

Plain Bearings with ELGOTEX[®]

Maintenance-free – wear-resistant

Plain bearings with ELGOTEX[®]

Features

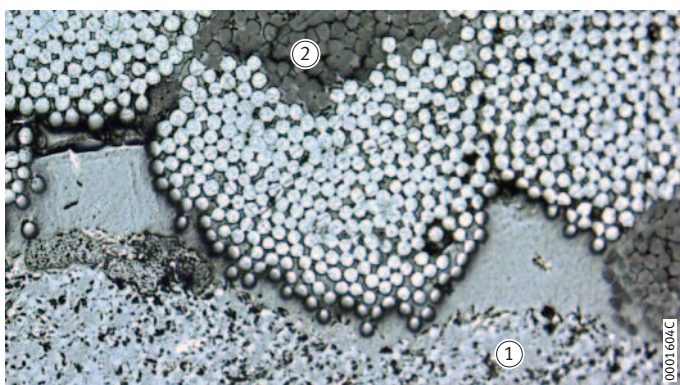
The radial dry plain bearings have a sliding layer made from ELGOTEX[®] and a twin layer structure, *Figure 1*:

- The outer layer (the backing) ensures the strength of the bush. It comprises continuous glass fibres that are additionally stabilised by means of a specific winding angle, giving an increase in strength. The fibres are bound in epoxy resin.
- The inner layer (sliding layer), contains a Polymer/PTFE yarn that is embedded together with fillers and solid lubricants in a resin matrix.

Due to the combination of fibres and resin matrix, the bushes are suited in preference for dry-running applications, see also table, page 2.

- ① Backing
- ② Sliding layer

Figure 1
Microsection
of a plain bush with ELGOTEX[®]



Advantages

Plain bearings with an ELGOTEX[®] sliding layer:

- are maintenance-free for the whole operating life
- can be used to replace steel, bronze and plastic plain bearings
- have high radial load carrying capacity
- are suitable for high, static loads
- are resistant to shocks
- are suitable for high alternating loads and swivel motion
- have good resistance to corrosive media
- are suitable for applications involving vibration due to their good damping characteristics
- can be used for axial motion
- can be fitted easily, since they are simply pressed into housing bores and require no further means of axial location
- can also be combined with separate, additional seals.

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Technical data on the sliding layer

The technical/physical characteristics of the sliding layer ELGOTEX® are shown in the table.

Data

Characteristic		Value
Maximum permissible sliding speed	v	500 mm/s
Maximum permissible dynamic contact pressure	p	150 N/mm ²
Maximum permissible static contact pressure	p	200 N/mm ²
Maximum pv value ¹⁾	p · v	1 050 N/mm ² · mm/s
Coefficient of friction	μ	0,03 to 0,08
Operating life behaviour with ²⁾		
dry running		+++
grease and oil lubrication		+
media lubrication, water lubrication		+

Definition of the symbols:

+++ very good

+ adequate.

1) For higher pv values, please consult Schaeffler Application Engineering.

2) See also section Test rig assessment with dry running and section Lubrication, page 3.

Test rig assessment with dry running

Wound plain bearings with ELGOTEX® are designed for dry running, *Figure 2*. They achieve their maximum operating life under these conditions.

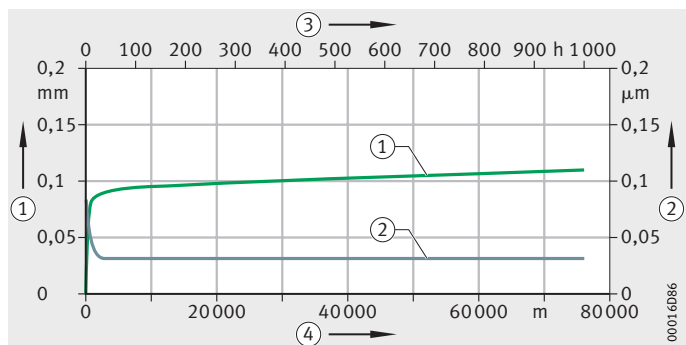
Slight setting of the material occurs during running-in. Subsequently, no further noticeable wear occurs up to 1000 hours. At moderate contact pressures ($p = 50 \text{ N/mm}^2$), the total wear is still very low even after more than 1000 hours.



In underwater use, there is a considerable reduction in operating life. In this case, the coefficient of friction may double.

