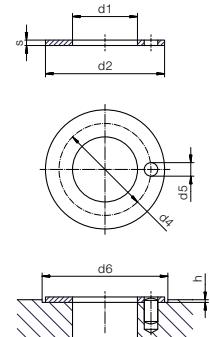


Bearing technology | Plain bearing | iglidur® X

Thrust washer (form T)



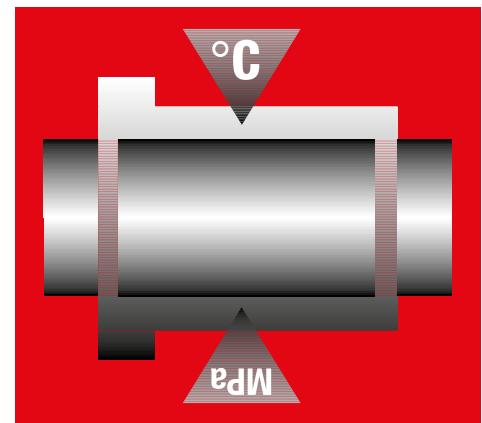
i Dimensions according to ISO 3547-1 and special dimensions

i 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	d2	d4	d5	h	d6	s	Part No.
[mm]							
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

^{a)} 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 bearing | iglidur® Z



Ø
4.0 –
120.0mm



Also available
as:



Bar stock,
round bar
Page 657



Bar stock,
plate
Page 683



tribo-tape liner
Page 691



Piston rings
Page 584



Two hole
flange
bearings
Page 603



Moulded
special parts
Page 624



igubal®
spherical balls
Page 841

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

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 · 10⁻⁵	4	DIN 53752
Electrical properties			
Specific contact resistance	Ωcm	> 10¹¹	DIN IEC 93
Surface resistance	Ω	> 10¹¹	DIN 53482

Table 01: Material properties

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).

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.

Resistance to weathering

iglidur® Z plain bearings are continuously resistant to weathering. The material properties are only slightly affected. Possible discolourations are only superficial.

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.

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 150 MPa the deformation is about 5.5% at room temperature.

Surface pressure, page 41

Bearing technology | Plain bearing | iglidur® Z

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

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

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

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

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

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

Table 02: Chemical resistance

Chemical table, page 1636

long-term	Rotating m/s	Oscillating 1.5	linear 1.1
short-term	m/s	3.5	2.5

Table 03: Maximum surface speeds

Dry	Greases	Oil	Water
Coefficient of friction μ	0.06 – 0.14	0.09	0.04

Table 04: Coefficient of friction against steel ($R_a = 1\mu\text{m}$, 50HRC)

$\varnothing d_1$ [mm]	Housing H7 [mm]	Plain bearing F10 [mm]	Shaft h9 [mm]
0 – 3	+0.000	+0.010	+0.006
> 3 – 6	+0.000	+0.012	+0.010
> 6 – 10	+0.000	+0.015	+0.013
> 10 – 18	+0.000	+0.018	+0.016
> 18 – 30	+0.000	+0.021	+0.020
> 30 – 50	+0.000	+0.025	+0.025
> 50 – 80	+0.000	+0.030	+0.030
> 80 – 120	+0.000	+0.035	+0.036
> 120 – 180	+0.000	+0.040	+0.043

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

Technical data

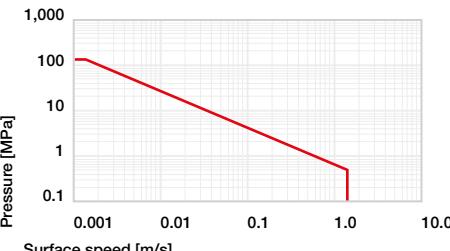


Diagram 01: Permissible pv values for iglidur® Z plain bearings with a wall thickness of 1mm, dry operation against a steel shaft, at +20°C, mounted in a steel housing

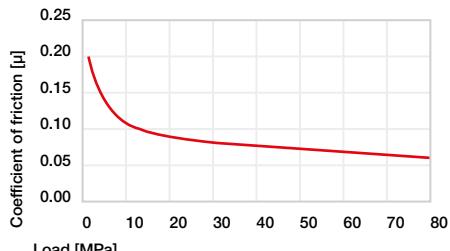


Diagram 05: Coefficient of friction as a function of the load, $v = 0.01\text{m/s}$

