shafts that are too smooth, increase both the coefficient of friction and the wear of the bearing. Diagram 06 shows results of testing different shafts. Diagram 06 shows that iglidur® J2 delivers good coefficient of wear especially with free cutting steel in rotation at 1MPa. In dry operation, the coefficient of wear is sometimes significantly higher on other shafts. Unlike many other iglidur® materials, the wear rate in pivoting is slightly higher compared to the rate in rotation with otherwise identical parameters (diagram 07).

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.11 – 0.27	0.08	0.07	0.04

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

Installation tolerances

iglidur® J2 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 E10 tolerances. In relation to the installation tolerance, the inner diameter changes with the absorption of humidity.

Testing methods, page 57

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

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

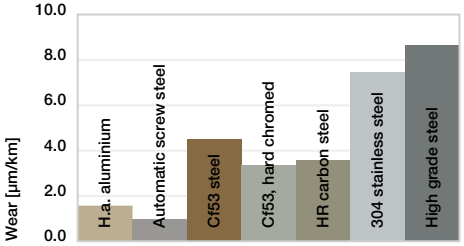
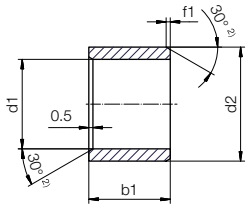


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Bearing technology | Plain bearings | iglidur® J2

Sleeve bearing (form S)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 6–12	Ø 12–30
f [mm]	0.5	0.8

Dimensions according to ISO 3547-1 and special dimensions

Order example: J2SM-0608-06 **- no minimum order quantity.**
J2 iglidur® material S Sleeve bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
6.0	+0.020 +0.068	8.0	6.0	**J2SM-0608-06**
8.0	+0.025 +0.083	10.0	10.0	**J2SM-0810-10**
10.0		12.0	10.0	**J2SM-1012-10**
12.0	+0.032 +0.102	14.0	12.0	**J2SM-1214-12**
16.0		18.0	15.0	**J2SM-1618-15**
20.0	+0.040 +0.124	23.0	20.0	**J2SM-2023-20**
25.0		28.0	20.0	**J2SM-2528-20**

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/J2

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

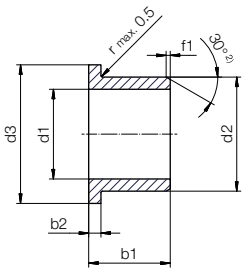
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur® J2
+90°C
46MPa

Bearing technology | Plain bearings | iglidur® J2

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 6–12	Ø 12–30
f [mm]	0.5	0.8

Dimensions according to ISO 3547-1 and special dimensions

Order example: J2FM-0608-06 **- no minimum order quantity.**
J2 iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.020 +0.068	8.0	12.0	6.0	1.00	**J2FM-0608-06**
8.0	+0.025 +0.083	10.0	15.0	10.0	1.00	**J2FM-0810-10**
10.0		12.0	18.0	10.0	1.00	**J2FM-1012-10**
12.0	+0.032 +0.102	14.0	20.0	12.0	1.00	**J2FM-1214-12**
16.0		18.0	24.0	17.0	1.00	**J2FM-1618-17**
20.0	+0.040 +0.124	23.0	30.0	21.5	1.50	**J2FM-2023-21**

[3] After press-fit. *Testing methods page 57*

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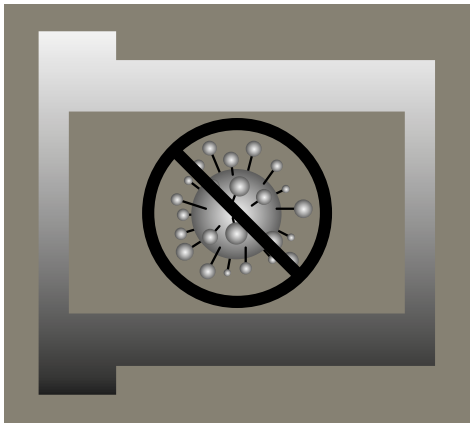


The first antibacterial iglidur® plain bearing

According to ISO 22 196:2011

iglidur® AB

When to use it?

- When bearing points must meet high hygienic standards
- When a universal plain bearing for manual applications is required
- When a plain bearing for low to medium loads is required

When not to use?

- When a wear-resistant plain bearing is required for continuous dry operation
  iglidur® J3
- When a plain bearing that conforms with Regulation (EU) No. 10/2011 and/or the FDA requirements for repeated contact with food is required
  iglidur® A181, iglidur® A350
- When a plain bearing with the highest possible media resistance is required
  iglidur® X

Bearing technology | Plain bearings | iglidur® AB

Ø
6.0 – 20.0
mm

Also available as:

Bar stock, round bar:
Page 629

Bar stock, plate:
Page 651

tribo-tape liner:
Page 657

Piston rings:
Page 559

Two hole flange bearing:
Page 581

Moulded special parts:
Page 602

igubal® spherical balls:
Page 783

The first antibacterial iglidur® plain bearing: According to ISO 22 196:2011

Plain bearings made from iglidur® AB help to reduce the bacteria in bearing points that are difficult to access.

