Metal/Polymer Composite Plain Bearings

Maintenance-free
Low-maintenance
Special designs, special materials

SCHAEFFLER GROUP
INDUSTRIAL

Foreword

Metal/polymer composite plain bearings are bearings for very small radial or axial design envelopes. They run with little noise and are particularly suitable where high loads in conjunction with relatively slow rotary and swivel motion must be supported.

These products are available as bushes, flanged bushes and thrust washers in two material groups.

High performance and environmentally safe

The special characteristics of the metal/polymer composite plain bearings are due to the combination of plastic and metal. This material combination allows low-wear sliding characteristics together with high load carrying capacity and thermal conductivity. The static load carrying capacity reaches values of up to 250 N/mm^2.

All metal/polymer composite plain bearings are free from lead in accordance with the End of Life Vehicles Directive, Directive 2000/53/EC as well as the EC Directive 2002/95/EC (RoHS) for the restriction of hazardous substances and are thus environmentally safe.

Maintenance-free

The maintenance-free plain bearing material E40 is, due to the dry lubricant PTFE, intended for dry running. These bearings are thus particularly suitable where the bearing position must be maintenance-free, there is a risk of lubricant starvation or where lubricant is unacceptable or undesirable. The material E40 can be used not only for rotary and oscillating motion but also for short stroke linear motion.

Typical areas of application can be found, for example, in fluid technology, in sports gear, in medical or electrical equipment as well as in automotive engineering.

Low-maintenance

The low-maintenance plain bearing material E50 is a low-wear material with good damping characteristics and long relubrication intervals. The bearings have a sliding layer made from polyoxymethylene POM. E50 can be used for rotary and oscillating motion and is recommended for long stroke linear motion. It is only slightly sensitive to edge loads and is insensitive to shocks.

Application examples can be found in particular in the area of production machinery, construction and agricultural equipment as well as commercial vehicles.

Current level of technology

Technical Product Information TPI 211 describes the core range of metal/polymer composite plain bearings. The data represent the current level of technology and manufacture as of May 2011. They reflect not only progress in plain bearing technology but also the experience gathered in practical applications.
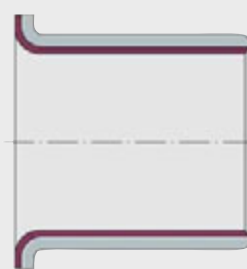
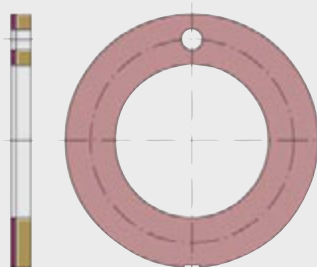Any information in previous publications that does not concur with the data in this TPI is therefore invalid.

EGS..-E40
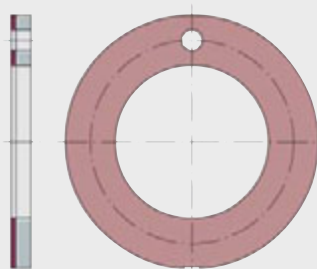
EGW..-E40

EGF..-E40

EGS..-E40-B

EGW..-E40-B
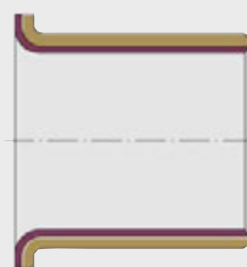
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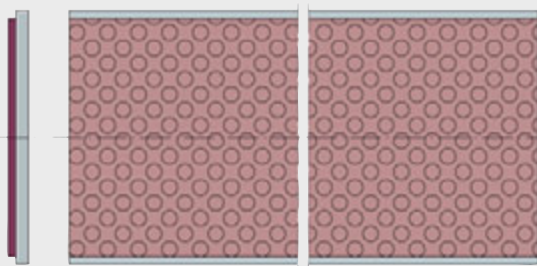
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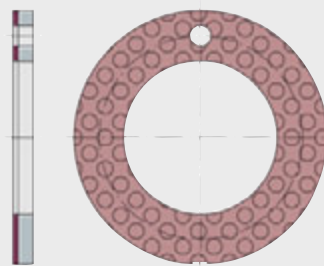
EGW..-E50

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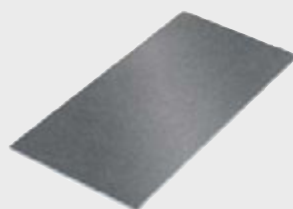
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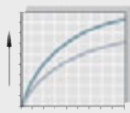
Technical principles

EGB..-E40,
EGBZ..-E40

EGB..-E40-B

**Metal/polymer composite
plain bearings, maintenance-free**
Bushes
Flanged bushes
Thrust washers
Strips, available by agreement
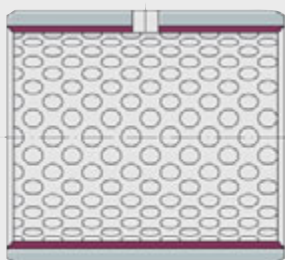
**Metal/polymer composite
plain bearings, low-maintenance**
Bushes
Thrust washers
Strips, available by agreement

EGB..-E50

**Special designs
Special materials**
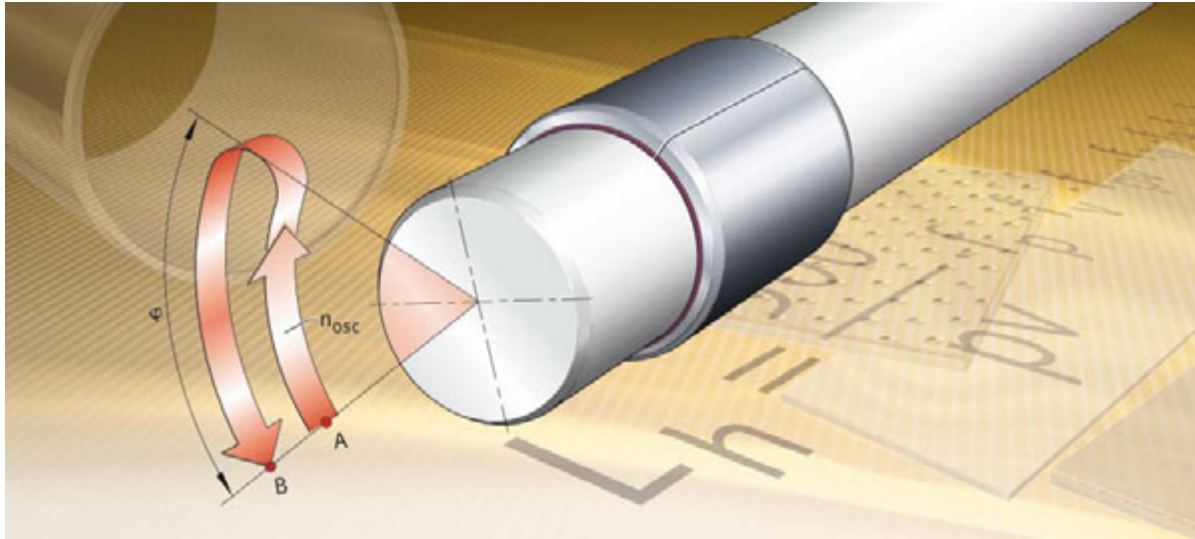
Technical principles

Plain bearing materials
Rating life
Design of bearing arrangements
Bearing clearance and mounting tolerances
Fitting and dismantling

Technical principles

Plain bearing materials

There are different materials for metal/polymer composite plain bearings, the maintenance-free E40 and E40-B or the low-maintenance E50.

The maintenance-free and low-maintenance materials conform to the regulations for lead-free plain bearings. They thus comply with Directive 2000/53/EC (End of Life Vehicles Directive) as well as the Directive 2002/95/EC (RoHS) for the restriction of hazardous substances.

Maintenance-free plain bearing material

For maintenance-free metal/polymer composite plain bearings from Schaeffler Group Industrial, the sliding material E40 and E40-B are used. The basis of the dry lubricant is polytetrafluoroethylene PTFE with embedded chemically non-reactive additives.

Material E40, structure

In the three-layered material, the steel backing has a sintered porous tin/bronze sliding layer whose pores are filled with the dry lubricant of the running-in layer, *Figure 1*.

① Running-in layer
② Sliding layer
③ Steel backing
④ Tin layer as surface protection

Figure 1
Maintenance-free
plain bearing material E40
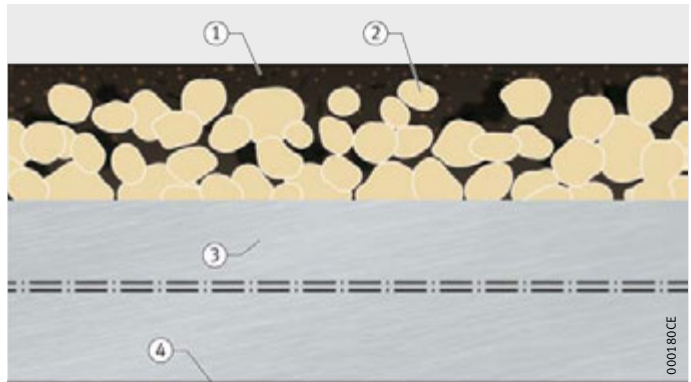
Material E40-B, structure

In the three-layered material, the bronze backing has a sintered porous tin/bronze sliding layer whose pores are filled with the dry lubricant of the running-in layer, *Figure 2*.

① Running-in layer
② Sliding layer
③ Bronze backing

Figure 2
Maintenance-free
plain bearing material E40-B
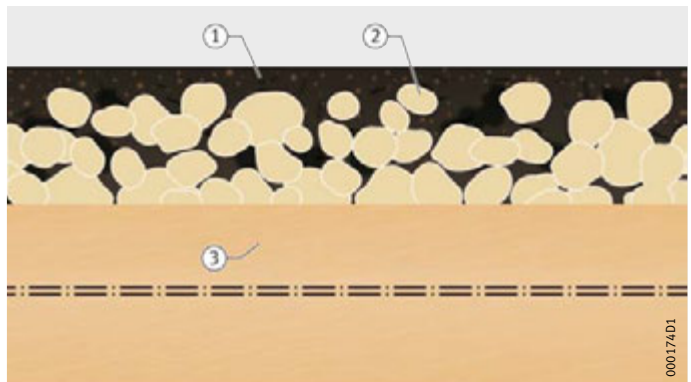
Low-maintenance plain bearing material

For low-maintenance metal/polymer composite plain bearings from Schaeffler Group Industrial, the sliding material E50 is used. The basis of the sliding layer is polyoxymethylene POM.

Material E50, structure

In the three-layered material, the steel backing has a sintered porous tin/bronze intermediate layer whose pores are filled with the sliding layer, *Figure 3*.

① Sliding layer
② Intermediate layer
③ Steel backing
④ Tin layer as surface protection
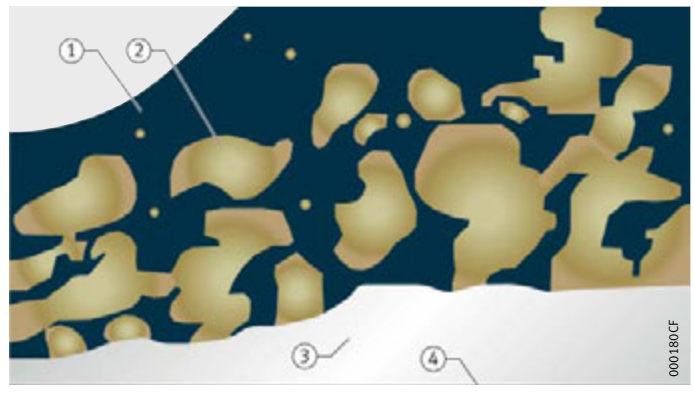
Figure 3
Low-maintenance plain bearing material E50

Technical data on layers

The structure of the plain bearing materials is fundamentally identical. A porous bronze sintered lattice, applied to a steel or bronze carrier strip, is impregnated with a special plastic mixture, see tables.

Sliding and running-in layer E40, E40-B

Chemical element	Proportion of mass w %		Layer thickness mm	
	Sliding layer	Running-in layer	Sliding layer	Running-in layer
Molybdenum disulphide MoS_2	–	max. 8	$0,2 - 0,4$	$0,01 - 0,05$
Polytetrafluoroethylene PTFE	–	$80 - 86$		
Fillers	max. 5,5	max. 19		
Tin Sn	$7 - 12$	–		
Copper Cu	Balance	–		

Sliding and intermediate layer E50

Chemical element	Proportion of mass w %		Layer thickness mm	
	Inter-mediate layer	Sliding layer	Inter-mediate layer	Sliding layer
Polyoxymethylene POM	–	$99,6 - 99,8$	$0,15 - 0,5$	$0,2 - 0,5$
Fillers	max. 0,95	max. 0,4		
Tin Sn	$10 - 12$	–		
Copper Cu	Balance	–		

Rating life

Influences on the rating life

Calculation of the basic rating life applies to plain bearings that perform rotary, swivel or linear motion.

The significant factors for a long rating life are the product of the specific bearing load and the sliding speed (pv value) as well as the design of the mating surface. Particular attention must be paid to the material used, the roughness depth and the surface structure of the mating surface.

