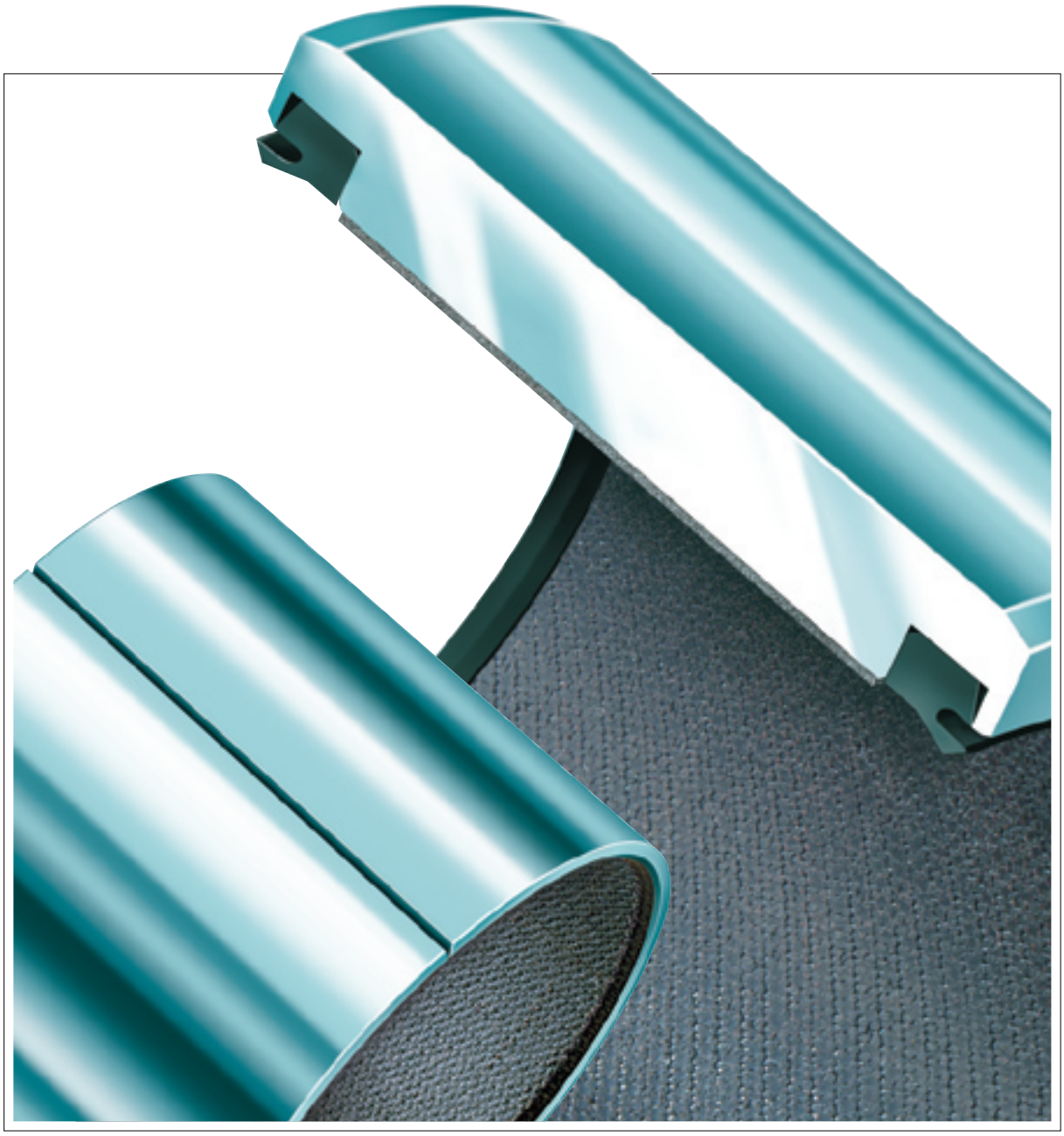

Elgoglide®

Maintenance-Free High Performance Plain Bearings

Technical Product Information TPI 102

This publication has been produced with a great deal of care, and all data have been checked for accuracy. However, no liability can be assumed for any incorrect or incomplete data.

Product pictures are for illustrative purposes only and must not be used for the design of bearing arrangements.

Bearing arrangements must only be designed in accordance with the technical information, dimension tables and dimension drawings.

Due to constant development of the product range, we reserve the right to make modifications.

The sales and delivery conditions in the relevant valid price list and on order confirmations apply for deliveries and other commercial transactions.

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TPI 102

Elgoglide®

Maintenance-Free High Performance Plain Bearings

Elgoglide® plain bearings are maintenance-free. They have a support body made from steel and a PTFE fabric sliding surface. The PTFE fabric is imbedded in artificial resin and securely bonded to the support body. The material will not expand and is chemically resistant to most media. It is especially suitable for oscillating motion, but can also be used for rotational or linear motion.

Elgoglide® plain bearings can support heavy loads and dissipate heat well. The steel body allows easy and secure installation even at high temperatures or in light-metal housings. They have good sliding characteristics and a low coefficient of friction.

The following Elgoglide® high performance plain bearing design types are available:

- Cylindrical bushings – machined or rolled design
- Flanged cylindrical bushings
- Plain bearing thrust washers
- Strip material.

Numerous special designs are also available.

The following brochure provides information on the standard range of Elgoglide® plain bearings. Qualified engineers from both ELGES and INA applications departments would be happy to help you select the best product or calculate and design the right bearing supports.

This publication (TPI 102) supersedes the previous version (TPI 95). Information in previous editions that is not consistent with the information in the present edition is no longer valid.