- Antibacterial
- Universal installation
- High media resistance
- Lubrication-free
- Maintenance-free

Typical application areas

- Medical technology
- Laboratory technology
- Ventilation systems
- Sanitary furniture and equipment
- Bearings of patient and care furniture

Descriptive technical specifications			
Wear resistance at +23°C	–		+
Wear resistance at +90°C	–		+
Wear resistance at +150°C	–		+
Low coefficient of friction	–		+
Low moisture absorption	–		+
Wear resistance under water	–		+
High media resistance	–		+
Resistant to edge pressures	–		+
Suitable for shock and impact loads	–		+
Resistant to dirt	–		+

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

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

iglidur® AB
+70°C
25MPa

Technical data

General properties			Testing method
Density	g/cm³	1.11	DIN EN ISO 1183–1
Colour		yellow	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.8	ISO 175
Max. moisture absorption	% weight	1.6	ISO 62
Coefficient of friction, dynamic, against steel	µ	0.18 – 0.31	
pv value, max. (dry)	MPa · m/s	0.25	
Mechanical properties			
Flexural modulus	MPa	1,850	DIN EN ISO 178
Flexural strength at +20°C	MPa	50	DIN EN ISO 178
Compressive strength	MPa	40	
Max. recommended surface pressure (+20°C)	MPa	25	
Shore D hardness		70	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+70	
Max. application temperature short–term	°C	+140	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	10	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$>10^{12}$	DIN IEC 93
Surface resistance	Ω	$>10^{12}$	DIN 53482

Table 01: Material properties table

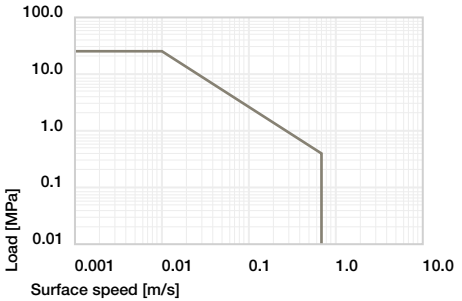


Diagram 01: Permissible pv values for iglidur® AB plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® AB plain bearings is approximately 0.8% weight. The saturation limit in water is 1.6% weight.

Vacuum

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

Radiation resistance

Plain bearings made from iglidur® AB are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® AB plain bearings become discoloured when exposed to UV radiation. However, hardness, compressive strength and wear resistance of the material do not change.

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

+ resistant **0 conditionally resistant** **– not resistant**
All information given at room temperature [+20°C]
Table 02: Chemical resistance

Chemical table, page 1542

–40°C up to +70°C

25MPa

HB

Bearing technology | Plain bearings | iglidur® AB

iglidur® AB was specially developed for applications in areas with hygienic requirements. These types of applications often involve manually actuated pivoting units (doors, furniture in the medical sector, etc.). The material reduces the level of bacterial contamination but - like all "anti-bacterial" materials - is not a substitute for adequate hygienic measures.

Mechanical properties

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

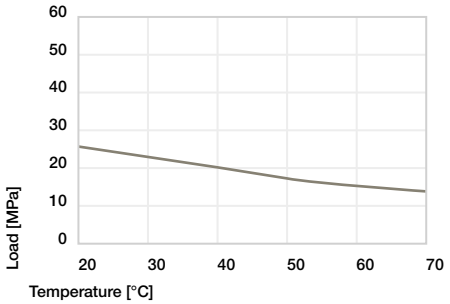


Diagram 02: Maximum recommended surface pressure as a function of temperature (25MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® AB at radial loads. A possible deformation could be, among others, dependant on the duty cycle of the load.

Surface pressure, page 41

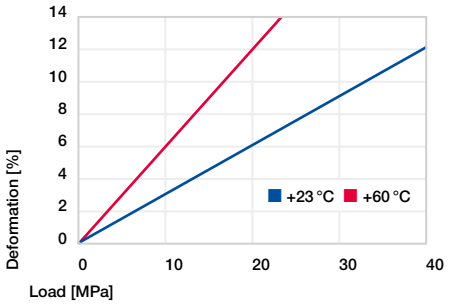


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® AB is mainly suitable for low surface speeds in dry operation, but the specified values shown in table 03 can only be achieved at very low pressures. At the given speeds, friction can cause a temperature increase to maximum permissible levels. In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.7	0.5	1.0
short-term	**m/s**	1.0	0.7	1.8

Table 03: Maximum surface speeds

Temperature

The temperatures prevailing in the bearing system also have an influence on the wear. With increasing temperatures, the wear increases and this effect is significant when temperatures rise over +60°C. For temperatures over +50°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

Coefficient of friction and wear resistance are dependent on the application parameters (diagrams 04 and 05).

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

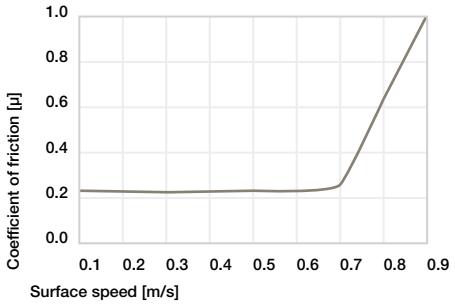


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

Technical data

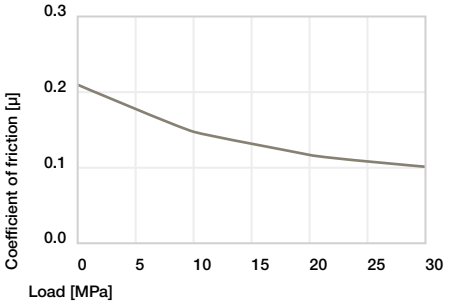


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

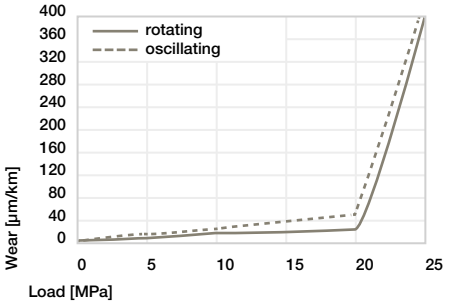


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

The friction and wear are also dependent, to a large degree, on the shaft material. Shafts that are too smooth, increase both the coefficient of friction and the wear of the bearing. Diagram 06 shows results of testing different shafts. When rotating at a load of 1MPa, the wear on all tested shafts is very similar. Only the hard-anodised aluminium shafts cause a noticeable increase in the wear. As illustrated in diagram 07, the wear rate from pivoting and rotational movements at loads in increasing levels is also quite similar if the remaining parameters are identical.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.18 – 0.31	0.09	0.04	0.04