The ambient temperature, heat dissipation via the shaft, bearing and housing as well as the operating duration have a fundamental influence on the operating temperature and thus on the rating life.

In calculation, it is not possible to quantify the following precisely in mathematical terms:

- corrosion (in dry running of the sliding layer E40)
- ageing of the lubricant (with grease lubrication of the sliding layer E50)
- contamination.

! Where the sliding layer E50 is used in linear motion, advice should be sought from the engineering service of the Schaeffler Group.

Operating life

The operating life is the life actually achieved by a plain bearing. It may deviate from the calculated basic rating life.

Basic rating life

Due to the wide range of influences, the calculated basic rating life is a guide value. Under very low bearing loads or very low sliding speeds, this can therefore lead to unrealistic values.

! Calculation of the rating life is only advisable within the permissible loads for plain bearing materials, see table. Calculation for the material E50 is valid for dry or mixed friction. Where hydrodynamic conditions are present, advice should be sought from the engineering service of the Schaeffler Group.

Permissible loads

Sliding layer	pv value $N/mm^2 \cdot m/s$	Specific dynamic load p N/mm^2	Sliding speed v m/s
E40, E40-B	$0{,}01 \leqq pv \leqq 1{,}8^{1)}$	140	2,5
E50	$0{,}1 \leqq pv \leqq 3$	140	2,5

[1] For short periods, the pv value for E40 can increase to 3,6 $N/mm^2 \cdot m/s$.

Operating conditions Certain operating conditions may lead to a reduction or increase in the rating life, see table. If the plain bearings are to be used under such conditions, please contact the engineering service of the Schaeffler Group.

Guide values

Operating precondition	Rating life of E40 L_h %
Dry running, intermittent	200
Alternating between dry running and running in water	20
Running in water	200
Continuous operation in fluid lubricants	300
Continuous operation in greases	50 – 150

Calculation of the basic rating life The basic rating life is calculated using the following formulae.

! Before calculating the rating life, the permissible loads must always be checked, see table.

φ = swivel angle
A = start point
B = end point
n_{osc} = swivel frequency (number of movements from A to B per minute)
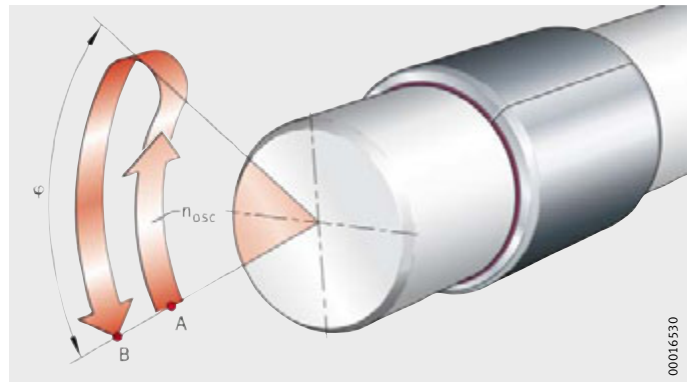
Figure 1
Swivel angle and swivel frequency

Maintenance-free sliding layer E40 Rotary and swivel motion:

$$L_h = \frac{500}{pv} \cdot f_p \cdot f_v \cdot f_{pv} \cdot f_\vartheta \cdot f_R \cdot f_W \cdot f_A$$

Linear motion:

$$L_h = \frac{500}{pv} \cdot f_p \cdot f_v \cdot f_{pv} \cdot f_\vartheta \cdot f_R \cdot f_W \cdot f_A \cdot f_L$$

Low-maintenance sliding layer E50 Rotary and swivel motion:

$$L_h = \frac{2500}{pv} \cdot f_p \cdot f_v \cdot f_{pv} \cdot f_\vartheta \cdot f_R \cdot f_A$$

Rating life

Specific bearing load

Bush:

$$p = \frac{F}{D_i \cdot B}$$

Flanged bush, radial force:

$$p = \frac{F}{D_i \cdot \left(B - R - s_{fl}\right)}$$

Flanged bush, axial force:

$$p = \frac{4 \cdot F}{\left(D_{fl}{}^2 - \left(D_o + 2 \cdot R\right)^2\right) \cdot \pi}$$

Thrust washer:

$$p = \frac{4 \cdot F}{\left(D_o^2 - D_i^2\right) \cdot \pi}$$

Sliding speed

Bush, rotary motion:

$$v = \frac{D_i \cdot \pi \cdot n}{60 \cdot 10^3}$$

Bush, swivel motion, *Figure 1*, page 9:

$$v = \frac{D_i \cdot \pi}{60 \cdot 10^3} \cdot \frac{2\varphi \cdot n_{osc}}{360°}$$

Thrust washer, rotary motion:

$$v = \frac{D_o \cdot \pi \cdot n}{60 \cdot 10^3}$$

Thrust washer, swivel motion:

$$v = \frac{D_o \cdot \pi}{60 \cdot 10^3} \cdot \frac{2\varphi \cdot n_{osc}}{360°}$$

Symbols, units and definitions

L_h h
Basic rating life in operating hours

f_p –
Correction factor for load, *Figure 2*, page 12

f_v –
Correction factor for sliding speed, *Figure 3*, page 12

f_{pv} –
Correction factor for frictional energy, *Figure 4*, page 13

f_ϑ –
Correction factor for temperature, *Figure 5*, page 13

f_R –
Correction factor for roughness depth, *Figure 6*, page 13

f_W –
Correction factor for material, see table, page 14

f_A mm
Correction factor for load case, see page 14

f_L –
Correction factor for linear motion, see page 15

p N/mm^2
Specific bearing load

v m/s
Sliding speed

F N
Bearing load

D_i mm
Inside diameter of bush or thrust washer

B mm
Bearing width

R mm
Radius of flange

D_{fl} mm
Outside diameter of flange

D_o mm
Inside diameter of bush or thrust washer

n min^{-1}
Operating speed

φ °
Swivel angle, *Figure 1*, page 9

n_{osc} min^{-1}
Swivel frequency, *Figure 1*, page 9

H mm
Stroke length, see page 15.

Rating life

Correction factors

Calculation of the basic rating life requires numerous correction factors. These take account of influences due to the type of load, the specific bearing load, the material used, the sliding speed, the temperature and the roughness depth of the mating surface. Linear motion is taken into consideration by means of a corresponding correction factor.

Correction factors for sliding layer E40 and E50

The values for the correction factors for load f_p, sliding speed f_v, frictional energy f_{pv}, temperature f_ϑ and roughness depth f_R can be derived from the diagrams, *Figure 2* to *Figure 6*, page 13.

E40 = maintenance-free sliding layer
E50 = low-maintenance sliding layer
p = specific bearing load
f_p = correction factor

Figure 2
Correction factor
for load
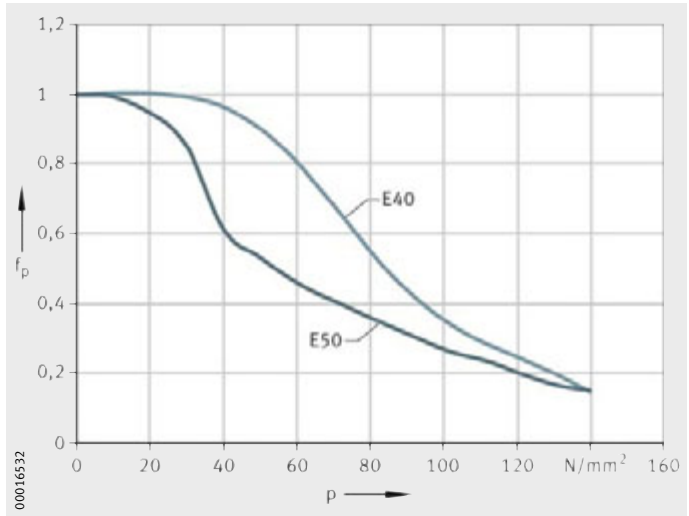
E40 = maintenance-free sliding layer
E50 = low-maintenance sliding layer
v = sliding speed
f_v = correction factor

Figure 3
Correction factor
for sliding speed
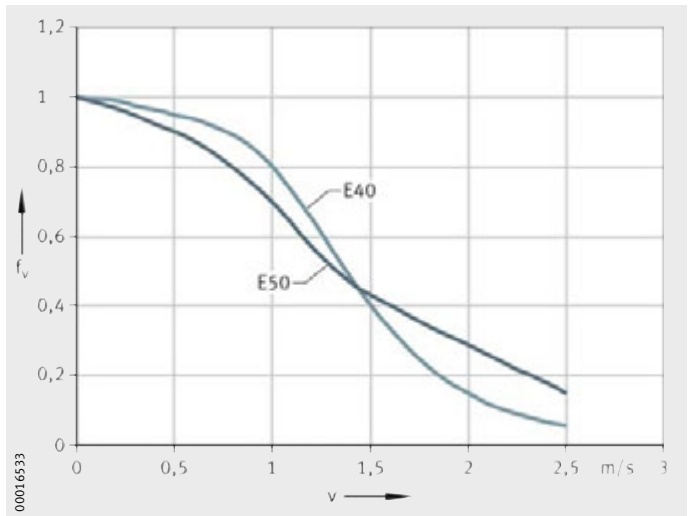
E40 = maintenance-free sliding layer
E50 = low-maintenance sliding layer
pv = product of bearing load and speed
f_{pv} = correction factor

Figure 4
Correction factor
for frictional energy
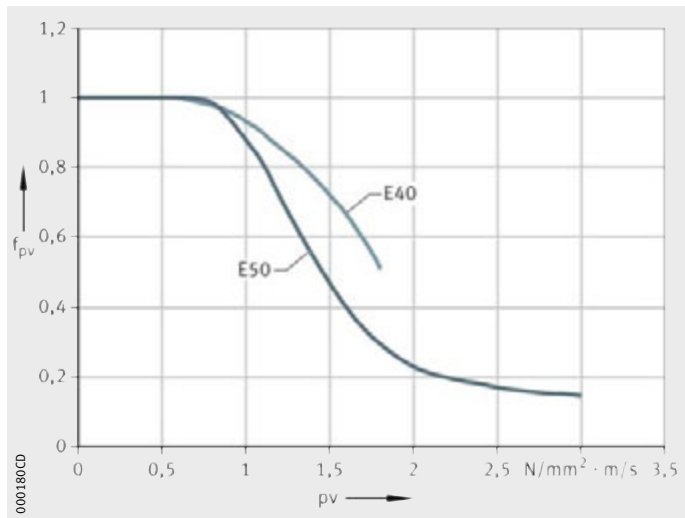
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E40 = maintenance-free sliding layer
E50 = low-maintenance sliding layer
ϑ = temperature
f_{ϑ} = correction factor

Figure 5
Correction factor
for temperature

0001656A
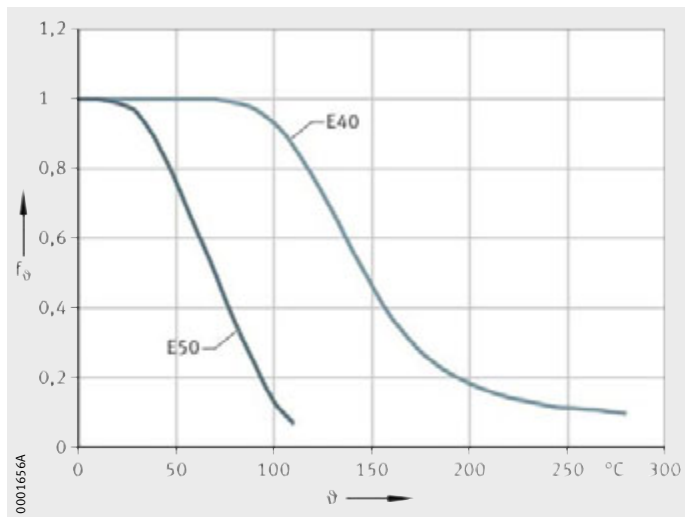
E40 = maintenance-free sliding layer
E50 = low-maintenance sliding layer
Rz, Ra = roughness depth
f_R = correction factor

Figure 6
Correction factor
for roughness depth

0001656B

Rating life

The correction factor f_A is dependent on the type of load, *Figure 7*:
- point load $f_A = 1$ (rotating shaft, stationary bush)
- circumferential load $f_A = 2$ (stationary shaft, rotating bush)
- thrust washer $f_A = 1$
- linear motion $f_A = 1$.
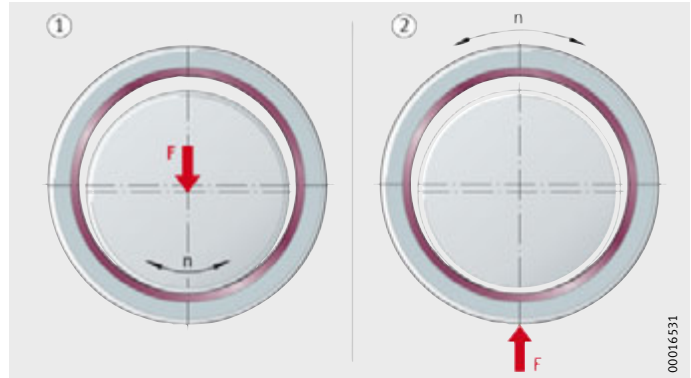
F = load
n = speed

① Point load $f_A = 1$
② Circumferential load $f_A = 2$

Figure 7
Correction factor
for load case

**Correction factors
for sliding layer E40**

The correction factor f_W is dependent on the material of the mating surface, with a roughness depth Rz2 to Rz3, see table.