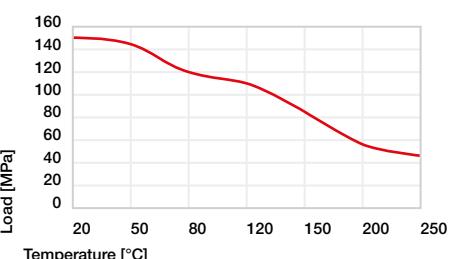


Diagram 02: Maximum recommended surface pressure as a function of temperature (150MPa at +20°C)

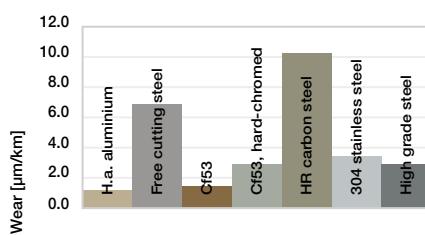


Diagram 06: Wear, rotating with different shaft materials, pressure, $p = 1\text{MPa}$, $v = 0.3\text{m/s}$

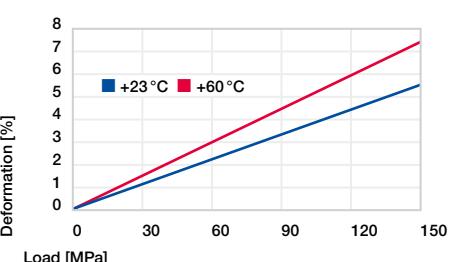


Diagram 03: Deformation under pressure and temperature

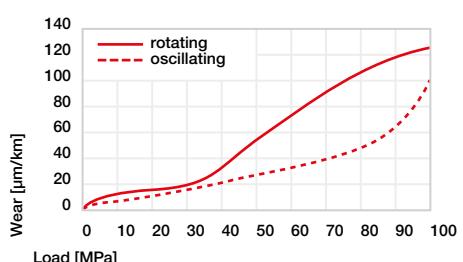


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load

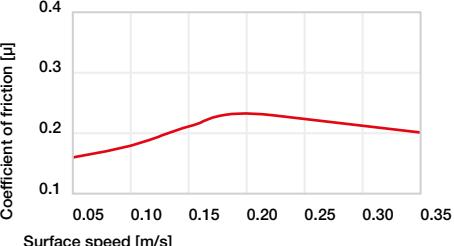
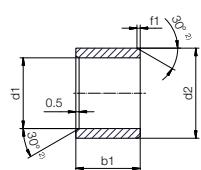


Diagram 04: Coefficient of friction as a function of the surface speed, $p = 0.75\text{MPa}$

Bearing technology | Plain bearing | 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
f1 [mm]	0.3	0.5	0.8	1.2

Dimensions according to ISO 3547-1 and special dimensions

i 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	d1	d2	b1	Part No.
[mm]	Tolerance ³⁾	[mm]	[mm]	h13
4.0		5.5	4.0	ZSM-0405-04
4.0		5.5	6.0	ZSM-0405-06
4.0		5.0	8.0	ZSM-0405-08
5.0		7.0	5.0	ZSM-0507-05
5.0	+0.010	7.0	9.0	ZSM-0507-09
5.0	+0.058	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		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	+0.013	10.0	12.0	ZSM-0810-12
10.0	+0.071	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		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	+0.016	14.0	15.0	ZSM-1214-15
12.0	+0.086	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

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

Product range

d1	d1	d2	b1	Part No.
[mm]	Tolerance ³⁾	[mm]	[mm]	h13
25.0		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	+0.020	32.0	20.0	ZSM-2832-20
28.0	+0.104	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		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	+0.025	39.0	20.0	ZSM-3539-20
35.0	+0.125	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