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

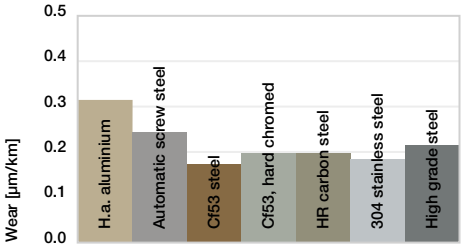


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® AB 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 E10 tolerances. In relation to the installation tolerance, the inner diameter changes with the absorption of humidity. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

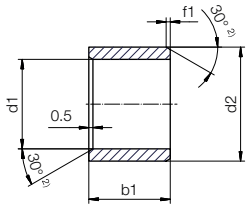
Testing methods, page 57

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

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

Bearing technology | Plain bearings | iglidur® AB

Sleeve bearing (form S)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: ABSM-0608-06 **- no minimum order quantity.**
AB iglidur® material S Sleeve bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
6.0	+0.020 +0.068	8.0	6.0	**ABSM-0608-06**
8.0	+0.025 +0.083	10.0	10.0	**ABSM-0810-10**
10.0		12.0	10.0	**ABSM-1012-10**
12.0	+0.032 +0.102	14.0	15.0	**ABSM-1214-15**
15.0		17.0	15.0	**ABSM-1517-15**
20.0	+0.040 +0.124	23.0	20.0	**ABSM-2023-20**

[3] After press-fit. *Testing methods page 57*

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Ordering note
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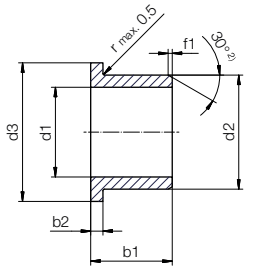
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur® AB
+70°C
25MPa

Bearing technology | Plain bearings | iglidur® AB

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

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

Dimensions according to ISO 3547-1 and special dimensions

Order example: ABFM-0608-08 **- no minimum order quantity.**
AB iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 08 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.020 +0.068	8.0	12.0	8.0	1.00	**ABFM-0608-08**
8.0	+0.025 +0.083	10.0	15.0	9.5	1.00	**ABFM-0810-09**
10.0		12.0	18.0	12.0	1.00	**ABFM-1012-12**
12.0	+0.032 +0.102	14.0	20.0	12.0	1.00	**ABFM-1214-12**
15.0		17.0	23.0	12.0	1.00	**ABFM-1517-12**
20.0	+0.040 +0.124	23.0	30.0	21.5	1.50	**ABFM-2023-21**

[3] After press-fit. *Testing methods page 57*

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Ordering note
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Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

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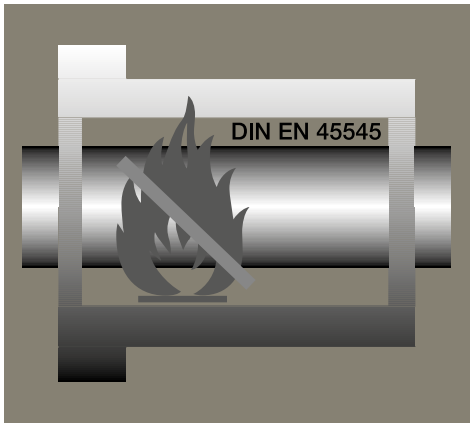

For the rail industry, complies with DIN EN 45545 HL3, R22/R23

Wear-resistant for rail technology

iglidur® RW370

When to use it?

- For applications in rail technology where suitability according to DIN EN 45545 is required
- For high wear resistance at low to medium pressures
- When a low coefficient of friction in dry operation is requested
- Low moisture absorption

When not to use?

- When high pressure loads occur and suitability according to DIN EN 45545 is not required
  iglidur® G, iglidur® W300
- When short-term temperatures higher than +190°C occur
  iglidur® G, iglidur® Z
- When a cost-effective plain bearing for occasional movements is necessary
  iglidur® G

Bearing technology | Plain bearings | iglidur® RW370

Ø 6.0 – 20.0 mm

Also available as:

Bar stock, round bar: Page 648

Bar stock, plate: Page 651

tribo-tape liner: Page 657

Piston rings: Page 657

Two hole flange bearing: Page 581

Moulded special parts: Page 602

igubal® spherical balls: Page 783

For the rail industry, complies with DIN EN 45545 HL3, R22/R23:
Wear-resistant for rail technology

The first iglidur® material that fulfills the European fire safety standard for rail vehicles is suitable for many wear-stressed applications in railway technology due to its very complete property profile.

- Complies with the European fire protection standard DIN EN 45545 HL3 requirement set R22/R23
- Flame-retardant
- High wear resistance
- Low coefficient of friction
- Lubrication and maintenance-free

Typical application areas

- Door guides and hinges
- Rotating joint
- Entrance staircases
- Seat table mechanisms

Descriptive technical specifications			
Wear resistance at +23°C	–		+
Wear resistance at +90°C	–		+
Wear resistance at +150°C	–		+
Low coefficient of friction	–		+
Low moisture absorption	–		+
Wear resistance under water	–		+
High media resistance	–		+
Resistant to edge pressures	–		+
Suitable for shock and impact loads	–		+
Resistant to dirt	–		+