Helmut ELGES GmbH
Steinhagen

Elgoglide®

Maintenance-Free High Performance Plain Bearings

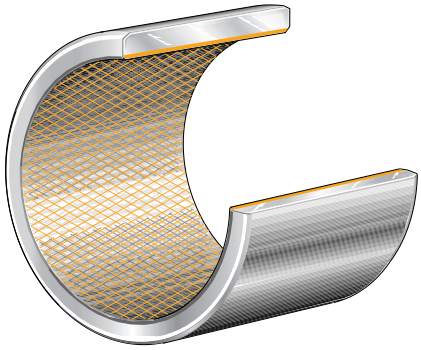
Features

Elgoglide® High Performance Plain Bearings

- Dry plain bearings consisting of a steel or stainless steel support body (depending on the design type) and a maintenance-free sliding layer
  - The support body allows for easy handling and secure installation.
  - The PTFE fabric is imbedded in artificial resin and securely bonded to the support body. The adhesive bonding is resistant to moisture and will not expand.
  - The load limit for Elgoglide® is determined by the strength of the support body and by the sliding layer.
- Are maintenance-free for life (lubricant can reduce the service life)
- Can be used in place of steel, bronze and plastic bearings (can support heavier loads than conventional plain bearings)
- Suitable for bearing supports w/limited design space
- Can support high alternating loads and swiveling motion
- Especially suitable for bearing supports with limited design space
- Are suitable for linear motion
- Have a very low coefficient of friction
- Have good damping characteristics
- Easy to install: bearings are pressed into the housing bore and require no further axial location
- Suitable for a wide variety of applications, including:
  - Plastic injection machines: elbow lever bearing support
  - Cranes: articulating arm and cylinder bearing support
  - Loaders: boom and cylinder bearing support
  - Commercial vehicles: hydraulic platform bearing
  - Textile and printing machines: conveyor chain bearing
  - Passenger cars: transmission line, axle suspension
  - Forklift: lift mast bearing support
  - Rail traffic technology: coupling bearing
  - Dams: supports for radial gates and flap gates
  - Mining equipment: suspension bearing arrangement, travelling mechanism bearing, pivot bushings
  - Environmental engineering: extension arm bearing, track roller bearing.

Cylindrical Bushing

ZGB



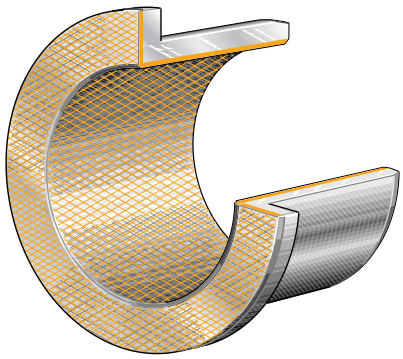
117 098

10

- steel support-body, precision machined
- without seals
- for operating temperatures from –50 °C to +150 °C
- for shaft diameters from 10 mm to 200 mm

Flanged Cylindrical Bushing

BGB

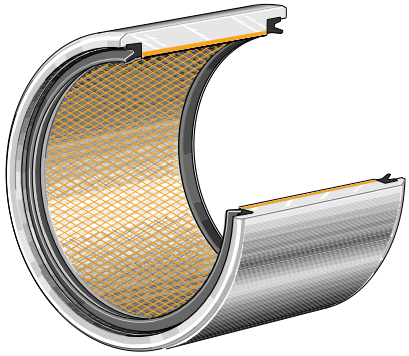


136 319

12

- steel support-body, precision machined
- for operating temperatures from –50 °C to +150 °C
- for shaft diameters from 10 mm to 70 mm

ZGB...2RS

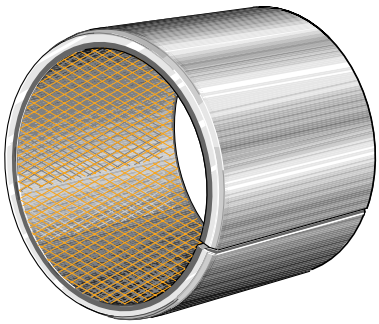


136 328

- steel support-body, precision machined
- sealed on both sides (special design)
- for operating temperatures from –30 °C to +100 °C, limited by the seal material
- for shaft diameters from 10 mm to 200 mm

10

RGB



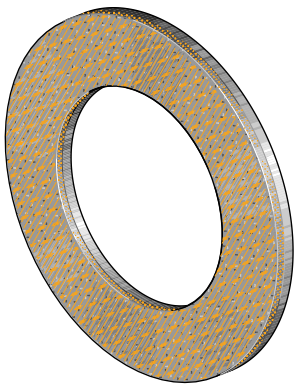
136 318

- support body rolled from stainless steel
- for operating temperatures from –50 °C to +150 °C
- for shaft diameters from 10 mm to 80 mm

11

Plain BearingThrust Washer

AGS



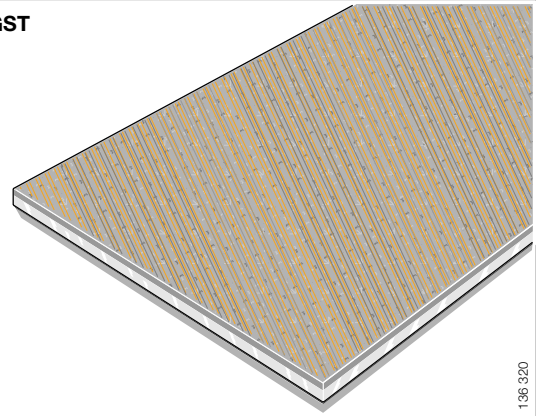
136 317

- stainless steel support-body
- for operating temperatures from –50 °C to +150 °C
- for shaft diameters from 10 mm to 60 mm

13

Strip Material

GST



136 320

- steel support body, rolled
- for operating temperatures from –50 °C to +150 °C
- dimensions on request

Design and Safety Information

⚠ Do not lubricate the sliding layer. Lubricant can increase wear and decrease bearing service life significantly.