Correction factor f_W

Material of the mating surface	Coating thickness mm	Correction factor f_W
Steel[1]		
Unalloyed	–	1
Nitrided	–	1
Corrosion-resistant	–	2
Hard chromium plated	$\geqq 0,013$	2
Zinc plated	$\geqq 0,013$	0,2
Phosphated	$\geqq 0,013$	0,2
Flake graphite cast iron Rz2	–	1
Anodised aluminium	–	0,4
Hard anodised aluminium 450 + 50 HV	0,025	2
Copper-based alloys	–	0,4
Nickel	–	0,2

[1] For increased loads, the hardness of the steel should be at least 25 HRC to 50 HRC.

Correction factor for linear motion

⚠️

The correction factor f_L is necessary for linear motion with the sliding layer E40, see page 15.

Where linear motion is present with the sliding layer E40, a maximum stroke length $H_{max} = 2,5 \cdot B$ should not be exceeded, *Figure 8*.

H_{max} = maximum stroke length
B = width of bush

Figure 8
Correction factor for linear motion
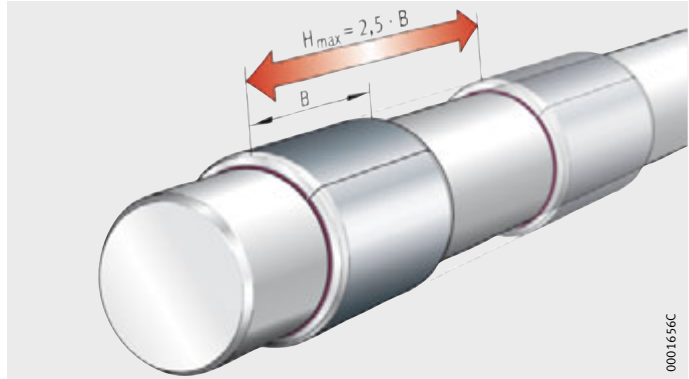
Correction factor f_L

$$f_L = 0,65 \cdot \frac{B}{H + B}$$

Calculation example

Bush		EGB4040-E40
Width of bush	B	40 mm
Inside diameter of bush	D_i	40 mm
Bearing load (point load)	F	1 200 N
Speed	n	250 min^{-1}
Material of shaft	Steel (Rz2)	
Operating temperature	ϑ	35 °C

Required

Bearing with required rating life L_h $> 1\,000$ h

Specific bearing load

Check the specific bearing load for reliability, see table, page 8:

$$p = \frac{F}{D_i \cdot B}$$

$$p = \frac{1\,200}{40 \cdot 40}$$

$$p = 0,75 \, N/mm^2$$

Rating life

Sliding speed Check the sliding speed for reliability, see table, page 8:

$$v = \frac{D_i \cdot \pi \cdot n}{60 \cdot 10^3}$$

$$v = \frac{40 \cdot \pi \cdot 250}{60 \cdot 10^3}$$

$$v = 0,52 \, \text{m/s}$$

pv value Check the pv value for reliability, see table, page 8:

$$pv = p \cdot v$$

$$pv = 0,75 \cdot 0,52 = 0,39 \, \text{N/mm}^2 \cdot \text{m/s}$$

Correction factors

Correction factor	Source	Correction factor determined
Load f_p	*Figure 2*, page 12	$f_p = 1$
Sliding speed f_v	*Figure 3*, page 12	$f_v = 0,95$
Frictional energy f_{pv}	*Figure 4*, page 13	$f_{pv} = 1$
Temperature f_ϑ	*Figure 5*, page 13	$f_\vartheta = 1$
Roughness depth f_R	*Figure 6*, page 13	$f_R = 0,97$
Material f_W	table, page 14	$f_W = 1$
Load case f_A	*Figure 7*, page 14	$f_A = 1$

Basic rating life Calculate the rating life of the selected bearing:

$$L_h = \frac{500}{pv} \cdot f_p \cdot f_v \cdot f_{pv} \cdot f_\vartheta \cdot f_R \cdot f_W \cdot f_A$$

$$L_h = \frac{500}{0,312} \cdot 1 \cdot 0,95 \cdot 1 \cdot 1 \cdot 0,97 \cdot 1 \cdot 1$$

$$L_h = 1181 \, \text{h}$$

Result The selected bush EGB4040-E40 fulfils the requirement for a rating life $L_h > 1\,000$ h.

Design of bearing arrangements

Bushes The plain bearing bushes are pressed into the housing.
This provides axial and radial location. No additional means
of location are required.

For the housing bore, a roughness Rz10 is recommended.

For easier pressing-in, a chamfer $f_G \times 20° \pm 5°$ should be provided,
see table and *Figure 1*.

Chamfer width

Bore diameter d_G mm	Chamfer width f_G mm
$d_G \leqq 30$	$0{,}8 \pm 0{,}3$
$30 < d_G \leqq 80$	$1{,}2 \pm 0{,}4$
$80 < d_G \leqq 180$	$1{,}8 \pm 0{,}8$
$180 < d_G$	$2{,}5 \pm 1$

f_G = chamfer width
R = rounded edge
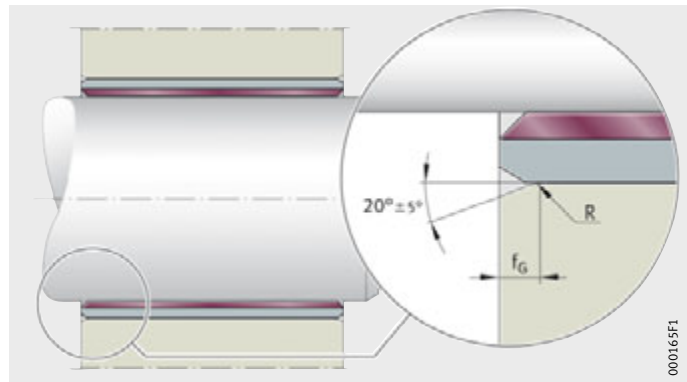
Figure 1
Chamfer on housing bore

Design of bearing arrangements

Flanged bushes

In flanged bushes, the radius at the transition from the radial to the axial component must be taken into consideration.

The flanged bush must not be in contact in the area of the radius and, where axial loads are present, additional sufficient support must be provided for the flange. Chamfer width for the housing bore, see table and *Figure 2*.

Chamfer width

Bore diameter d_G mm	Chamfer width f_G mm
$d_G \leqq 20$	$1,2\pm0,8$
$20 < d_G \leqq 28$	$1,7\pm0,2$
$28 < d_G \leqq 45$	$2,2\pm0,2$
$45 < d_G$	$2,7\pm0,2$

f_G = chamfer width
R = rounded edge

Figure 2
Chamfer on housing bore
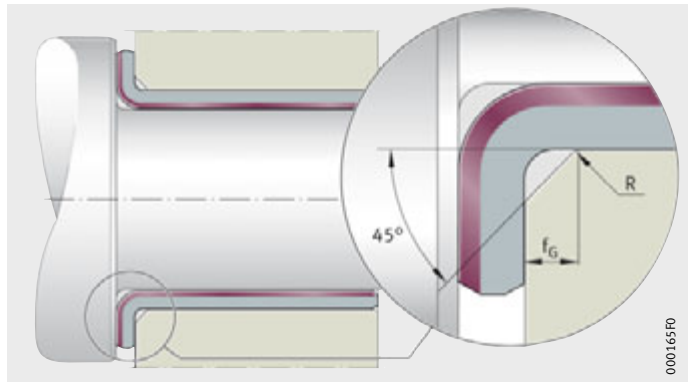
Thrust washers   Concentric seating of the washers is ensured by means of recesses in the housing, *Figure 3*. Diameters and depths of recesses, see dimension tables.

Unintentional rotation of the washers is prevented by means of a dowel pin or countersunk head screw. The screw head or dowel pin must be recessed by at least 0,25 mm, *Figure 3* and *Figure 4*. Size and arrangement of the holes, see dimension tables.

If it is not possible to make a recess in the housing, the plain bearings must be secured by means of several dowel pins or screws. Other cost-effective joining techniques such as laser welding, soft soldering or adhesive bonding can be used.

It is not always necessary to provide security against rotation. In some cases, the adhesive friction between the backing of the bush and the housing will be sufficient.

R = rounded edge

Figure 3
Prevention of rotation
by dowel pin
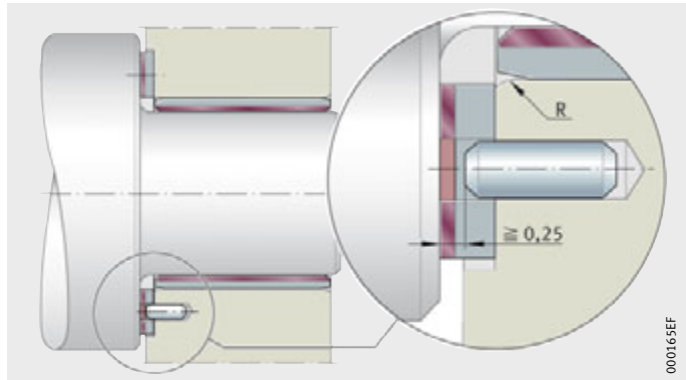
R = rounded edge

Figure 4
Prevention of rotation
by countersunk head screw
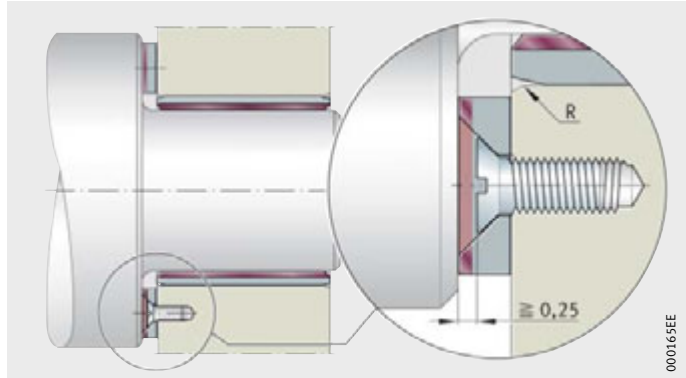
Strips   Strips can be located in the same way as thrust washers.

Design of bearing arrangements

Shaft design

Shafts should be chamfered and all sharp edges rounded.
This allows easier mounting and prevents damage to the sliding layer of the bush.

Mating surface

The mating surface should always be wider than the bearing to prevent the formation of steps in the sliding layer.

The optimum operating life in dry running of the sliding layer E40 and in the lubrication of the sliding layer E50 is achieved with a mating surface roughness of Rz2 to Rz3.

⚠️ Very small roughness values do not have a beneficial effect on the operating life, but larger roughness values reduce it considerably.

Surface quality

Ground or drawn surfaces are preferable as a mating surface. Surfaces that have been precision turned or rolled by precision turning, even with Rz2 to Rz3, can cause greater wear since helical manufacturing grooves are created by precision turning.

Spheroidal graphite cast iron (GGG) has an open surface structure and should therefore be ground to Rz2 or better.

Protection against corrosion

Corrosion of the mating surface in the case of the sliding layer E40 and E50 is prevented by sealing or the use of corrosion-resistant steel. Alternatively, suitable surface treatments may be carried out. In the case of the sliding layer E50, the lubricant gives additional protection against corrosion.

Hydrodynamic operation

⚠️ For hydrodynamic operation with the sliding layer E40, the roughness Rz of the mating surface should be less than the smallest lubricant film thickness in fluid friction.

The Schaeffler Group offers the calculation of hydrodynamic conditions for plain bearings as a service.

Theoretical bearing clearance

Bushes with the sliding layer E40 and E50 are pressed into the housing. This provides axial and radial location. No additional means of location are required.

If the recommended mounting tolerances are used with rigid housings and shafts, this gives an interference fit or bearing clearance, see table, page 27.

⚠ Expansion of the housing bore is not taken into account in calculation of the bearing clearance.

Calculation of the interference U is carried out using the tolerances of the housing bore and the deviations for the outside diameter of the bush D_o, see table, page 27, and table, page 28.

Calculation of bearing clearance

The theoretical bearing clearance is calculated as follows:

$$\Delta s_{max} = d_{G\,max} - 2 \cdot s_{3\,min} - d_{W\,min}$$

$$\Delta s_{min} = d_{G\,min} - 2 \cdot s_{3\,max} - d_{W\,max}$$

Δs_{max} mm
Maximum bearing clearance

Δs_{min} mm
Minimum bearing clearance

$d_{G\,max}$ mm
Maximum diameter of housing bore

$d_{G\,min}$ mm
Minimum diameter of housing bore

$d_{W\,max}$ mm
Maximum shaft diameter

$d_{W\,min}$ mm
Minimum shaft diameter

$s_{3\,max}$ mm
Maximum wall thickness, see tables, page 28

$s_{3\,min}$ mm
Minimum wall thickness, see tables, page 28.

