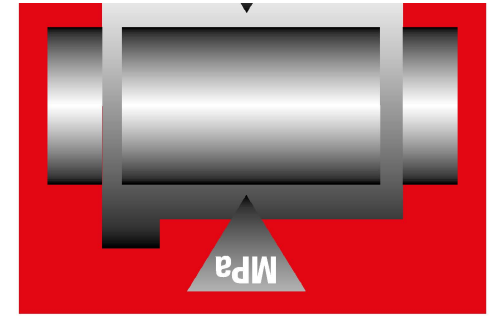




Long service life under extreme conditions

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 it?

- 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*

EN 09/2023



Ø
4.0-120.0mm



Also available
as:



Bar stock,
round bar
Page 743



Bar stock,
plate
Page 773



tribo-tape liner
Page 781



Guide rings
Page 641



Two hole
flange
bearings
Page 667



Moulded
special parts
Page 696



igubal®
spherical balls
Page 993

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	-		+
Slide property	-		+
Wear resistance under water	-		+
Media resistance	-		+
Resistant to edge pressures	-		+
Resistant to shock and impact loads	-		+
Dirt resistance	-		+



Online product finder
www.igus.sk/igidur-finder



Online service life calculation
www.igus.sk/igidur-expert



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General properties

Density	g/cm³	1.40	
Colour		brown	
Max. moisture absorption at +23°C/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. permissible 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 transitional 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

The moisture absorption of iglidur® Z plain bearings in ambient conditions is approximately 0.3% weight. The saturation limit submerged 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 · 10⁵ Gy.

Resistance to weathering

igidur® 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.

igidur® 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 23MPa the deformation is about 5.5% at room temperature.

Surface pressure, page 45



-100°C up to
+250°C



150MPa



V-0



ISO 3547



RoHS II



ISO 3547



ISO 3547

Permissible surface speeds

iglidur® Z is a high temperature material that 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 48

Temperature

The iglidur® Z plain bearings can be used at temperatures up to +310°C for short periods. 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 53

Additional securing, page 53

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 51

Wear resistance, page 54

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 56

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 61

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

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

Table 02: Chemical resistance

Chemical table, page 1170

	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

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

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

	Housing	Plain bearings	Shaft
$\varnothing d1$ [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

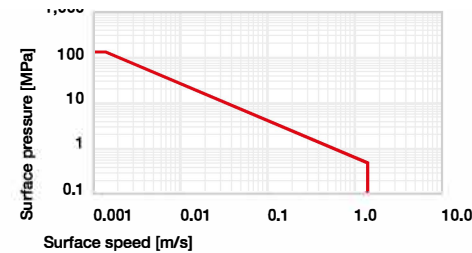


Diagram 01: Permissible pv values for iglidur® Z plain bearing with a wall thickness of 1mm dry operation against a steel shaft at +20°C, mounted in a steel housing.

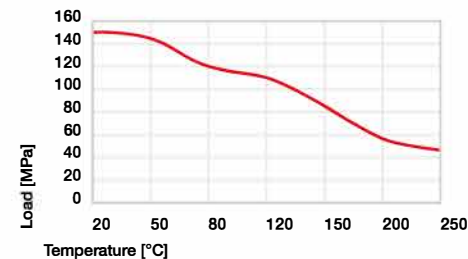


Diagram 02: Maximum recommended surface pressure as a function of temperature (150MPa at +20°C)

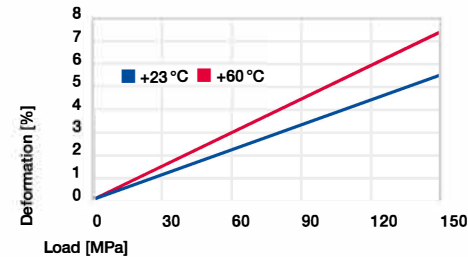


Diagram 03: Deformation under pressure and temperature

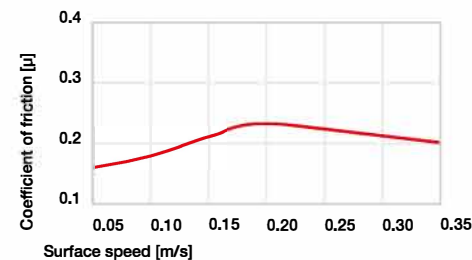


Diagram 04: Coefficient of friction as a function of the surface speed, $p = 0.75\text{MPa}$

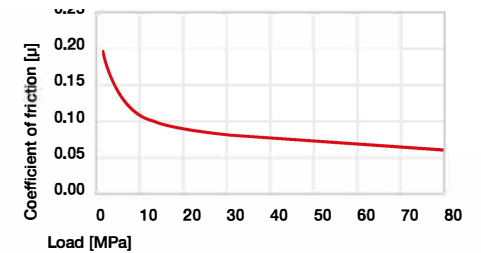


Diagram 05: Coefficient of friction as a function of the pressure, $v = 0.01\text{m/s}$

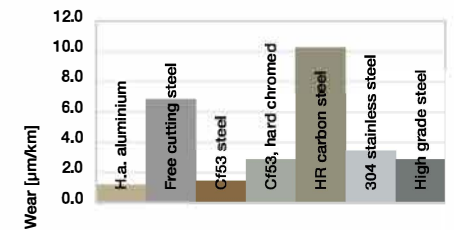


Diagram 06: Wear, rotating with different shaft materials, pressure, $p = 1\text{MPa}$, $v = 0.3\text{m/s}$