- ① Wear
- ② Friction
- ③ Operating hours
- ④ Distance covered

Figure 2
Dry running test



Sealing The plain bearings are not sealed. In order to give protection against abrasive contaminants, however, they can be supplied with integrated seals.

Lubrication Due to the material pairing used, the plain bearings are maintenance-free for the whole of the operating life.



Do not lubricate the bearings. Lubricant increases wear and considerably reduces the life of the bushes.

Areas of application

The key areas for the new plain bushes are:

- agricultural and forestry machinery and equipment
- lifting and transfer equipment
- construction machinery
- metalworking machinery
- packaging machinery
- tail lift platforms
- hydraulic cylinder guides
- steel and hydraulic construction
- solar energy applications.

Plain bearings with ELGOTEX[®]

Design and safety guidelines



Do not use plain bearings for movement involving spatial alignment. Skewing of the shaft gives a considerable reduction in the operating life of the bushes.

Design of adjacent components

The shaft seat (mating sliding surface) and housing bore should be designed as specified, *Figure 3*. The bore tolerance must be H7, the shaft tolerance must be h7.

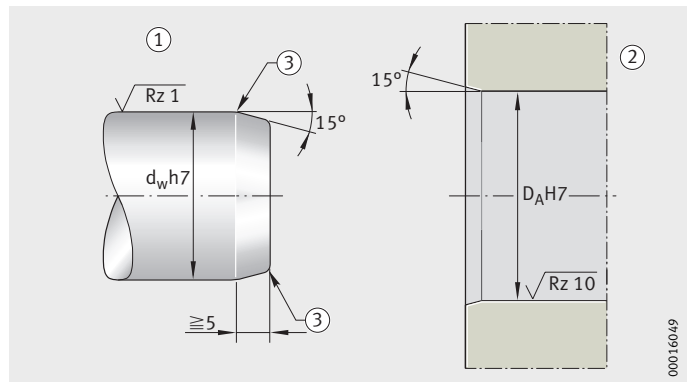
Raceway hardness

If the full volume of the sliding layer is to be used, the raceway on the shaft must be hard, smooth and resistant to corrosion.

A hardness of >350 HB is recommended. The rating life begins to increase at a hardness of >375 HB.

- ① Shaft
- ② Housing bore
- ③ Rounded

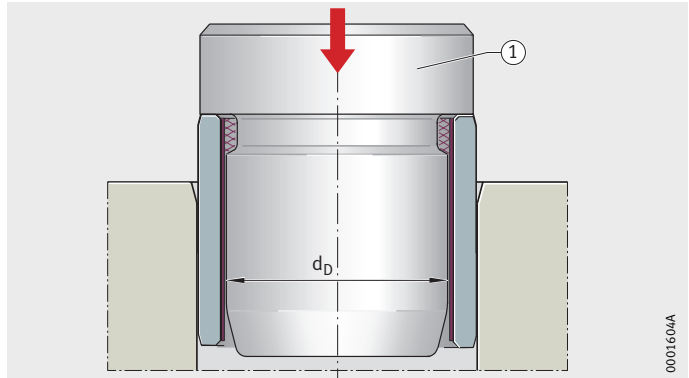
Figure 3
Design of adjacent components



Fitting Plain bushes should be pressed in using a fitting mandrel, *Figure 4*. The chamfer on the mandrel must have rounded transitions or rounding of the end.



Sharp transitions on the entry side of the shaft and mandrel will damage the sliding layer during fitting and reduce the operating life of the plain bearings.



① Fitting mandrel
 $d_D = d - 0,3 \text{ mm to } 0,5 \text{ mm}$

Figure 4
Fitting using a fitting mandrel

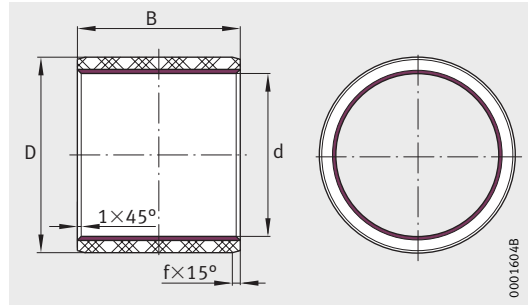
Availability

ELGOTEX[®] plain bearings are manufactured to meet specific orders. The available sizes are shown in the dimension table. Special sizes and special tolerance classes may be available by agreement with Schaeffler.