Bushings should not be used for self-aligning motion. A misaligned shaft will reduce the product service life.

- ELGES should be consulted if plain bearings are to be designed for under-water applications.
- If plain bearings come into contact with chemical media, special measures for the support body material are often necessary. ELGES should be consulted in such cases.

Design of bearing supports with bushings

- Shaft and housing should be designed to Figure 1 (for bushing tolerances, see Figure 2)
  - Tolerance zone for Elgoglide® RGB: d^{H10}
  - Harden shaft for optimum conditions (service life is reduced for HRC values ≦54). Surface should be hard chrome plated or made from stainless steel.
  - For the shaft a roughness of R_z1 should not be exceeded. A higher roughness will reduce the bushing service life. Avoid roughness values $>R_z4$.
- Use seals if a high-risk contamination hazard is present.
- If seals are combined with bushings, seal design should take the following into account:
  - Internal clearance increases as the sliding surface wears.
  - The bushing is not relubricated. There should be no grease contact with the sliding surface.

ELGES should be consulted if Elgoglide® thrust washers are to be used.

Installation

- Bushings should be mounted using a press-in arbor (see Figure 3).
  - Design chamfer on the mounting arbor with rounded transitions or rounded ends. $d_D = d - (0.3\text{ mm to }0.5\text{ mm})$.

⚠ Sharp transitions on the side of the shaft to be inserted and on the arbor can damage the sliding layer and reduce the service life of the bushing.

- Press in bushing RGB with d ≧55 mm with an auxiliary ring (see Figure 4, page 5).