Online product finder
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Online service life calculation
www.igus.eu/iglidur-expert

iglidur® RW370 +170°C 75MPa

Technical data

General properties			Testing method
Density	g/cm³	1.34	DIN EN ISO 1183–1
Colour		beige	
Max. moisture absorption at +23°C and 50% r.h.	% weight	0.25	ISO 175
Max. moisture absorption	% weight	1.2	ISO 62
Coefficient of friction, dynamic, against steel	µ	0.13 – 0.17	
pv value, max. (dry)	MPa · m/s	1.20	
Mechanical properties			
Flexural modulus	MPa	2,997	DIN EN ISO 178
Flexural strength at +20°C	MPa	100	DIN EN ISO 178
Compressive strength	MPa	129	
Max. recommended surface pressure (+20°C)	MPa	75	
Shore D hardness		80	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+170	
Max. application temperature short–term	°C	+190	
Min. application temperature	°C	–50	
Thermal conductivity	W/m · K	0.22	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	5	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	>10 [12]	DIN IEC 93
Surface resistance	Ω	> 10^{12}	DIN 53482

Table 01: Material properties table

–50°C up to +170°C

75MPa

V-0

RoHS-II

ISO 3547-1

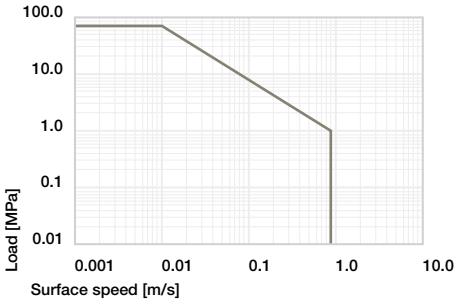


Diagram 01: Permissible pv values for iglidur® RW370 plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® RW370 plain bearings is below 0.25% weight. The saturation limit in water is 1.2% weight.

Vacuum

In vacuum, the moisture content is released as vapour. Due to its low moisture absorption, use in a vacuum is possible.

Radiation resistance

Plain bearings made from iglidur® RW370 are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® RW370 plain bearings become discoloured when exposed to UV radiation. However, hardness, compressive strength and wear resistance of the material do not change.

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

+ resistant **0 conditionally resistant** **– not resistant**

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® RW370

iglidur® RW370 was specially developed for the fire protection requirements in railway technology. It fulfils the specification of DIN EN 45545. Plain bearings made of iglidur® RW370 are used primarily in door systems, seat adjustments and joints, as well as hinges.

Mechanical properties

With increasing temperatures, the compressive strength of iglidur® RW370 plain bearings decreases. Diagram 02 shows this inverse relationship. The maximum recommended surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this.

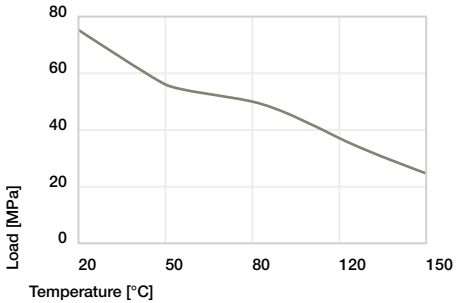


Diagram 02: Maximum recommended surface pressure as a function of temperature (75MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® RW370 at radial loads. A possible deformation could be, among others, dependant on the duty cycle of the load.

Surface pressure, page 41

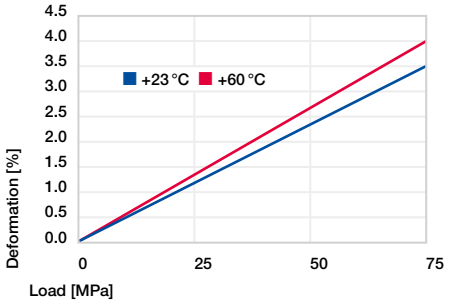


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

Although the typical applications of iglidur® RW370 plain bearings are generally in the area of intermittent operation, the maximum attainable speeds can be quite high, depending on the type of motion. The speeds stated in table 03 are limit values for the lowest bearing loads. With higher loads, the permitted speed drops with the extent of the load due to the limitations by the pv value.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.9	0.6	2.5
short-term	**m/s**	1.0	0.8	2.6

Table 03: Maximum surface speeds

Temperature

The short-term permissible temperature limit is +190°C, which allows the use of iglidur® RW370 plain bearings in all applications involving elevated ambient temperatures. With increasing temperatures, the compressive strength of iglidur® RW370 plain bearings decreases. When considering temperatures, the additional frictional heat in the bearing system must be taken into account. For temperatures over +120°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The excellent coefficient of friction level of iglidur® RW370 in dry operation decreases with speed, to a value of 1.1m/s. Diagram 04 shows this with respect to a steel shaft. Above a speed of 1.25m/s the coefficient of friction increases significantly as the load limit of the material is reached.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

Technical data

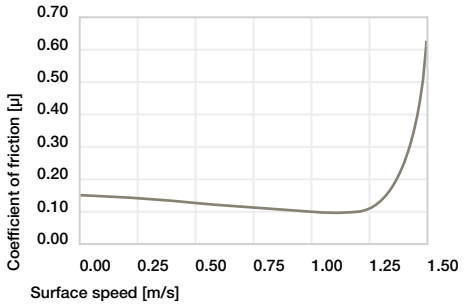


Diagram 04: Coefficient of friction as a function of the surface speed, p = 1MPa

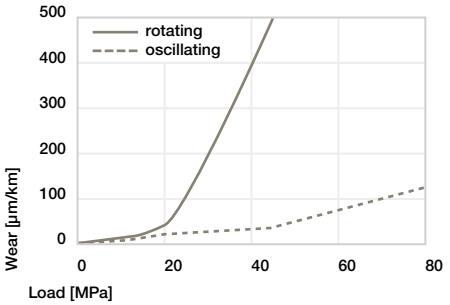


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

Diagrams 06 and 07 display a summary of the results of tests with different shaft materials conducted with plain bearings made from iglidur® RW370. At a surface pressure of 0.3m/s and 1MPa, shafts made of hard-anodised aluminium and hard-chromed Cf53 are the most suitable glide surfaces. Shafts made from 304 stainless steel or high grade steel also show good results. If the shaft material you plan on using is not shown in these test results, please contact us.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.13 – 0.17	0.09	0.04	0.04