Plain bearings

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Dimension table · Dimensions in mm

Designation ¹⁾	Mass m ≈g	Dimensions ²⁾				Basic load ratings	
		d C10	D s8	B h13	f	dyn. C _r N	stat. C _{0r} N
ZWB202415	4	20 ^{+0,194} _{+0,11}	24 ^{+0,068} _{+0,035}	15 _{-0,27}	1,5±0,5	40 500	54 000
ZWB202420	5	20 ^{+0,194} _{+0,11}	24 ^{+0,068} _{+0,035}	20 _{-0,33}	1,5±0,5	54 000	72 000
ZWB202430	7	20 ^{+0,194} _{+0,11}	24 ^{+0,068} _{+0,035}	30 _{-0,33}	1,5±0,5	81 000	108 000
ZWB253020	8	25 ^{+0,194} _{+0,11}	30 ^{+0,068} _{+0,035}	20 _{-0,33}	1,5±0,5	67 500	90 000
ZWB253030	12	25 ^{+0,194} _{+0,11}	30 ^{+0,068} _{+0,035}	30 _{-0,33}	1,5±0,5	101 250	135 000
ZWB253040	16	25 ^{+0,194} _{+0,11}	30 ^{+0,068} _{+0,035}	40 _{-0,39}	1,5±0,5	135 000	180 000
ZWB283420	11	28 ^{+0,194} _{+0,11}	34 ^{+0,082} _{+0,043}	20 _{-0,33}	1,5±0,5	75 600	100 800
ZWB283430	16	28 ^{+0,194} _{+0,11}	34 ^{+0,082} _{+0,043}	30 _{-0,33}	1,5±0,5	113 400	151 200
ZWB283440	21	28 ^{+0,194} _{+0,11}	34 ^{+0,082} _{+0,043}	40 _{-0,39}	1,5±0,5	151 200	201 600
ZWB303620	11	30 ^{+0,194} _{+0,11}	36 ^{+0,082} _{+0,043}	20 _{-0,33}	1,5±0,5	81 000	108 000
ZWB303630	17	30 ^{+0,194} _{+0,11}	36 ^{+0,082} _{+0,043}	30 _{-0,33}	1,5±0,5	121 500	162 000
ZWB303640	22	30 ^{+0,194} _{+0,11}	36 ^{+0,082} _{+0,043}	40 _{-0,39}	1,5±0,5	162 000	216 000
ZWB354130	19	35 ^{+0,22} _{+0,12}	41 ^{+0,082} _{+0,043}	30 _{-0,33}	1,5±0,5	141 750	189 000
ZWB354140	26	35 ^{+0,22} _{+0,12}	41 ^{+0,082} _{+0,043}	40 _{-0,39}	1,5±0,5	189 000	252 000
ZWB354150	32	35 ^{+0,22} _{+0,12}	41 ^{+0,082} _{+0,043}	50 _{-0,39}	1,5±0,5	236 250	315 000
ZWB404830	30	40 ^{+0,22} _{+0,12}	48 ^{+0,082} _{+0,043}	30 _{-0,33}	2 ±0,7	162 000	216 000
ZWB404840	40	40 ^{+0,22} _{+0,12}	48 ^{+0,082} _{+0,043}	40 _{-0,39}	2 ±0,7	216 000	288 000
ZWB404860	60	40 ^{+0,22} _{+0,12}	48 ^{+0,082} _{+0,043}	60 _{-0,46}	2 ±0,7	324 000	432 000
ZWB455330	33	45 ^{+0,23} _{+0,13}	53 ^{+0,099} _{+0,053}	30 _{-0,33}	2 ±0,7	182 250	243 000
ZWB455340	44	45 ^{+0,23} _{+0,13}	53 ^{+0,099} _{+0,053}	40 _{-0,39}	2 ±0,7	243 000	324 000
ZWB455360	66	45 ^{+0,23} _{+0,13}	53 ^{+0,099} _{+0,053}	60 _{-0,46}	2 ±0,7	364 500	486 000
ZWB505840	49	50 ^{+0,23} _{+0,13}	58 ^{+0,099} _{+0,053}	40 _{-0,39}	2 ±0,7	270 000	360 000
ZWB505850	61	50 ^{+0,23} _{+0,13}	58 ^{+0,099} _{+0,053}	50 _{-0,39}	2 ±0,7	337 500	450 000
ZWB505860	73	50 ^{+0,23} _{+0,13}	58 ^{+0,099} _{+0,053}	60 _{-0,46}	2 ±0,7	405 000	540 000
ZWB556340	53	55 ^{+0,26} _{+0,14}	63 ^{+0,099} _{+0,053}	40 _{-0,39}	2 ±0,7	297 000	396 000
ZWB556350	67	55 ^{+0,26} _{+0,14}	63 ^{+0,099} _{+0,053}	50 _{-0,39}	2 ±0,7	371 250	495 000
ZWB556370	93	55 ^{+0,26} _{+0,14}	63 ^{+0,099} _{+0,053}	70 _{-0,46}	2 ±0,7	519 750	693 000
ZWB607040	74	60 ^{+0,26} _{+0,14}	70 ^{+0,105} _{+0,059}	40 _{-0,39}	2 ±0,7	324 000	432 000
ZWB607060	110	60 ^{+0,26} _{+0,14}	70 ^{+0,105} _{+0,059}	60 _{-0,46}	2 ±0,7	486 000	648 000
ZWB607080	147	60 ^{+0,26} _{+0,14}	70 ^{+0,105} _{+0,059}	80 _{-0,46}	2 ±0,7	648 000	864 000