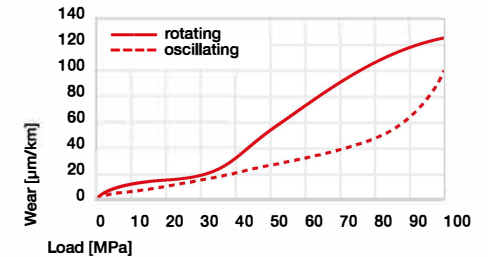
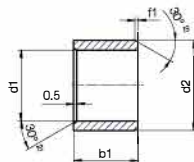


Diagram 07: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the load



³⁾ 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

i Dimensions according to ISO 3547-1 and special dimensions

Order example: ZSM-0405-04 – no minimum order quantity.
Z iglidur® material **S** Cylindrical **M** Metric **04** Inner Ø d1 **05** Outer Ø d2 **04** Total length b1

d1	d1	d2	b1	Part No.
[mm]	Tolerance ³⁾	[mm]	h13	
4.0		5.5	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	+0.010	7.0	10.0	ZSM-0507-10
6.0	+0.058	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		10.0	12.0	ZSM-0810-12
10.0	+0.013	12.0	8.0	ZSM-1012-08
10.0	+0.071	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		14.0	15.0	ZSM-1214-15
12.0	+0.016	14.0	20.0	ZSM-1214-20
13.0	+0.086	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

d1	d1	d2	b1	Part No.
[mm]	Tolerance ³⁾	[mm]	h13	
14.0		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	+0.016	18.0	12.0	ZSM-1618-12
16.0	+0.086	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		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	25.0	15.0	ZSM-2225-15
22.0	+0.104	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 61

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d1	d1	d2	b1	Part No.
[mm]	Tolerance ³⁾	[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 61

d1	d1	d2	b1	Part No.
[mm]	Tolerance ³⁾	[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
45.0		50.0	20.0	ZSM-4550-20
45.0		50.0	30.0	ZSM-4550-30
45.0	+0.025	50.0	40.0	ZSM-4550-40
45.0	+0.125	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		60.0	60.0	ZSM-5560-60
60.0	+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
80.0		85.0	80.0	ZSM-8085-80
85.0	+0.036	90.0	60.0	ZSM-8590-60
85.0	+0.176	90.0	100.0	ZSM-8590-100
95.0		100.0	60.0	ZSM-95100-60
100.0	+0.072	105.0	100.0	ZSM-100105-100
	+0.212			
120.0	+0.043	125.0	100.0	ZSM-120125-100
	+0.203			

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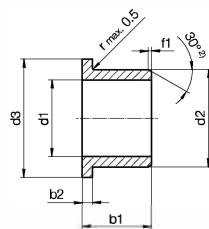
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³⁾ Thickness < 0.6mm: chamfer = 20°

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

i Dimensions according to ISO 3547-1 and special dimensions

Order example: ZFM-0405-04 – no minimum order quantity.
Z iglidur® material **F** With flange **M** Metric **04** Inner Ø d1 **05** Outer Ø d2 **04** Total length b1

d1	d1	d2	d3	b1	b2	Part No.
[mm]	Tolerance ³⁾	[mm]	d13 ³⁾	h13	h13	
4.0		5.5	9.5	4.0	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	1.00	ZFM-091117-20
10.0	+0.013	12.0	18.0	5.0	1.00	ZFM-1012-05
10.0	+0.071	12.0	18.0	7.0	1.00	ZFM-1012-07
10.0		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	+0.016	16.0	22.0	12.0	1.00	ZFM-1416-12
14.0	+0.086	16.0	22.0	17.0	1.00	ZFM-1416-17
15.0		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 61*

d1	d1	d2	d3	b1	b2	Part No.
[mm]	Tolerance ³⁾	[mm]	d13 ³⁾	h13	h13	
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	11.5	1.50	ZFM-2023-11
20.0		23.0	30.0	15.5	1.50	ZFM-2023-155
20.0		23.0	30.0	16.5	1.50	ZFM-2023-16
20.0		23.0	30.0	21.5	1.50	ZFM-2023-21
20.0		23.0	30.0	31.5	1.50	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	31.5	1.50	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

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

³⁾ After press-fit. *Testing methods, page 61*

d1	d1	d2	d3	b1	b2	Part No.
[mm]	Tolerance ³⁾	[mm]	d13 ³⁾	h13	h13	
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

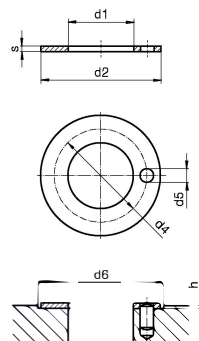
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i Dimensions according to ISO 3547-1 and special dimensions

key 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** Height **s**

d1	d2	d4	d5	h	d6	Øs	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	30	25	2	1.0	30	1.5	ZTM-1430-015 ^{14B)}
15	27	⁴⁾	⁴⁾	1.0	27	1.5	ZTM-1527-015
15	35	⁴⁾	⁴⁾	1.0	35	1.5	ZTM-1535-015
15	40	⁴⁾	⁴⁾	1.0	35	1.5	ZTM-1540-015
16	23	⁴⁾	⁴⁾	1.0	23	1.5	ZTM-1623-015
20	36	28	3	1.0	36	1.5	ZTM-2036-015
22	38	30	3	1.0	38	1.5	ZTM-2238-015
22	50	30	3	1.0	38	0.5	ZTM-2250-005
22	50	30	3	1.0	38	1.5	ZTM-2250-015
28	38	⁴⁾	⁴⁾	1.0	38	1.5	ZTM-2838-015
32	54	43	4	1.0	54	1.5	ZTM-3254-015
62	90	⁴⁾	⁴⁾	1.5	90	2.0	ZTM-6290-020

⁴⁾ Design without fixing hole ^{14B)} d4 +/-0.2, d5 +/-0.1

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