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

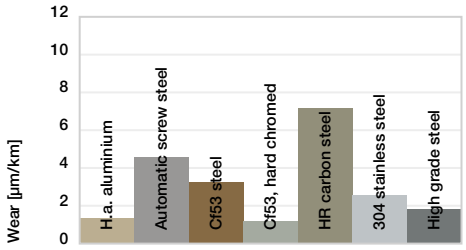


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® RW370 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 F10 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

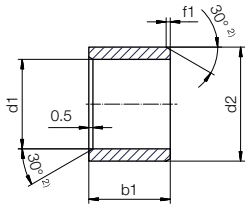
Testing methods, page 57

Ø d1 [mm]	Housing H7 [mm]		Plain bearing F10 [mm]		Shaft h9 [mm]	
0 – 3	+0.000	+0.010	+0.006	+0.046	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.010	+0.058	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.013	+0.071	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.016	+0.086	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.020	+0.104	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.025	+0.125	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.030	+0.150	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.036	+0.176	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.043	+0.203	+0.000	+0.100

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

Bearing technology | Plain bearings | iglidur® RW370

Sleeve bearing (form S)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 6–12	Ø 12–30
f [mm]	0.5	0.8

Dimensions according to ISO 3547-1 and special dimensions

Order example: RW370SM-0608-06 - no minimum order quantity.
RW370 iglidur® material S Sleeve bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 06 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	b1 h13 [mm]	Part No.
6.0	+0.010 +0.058	8.0	6.0	**RW370SM-0608-06**
8.0	+0.013 +0.071	10.0	10.0	**RW370SM-0810-10**
10.0		12.0	10.0	**RW370SM-1012-10**
12.0	+0.016 +0.086	14.0	12.0	**RW370SM-1214-12**
16.0		18.0	15.0	**RW370SM-1618-15**
20.0	+0.020 +0.104	23.0	20.0	**RW370SM-2023-20**

[3] After press-fit. *Testing methods page 57*

Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/RW370

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

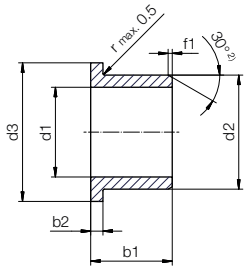
Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur®
RW370
+170°C
75MPa

Bearing technology | Plain bearings | iglidur® RW370

Flange bearing (form F)



[2] Thickness < 0.6mm: Chamfer = 20°

Chamfer in relation to d1

d1 [mm]	Ø 6–12	Ø 12–30
f [mm]	0.5	0.8

Dimensions according to ISO 3547-1 and special dimensions

Order example: RW370FM-0608-08 - no minimum order quantity.
RW370 iglidur® material F Flange bearing M Metric 06 Inner Ø d1 08 Outer Ø d2 08 Total length b1

d1 [mm]	d1 Tolerance[3]	d2 [mm]	d3 d13 [mm]	b1 h13 [mm]	b2 –0,14 [mm]	Part No.
6.0	+0.010 +0.058	8.0	12.0	8.0	1.00	**RW370FM-0608-08**
8.0	+0.013 +0.071	10.0	15.0	9.5	1.00	**RW370FM-0810-09**
10.0		12.0	18.0	9.0	1.00	**RW370FM-1012-09**
12.0	+0.016 +0.086	14.0	20.0	12.0	1.00	**RW370FM-1214-12**
16.0		18.0	24.0	12.0	1.00	**RW370FM-1517-12**
20.0	+0.020 +0.104	23.0	30.0	21.5	1.50	**RW370FM-2023-20**

[3] After press-fit. *Testing methods page 57*

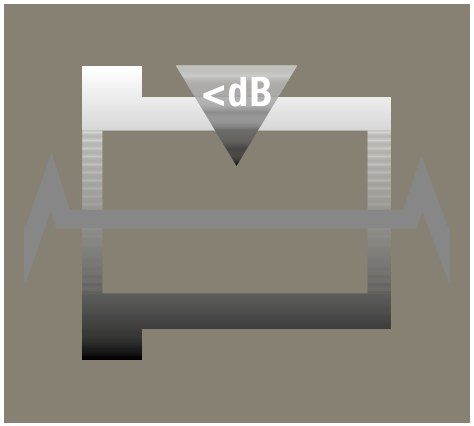
Available from stock
Detailed information about delivery time online.
www.igus.eu/24

Online ordering
including delivery times, prices, online tools
www.igus.eu/RW370

Ordering note
Our prices are scaled according to order quantities, current prices can be found online.

Discount scaling		
1 – 9	50 – 99	500 – 999
10 – 24	100 – 199	1,000 – 2,499
25 – 49	200 – 499	2,500 – 4,999

No minimum order value.
No low-quantity surcharges.
Free shipping within Germany for orders above €150.



The flexible one

For simple bearing applications

iglidur® B

When to use it?

- When maximum vibration dampening is required
- When sealing function has to be integrated
- When high edge loads occur

When not to use?

- In applications with high atmospheric humidity
  iglidur® J
- When a cost-effective universal plain bearing is required
  iglidur® R
- When the highest wear resistance is required
  iglidur® J

Bearing technology | Plain bearings | iglidur® B

Ø
–

Also available as:

Bar stock, round bar:
Page 629

Bar stock, plate:
Page 651

tribo-tape liner:
Page 657

Piston rings:
Page 559

Two hole flange bearing:
Page 581

Moulded special parts:
Page 602

igubal® spherical balls:
Page 783

The flexible one:
For simple bearing applications

Vibration dampening is the predominant feature of the iglidur® B material, which are also well-suited for edge loads at low pressure.