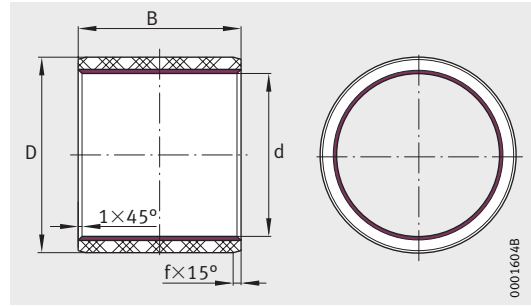
1) Available sizes.

2) Plain bushes with special dimensions (up to an outside diameter of 1200 mm), special tolerances and seals on both sides are available by agreement.

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Dimension table (continued) · Dimensions in mm

Designation ¹⁾	Mass m ≈g	Dimensions ²⁾				Basic load ratings	
		d	D	B	f	dyn. C _r N	stat. C _{0r} N
		C10	s8	h13			
ZWB657550	99	65 ^{+0,26} _{+0,14}	75 ^{+0,105} _{+0,059}	50 _{-0,39}	2±0,7	438 750	585 000
ZWB657560	119	65 ^{+0,26} _{+0,14}	75 ^{+0,105} _{+0,059}	60 _{-0,46}	2±0,7	526 500	702 000
ZWB657580	158	65 ^{+0,26} _{+0,14}	75 ^{+0,105} _{+0,059}	80 _{-0,46}	2±0,7	702 000	936 000
ZWB708050	106	70 ^{+0,27} _{+0,15}	80 ^{+0,105} _{+0,059}	50 _{-0,39}	3±1	472 500	630 000
ZWB708070	148	70 ^{+0,27} _{+0,15}	80 ^{+0,105} _{+0,059}	70 _{-0,46}	3±1	661 500	882 000
ZWB708090	191	70 ^{+0,27} _{+0,15}	80 ^{+0,105} _{+0,059}	90 _{-0,54}	3±1	850 500	1 134 000
ZWB758550	113	75 ^{+0,27} _{+0,15}	85 ^{+0,125} _{+0,071}	50 _{-0,39}	3±1	506 250	675 000
ZWB758570	158	75 ^{+0,27} _{+0,15}	85 ^{+0,125} _{+0,071}	70 _{-0,46}	3±1	708 750	945 000
ZWB758590	204	75 ^{+0,27} _{+0,15}	85 ^{+0,125} _{+0,071}	90 _{-0,54}	3±1	911 250	1 215 000
ZWB809060	144	80 ^{+0,27} _{+0,15}	90 ^{+0,125} _{+0,071}	60 _{-0,46}	3±1	648 000	864 000
ZWB809080	192	80 ^{+0,27} _{+0,15}	90 ^{+0,125} _{+0,071}	80 _{-0,46}	3±1	864 000	1 152 000
ZWB8090100	240	80 ^{+0,27} _{+0,15}	90 ^{+0,125} _{+0,071}	100 _{-0,54}	3±1	1 080 000	1 440 000
ZWB859560	153	85 ^{+0,31} _{+0,17}	95 ^{+0,125} _{+0,071}	60 _{-0,46}	3±1	688 500	918 000
ZWB859580	204	85 ^{+0,31} _{+0,17}	95 ^{+0,125} _{+0,071}	80 _{-0,46}	3±1	918 000	1 224 000
ZWB8595100	254	85 ^{+0,31} _{+0,17}	95 ^{+0,125} _{+0,071}	100 _{-0,54}	3±1	1 147 500	1 530 000