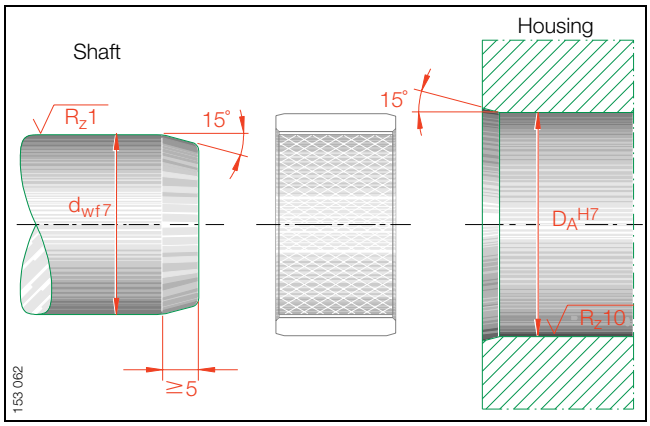


Figure 1 · Mating Component Design – Shaft, Housing

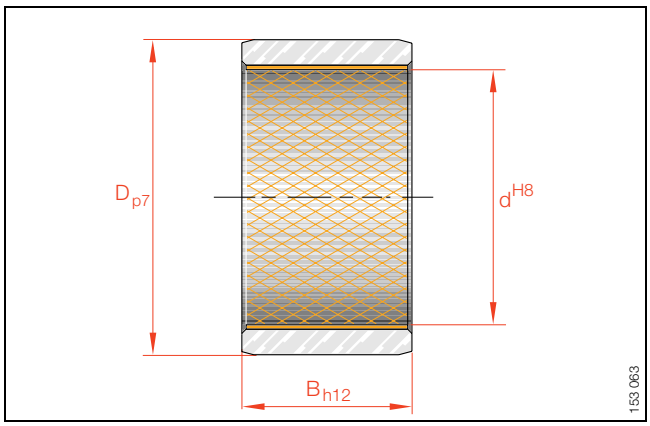


Figure 2 · Bushing Tolerances

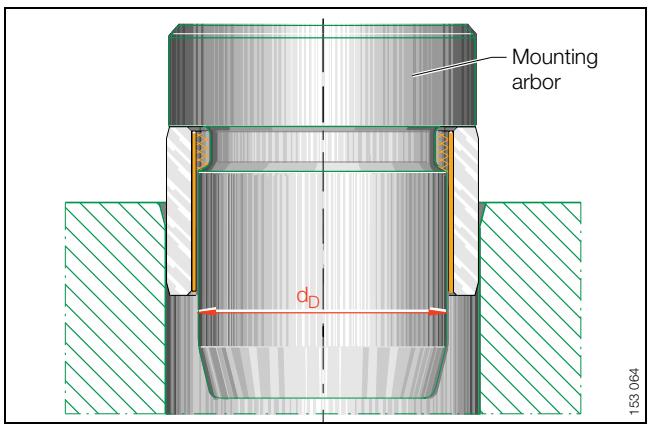


Figure 3 · Installation with a Press-in Arbor

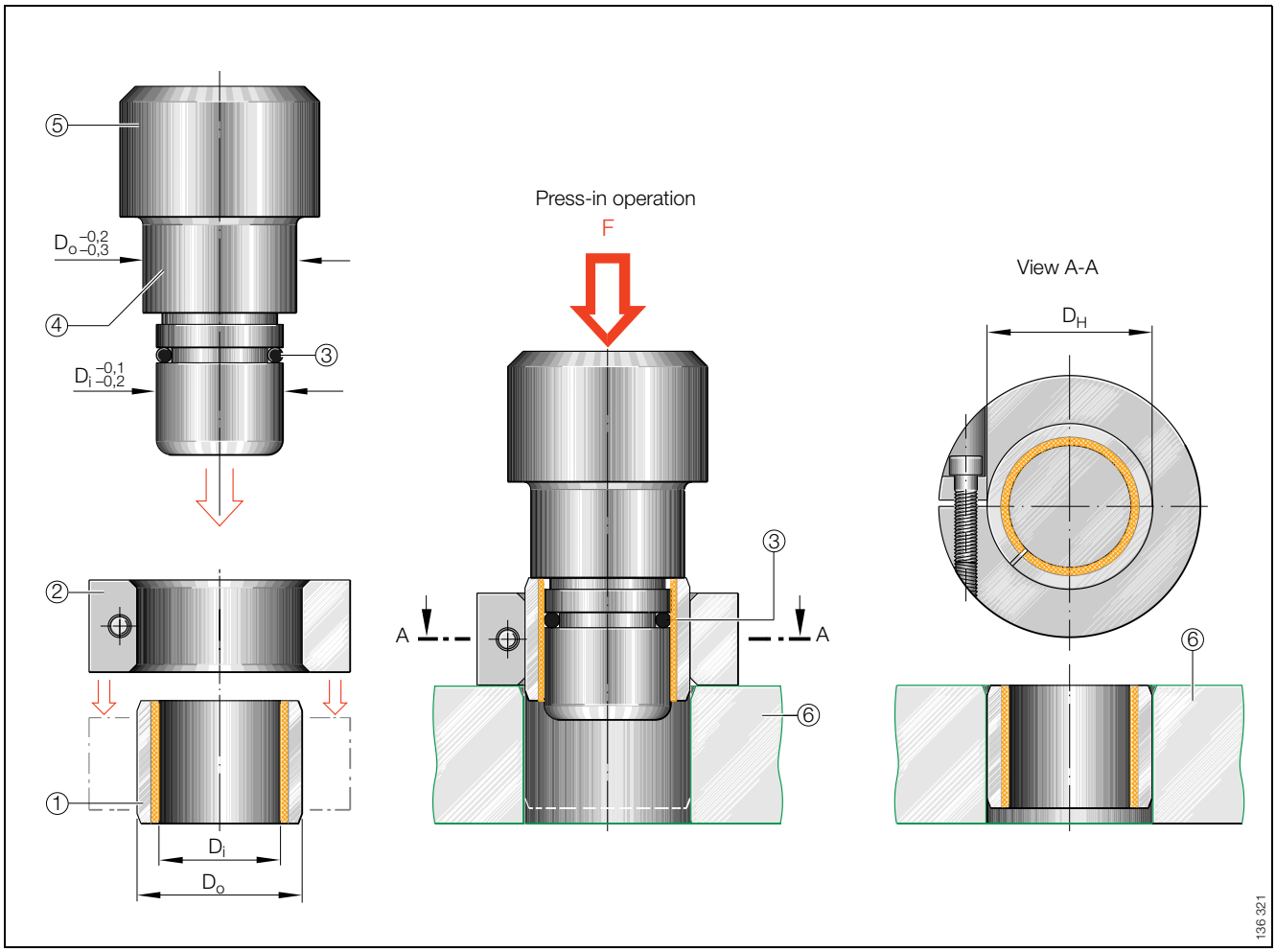


Figure 4 · Pressing in bushings with auxiliary ring for D für D_o ≧55 mm

① bushing
② auxiliary ring
③ O-ring
④ shoulder diameter
⑤ press-in arbor
⑥ housing

Table 1 · Auxiliary ring inside diameter D_H for outside diameter D_o

D_o mm	D_H mm
55 ≤D_o ≦100	D_o $^{+0,28}_{+0,25}$

Application ranges (Figure 5)

Max. contact pressure:

- dynamic
  p = 200 N/mm^2
- static
  p_0 = 300 N/mm^2 (due to support-body material)

Max. sliding velocity:

- v = 100 (220) mm/s

Thermal load limits:

- p = 200 N/mm^2 → v_{max} = 5 mm/s
  v = 100 mm/s → p_{max} = 5 N/mm^2
- Max. specific output:
  $p \cdot v$ = 2 500 (5 000) N/mm^2 · mm/s for p = 50 N/mm^2.
- Coefficient of friction:
  μ = 0.02 to 0.2

Special requirements are necessary for the values given in parentheses. Please consult ELGES in such cases.

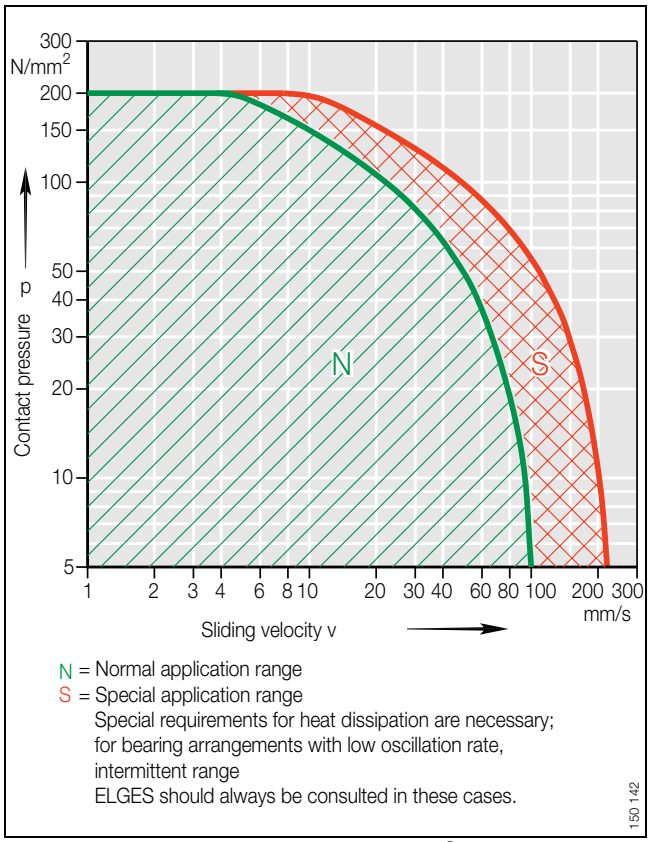


Figure 5 · Application Ranges for Elgoglide® Plain Bearings

Friction behavior of Elgoglide® maintenance-free sliding material.