- Elimination of noise
- High flexibility
- Sealing function possible
- Lubrication-free
- Maintenance-free

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® B
+100°C
40MPa

Technical data

General properties			Testing method
Density	g/cm³	1.15	
Colour		grey	
Max. moisture absorption at +23°C and 50% r.h.	% weight	1	DIN 53495
Max. moisture absorption	% weight	6.3	
Coefficient of friction, dynamic, against steel	μ	0.18 – 0.28	
pv value, max. (dry)	MPa · m/s	0.15	
Mechanical properties			
Flexural modulus	MPa	1,800	DIN 53457
Flexural strength at +20°C	MPa	55	DIN 53452
Compressive strength	MPa	20	
Max. recommended surface pressure (+20°C)	MPa	40	
Shore D hardness		69	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+100	
Max. application temperature short–term	°C	+130	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	12	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{10}$	DIN IEC 93
Surface resistance	Ω	$> 10^{9}$	DIN 53482

Table 01: Material properties table

–40°C up to +100°C

40MPa

HB

FDA

RoHS-II

ISO 3547-1

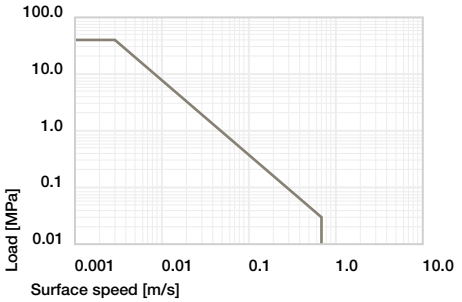


Diagram 01: Permissible pv values for iglidur® B plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

Under standard climatic conditions, the moisture absorption of iglidur® B plain bearings is approximately 1% weight. The saturation limit in water is 6.3% weight. This must be taken into account for these types of applications.

Vacuum

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

Radiation resistance

Plain bearings made from iglidur® B are resistant up to a radiation intensity of $3 \cdot 10^2$Gy.

UV resistance

iglidur® B plain bearings are not resistant to UV radiation.

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

+ resistant 0 conditionally resistant – not resistant

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® B

The compressive strength of the iglidur® B plain bearings is on the one hand low, but on the other, is an important property of the bearing. They are mainly used where vibration dampening and acoustic separation are required.

Mechanical properties

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

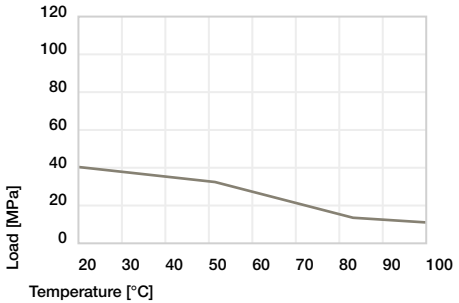


Diagram 02: Maximum recommended surface pressure as a function of temperature (40MPa at +20 °C)

Diagram 03 shows the elastic deformation of iglidur® B at radial loads. At the maximum recommended surface pressure of 40MPa the deformation is about 5.3% at room temperature.

Surface pressure, page 41

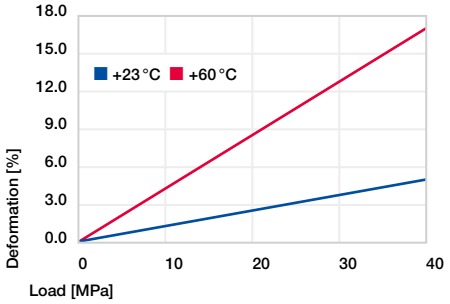


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

iglidur® B plain bearings can be continuously used up to 0.7m/s in rotating applications. The frictional heat provides the speed limits. In practice, though, this level is rarely reached due to varying application conditions.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	0.7	0.5	2.0
short-term	**m/s**	1.0	0.7	3.0

Table 03: Maximum surface speeds

Temperature

The maximum long-term application temperature is +100°C. For temperatures over +50°C an additional securing is required. The wear resistance also decreases exponentially from +70°C upwards.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction increase slightly with the speed and decrease with the load. Surface finishes (Ra) of the shaft between 0.4 – 0.6µm are ideal. As far as the bearing load is not too high, the attained coefficient of wear is pretty good. An increase in load results in a disproportionate increase in abrasion.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

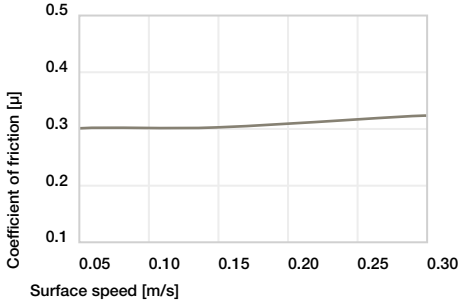


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

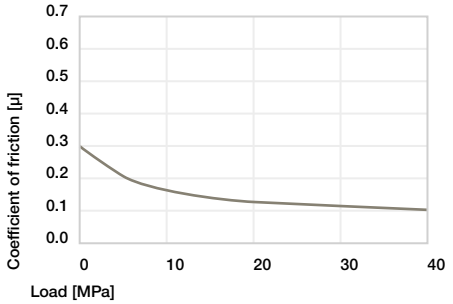


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

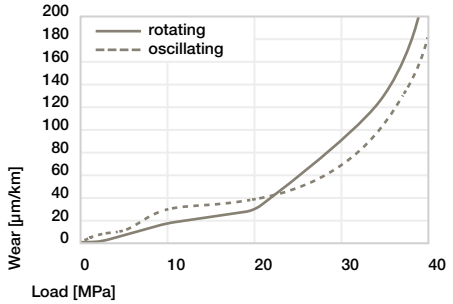


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

The influence of the shaft is not very large on the wear resistance. Diagrams 06 and 07 clarify that very similar wear data are attained with different shaft materials. If high running performances are expected, the bearing load should not be too high.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.18 – 0.28	0.09	0.04	0.04

