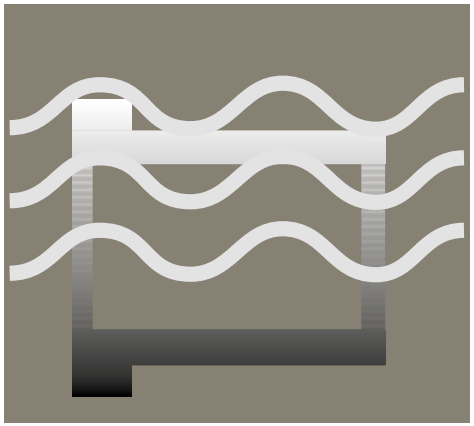


For fast rotation under water

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 bearing | iglidur® UW

Ø
3.0 – 20.0mm

Also available as:

Bar stock, round bar
Page 657

Bar stock, plate
Page 683

tribo-tape liner
Page 691

Piston rings
Page 581

Two hole flange bearings
Page 603

Moulded special parts
Page 624

igubal® spherical balls
Page 841

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

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® 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.

–50°C up to +90°C

40MPa

HB

RoHS-II

ISO 3547-1

Table 01: Material properties

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.

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.

Resistance to weathering

iglidur® UW plain bearings have limited resistance to weathering. The material properties are affected. Discoloration occurs. Practical tests under real application conditions are recommended.

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 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

Bearing technology | Plain bearing | iglidur® UW

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

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

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

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

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

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

Table 02: Chemical resistance

Chemical table, page 1636

		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

	Dry	Greases	Oil	Water
Coefficient of friction μ	0.15 – 0.35	0.09	0.04	0.04

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

	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

Technical data

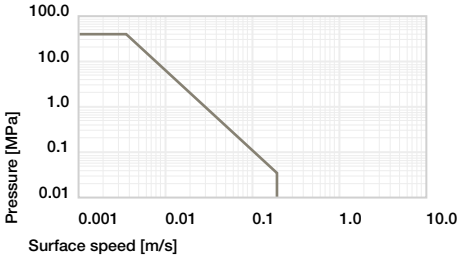


Diagram 01: Permissible pv values for iglidur® UW plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

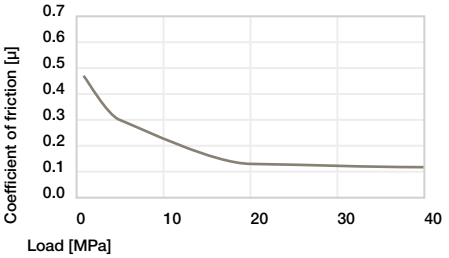


Diagram 05: Coefficient of friction as a function of the load, v = 0.01m/s

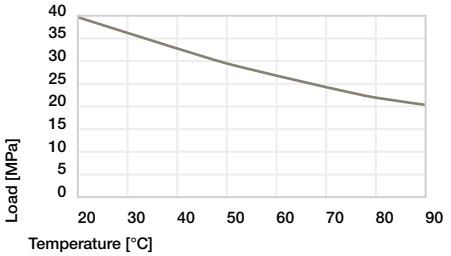


Diagram 02: Maximum recommended surface pressure as a function of temperature (40MPa at +20°C)

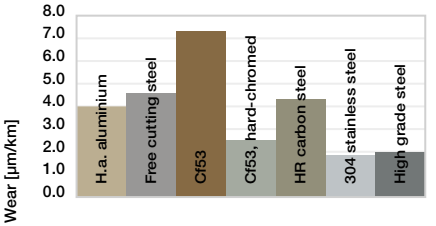


Diagram 06: Wear, rotating with different shaft materials, pressure, p = 1MPa, v = 0.3m/s

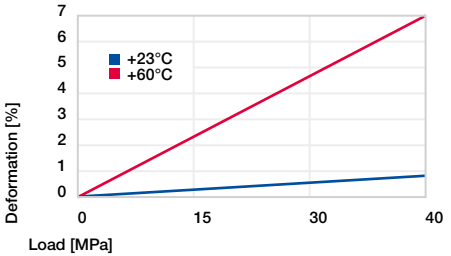


Diagram 03: Deformation under pressure and temperature

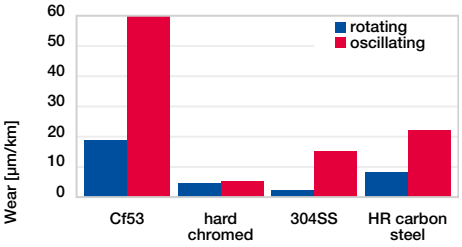


Diagram 07: Wear for rotating and oscillating applications with different shaft materials, p = 2MPa

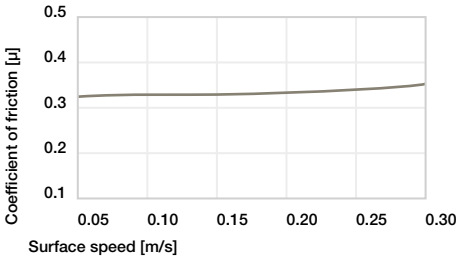
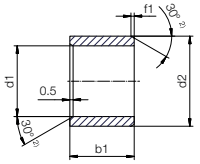


Diagram 04: Coefficient of friction as a function of the surface speed, p = 0.75MPa

Bearing technology | Plain bearing | 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
f1 [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*

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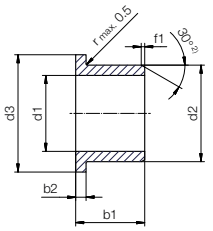
No low-quantity surcharges.
Free shipping within Germany for orders above €150.

iglidur® UW
+90°C
40MPa

Bearing technology | Plain bearing | 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
f1 [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[3] [mm]	b1 h13 [mm]	b2 h13 [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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