ZWB9010560	248	90 ^{+0,31} _{+0,17}	105 ^{+0,133} _{+0,079}	60 _{-0,46}	3±1	729 000	972 000
ZWB9010580	331	90 ^{+0,31} _{+0,17}	105 ^{+0,133} _{+0,079}	80 _{-0,46}	3±1	972 000	1 296 000
ZWB90105120	496	90 ^{+0,31} _{+0,17}	105 ^{+0,133} _{+0,079}	120 _{-0,54}	3±1	1 458 000	1 944 000
ZWB9511060	261	95 ^{+0,31} _{+0,17}	110 ^{+0,133} _{+0,079}	60 _{-0,46}	3±1	769 500	1 026 000
ZWB95110100	435	95 ^{+0,31} _{+0,17}	110 ^{+0,133} _{+0,079}	100 _{-0,54}	3±1	1 282 500	1 710 000
ZWB95110120	522	95 ^{+0,31} _{+0,17}	110 ^{+0,133} _{+0,079}	120 _{-0,54}	3±1	1 539 000	2 052 000
ZWB10011580	365	100 ^{+0,31} _{+0,17}	115 ^{+0,133} _{+0,079}	80 _{-0,46}	3±1	1 080 000	1 440 000
ZWB100115100	456	100 ^{+0,31} _{+0,17}	115 ^{+0,133} _{+0,079}	100 _{-0,54}	3±1	1 350 000	1 800 000
ZWB100115120	547	100 ^{+0,31} _{+0,17}	115 ^{+0,133} _{+0,079}	120 _{-0,54}	3±1	1 620 000	2 160 000
ZWB10512080	382	105 ^{+0,32} _{+0,18}	120 ^{+0,133} _{+0,079}	80 _{-0,46}	4±1	1 134 000	1 512 000
ZWB105120100	477	105 ^{+0,32} _{+0,18}	120 ^{+0,133} _{+0,079}	100 _{-0,54}	4±1	1 417 500	1 890 000
ZWB105120120	573	105 ^{+0,32} _{+0,18}	120 ^{+0,133} _{+0,079}	120 _{-0,54}	4±1	1 701 000	2 268 000
ZWB11012580	399	110 ^{+0,32} _{+0,18}	125 ^{+0,155} _{+0,092}	80 _{-0,46}	4±1	1 188 000	1 584 000
ZWB110125100	498	110 ^{+0,32} _{+0,18}	125 ^{+0,155} _{+0,092}	100 _{-0,54}	4±1	1 485 000	1 980 000
ZWB110125120	598	110 ^{+0,32} _{+0,18}	125 ^{+0,155} _{+0,092}	120 _{-0,54}	4±1	1 782 000	2 376 000

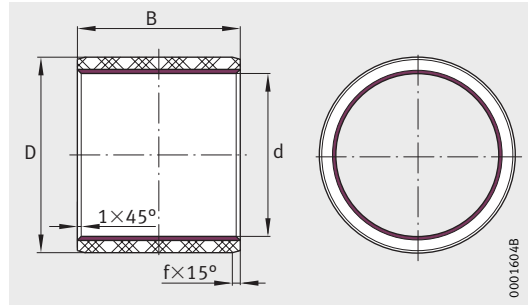
1) Available sizes.

2) Plain bushes with special dimensions (up to an outside diameter of 1 200 mm), special tolerances and seals on both sides are available by agreement.

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Dimension table (continued) - Dimensions in mm