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

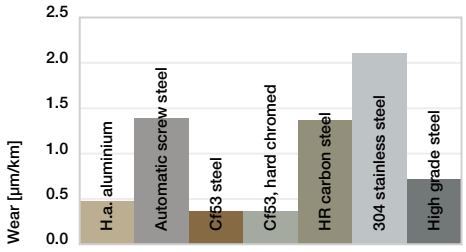


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® B 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 D11 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

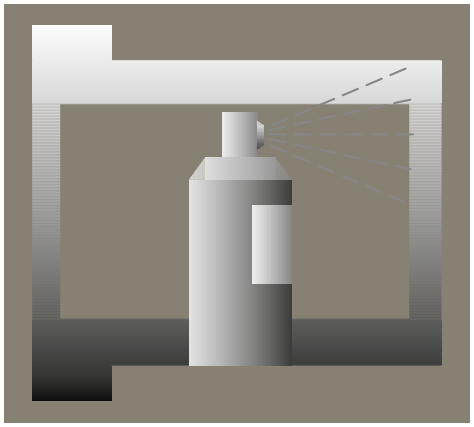
Testing methods, page 57

Ø d1 [mm]	Housing H7 [mm]		Plain bearing D11 [mm]		Shaft h9 [mm]	
0 – 3	+0.000	+0.010	+0.020	+0.080	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.030	+0.105	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.040	+0.130	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.050	+0.160	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.065	+0.195	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.080	+0.240	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.100	+0.290	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.120	+0.340	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.145	+0.395	–0.100	+0.000

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

Product range

iglidur® B plain bearings are manufactured to special order.



Free from PTFE and silicone

For simple applications

iglidur® C

When to use it?

- When PTFE and silicone are not allowed in your application
- For applications with low speed
- When dirt-resistant bearings is required
- When maintenance-free, self-lubricating bearings is required

When not to use?

- When the highest wear resistance is required
  iglidur® W300
- When lowest coefficient of friction is required
  iglidur® J, iglidur® L250
- When a cost-effective option is requested
  iglidur® M250
- When low moisture absorption is required
  iglidur® R

Bearing technology | Plain bearings | iglidur® C

Ø
–

Also available as:

Bar stock, round bar: **Page 629**

Bar stock, plate: **Page 651**

tribo-tape liner: **Page 657**

Piston rings: **Page 559**

Two hole flange bearing: **Page 581**

Moulded special parts: **Page 602**

igubal® spherical balls: **Page 783**

Free from PTFE and silicone: For simple applications

Although iglidur® C dispenses with the use of PTFE and silicone as lubricants, the bearings still have excellent wear resistance under low loads.

- Maintenance-free dry operation
- High wear resistance
- Lubrication-free
- Maintenance-free

Descriptive technical specifications		
Wear resistance at +23°C	–	+
Wear resistance at +90°C	–	+
Wear resistance at +150°C	–	+
Low coefficient of friction	–	+
Low moisture absorption	–	+
Wear resistance under water	–	+
High media resistance	–	+
Resistant to edge pressures	–	+
Suitable for shock and impact loads	–	+
Resistant to dirt	–	+

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

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

iglidur® C
+90°C
40MPa

Technical data

General properties			Testing method
Density	g/cm³	1.10	
Colour		off white	
Max. moisture absorption at +23°C and 50% r.h.	% weight	1	DIN 53495
Max. moisture absorption	% weight	6.9	
Coefficient of friction, dynamic, against steel	µ	0.17 – 0.25	
pv value, max. (dry)	MPa · m/s	0.10	
Mechanical properties			
Flexural modulus	MPa	1,900	DIN 53457
Flexural strength at +20°C	MPa	60	DIN 53452
Compressive strength	MPa	30	
Max. recommended surface pressure (+20°C)	MPa	40	
Shore D hardness		72	DIN 53505
Physical and thermal properties			
Max. application temperature long–term	°C	+90	
Max. application temperature short–term	°C	+130	
Min. application temperature	°C	–40	
Thermal conductivity	W/m · K	0.24	ASTM C 177
Coefficient of thermal expansion (at +23°C)	$K^{-1} \cdot 10^{-5}$	15	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	$> 10^{10}$	DIN IEC 93
Surface resistance	Ω	$> 10^{9}$	DIN 53482

Table 01: Material properties table

–40°C up to +90°C

40MPa

HB

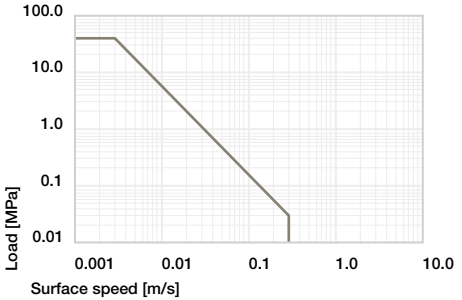


Diagram 01: Permissible pv values for iglidur® C plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

Moisture absorption

The moisture absorption of iglidur® C plain bearings is approximately 6.9% weight when saturated in water. This must be taken into account for these types of applications.

Vacuum

In vacuum, any present moisture is released as vapour. The use in vacuum is only possible to a limited extent.

Radiation resistance

Plain bearings made from iglidur® C are resistant up to a radiation intensity of $2 \cdot 10^4$Gy.

UV resistance

iglidur® C plain bearings are not resistant to UV radiation.

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

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

Table 02: Chemical resistance

Chemical table, page 1542

Bearing technology | Plain bearings | iglidur® C

Plain bearings made from iglidur® C were developed especially for applications where the use of PTFE and silicon is not possible. Such applications can be found in electronics, tobacco and beverages industry and in many painting processes. Keywords like paint compatibility and silicon-free make the further employment of this material reasonable.