D_o = outside diameter of bush
D_i = inside diameter of bush
d_W = shaft diameter
d_G = diameter of housing bore
s_3 = wall thickness of bush
Δs = bearing clearance

Figure 1
Theoretical bearing clearance
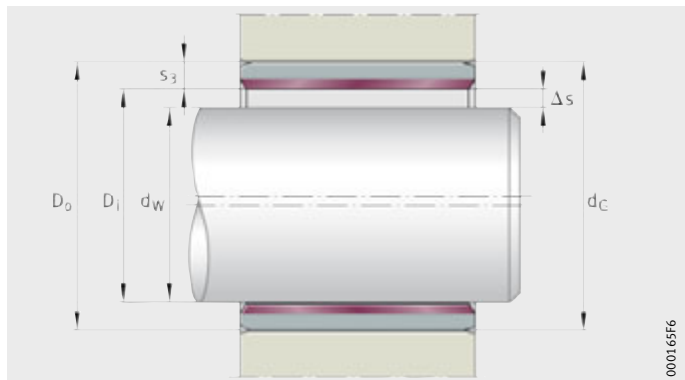
Bearing clearance and mounting tolerances

Theoretical bearing clearance after pressing-in

The theoretical internal clearance after pressing in of bushes or flanged bushes of metric sizes or inch sizes is calculated without considering any possible expansion of the bore, see tables.

Theoretical bearing clearance for metric sizes

Diameter of bush		Bearing clearance Δs			
		E40, E40-B		E50	
Δi mm	Δo mm	Δs_{min} mm	Δs_{max} mm	Δs_{min} mm	Δs_{max} mm
2	3,5	0,000	0,054	–	–
3	4,5	0,000	0,054	–	–
4	5,5	0,000	0,056	–	–
5	7	0,000	0,077	–	–
6	8	0,000	0,077	–	–
7	9	0,003	0,083	–	–
8	10	0,003	0,083	0,040	0,127
10	12	0,003	0,086	0,040	0,130
12	14	0,006	0,092	0,040	0,135
13	15	0,006	0,092	0,040	0,135
14	16	0,006	0,092	0,040	0,135
15	17	0,006	0,092	0,040	0,135
16	18	0,006	0,092	0,040	0,135
18	20	0,006	0,095	0,040	0,138
20	23	0,010	0,112	0,050	0,164
22	25	0,010	0,112	0,050	0,164
24	27	0,010	0,112	0,050	0,164
25	28	0,010	0,112	0,050	0,164
28	32	0,010	0,126	0,060	0,188
30	34	0,010	0,126	0,060	0,188
32	36	0,015	0,135	0,060	0,194
35	39	0,015	0,135	0,060	0,194
40	44	0,015	0,135	0,060	0,194
45	50	0,015	0,155	0,080	0,234
50	55	0,015	0,160	0,080	0,239

Theoretical bearing clearance for metric sizes continued

Diameter of bush		Bearing clearance Δs			
		E40, E40-B		E50	
Δi mm	Δo mm	Δs_{min} mm	Δs_{max} mm	Δs_{min} mm	Δs_{max} mm
55	60	0,020	0,170	0,080	0,246
60	65	0,020	0,170	0,080	0,246
65	70	0,020	0,170	0,080	0,246
70	75	0,020	0,170	0,080	0,246
75	80	0,020	0,170	0,080	0,246
80	85	0,020	0,201	0,080	0,251
85	90	0,020	0,209	0,080	0,251
90	95	0,020	0,209	0,080	0,259
95	100	0,020	0,209	0,080	0,259
100	105	0,020	0,209	0,080	0,259
105	110	0,020	0,209	–	–
110	115	0,020	0,209	–	–
115	120	0,020	0,209	–	–
120	125	0,070	0,264	–	–
125	130	0,070	0,273	–	–
130	135	0,070	0,273	–	–
135	140	0,070	0,273	–	–
140	145	0,070	0,273	–	–
150	155	0,070	0,273	–	–
160	165	0,070	0,273	–	–
180	185	0,070	0,279	–	–
200	205	0,070	0,288	–	–
220	225	0,070	0,288	–	–
250	255	0,070	0,294	–	–
300	305	0,070	0,303	–	–

Theoretical bearing clearance
for inch sizes

Designation	Nominal diameter *inch*	Recommended diameter of			
		Shaft *inch*/mm		Housing bore *inch*/mm	
		$d_{W\,min}$	$d_{W\,max}$	$d_{G\,min}$	$d_{G\,max}$
EGBZ03	$^3/_{16}$	0,1858	0,1865	0,2497	0,2503
		4,719	4,737	6,342	6,358
EGBZ04	$^1/_4$	0,2481	0,2490	0,3122	0,3128
		6,302	6,325	7,930	7,945
EGBZ05	$^5/_{16}$	0,3106	0,3115	0,3747	0,3753
		7,889	7,912	9,517	9,533
EGBZ06	$^3/_8$	0,3731	0,3740	0,4684	0,4691
		9,477	9,500	11,897	11,915
EGBZ07	$^7/_{16}$	0,4355	0,4365	0,5309	0,5316
		11,062	11,087	13,485	13,503
EGBZ08	$^1/_2$	0,4980	0,4990	0,5934	0,5941
		12,649	12,675	15,072	15,090
EGBZ09	$^9/_{16}$	0,5605	0,5615	0,6559	0,6566
		14,237	14,262	16,660	16,678
EGBZ10	$^5/_8$	0,6230	0,6240	0,7184	0,7192
		15,824	15,850	18,247	18,268
EGBZ11	$^{11}/_{16}$	0,6855	0,6865	0,7809	0,7817
		17,412	17,437	19,835	19,855
EGBZ12	$^3/_4$	0,7479	0,7491	0,8747	0,8755
		18,997	19,027	22,217	22,238
EGBZ14	$^7/_8$	0,8729	0,8741	0,9997	1,0005
		22,172	22,202	25,392	25,413
EGBZ16	1	0,9979	0,9991	1,1246	1,1256
		25,347	25,377	28,565	28,590
EGBZ18	$1^1/_8$	1,1226	1,1238	1,2808	1,2818
		28,514	28,545	32,532	32,558
EGBZ20	$1^1/_4$	1,2472	1,2488	1,4058	1,4068
		31,679	31,720	35,707	35,733
EGBZ22	$1^3/_8$	1,3722	1,3738	1,5308	1,5318
		34,854	34,895	38,882	38,908
EGBZ24	$1^1/_2$	1,4972	1,4988	1,6558	1,6568
		38,029	38,070	42,057	42,083
EGBZ26	$1^5/_8$	1,6222	1,6238	1,7808	1,7818
		41,204	41,245	45,232	45,258
EGBZ28	$1^3/_4$	1,7471	1,7487	1,9371	1,9381
		44,376	44,417	49,202	49,228
EGBZ32	2	1,9969	1,9987	2,1871	2,1883
		50,721	50,767	55,552	55,583

Theoretical bearing clearance for inch sizes continued

Designation	Nominal diameter *inch*/mm		Inside diameter after pressing-in		Bearing clearance *inch*/mm	
	D_i	D_o	min.	max.	Δs_{min}	Δs_{max}
EGBZ03	0,1875	0,2500	0,1867	0,1893	0,0002	0,0035
	4,763	6,350	4,742	4,808	0,005	0,089
EGBZ04	0,2500	0,3125	0,2492	0,2518	0,0002	0,0037
	6,350	7,938	6,330	6,396	0,005	0,094
EGBZ05	0,3125	0,3750	0,3117	0,3143	0,0002	0,0037
	7,938	9,525	7,917	7,983	0,005	0,094
EGBZ06	0,3750	0,4688	0,3742	0,3769	0,0002	0,0038
	9,525	11,906	9,505	9,573	0,005	0,096
EGBZ07	0,4375	0,5313	0,4367	0,4394	0,0002	0,0039
	11,113	13,494	11,092	11,161	0,005	0,099
EGBZ08	0,5000	0,5938	0,4992	0,5019	0,0002	0,0039
	12,700	15,082	12,680	12,748	0,005	0,099
EGBZ09	0,5625	0,6563	0,5617	0,5644	0,0002	0,0039
	14,288	16,669	14,267	14,336	0,005	0,099
EGBZ10	0,6250	0,7188	0,6242	0,6270	0,0002	0,0040
	15,875	18,258	15,855	15,926	0,005	0,102
EGBZ11	0,6875	0,7813	0,6867	0,6895	0,0002	0,0040
	17,463	19,844	17,442	17,513	0,005	0,101
EGBZ12	0,7500	0,8750	0,7493	0,7525	0,0002	0,0046
	19,050	22,225	19,032	19,114	0,005	0,116
EGBZ14	0,8750	1,0000	0,8743	0,8775	0,0002	0,0046
	22,225	25,400	22,207	22,289	0,005	0,116
EGBZ16	1,0000	1,1250	0,9992	1,0026	0,0001	0,0047
	25,400	28,575	25,380	25,466	0,003	0,119
EGBZ18	1,1250	1,2813	1,1240	1,1278	0,0002	0,0052
	28,575	32,544	28,550	28,646	0,005	0,132
EGBZ20	1,2500	1,4063	1,2490	1,2528	0,0002	0,0056
	31,750	35,719	31,725	31,821	0,005	0,142
EGBZ22	1,3750	1,5313	1,3740	1,3778	0,0002	0,0056
	34,925	38,894	34,900	34,996	0,005	0,142
EGBZ24	1,5000	1,6563	1,4990	1,5028	0,0002	0,0056
	38,100	42,069	38,075	38,171	0,005	0,142
EGBZ26	1,6250	1,7813	1,6240	1,6278	0,0002	0,0056
	41,275	45,244	41,250	41,346	0,005	0,142
EGBZ28	1,7500	1,9375	1,7489	1,7535	0,0002	0,0064
	44,450	49,213	44,422	44,539	0,005	0,163
EGBZ32	2,0000	2,1875	1,9989	2,0037	0,0002	0,0068
	50,800	55,563	50,772	50,894	0,005	0,173

Bearing clearance and mounting tolerances

Interference fit and bearing clearance

The table shows measures that can be taken to influence the bearing clearance and interference fit:

- at high ambient temperatures
- depending on housing material
- depending on housing wall thickness.

Reduced clearance tolerances require tighter tolerances for the shaft and the bore.

Consequences and measures due to environmental influences

Consequences and measures for interference fit and internal clearance in case of high ambient temperatures, special housing materials or special wall thicknesses, see table.

Environmental influence

| Design and environmental influences | Consequences | | | Measures | | |
| | Bearing clearance | | Poor interference fit | Change in diameter | | |
	Too large	Too small		d_G	d_W	Notes
Light metal, thin-walled housings	■	–	–	●	–	The housing is more highly stressed; the permissible stress on the housing must not be exceeded.
Steel or cast iron housings[1]	–	■	–	–	▼	–
Bronze or copper alloy housings[1]	–	–	■	▲	▲	Reduce d_G and d_W by the same value so that the bearing clearance is maintained.
Aluminium alloy housings[1]	–	–	■	○	○	Reduce d_G and d_W by the same value so that the bearing clearance is maintained. At temperatures below 0 °C, the housing is more highly stressed; the permissible stress on the housing must not be exceeded.
Bushes with thicker anti-corrosion layer	–	■	–	❏	–	The bush and housing will be more highly stressed if appropriate measures are not taken.

■ Applicable
● Reduce
○ Reduce by 0,1% per 100 °C above room temperature
▲ Reduce by 0,05% per 100 °C above room temperature
❏ Increase by 0,03 mm if, for example, the layer thickness = 0,015 mm
▼ Reduce by 0,008 mm per 100 °C above room temperature.

[1] At high ambient temperatures.

Recommended mounting tolerances

Recommended mounting tolerances, see table.

⚠ If the shafts used have the tolerance zone h, the bearing clearance must be checked in accordance with the formulae for Δs_{max} and for Δs_{min}, see page 21.

For aluminium housings, mounting tolerances to M7 are recommended.

Mounting tolerances

Diameter range	Sliding layer		
mm	E40	E40-B	E50
Shaft			
$d_W <$ 5	h6	f7	h8
5 $\leqq d_W <$ 80	f7	f7	h8
80 $\leqq d_W$	h8	h8	h8
Housing bore			
$d_G \leqq$ 5,5	H6	–	–
5,5 $< d_G$	H7	H7	H7

ISO tolerances

The ISO tolerances for shafts and housings to ISO 286 give, in conjunction with the tolerances for the bore and outside diameter of bearings to ISO 3547, the fit, see tables.