In figure 6 the friction coefficient is depicted as a function of:

- sliding velocity
- load
- temperature.

In new plain bearings, the frictional torque can be significantly higher during the early break-in phase due to:

- the plastic transfer of the PTFE material onto the mating surface
- the initial saturation of the sliding member with PTFE.

The wear characteristics for Elgoglide® plain bearings are shown in Figure 7.

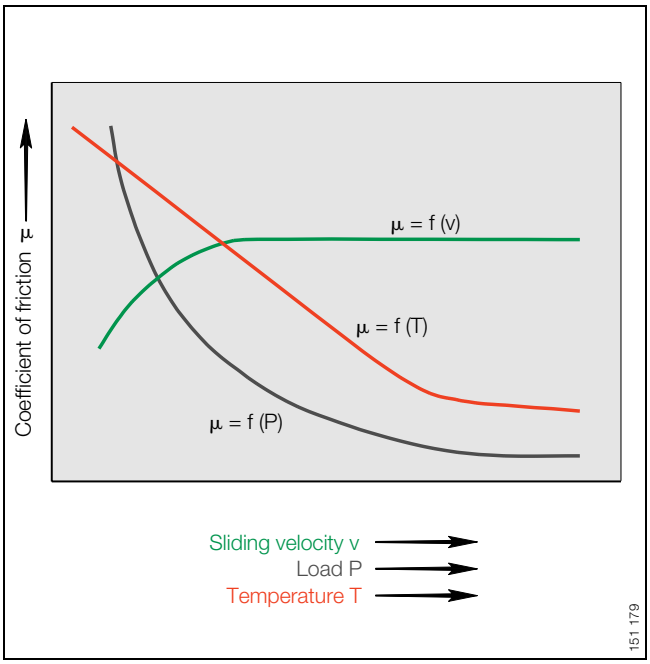


Figure 6 · Friction Coefficient as a Function of Sliding Velocity, Load and Temperature

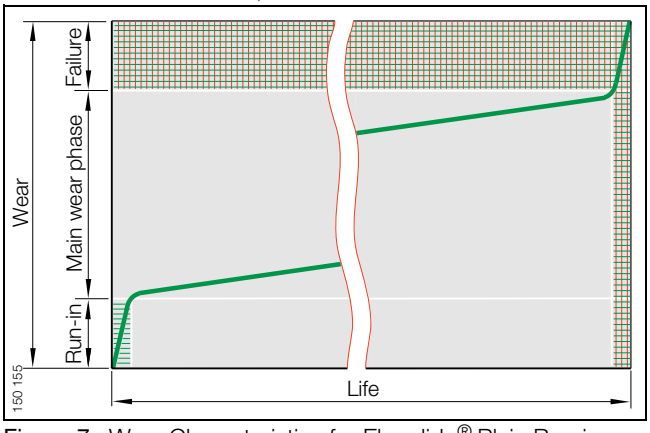


Figure 7 · Wear Characteristics for Elgoglide® Plain Bearings

Spec. **Special Design**

Available on request:

- Cylindrical bushings, series ZGB, sealed on both sides
- Diameters and widths other than those given in the dimension table
- Support body made from different material
- Special support-body surface treatment
- Sliding surface for higher temperatures
- Complete bearing supports that consist of:
  – bushing/pins
  – bushing/inner ring

Sample Order and Order Code

Maintenance-free cylindrical Elgoglide® bushing, machined, for:
shaft 30 mm
width 30 mm
housing ∅ 36 mm.

Order code: ZGB 30×36×30 (Figure 8).

Maintenance-free cylindrical Elgoglide® bushing, machined, with flange, for:
shaft 20 mm
width 20 mm

Order code: BGB 2020 (Figure 9).

Maintenance-free cylindrical Elgoglide® bushing, rolled, for:
shaft 20 mm
width 15 mm

Order code: BGB 2015 (Figure 10).