Mechanical properties

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

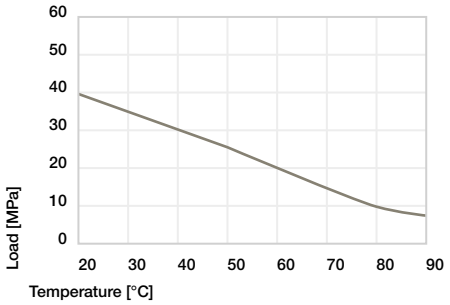


Diagram 02: Maximum recommended surface pressure as a function of temperature (40MPa at +20°C)

Diagram 03 shows the elastic deformation of iglidur® C at radial loads. The high flexibility makes the bearing suitable for vibrations and edge loads.

Surface pressure, page 41

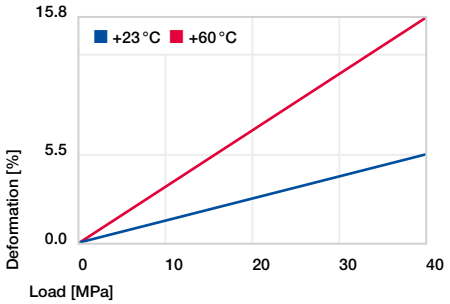


Diagram 03: Deformation under pressure and temperature

Permissible surface speeds

Although important solid lubricants were intentionally avoided in the development of iglidur® C, the plain bearings are very wear-resistant and therefore also suitable for continuous movements at medium surface speeds. Despite it being possible to temporarily attain rotational speeds of up to 1.5m/s, the main applications should nevertheless involve speeds of less than 0.5m/s.

Surface speed, page 44

		rotating	oscillating	linear
long-term	**m/s**	1.0	0.7	2.0
short-term	**m/s**	1.5	1.1	3.0

Table 03: Maximum surface speeds

Temperature

The iglidur® C plain bearings can be used in short-term temperatures up to +130°C. However no real loads are possible at this temperature. It therefore makes sense to limit the temperature to around +80°C to +90°C. For temperatures over +40°C an additional securing is required.

Application temperatures, page 49
Additional securing, page 49

Friction and wear

The coefficient of friction of the iglidur® C plain bearing is dependent to a large degree on the surface finish of the shaft. The wear of the bearing is very good in applications with rotating or pivoting movements with low loads.

Coefficient of friction and surfaces, page 47
Wear resistance, page 50

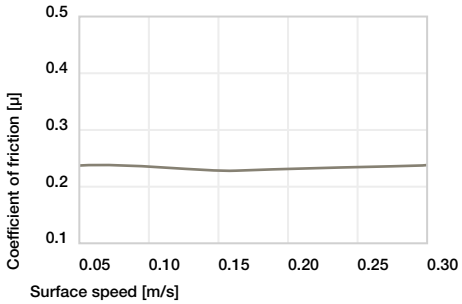


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Technical data

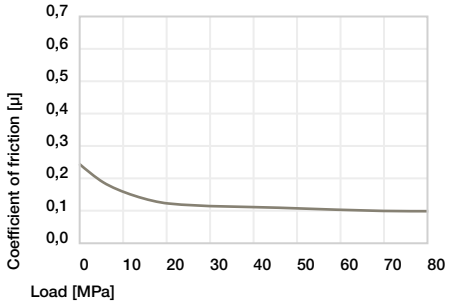


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

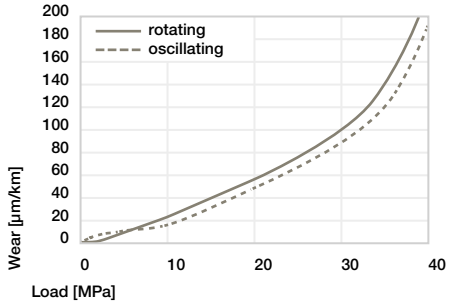


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

Shaft materials

Diagram 06 clearly shows how important the most "suitable" shaft can be. Although all shown results of these rotation experiments can be understood as very good, the difference is sometimes significant. This difference increases still further with increasing loads.

Shaft materials, page 52

	Dry	Greases	Oil	Water
Coeff. of friction [µ]	0.17 – 0.25	0.09	0.04	0.04

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

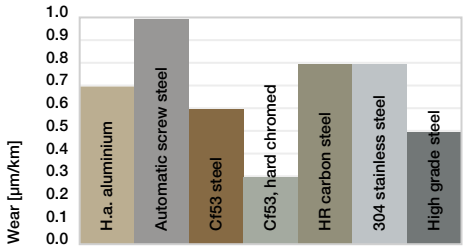


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

Installation tolerances

iglidur® C 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 D11 tolerances. For particular dimensions the tolerance differs depending on the wall thickness (please see product range table).

Testing methods, page 57

	Housing		Plain bearing		Shaft	
Ø d1 [mm]	H7 [mm]		D11 [mm]		h9 [mm]	
0 – 3	+0.000	+0.010	+0.020	+0.080	–0.025	+0.000
> 3 – 6	+0.000	+0.012	+0.030	+0.105	–0.030	+0.000
> 6 – 10	+0.000	+0.015	+0.040	+0.130	–0.036	+0.000
> 10 – 18	+0.000	+0.018	+0.050	+0.160	–0.043	+0.000
> 18 – 30	+0.000	+0.021	+0.065	+0.195	–0.052	+0.000
> 30 – 50	+0.000	+0.025	+0.080	+0.240	–0.062	+0.000
> 50 – 80	+0.000	+0.030	+0.100	+0.290	–0.074	+0.000
> 80 – 120	+0.000	+0.035	+0.120	+0.340	–0.087	+0.000
> 120 – 180	+0.000	+0.040	+0.145	+0.395	–0.100	+0.000

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

Product range

iglidur® C plain bearings are manufactured to special order.