ISO tolerances for shafts

Nominal shaft diameter in mm											
over incl.	– 3	3 6	6 10	10 18	18 30	30 50	50 80	80 120	120 180	180 250	250 315
Shaft deviation in μm											
f7	−6 −16	−10 −22	−13 −28	−16 −34	−20 −41	−25 −50	−30 −60	−36 −71	−43 −83	−50 −96	−56 −108
h6	0 −6	0 −8	0 −9	0 −11	0 −13	0 −16	0 −19	0 −22	0 −25	0 −29	0 −32
h7	0 −10	0 −12	0 −15	0 −18	0 −21	0 −25	0 −30	0 −35	0 −40	0 −46	0 −52
h8	0 −14	0 −18	0 −22	0 −27	0 −33	0 −39	0 −46	0 −54	0 −63	0 −72	0 −81

ISO tolerances for bores

Nominal bore diameter in mm											
over incl.	– 3	3 6	6 10	10 18	18 30	30 50	50 80	80 120	120 180	180 250	250 315
Bore deviation in μm											
G7	+12 +2	+16 +4	+20 +5	+24 +6	+28 +7	+34 +9	+40 +10	+47 +12	+54 +14	+61 +15	+69 +17
H6	+6 0	+8 0	+9 0	+11 0	+13 0	+16 0	+19 0	+22 0	+25 0	+29 0	+32 0
H7	+10 0	+12 0	+15 0	+18 0	+21 0	+25 0	+30 0	+35 0	+40 0	+46 0	+52 0
H8	+14 0	+18 0	+22 0	+27 0	+33 0	+39 0	+46 0	+54 0	+63 0	+72 0	+81 0
J7	+4 −6	+6 −6	+8 −7	+10 −8	+12 −9	+14 −11	+18 −12	+22 −13	+26 −14	+30 −16	+36 −16
M7	−2 −12	0 −12	0 −15	0 −18	0 −21	0 −25	0 −30	0 −35	0 −40	0 −46	0 −52

Bearing clearance and mounting tolerances

Tables of deviations and wall thicknesses

The deviations for the bushes are defined in ISO 3547.

Deviations of outside diameter

The deviations for the outside diameter D_o conform to ISO 3547-1, Table 7, see table.

Deviations Tolerances in mm

D_o	E40, E50		E40-B	
	Deviation			
mm	upper	lower	upper	lower
$D_o \leqq 10$	+0,055	+0,025	+0,075	+0,045
$10 < D_o \leqq 18$	+0,065	+0,030	+0,080	+0,050
$18 < D_o \leqq 30$	+0,075	+0,035	+0,095	+0,055
$30 < D_o \leqq 50$	+0,085	+0,045	+0,110	+0,065
$50 < D_o \leqq 80$	+0,100	+0,055	+0,125	+0,075
$80 < D_o \leqq 120$	+0,120	+0,070	+0,140	+0,090
$120 < D_o \leqq 180$	+0,170	+0,100	+0,190	+0,120
$180 < D_o \leqq 305$	+0,255	+0,125	+0,245	+0,145

Wall thickness for sliding layer E40

The nominal dimensions and limiting deviations for the wall thickness s_3 of bushes and flanged bushes with the sliding layer E40 conform to ISO 3547-1, Table 5, series B, see table.

Wall thickness Tolerances in mm

D_i	s_3	E40		E40-B	
		Deviation			
mm	mm	upper	lower	upper	lower
$D_i < 5$	0,5	0,000	−0,030	−	−
	0,75	0,000	−0,020	−	−
	1	−	−	+0,005	−0,020
$5 \leqq D_i < 20$	1	+0,005	−0,020	+0,005	−0,020
$20 \leqq D_i < 28$	1,5	+0,005	−0,025	+0,005	−0,025
$28 \leqq D_i < 45$	2	+0,005	−0,030	+0,005	−0,030
$45 \leqq D_i < 80$	2,5	+0,005	−0,040	+0,005	−0,040
$80 \leqq D_i < 120$	2,5	−0,010	−0,060	−0,010	−0,060
$120 \leqq D_i$	2,5	−0,035	−0,085	−0,035	−0,085

Wall thickness for sliding layer E50

The nominal dimensions and limiting deviations for the wall thickness s_3 of bushes with the sliding layer E50 for inside diameter D_i conform to ISO 3547-1, Table 5, series D, see table.

Wall thickness Tolerances in mm

D_i	s_3	E50	
		Deviation	
mm	mm	upper	lower
$8 \leqq D_i < 20$	1	−0,020	−0,045
$20 \leqq D_i < 28$	1,5	−0,025	−0,055
$28 \leqq D_i < 45$	2	−0,030	−0,065
$45 \leqq D_i$	2,5	−0,040	−0,085

Chamfers and chamfer tolerances

Chamfer deformation due to round bending is permissible.

The tolerances and dimensions of the outer chamfer C_o and inner edge break C_i for bushes of metric sizes conform to ISO 3547-1, see table and *Figure 2*.

① $\geqq$ 0,3 mm
For s_3 = 0,5 mm: $\geqq$ 0,2 mm

C_i = inner edge break
C_o = outer chamfer
s_3 = wall thickness
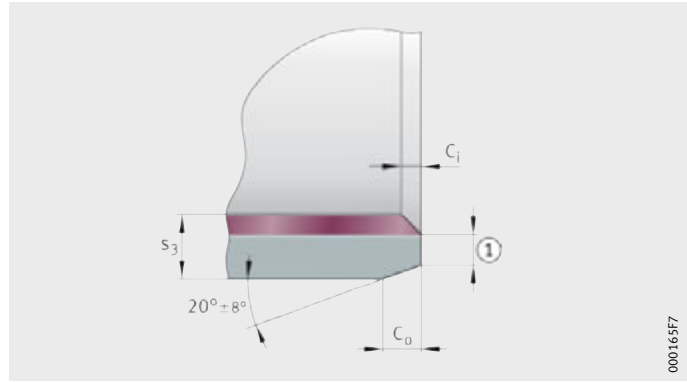
Figure 2
Outer chamfer and inner edge break

Outer chamfer and inner edge break for metric sizes

Wall thickness of bush	Outer chamfer, cutting machining	Inner edge break[1] C_i	
s_3 mm	C_o mm	min. mm	max. mm
0,5	0,2±0,1	0,05	0,3
0,75	0,5±0,3	0,1	0,4
1	0,6±0,4	0,1	0,6
1,5	0,6±0,4	0,1	0,7
2	1,2±0,4	0,1	0,7
2,5	1,8±0,6	0,2	1

[1] If a machining allowance is necessary on the inside diameter D_i, components with a larger dimension C_i must be ordered.

Fitting and dismantling

General guidelines

In the interests of the user, the applicable legal regulations and other directives relating to environmental protection and occupational safety must be observed.

[!] Plain bearings rings must be handled with care before and during mounting. Problem-free functioning of the sliding layer is substantially dependent on the care taken in fitting. The sliding layer must not be damaged. Ensure that assembly is carried out in clean conditions.

The bearings will only achieve their maximum operating life and functional capability if they are fitted correctly. Where a mounting position is specified, this must be observed in all cases.

Delivered condition and storage

The plain bearings are supplied with preservative in a box or in a bag held in a box.

Plain bearings should be stored:
- in clean, dry areas
- at as constant a temperature as possible
- at a relative humidity of max. 65%.

Unpacking of bearings

Plain bearings should only be removed from their packaging immediately before fitting:
- Hands should be kept clean and dry and protective gloves worn if necessary (perspiration leads to corrosion).
- If the original packaging is damaged, the products must be checked.
- If the products are contaminated, they must be wiped with a clean cloth only.

Pressing in of bushes

The bushes can be easily pressed into the housing bore. The bushes can be pressed in more easily if the bush backing or housing bore is lightly oiled.

Outside diameter D_o up to approx. 55 mm:

■ Pressing in flush using a mandrel without an auxiliary ring, *Figure 1*

■ Pressing into a counterbore using a mandrel without an auxiliary ring, *Figure 2*

Outside diameter D_o from approx. 55 mm:

■ Pressing in using a mandrel with an auxiliary ring, *Figure 3*, Design of the auxiliary ring, see table and *Figure 3*, page 32.

Design of the auxiliary ring, dependent on the bush

Outside diameter of bush D_o mm	Inside diameter of auxiliary ring d_H mm
$55 \leqq D_o \leqq 100$	$D_{o+0,25}^{+0,28}$
$100 < D_o \leqq 200$	$D_{o+0,36}^{+0,4}$
$200 < D_o \leqq 305$	$D_{o+0,46}^{+0,5}$

$D_o \leqq 55$ mm
D_i = inside diameter of bush
F = pressing-in force

① Bush
② Pressing-in mandrel
③ Housing

Figure 1
Pressing bushes in flush
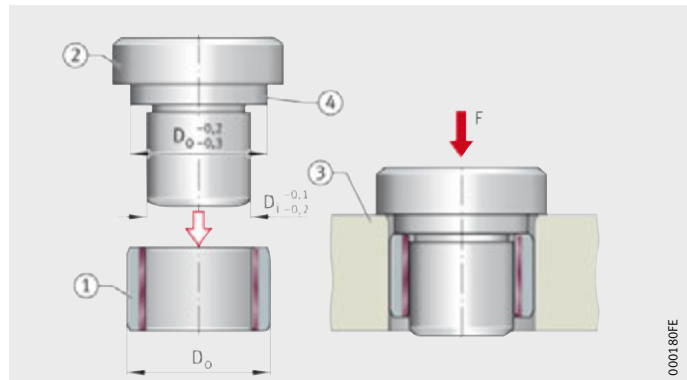
$D_o \geqq 55$ mm
D_i = inside diameter of bush
F = pressing-in force

① Bush
② Pressing-in mandrel
③ Housing
④ Abutment diameter

Figure 2
Pressing bushes into a counterbore
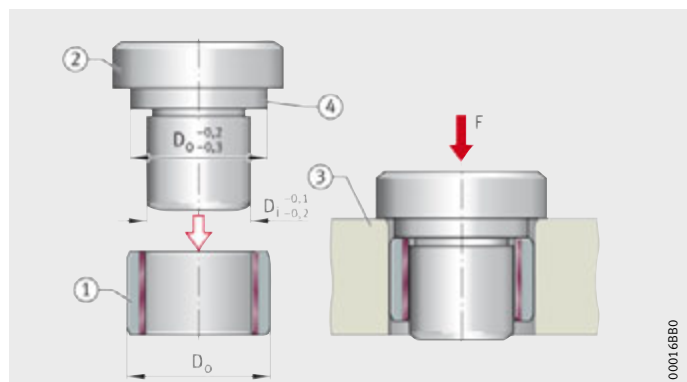
Fitting and dismantling

$D_o \geqq 55$ mm
D_o = outside diameter of bush
D_i = inside diameter of bush
d_H = inside diameter of auxiliary ring

① Bush
② Auxiliary ring
③ Pressing-in mandrel
④ Housing
⑤ Abutment diameter
⑥ O ring

Figure 3
Pressing bush in using auxiliary ring
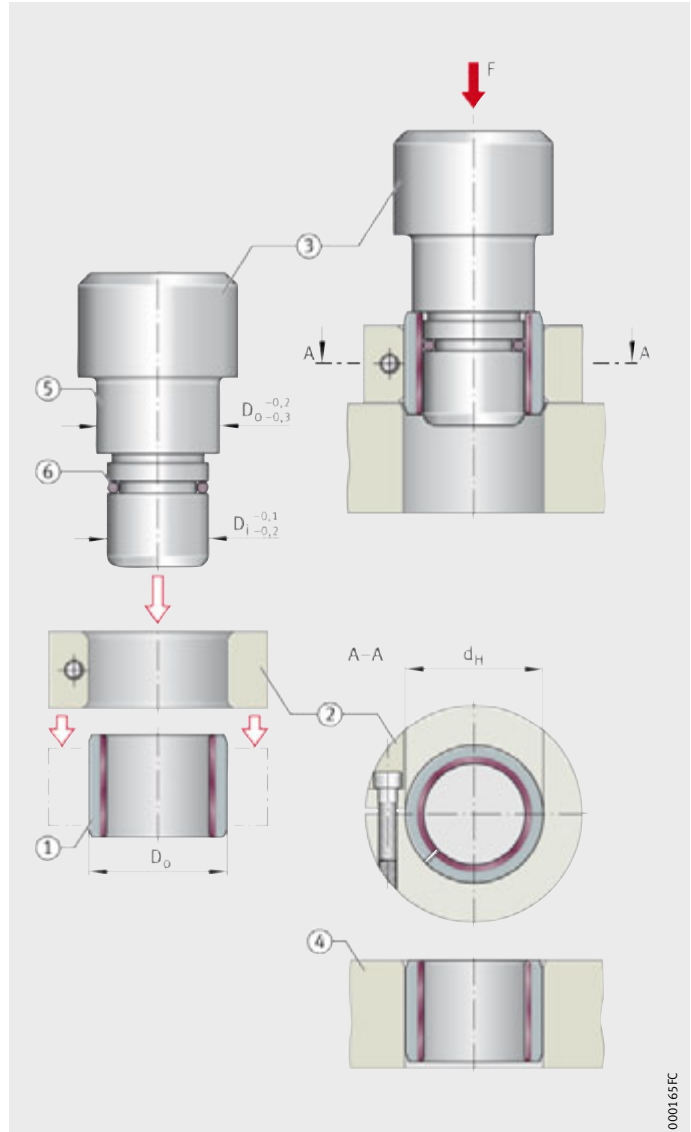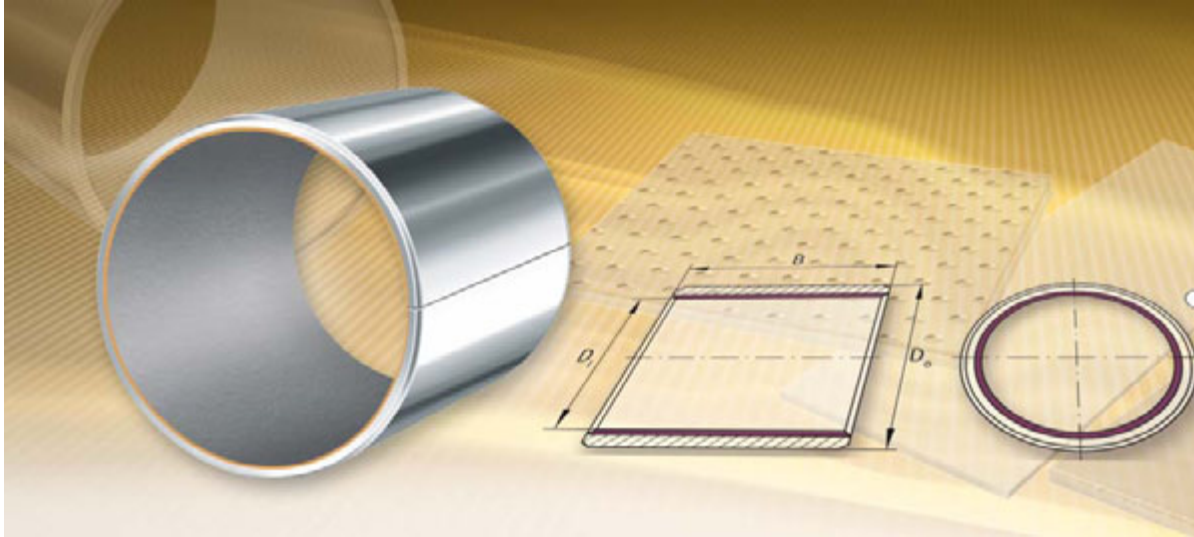
Metal/polymer composite plain bearings, maintenance-free