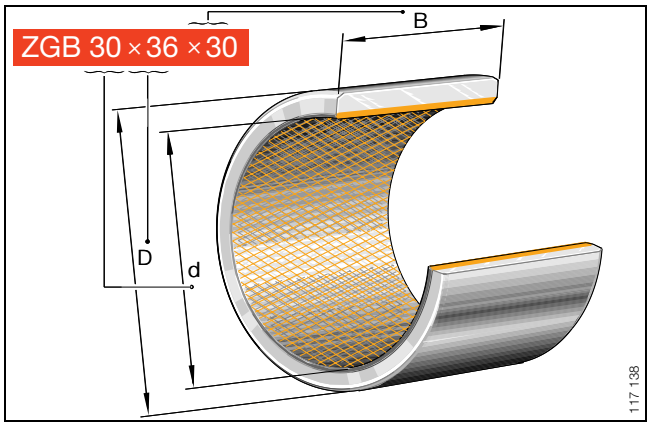


Figure 8 · Sample Order and Order Code

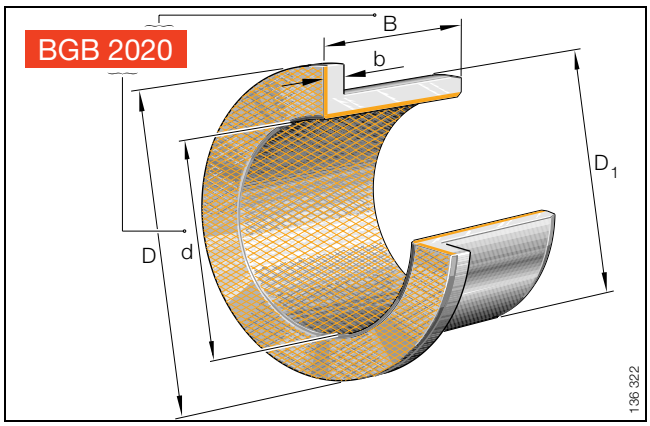


Figure 9 · Sample Order and Order Code

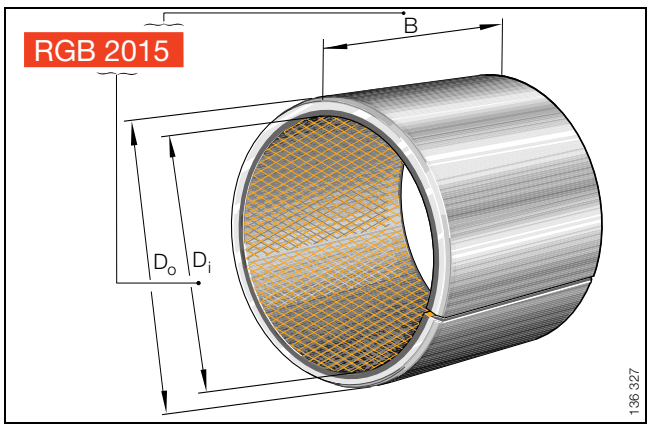


Figure 10 · Sample Order and Order Code

Articulated Loader

Steering and Bucket Control

Application Example

Loaders with pivot steering, also known as articulated loaders, are sturdy off-road transport vehicles that are often used in harsh environments. The steering principle makes them very maneuverable, and they can make precise movements in a very small space.

A bucket is used to convey material. The movable bucket is connected to the guide linkage and the lift hydraulics by means of arms. Guide linkage and steering linkage are coupled to the front axle. The steering linkage transmits the motion of the steering wheel to the front axle. This allows the front wheels to be pivoted or aligned with respect to the rear axle.

Bucket joints and steering joints must operate smoothly, and their unlimited agility must be guaranteed even after the loader has not been used for extended periods. The bearings allow only pivoting motion and are subjected to very high shock loads. The bearing supports must be easy to install and maintenance-free.

ELGES Design Solution

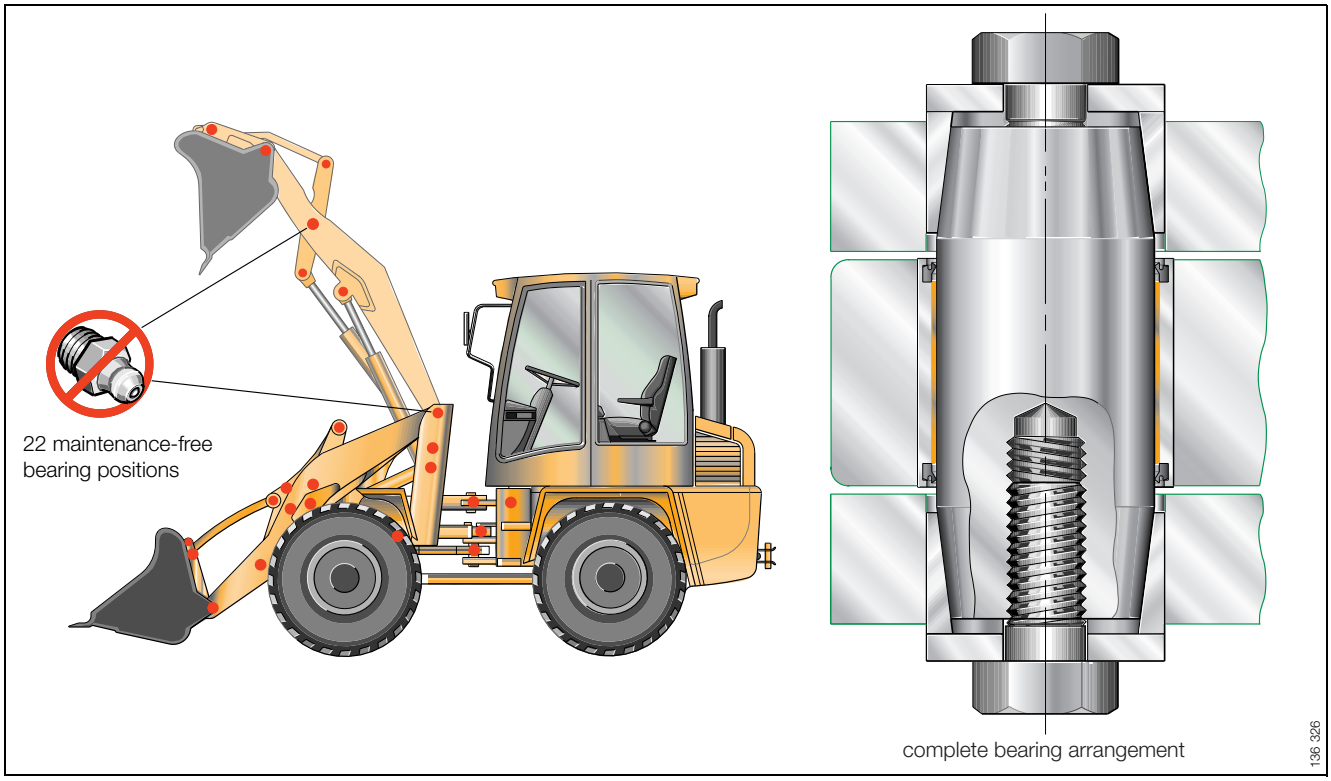
All 22 bearing positions in the steering and bucket control area are furnished with Elgoglide® high performance plain bearings or complete Elgoglide® bearing support systems (see Figure). Their small cross section allows compact bearing supports in the joints.

The plain bearings are pressed into the housing and require no additional axial location.

Because the sliding material prevents fretting corrosion, the bearing positions will not rust, even if the loader is not used for extended periods.