Designation ¹⁾	Mass m ≈g	Dimensions ²⁾				Basic load ratings	
		d	D	B	f	dyn. C _r N	stat. C _{0r} N
		C10	s8	h13			
ZWB120135100	541	120 ^{+0,32} _{+0,18}	135 ^{+0,155} _{+0,092}	100 _{-0,54}	4±1	1 620 000	2 160 000
ZWB120135120	649	120 ^{+0,32} _{+0,18}	135 ^{+0,155} _{+0,092}	120 _{-0,54}	4±1	1 944 000	2 592 000
ZWB120135150	811	120 ^{+0,32} _{+0,18}	135 ^{+0,155} _{+0,092}	150 _{-0,63}	4±1	2 430 000	3 240 000
ZWB130145100	583	130 ^{+0,36} _{+0,2}	145 ^{+0,163} _{+0,1}	100 _{-0,54}	4±1	1 755 000	2 340 000
ZWB130145120	700	130 ^{+0,36} _{+0,2}	145 ^{+0,163} _{+0,1}	120 _{-0,54}	4±1	2 106 000	2 808 000
ZWB130145150	875	130 ^{+0,36} _{+0,2}	145 ^{+0,163} _{+0,1}	150 _{-0,63}	4±1	2 632 500	3 510 000
ZWB140155100	626	140 ^{+0,36} _{+0,2}	155 ^{+0,163} _{+0,1}	100 _{-0,54}	4±1	1 890 000	2 520 000
ZWB140155150	938	140 ^{+0,36} _{+0,2}	155 ^{+0,163} _{+0,1}	150 _{-0,63}	4±1	2 835 000	3 780 000
ZWB140155180	1 126	140 ^{+0,36} _{+0,2}	155 ^{+0,163} _{+0,1}	180 _{-0,63}	4±1	3 402 000	4 536 000
ZWB150165120	802	150 ^{+0,37} _{+0,21}	165 ^{+0,171} _{+0,108}	120 _{-0,54}	4±1	2 430 000	3 240 000
ZWB150165150	1 002	150 ^{+0,37} _{+0,21}	165 ^{+0,171} _{+0,108}	150 _{-0,63}	4±1	3 037 500	4 050 000
ZWB150165180	1 202	150 ^{+0,37} _{+0,21}	165 ^{+0,171} _{+0,108}	180 _{-0,63}	4±1	3 645 000	4 860 000
ZWB160180120	1 154	160 ^{+0,37} _{+0,21}	180 ^{+0,171} _{+0,108}	120 _{-0,54}	4±1	2 592 000	3 456 000
ZWB160180150	1 442	160 ^{+0,37} _{+0,21}	180 ^{+0,171} _{+0,108}	150 _{-0,63}	4±1	3 240 000	4 320 000
ZWB160180180	1 730	160 ^{+0,37} _{+0,21}	180 ^{+0,171} _{+0,108}	180 _{-0,63}	4±1	3 888 000	5 184 000
ZWB170190120	1 221	170 ^{+0,39} _{+0,23}	190 ^{+0,194} _{+0,122}	120 _{-0,54}	5±1	2 754 000	3 672 000
ZWB170190180	1 832	170 ^{+0,39} _{+0,23}	190 ^{+0,194} _{+0,122}	180 _{-0,63}	5±1	4 131 000	5 508 000
ZWB170190200	2 036	170 ^{+0,39} _{+0,23}	190 ^{+0,194} _{+0,122}	200 _{-0,72}	5±1	4 590 000	6 120 000
ZWB180200150	1 612	180 ^{+0,39} _{+0,23}	200 ^{+0,194} _{+0,122}	150 _{-0,63}	5±1	3 645 000	4 860 000
ZWB180200180	1 934	180 ^{+0,39} _{+0,23}	200 ^{+0,194} _{+0,122}	180 _{-0,63}	5±1	4 374 000	5 832 000
ZWB180200250	2 686	180 ^{+0,39} _{+0,23}	200 ^{+0,194} _{+0,122}	250 _{-0,72}	5±1	6 075 000	8 100 000
ZWB190210150	1 696	190 ^{+0,425} _{+0,24}	210 ^{+0,202} _{+0,13}	150 _{-0,63}	5±1	3 847 500	5 130 000
ZWB190210180	2 036	190 ^{+0,425} _{+0,24}	210 ^{+0,202} _{+0,13}	180 _{-0,63}	5±1	4 617 000	6 156 000
ZWB190210250	2 827	190 ^{+0,425} _{+0,24}	210 ^{+0,202} _{+0,13}	250 _{-0,72}	5±1	6 412 500	8 550 000
ZWB200220180	2 137	200 ^{+0,425} _{+0,24}	220 ^{+0,202} _{+0,13}	180 _{-0,63}	5±1	4 860 000	6 480 000
ZWB200220200	2 375	200 ^{+0,425} _{+0,24}	220 ^{+0,202} _{+0,13}	200 _{-0,72}	5±1	5 400 000	7 200 000
ZWB200220250	2 969	200 ^{+0,425} _{+0,24}	220 ^{+0,202} _{+0,13}	250 _{-0,72}	5±1	6 750 000	9 000 000

1) Available sizes.

2) Plain bushes with special dimensions (up to an outside diameter of 1 200 mm), special tolerances and seals on both sides are available by agreement.

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