Maintenance-free plain bearing material
Bushes
Flanged bushes
Thrust washers

Metal/polymer composite plain bearings, maintenance-free

Product overview

Metal/polymer composite plain bearings, maintenance-free

Bushes

With steel backing or
with bronze backing
Metric or inch sizes

EGB..-E40, EGBZ..-E40

00017297

EGB..-E40-B

00017298
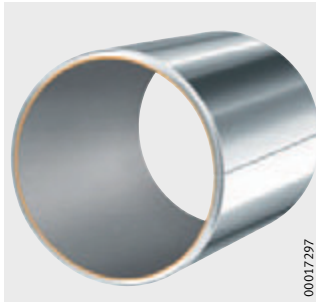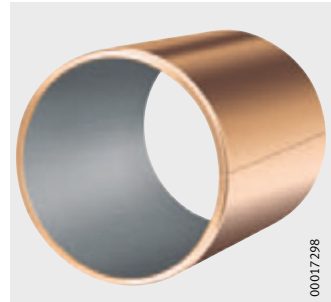
Flanged bushes

With steel backing or
with bronze backing

EGF..-E40

00017299

EGF..-E40-B

0001729A
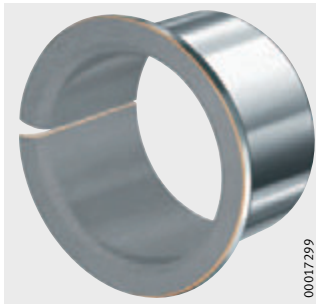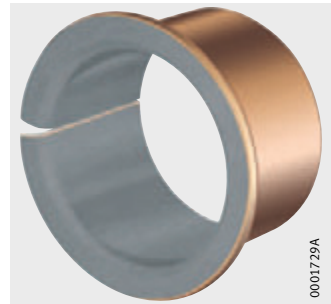
Thrust washers

With steel backing or
with bronze backing

EGW..-E40

0001729B

EGW..-E40-B

00017359

Strips

With steel backing or
with bronze backing

Available by agreement

EGS..-E40

0001729C

EGS..-E40-B

0001735A
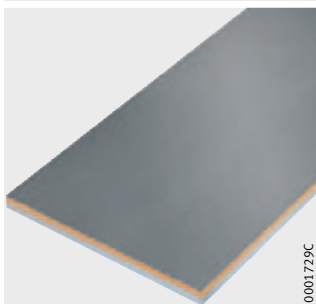
Metal/polymer composite
plain bearings, maintenance-free

Features

These plain bearings are bearings for very small radial or axial design envelopes. These products are available as bushes, flanged bushes, thrust washers and strips. The bushes are available in metric sizes and in inch sizes.

The plain bearings are supplied with either steel backing or bronze backing. Bearings with a bronze backing have high corrosion resistance and thermal conductivity and are antimagnetic.

If the plain bearings are to be used in the medical or aerospace sectors or in the food or pharmaceuticals industry, please contact the engineering service of the Schaeffler Group.

**Resistance
of the plain bearing material**

The resistance of the material E40 depends on the chemical characteristics of the individual layers:

- The material E40 is resistant to water, alcohols, glycols and numerous mineral and synthetic oils.
- The tin-plated steel surface gives adequate protection against corrosion in most cases.
- In the case of the material E40-B, the bronze backing is additionally resistant to water vapour and seawater.

The material E40 is not resistant to acidic (pH $<$ 5) and alkaline media (pH $>$ 9). The bronze backing of E40-B is not resistant to oxidising acids and gases such as free halides, ammonia or hydrogen sulphide, especially if these gases have a high moisture content.

Metal/polymer composite
plain bearings, maintenance-free

Sliding layer E40 The sliding layer E40 is maintenance-free. It can be used for rotary and oscillating motion as well as for short stroke linear motion.

The low-wear material has good sliding characteristics (no stick-slip), a low coefficient of friction and high resistance to chemicals. It does not absorb water (highly resistant to swelling), does not tend to weld to metal and is also suitable for hydrodynamic operation.

The maintenance-free plain bearing materials are available in the variants E40 and E40-B.

Technical data for E40 For the important mechanical and physical characteristics of the maintenance-free plain bearing materials E40 and E40-B, see table.

Characteristics of E40 and E40-B

Characteristic	Loading		
Maximum pv value for dry running	Continuous operation	pv	$1,8 \text{ N/mm}^2 \cdot \text{m/s}$
	For short periods		$3,6 \text{ N/mm}^2 \cdot \text{m/s}$
Permissible specific bearing load	Static	p_{max}	250 N/mm^2
	Rotary, oscillating		140 N/mm^2
Permissible sliding speed	Dry running	v_{max}	$2,5 \text{ m/s}$
	Hydrodynamic operation		$>2,5 \text{ m/s}$
Permissible operating temperature		ϑ	$-200 \text{ °C to } +280 \text{ °C}$
Coefficient of thermal expansion	Steel backing	α_{St}	$11 \cdot 10^{-6} \text{ K}^{-1}$
	Bronze backing	α_{Bz}	$17 \cdot 10^{-6} \text{ K}^{-1}$
Coefficient of thermal conductivity	Steel backing	λ_{St}	$>42 \text{ Wm}^{-1}\text{K}^{-1}$
	Bronze backing	λ_{Bz}	$>70 \text{ Wm}^{-1}\text{K}^{-1}$
Relative electrical resistance after running-in		$R_{rel\ min}$	$>1 \ \Omega \cdot \text{cm}^2$

Sealing The plain bearings are not sealed, but can be protected against the ingress of contamination and moisture by the use of external seals.

Lubrication	Plain bearings with the sliding layer E40 contain dry lubricants and do not therefore require lubrication.
	Lubrication can be used to protect the mating surface against corrosion or simply to provide sealing against contamination. It should be checked in advance, however, whether it is more advantageous in such cases to use a corrosion-resistant material for the mating surface or a different means of sealing the bearing position.
	In certain applications, the sliding layer E40 can be used in fluid media. In this case, the improved heat dissipation may considerably increase the operating life.
⚠	The compatibility of the media with the sliding layer E40 must be checked. Further advice should therefore be sought from the engineering service of the Schaeffler Group.
Grease lubrication	Oil and grease lubrication, even in very small quantities, impairs material transfer during running-in.
	Over time, grease and small quantities of oil mix with wear debris to form a paste that promotes wear. Solid lubricants such as zinc sulphide, molybdenum disulphide or similar grease additives are not permitted, since they promote this paste formation to an increased extent.
Relubrication	During relubrication, old grease is replaced by fresh grease. At the same time, the grease flushes wear debris and contaminants out of the bearing.
⚠	If it is not possible in exceptional cases to avoid the use of grease lubrication, the bearings must be relubricated periodically in order to prevent the formation of paste comprising debris and contaminants.

Metal/polymer composite
plain bearings, maintenance-free

Friction Sliding motion is free from stick-slip.

The friction in a plain bearing is dependent on:

- the roughness of the mating surface
- the material of the mating surface
- the specific bearing load
- the sliding speed
- the operating temperature
  - up to approx. +100 °C, the coefficient of friction
    is slightly lower than the value at room temperature
  - above +100 °C, the coefficient of friction
    may be up to 50% above the value at room temperature.

Friction behaviour At high specific bearing load and low sliding speed, the coefficient of friction is more favourable, see table.

Coefficient of friction for sliding layer E40

Specific bearing load p N/mm²	Sliding speed v m/s	Coefficient of friction μ
250 to 140	≦ 0,001	0,03
140 to 60	0,001 to 0,005	0,04 to 0,07
60 to 10	0,005 to 0,05	0,07 to 0,1
10 to 1	0,05 to 0,5	0,1 to 0,15
≦ 1	0,5 to 2	0,15 to 0,25

Operating temperature The permissible operating temperature for maintenance-free plain bearings is between −200 °C and +280 °C.

The running-in layer and sliding layer swells in the presence of some mineral oils at temperatures above +100 °C. This can lead to jamming of the bearing.

This can be remedied by increasing the bearing clearance, since other characteristics of the sliding layer E40 are unaffected. Alternatively, a special design should be used.

Suffixes Suffixes for available designs: see table.

Available designs

Suffix		Description	Design
E40	–	Maintenance-free sliding layer, with steel backing	Standard
	-B	Maintenance-free sliding layer, with bronze backing	
	-S	Maintenance-free sliding layer, with alloy steel backing for increased anti-corrosion protection	Special design, available by agreement

Bushes

Maintenance-free
With steel backing
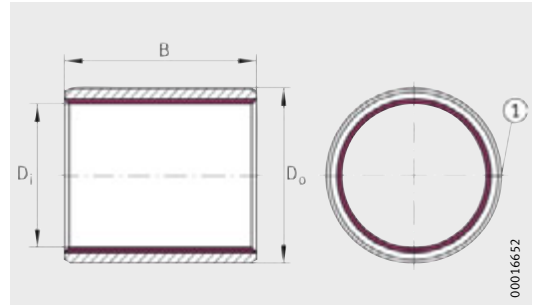
EGB
① Butt joint

Dimension table · Dimensions in mm				
Designation	Mass	Dimensions		
	m	D_i	D_o	B
	$\approx$g			$\pm 0,25$
EGB0303-E40	0,1	**3**	4,5	3
EGB0304-E40	0,2	**3**	4,5	4
EGB0305-E40	0,3	**3**	4,5	5
EGB0306-E40	0,3	**3**	4,5	6
EGB0403-E40	0,2	**4**	5,5	3
EGB0404-E40	0,3	**4**	5,5	4
EGB0406-E40	0,4	**4**	5,5	6
EGB0410-E40	0,7	**4**	5,5	10
EGB0505-E40	0,6	**5**	7	5
EGB0508-E40	1,0	**5**	7	8
EGB0510-E40	1,3	**5**	7	10
EGB0606-E40	0,9	**6**	8	6
EGB0608-E40	1,2	**6**	8	8
EGB0610-E40	1,5	**6**	8	10
EGB0710-E40	1,7	**7**	9	10
EGB0806-E40	1,1	**8**	10	6
EGB0808-E40	1,5	**8**	10	8
EGB0810-E40	2,0	**8**	10	10
EGB0812-E40	2,4	**8**	10	12
EGB1008-E40	1,9	**10**	12	8
EGB1010-E40	2,4	**10**	12	10
EGB1012-E40	2,9	**10**	12	12
EGB1015-E40	3,6	**10**	12	15
EGB1020-E40	4,9	**10**	12	20

Dimension table (continued) · Dimensions in mm				
Designation	Mass	Dimensions		
	m	D_i	D_o	B
	$\approx$g			$\pm 0,25$
EGB1208-E40	2,3	**12**	14	8
EGB1210-E40	2,8	**12**	14	10
EGB1212-E40	3,4	**12**	14	12
EGB1215-E40	4,3	**12**	14	15
EGB1220-E40	5,8	**12**	14	20
EGB1225-E40	7,3	**12**	14	25
EGB1310-E40	3,1	**13**	15	10
EGB1410-E40	3,3	**14**	16	10
EGB1412-E40	4	**14**	16	12
EGB1415-E40	5	**14**	16	15
EGB1420-E40	6,7	**14**	16	20
EGB1425-E40	8,4	**14**	16	25
EGB1510-E40	3,5	**15**	17	10
EGB1512-E40	4,2	**15**	17	12
EGB1515-E40	5,3	**15**	17	15
EGB1520-E40	7,1	**15**	17	20
EGB1525-E40	8,9	**15**	17	25
EGB1610-E40	3,7	**16**	18	10
EGB1612-E40	4,5	**16**	18	12
EGB1615-E40	5,7	**16**	18	15
EGB1620-E40	7,6	**16**	18	20
EGB1625-E40	9,5	**16**	18	25
EGB1810-E40	4,2	**18**	20	10
EGB1815-E40	6,3	**18**	20	15
EGB1820-E40	8,5	**18**	20	20
EGB1825-E40	10,6	**18**	20	25

Recommended mounting tolerances, see page 27.