Due to the extremely high compressive strength of the sliding material, the shock loads as well as static and dynamic alternating loads often present during loader operation can be accommodated without any problems.

All of these advantages that Elgoglide® bearings have to offer for the joints in this applications allow an especially economical and service-friendly design solution.

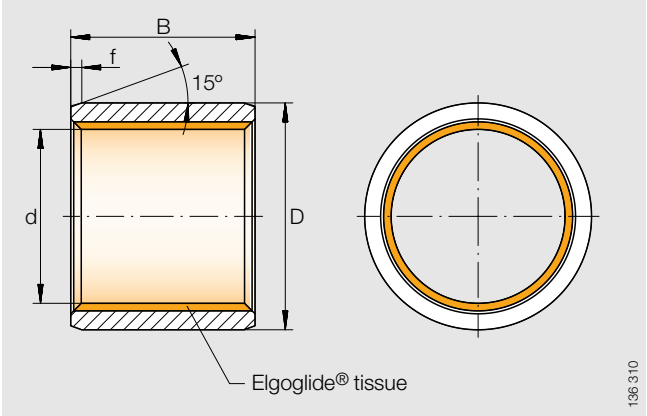


Elgoglide®

Cylindrical Bushings

precision machined, maintenance-free, without seals[1])

Series ZGB



ZGB

Dimension Table · Dimension in mm

Shaft Diameter	Designation	Weight	Dimensions				Load Ratings	
			d	D	B	f[2])	dyn. C	stat. C_0
		g	H8	p7	h12		kN	kN
10	**ZGB 10× 14× 10**	5	10	14	10	1	20	30
12	**ZGB 12× 16× 12**	6	12	16	12	1	29	43
16	**ZGB 16× 20× 16**	14	16	20	16	1	51	77
20	**ZGB 20× 25× 20**	23	20	25	20	1	80	120
25	**ZGB 25× 30× 25**	28	25	30	25	1	125	188
30	**ZGB 30× 36× 30**	61	30	36	30	1.5	180	270
35	**ZGB 35× 41× 30**	75	35	41	30	1.5	245	368
40	**ZGB 40× 48× 40**	150	40	48	40	2	320	480
45	**ZGB 45× 53× 40**	170	45	53	40	2	360	540
50	**ZGB 50× 58× 50**	230	50	58	50	2	500	750
60	**ZGB 60× 70× 60**	430	60	70	60	2	720	1 080
70	**ZGB 70× 80× 70**	570	70	80	70	3	980	1 470
80	**ZGB 80× 90× 80**	750	80	90	80	3	1 270	1 905
90	**ZGB 90×105× 80**	1 350	90	105	80	3	1 430	2 145
100	**ZGB 100×115×100**	1 800	100	115	100	3	2 000	3 000
110	**ZGB 110×125×100**	2 000	110	125	100	4	2 200	3 300
120	**ZGB 120×135×120**	2 600	120	135	120	4	2 850	4 275
140	**ZGB 140×155×150**	3 800	140	155	150	4	4 150	6 225
160	**ZGB 160×180×150**	6 000	160	180	150	4	4 800	7 200
180	**ZGB 180×200×180**	8 000	180	200	180	5	6 400	9 600
200	**ZGB 200×220×180**	8 800	200	220	180	5	7 200	10 800

1) Can also be supplied with seals on both sides (See p. 3, Special design).

2) Tolerances for chamfers f:

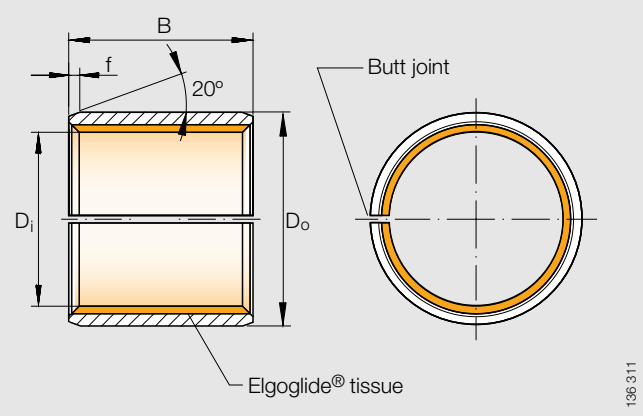
Chamfer f mm	Tolerance mm
1	±0.3
1,5	±0.5
2	±0.7
3	±1
4	±1.3
5	±1.6

Elgoglide®

Cylindrical Bushings

rolled, maintenance-free

Series RGB



RGB

Dimension Table · Dimension in mm

Shaft Diameter	Designation	Weight	Dimensions				Load Ratings	
			D_i	D_o	B	f[1])	dyn. C	stat. C_0
		g			±0.25		kN	kN
10	**RGB 1010**	2	10	12	10	0.6	20	30
	RGB 1015	4	10	12	15	0.6	30	45
	RGB 1020	5	10	12	20	0.6	40	60
12	**RGB 1212**	4	12	14	12	0.6	29	43
	RGB 1215	5	12	14	15	0.6	36	54
	RGB 1220	6	12	14	20	0.6	48	72
16	**RGB 1615**	6	16	18	15	0.6	48	72
	RGB 1620	8	16	18	20	0.6	64	96
	RGB 1625	10	16	18	25	0.6	80	120
20	**RGB 2015**	11	20	23	15	0.6	60	90
	RGB 2020	15	20	23	20	0.6	80	120
	RGB 2025	19	20	23	25	0.6	100	150
25	**RGB 2515**	14	25	28	15	0.6	75	113
	RGB 2520	18	25	28	20	0.6	100	150
	RGB 2525	23	25	28	25	0.6	125	188
30	**RGB 3020**	30	30	34	20	1.2	120	180
	RGB 3030	45	30	34	30	1.2	180	270
	RGB 3040	60	30	34	40	1.2	240	360
40	**RGB 4020**	39	40	44	20	1.2	160	240
	RGB 4030	59	40	44	30	1.2	240	360
	RGB 4040	78	40	44	40	1.2	320	480
50	**RGB 5030**	93	50	55	30	1.8	300	450
	RGB 5040	123	50	55	40	1.8	400	600
	RGB 5060	185	50	55	60	1.8	600	900
60	**RGB 6040**	149	60	65	40	1.8	480	720
	RGB 6060	220	60	65	60	1.8	720	1080
	RGB 6070	265	60	65	70	1.8	840	1260
70	**RGB 7050**	212	70	75	50	1.8	700	1050
	RGB 7070	298	70	75	70	1.8	980	1470
80	**RGB 8060**	288	80	85	60	1.8	960	1440
	RGB 8080	386	80	85	80	1.8	1280	1920