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

d1	d1	d2	b1	Part No.
[mm]	Tolerance ³⁾	[mm]	[mm]	h13
40.0		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
50.0		50.0	20.0	ZSM-4550-20
50.0		50.0	30.0	ZSM-4550-30
50.0	+0.025	50.0	40.0	ZSM-4550-40
50.0	+0.125	50.0	50.0	ZSM-4550-50
55.0		55.0	20.0	ZSM-5055-20
55.0		55.0	30.0	ZSM-5055-30
55.0		55.0	40.0	ZSM-5055-40
55.0		55.0	50.0	ZSM-5055-50
55.0		55.0	60.0	ZSM-5055-60
60.0		60.0	60.0	ZSM-5560-60
65.0	+0.030	65.0	60.0	ZSM-6065-60
70.0	+0.150	75.0	70.0	ZSM-7075-70
80.0		85.0	60.0	ZSM-8085-60
85.0		85.0	80.0	ZSM-8085-80
85.0	+0.036	90.0	100.0	ZSM-8590-100
85.0	+0.176	90.0	60.0	ZSM-8590-60
95.0		100.0	60.0	ZSM-95100-60
100.0	+0.072	105.0	100.0	ZSM-100105-100
120.0	+0.043	125.0	100.0	ZSM-120125-100
120.0	+0.203			

Available from stock

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

Online ordering

Including delivery times, prices, online tools
www.igus.eu/Z

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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

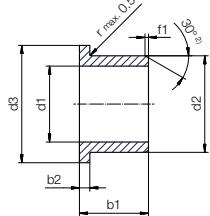
No minimum order value.

No low-quantity surcharges.

Free shipping within Germany for orders above €150.

Bearing technology | Plain bearing | 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
f1 [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	d1	d2	d3	b1	b2	Part No.
Tolerance ³⁾			d13 ³⁾	h13	h13	
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
4.0	5.0	9.0	4.0	0.75	0.75	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	5.0	1.00	ZFM-0810-05
8.0		10.0	15.0	7.5	1.00	ZFM-0810-07
8.0		10.0	15.0	9.0	1.00	ZFM-0810-09
9.0		11.0	17.0	20.0	0.50	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	5.5	1.50	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
14.0	+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

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

Product range

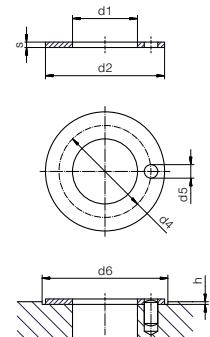
d1	d1	d2	d3	b1	b2	Part No.
Tolerance ³⁾			d13 ³⁾	h13	h13	
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
50.0		+0.025	55.0	63.0	50.0	2.00 ZFM-5055-50
		+0.125				

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

d1	d1	d2	d3	b1	b2	Part No.
Tolerance ³⁾			d13 ³⁾	h13	h13	
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
60.0		+0.030	65.0	73.0	50.0	2.00 ZFM-6065-50
75.0		+0.150	80.0	88.0	50.0	2.50 ZFM-7580-50
75.0			80.0	94.0	65.0	2.00 ZFM-758094-65

Bearing technology | Plain bearing | iglidur® Z

Thrust washer (form T)



i 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	d2	d4	d5	h	d6	s	Part No.
[mm]							
14	30	25	2	1	30	1.5	ZTM-1430-015¹⁴⁶⁾
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

! Available from stock

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

! Online ordering

Including delivery times, prices, online tools
www.igus.eu/Z

! Ordering note

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

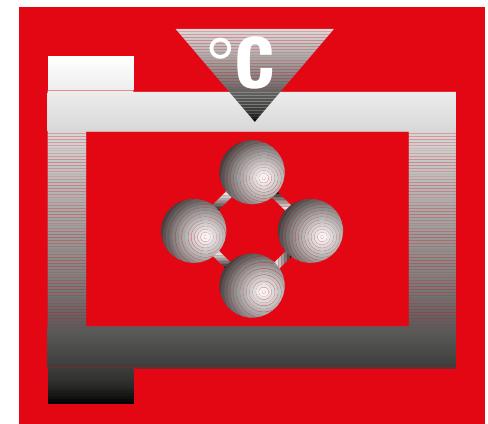
Discount scaling

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 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