Bushes

Maintenance-free
With steel backing
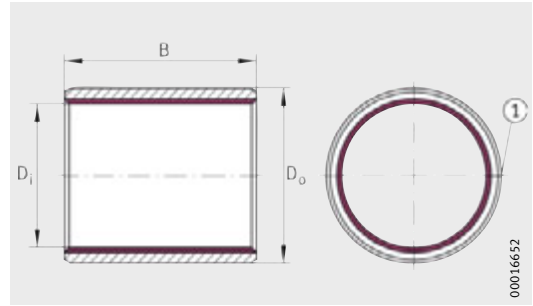
EGB
① Butt joint

Dimension table (continued) · Dimensions in mm				
Designation	Mass	Dimensions		
	m	D_i	D_o	B
	≈g			±0,25
EGB2010-E40	7,4	**20**	23	10
EGB2015-E40	11,1	**20**	23	15
EGB2020-E40	14,9	**20**	23	20
EGB2025-E40	18,6	**20**	23	25
EGB2030-E40	22,4	**20**	23	30
EGB2215-E40	12,2	**22**	25	15
EGB2220-E40	16,3	**22**	25	20
EGB2225-E40	20,4	**22**	25	25
EGB2230-E40	24,5	**22**	25	30
EGB2415-E40	13,2	**24**	27	15
EGB2420-E40	17,7	**24**	27	20
EGB2425-E40	22,1	**24**	27	25
EGB2430-E40	26,5	**24**	27	30
EGB2510-E40	9,1	**25**	28	10
EGB2515-E40	13,7	**25**	28	15
EGB2520-E40	18,3	**25**	28	20
EGB2525-E40	23	**25**	28	25
EGB2530-E40	27,6	**25**	28	30
EGB2540-E40	36,8	**25**	28	40
EGB2550-E40	46,1	**25**	28	50
EGB2820-E40	27,8	**28**	32	20
EGB2830-E40	42	**28**	32	30
EGB3015-E40	22,2	**30**	34	15
EGB3020-E40	29,7	**30**	34	20
EGB3025-E40	37,4	**30**	34	25
EGB3030-E40	44,8	**30**	34	30
EGB3040-E40	59,9	**30**	34	40

Dimension table (continued) · Dimensions in mm				
Designation	Mass	Dimensions		
	m	D_i	D_o	B
	≈g			±0,25
EGB3230-E40	47,6	**32**	36	30
EGB3240-E40	63,6	**32**	36	40
EGB3520-E40	34,4	**35**	39	20
EGB3530-E40	51,8	**35**	39	30
EGB3540-E40	69,2	**35**	39	40
EGB3550-E40	86,7	**35**	39	50
EGB4020-E40	39	**40**	44	20
EGB4030-E40	58,8	**40**	44	30
EGB4040-E40	78,6	**40**	44	40
EGB4050-E40	98,4	**40**	44	50
EGB4530-E40	83,2	**45**	50	30
EGB4540-E40	111	**45**	50	40
EGB4550-E40	140	**45**	50	50
EGB5020-E40	60,8	**50**	55	20
EGB5030-E40	92	**50**	55	30
EGB5040-E40	123	**50**	55	40
EGB5060-E40	186	**50**	55	60
EGB5540-E40	135	**55**	60	40
EGB5560-E40	203	**55**	60	60
EGB6030-E40	110	**60**	65	30
EGB6040-E40	147	**60**	65	40
EGB6060-E40	221	**60**	65	60
EGB6070-E40	259	**60**	65	70
EGB6530-E40	119	**65**	70	30
EGB6540-E40	158	**65**	70	40
EGB6550-E40	200	**65**	70	50
EGB6560-E40	240	**65**	70	60
EGB6570-E40	279	**65**	70	70

Schaeffler Group Industrial

Bushes

Maintenance-free
With steel backing

EGB
① Butt joint

Dimension table (continued) · Dimensions in mm				
Designation	Mass	Dimensions		
	m	D_i	D_o	B
	≈g			±0,25
EGB7040-E40	170	**70**	75	40
EGB7050-E40	214	**70**	75	50
EGB7070-E40	301	**70**	75	70
EGB7540-E40	182	**75**	80	40
EGB7550-E40	229	**75**	80	50
EGB7560-E40	278	**75**	80	60
EGB7580-E40	367	**75**	80	80
EGB8040-E40	194	**80**	85	40
EGB8060-E40	292	**80**	85	60
EGB8080-E40	390	**80**	85	80
EGB80100-E40	488	**80**	85	100
EGB8560-E40	311	**85**	90	60
EGB85100-E40	519	**85**	90	100
EGB9050-E40	272	**90**	95	50
EGB9060-E40	327	**90**	95	60
EGB90100-E40	547	**90**	95	100
EGB9560-E40	345	**95**	100	60
EGB95100-E40	578	**95**	100	100
EGB10050-E40	301	**100**	105	50
EGB10060-E40	362	**100**	105	60
EGB100115-E40	697	**100**	105	115
EGB10560-E40	382	**105**	110	60
EGB105115-E40	733	**105**	110	115
EGB11060-E40	398	**110**	115	60
EGB110115-E40	767	**110**	115	115
EGB11550-E40	347	**115**	120	50
EGB11560-E40	417	**115**	120	60
EGB11570-E40	487	**115**	120	70

Dimension table (continued) · Dimensions in mm				
Designation	Mass	Dimensions		
	m	D_i	D_o	B
	≈g			±0,25
EGB12060-E40	433	**120**	125	60
EGB120100-E40	724	**120**	125	100
EGB125100-E40	754	**125**	130	100
EGB13060-E40	468	**130**	135	60
EGB130100-E40	785	**130**	135	100
EGB13560-E40	486	**135**	140	60
EGB13580-E40	649	**135**	140	80
EGB14060-E40	504	**140**	145	60
EGB140100-E40	842	**140**	145	100
EGB15060-E40	539	**150**	155	60
EGB15080-E40	720	**150**	155	80
EGB150100-E40	901	**150**	155	100
EGB16080-E40	768	**160**	165	80
EGB160100-E40	961	**160**	165	100
EGB180100-E40	1078	**180**	185	100
EGB200100-E40	1197	**200**	205	100
EGB220100-E40	1315	**220**	225	100
EGB250100-E40	1492	**250**	255	100
EGB300100-E40	1790	**300**	305	100

Bushes

Maintenance-free
With steel backing
Inch sizes
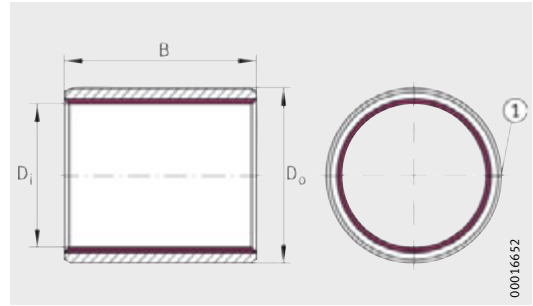
EGBZ
① Butt joint

Dimension table · Dimensions in mm and *inch*				
Designation	Mass	Dimensions		
	m $\approx$ g	D_i	D_o	B
EGBZ0303-E40	0,5	$^3/_{16}$	$^1/_4$	$^3/_{16}$
		4,763	6,35	4,76±0,25
EGBZ0304-E40	0,7	$^3/_{16}$	$^1/_4$	$^1/_4$
		4,763	6,35	6,35±0,25
EGBZ0306-E40	1	$^3/_{16}$	$^1/_4$	$^3/_8$
		4,763	6,35	9,53±0,25
EGBZ0404-E40	0,9	$^1/_4$	$^5/_{16}$	$^1/_4$
		6,35	7,938	6,35±0,25
EGBZ0406-E40	1,3	$^1/_4$	$^5/_{16}$	$^3/_8$
		6,35	7,938	9,53±0,25
EGBZ0408-E40	1,7	$^1/_4$	$^5/_{16}$	$^1/_2$
		6,35	7,938	12,70±0,25
EGBZ0504-E40	1,1	$^5/_{16}$	$^3/_8$	$^1/_4$
		7,938	9,525	6,35±0,25
EGBZ0506-E40	1,6	$^5/_{16}$	$^3/_8$	$^3/_8$
		7,938	9,525	9,53±0,25
EGBZ0603-E40	1,5	$^3/_8$	$^{15}/_{32}$	$^3/_{16}$
		9,525	11,906	4,76±0,25
EGBZ0604-E40	2	$^3/_8$	$^{15}/_{32}$	$^1/_4$
		9,525	11,906	6,35±0,25
EGBZ0606-E40	3	$^3/_8$	$^{15}/_{32}$	$^3/_8$
		9,525	11,906	9,53±0,25
EGBZ0608-E40	3,9	$^3/_8$	$^{15}/_{32}$	$^1/_2$
		9,525	11,906	12,7±0,25
EGBZ0610-E40	4,9	$^3/_8$	$^{15}/_{32}$	$^5/_8$
		9,525	11,906	15,88±0,25
EGBZ0612-E40	6	$^3/_8$	$^{15}/_{32}$	$^3/_4$
		9,525	11,906	19,05±0,25

Dimension table (continued) · Dimensions in mm and *inch*				
Designation	Mass	Dimensions		
	m $\approx$ g	D_i	D_o	B
EGBZ0706-E40	3,4	$^7/_{16}$	$^{17}/_{32}$	$^3/_8$
		11,113	13,494	9,53±0,25
EGBZ0708-E40	4,5	$^7/_{16}$	$^{17}/_{32}$	$^1/_2$
		11,113	13,494	12,70±0,25
EGBZ0710-E40	6	$^7/_{16}$	$^{17}/_{32}$	$^5/_8$
		11,113	13,494	15,88±0,25
EGBZ0712-E40	7	$^7/_{16}$	$^{17}/_{32}$	$^3/_4$
		11,113	13,494	19,05±0,25
EGBZ0804-E40	2,6	$^1/_2$	$^{19}/_{32}$	$^1/_4$
		12,7	15,082	6,35±0,25
EGBZ0806-E40	3,8	$^1/_2$	$^{19}/_{32}$	$^3/_8$
		12,7	15,082	9,53±0,25
EGBZ0808-E40	6	$^1/_2$	$^{19}/_{32}$	$^1/_2$
		12,7	15,082	12,70±0,25
EGBZ0810-E40	7	$^1/_2$	$^{19}/_{32}$	$^5/_8$
		12,7	15,082	15,88±0,25
EGBZ0812-E40	8	$^1/_2$	$^{19}/_{32}$	$^3/_4$
		12,7	15,082	19,05±0,25
EGBZ0814-E40	9	$^1/_2$	$^{19}/_{32}$	$^7/_8$
		12,7	15,082	22,23±0,25
EGBZ0906-E40	4,3	$^9/_{16}$	$^{21}/_{32}$	$^3/_8$
		14,288	16,669	9,53±0,25
EGBZ0908-E40	6	$^9/_{16}$	$^{21}/_{32}$	$^1/_2$
		14,288	16,669	12,70±0,25
EGBZ0912-E40	9	$^9/_{16}$	$^{21}/_{32}$	$^3/_4$
		14,288	16,669	19,05±0,25
EGBZ1004-E40	3,1	$^5/_8$	$^{23}/_{32}$	$^1/_4$
		15,875	18,258	6,35±0,25
EGBZ1008-E40	7	$^5/_8$	$^{23}/_{32}$	$^1/_2$
		15,875	18,258	12,70±0,25
EGBZ1010-E40	8	$^5/_8$	$^{23}/_{32}$	$^5/_8$
		15,875	18,258	15,88±0,25
EGBZ1012-E40	10	$^5/_8$	$^{23}/_{32}$	$^3/_4$
		15,875	18,258	19,05±0,25
EGBZ1014-E40	11	$^5/_8$	$^{23}/_{32}$	$^7/_8$
		15,875	18,258	22,23±0,25

Recommended mounting tolerances, see page 24.