[1]) Tolerances for chamfers f:

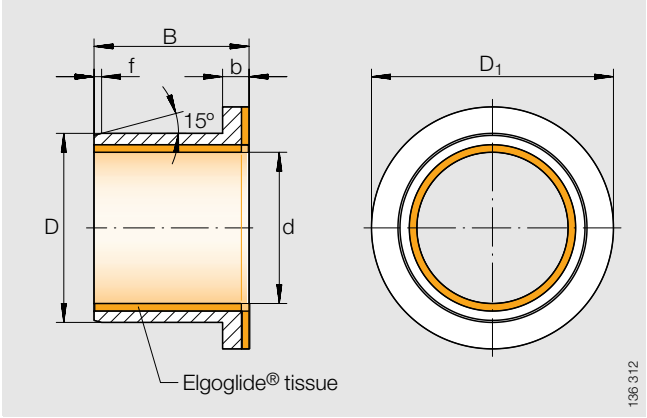
Chamfer f mm	Tolerance mm
0.6	±0.4
1.2	±0.4
1.8	±0.6

Elgoglide®

Flanged Cylindrical Bushings

precision machined, maintenance-free

Series BGB



BGB

Dimension Table · Dimension in mm

Shaft Diameter	Designation	Weight	Dimensions						Load Ratings			
			d	D	B	D_1	b	f[1])	radial		axial	
		g	H8	p7	–0.5	–0.5	–0.5		C kN	C_0 kN	C kN	C_0 kN
10	**BGB 1010**	11	10	14	10	22	3	1	19	28	57	85
12	**BGB 1212**	15	12	16	12	25	3	1	28	41	71	107
16	**BGB 1616**	23	16	20	16	28	3	1	50	75	77	116
20	**BGB 2020**	38	20	25	20	32	3	1	78	117	91	137
25	**BGB 2525**	57	25	30	25	38	3	1	123	184	120	180
30	**BGB 3030**	98	30	36	32	44	3	1.5	189	284	153	229
35	**BGB 3535**	145	35	42	35	50	4	1.5	242	362	189	283
40	**BGB 4040**	214	40	48	40	58	4	2	316	474	264	396
45	**BGB 4545**	246	45	52	45	63	5	2	400	600	291	436
50	**BGB 5050**	311	50	58	50	68	5	2	495	742	317	476
60	**BGB 6060**	588	60	70	60	83	6	2	714	1 071	497	746
70	**BGB 7070**	791	70	80	70	95	6	3	973	1 459	625	938

[1]) Tolerances for chamfers f:

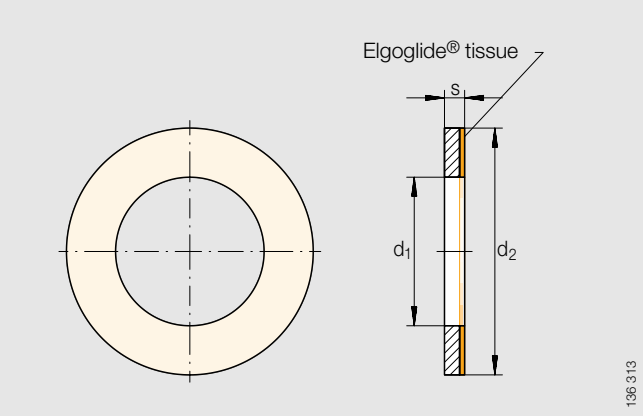
Chamfer f mm	Tolerance mm
1	±0.3
1.5	±0.5
2	±0.7
3	±1

Elgoglide®

Plain Bearing Thrust Washers

maintenance-free

Series AGS



AGS

Dimension Table · Dimension in mm

Shaft Diameter	Designation	Weight	Dimensions			Load Ratings	
			d_1	d_2	s	dyn. C	stat. C_0
		g	+0.25	–0.25	–0.05	kN	kN
10	**AGS 1024**	4	12	24	1.5	68	102
12	**AGS 1226**	5	14	26	1.5	75	113
16	**AGS 1632**	6	18	32	1.5	110	165
20	**AGS 2038**	9	22	38	1.5	151	226
25	**AGS 2548**	13	28	48	1.5	239	358
30	**AGS 3054**	16	32	54	1.5	279	446
35	**AGS 3562**	21	38	62	1.5	377	565
40	**AGS 4066**	24	42	66	1.5	407	610
45	**AGS 4574**	37	48	74	2	498	747
50	**AGS 5078**	39	52	78	2	531	796
60	**AGS 6088**	48	62	88	2	612	918

Symbols Used in this Publication

Symbol	Description
	Bearings are maintenance-free throughout the service life of the unit.
	Bearings can support radial loads.
	Bearings can support axial loads in one direction.
	Bearings are especially compact.
	Bearings are sealed on both sides.
	The permissible operating temperature deviates from standard values.
	The product and/or the mounting structure may be damaged if the information provided here is not observed.
	Page number for the dimension table.

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