Bushes

Maintenance-free
With steel backing
Inch sizes
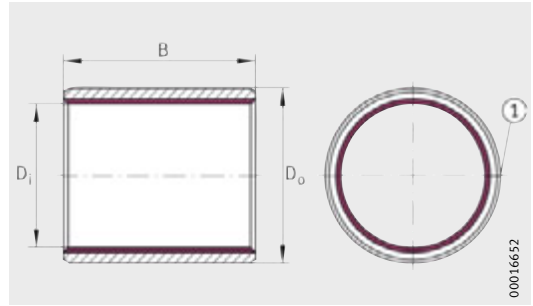
EGBZ
① Butt joint

Dimension table (continued) · Dimensions in mm and *inch*				
Designation	Mass m ≈g	Dimensions D_i	D_o	B
EGBZ1112-E40	11	*$^{11}/_{16}$*	*$^{25}/_{32}$*	*$^3/_4$*
		17,463	19,844	19,05±0,25
EGBZ1204-E40	6	*$^3/_4$*	*$^7/_8$*	*$^1/_4$*
		19,05	22,225	6,35±0,25
EGBZ1206-E40	8	*$^3/_4$*	*$^7/_8$*	*$^3/_8$*
		19,05	22,225	9,53±0,25
EGBZ1208-E40	11	*$^3/_4$*	*$^7/_8$*	*$^1/_2$*
		19,05	22,225	12,70±0,25
EGBZ1210-E40	13	*$^3/_4$*	*$^7/_8$*	*$^5/_8$*
		19,05	22,225	15,88±0,25
EGBZ1212-E40	16	*$^3/_4$*	*$^7/_8$*	*$^3/_4$*
		19,05	22,225	19,05±0,25
EGBZ1216-E40	21	*$^3/_4$*	*$^7/_8$*	*1*
		19,05	22,225	25,40±0,25
EGBZ1412-E40	18	*$^7/_8$*	*1*	*$^3/_4$*
		22,225	25,4	19,05±0,25
EGBZ1416-E40	24	*$^7/_8$*	*1*	*1*
		22,225	25,4	25,40±0,25
EGBZ1606-E40	10	*1*	*$1^1/_8$*	*$^3/_8$*
		25,4	28,575	9,53±0,25
EGBZ1608-E40	14	*1*	*$1^1/_8$*	*$^1/_2$*
		25,4	28,575	12,70±0,25
EGBZ1612-E40	20	*1*	*$1^1/_8$*	*$^3/_4$*
		25,4	28,575	19,05±0,25
EGBZ1614-E40	23	*1*	*$1^1/_8$*	*$^7/_8$*
		25,4	28,575	22,23±0,25
EGBZ1616-E40	27	*1*	*$1^1/_8$*	*1*
		25,4	28,575	25,40±0,25
EGBZ1620-E40	33	*1*	*$1^1/_8$*	*$1^1/_4$*
		25,4	28,575	31,75±0,25
EGBZ1624-E40	40	*1*	*$1^1/_8$*	*$1^1/_2$*
		25,4	28,575	38,10±0,25

Dimension table (continued) · Dimensions in mm and *inch*				
Designation	Mass m ≈g	Dimensions D_i	D_o	B
EGBZ1808-E40	19	*$1^1/_8$*	*$1^9/_{32}$*	*$^1/_2$*
		28,575	32,544	12,70±0,25
EGBZ1812-E40	28	*$1^1/_8$*	*$1^9/_{32}$*	*$^3/_4$*
		28,575	32,544	19,05±0,25
EGBZ1816-E40	38	*$1^1/_8$*	*$1^9/_{32}$*	*1*
		28,575	32,544	25,40±0,25
EGBZ2006-E40	16	*$1^1/_4$*	*$1^{13}/_{32}$*	*$^3/_8$*
		31,75	35,719	9,53±0,25
EGBZ2012-E40	31	*$1^1/_4$*	*$1^{13}/_{32}$*	*$^3/_4$*
		31,75	35,719	19,05±0,25
EGBZ2016-E40	42	*$1^1/_4$*	*$1^{13}/_{32}$*	*1*
		31,75	35,719	25,40±0,25
EGBZ2020-E40	52	*$1^1/_4$*	*$1^{13}/_{32}$*	*$1^1/_4$*
		31,75	35,719	31,75±0,25
EGBZ2206-E40	17	*$1^3/_8$*	*$1^{17}/_{32}$*	*$^3/_8$*
		34,925	38,894	9,53±0,25
EGBZ2208-E40	23	*$1^3/_8$*	*$1^{17}/_{32}$*	*$^1/_2$*
		34,925	38,894	12,70±0,25
EGBZ2210-E40	29	*$1^3/_8$*	*$1^{17}/_{32}$*	*$^5/_8$*
		34,925	38,894	15,88±0,25
EGBZ2212-E40	34	*$1^3/_8$*	*$1^{17}/_{32}$*	*$^3/_4$*
		34,925	38,894	19,05±0,25
EGBZ2216-E40	46	*$1^3/_8$*	*$1^{17}/_{32}$*	*1*
		34,925	38,894	25,40±0,25
EGBZ2224-E40	68	*$1^3/_8$*	*$1^{17}/_{32}$*	*$1^1/_2$*
		34,925	38,894	38,10±0,25
EGBZ2228-E40	79	*$1^3/_8$*	*$1^{17}/_{32}$*	*$1^3/_4$*
		34,925	38,894	44,45±0,25

Recommended mounting tolerances, see page 24.

Bushes

Maintenance-free
With steel backing
Inch sizes
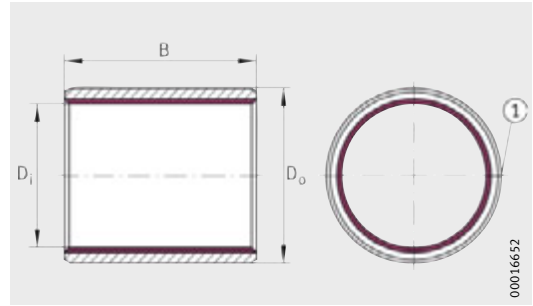
EGBZ
① Butt joint

Dimension table (continued) · Dimensions in mm and *inch*				
Designation	Mass	Dimensions		
	m	D_i	D_o	B
	≈g			
EGBZ2408-E40	25	*$1^1/_2$*	*$1^{21}/_{32}$*	*$^1/_2$*
		38,1	42,069	12,70±0,25
EGBZ2416-E40	49	*$1^1/_2$*	*$1^{21}/_{32}$*	*1*
		38,1	42,069	25,40±0,25
EGBZ2420-E40	62	*$1^1/_2$*	*$1^{21}/_{32}$*	*$1^1/_4$*
		38,1	42,069	31,75±0,25
EGBZ2424-E40	74	*$1^1/_2$*	*$1^{21}/_{32}$*	*$1^1/_2$*
		38,1	42,069	38,10±0,25
EGBZ2432-E40	98	*$1^1/_2$*	*$1^{21}/_{32}$*	*2*
		38,1	42,069	50,80±0,25
EGBZ2616-E40	53	*$1^5/_8$*	*$1^{25}/_{32}$*	*1*
		41,275	45,244	25,40±0,25
EGBZ2624-E40	80	*$1^5/_8$*	*$1^{25}/_{32}$*	*$1^1/_2$*
		41,275	45,244	38,10±0,25
EGBZ2816-E40	69	*$1^3/_4$*	*$1^{15}/_{16}$*	*1*
		44,45	49,213	25,40±0,25
EGBZ2824-E40	104	*$1^3/_4$*	*$1^{15}/_{16}$*	*$1^1/_2$*
		44,45	49,213	38,10±0,25
EGBZ2832-E40	138	*$1^3/_4$*	*$1^{15}/_{16}$*	*2*
		44,45	49,213	50,80±0,25

Dimension table (continued) · Dimensions in mm and *inch*				
Designation	Mass	Dimensions		
	m	D_i	D_o	B
	≈g			
EGBZ3216-E40	79	*2*	*$2^3/_{16}$*	*1*
		50,8	55,563	25,4±0,25
EGBZ3224-E40	118	*2*	*$2^3/_{16}$*	*$1^1/_2$*
		50,8	55,563	38,1±0,25
EGBZ3232-E40	157	*2*	*$2^3/_{16}$*	*2*
		50,8	55,563	50,8±0,25
EGBZ3240-E40	196	*2*	*$2^3/_{16}$*	*$2^1/_2$*
		50,8	55,563	63,5±0,25

Recommended mounting tolerances, see page 24.

Bushes

Maintenance-free
With bronze backing

EGB
① Butt joint
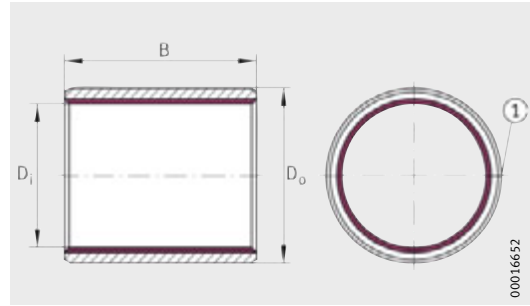
Dimension table · Dimensions in mm				
Designation	Mass	Dimensions[1]		
	m	D_i	D_o	B
	≈g			±0,25
EGB0505-E40-B	0,7	**5**	7	5
EGB0606-E40-B	1	**6**	8	6
EGB0610-E40-B	1,6	**6**	8	10
EGB0808-E40-B	1,7	**8**	10	8
EGB0810-E40-B	2,1	**8**	10	10
EGB0812-E40-B	2,6	**8**	10	12
EGB1005-E40-B	1,3	**10**	12	5
EGB1010-E40-B	2,6	**10**	12	10
EGB1015-E40-B	4	**10**	12	15
EGB1020-E40-B	5,3	**10**	12	20
EGB1210-E40-B	3,1	**12**	14	10
EGB1212-E40-B	3,7	**12**	14	12
EGB1215-E40-B	4,7	**12**	14	15
EGB1220-E40-B	6,3	**12**	14	20
EGB1225-E40-B	7,9	**12**	14	25
EGB1415-E40-B	5,4	**14**	16	15
EGB1515-E40-B	5,8	**15**	17	15
EGB1525-E40-B	9,7	**15**	17	25
EGB1615-E40-B	6,2	**16**	18	15
EGB1625-E40-B	10,3	**16**	18	25
EGB1815-E40-B	6,9	**18**	20	15
EGB1825-E40-B	11,6	**18**	20	25

Dimension table (continued) · Dimensions in mm				
Designation	Mass	Dimensions		
	m	D_i	D_o	B
	≈g			±0,25
EGB2015-E40-B	12,2	**20**	23	15
EGB2020-E40-B	16,3	**20**	23	20
EGB2025-E40-B	20,4	**20**	23	25
EGB2030-E40-B	24,5	**20**	23	30
EGB2215-E40-B	13,3	**22**	25	15
EGB2220-E40-B	17,8	**22**	25	20
EGB2225-E40-B	22,3	**22**	25	25
EGB2430-E40-B	29,1	**24**	27	30
EGB2525-E40-B	25,2	**25**	28	25
EGB2530-E40-B	30,2	**25**	28	30
EGB2830-E40-B	46,1	**28**	32	30
EGB3020-E40-B	32,6	**30**	34	20
EGB3030-E40-B	49,2	**30**	34	30
EGB3040-E40-B	65,8	**30**	34	40
EGB3520-E40-B	37,7	**35**	39	20
EGB3530-E40-B	56,9	**35**	39	30
EGB4050-E40-B	108	**40**	44	50
EGB4550-E40-B	154	**45**	50	50
EGB5030-E40-B	101	**50**	55	30
EGB5040-E40-B	136	**50**	55	40
EGB5060-E40-B	204	**50**	55	60
EGB5540-E40-B	149	**55**	60	40
EGB6040-E40-B	161	**60**	65	40
EGB6050-E40-B	202	**60**	65	50
EGB6060-E40-B	243	**60**	65	60
EGB6070-E40-B	284	**60**	65	70
EGB7050-E40-B	235	**70**	75	50
EGB7070-E40-B	329	**70**	75	70
EGB8060-E40-B	321	**80**	85	60
EGB80100-E40-B	537	**80**	85	100
EGB9060-E40-B	360	**90**	95	60
EGB90100-E40-B	602	**90**	95	100
EGB9560-E40-B	379	**95**	100	60
EGB10060-E40-B	399	**100**	105	60
EGB100115-E40-B	767	**100**	105	115

Recommended mounting tolerances, see page 27.

[1] Inside diameter < 5 mm available by agreement.

Flanged bushes

Maintenance-free
With steel or bronze backing
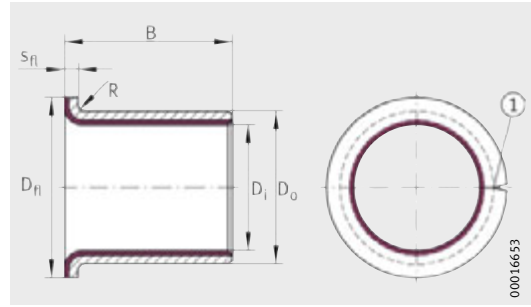
EGF
① Butt joint

Dimension table · Dimensions in mm							
Designation	Mass	Dimensions					
	m	D_i	D_o	D_{fl}	B	s_{fl}	R
	$\approx$g			±0,5	±0,25	+0,05 −0,2	max.
EGF06040-E40	0,9	**6**	8	12	4	1	1
EGF06070-E40	1,4	**6**	8	12	7	1	1
EGF06080-E40	1,6	**6**	8	12	8	1	1
EGF08055-E40	1,6	**8**	10	15	5,5	1	1
EGF08075-E40	2	**8**	10	15	7,5	1	1
EGF08095-E40	2,4	**8**	10	15	9,5	1	1
EGF10070-E40	2,5	**10**	12	18	7	1	1
EGF10090-E40	3	**10**	12	18	9	1	1
EGF10120-E40	3,8	**10**	12	18	12	1	1
EGF10170-E40	5	**10**	12	18	17	1	1
EGF12070-E40	2,9	**12**	14	20	7	1	1
EGF12090-E40	3,5	**12**	14	20	9	1	1
EGF12120-E40	4,4	**12**	14	20	12	1	1
EGF12170-E40	5,9	**12**	14	20	17	1	1
EGF14120-E40	5,1	**14**	16	22	12	1	1
EGF14170-E40	6,8	**14**	16	22	17	1	1
EGF15090-E40	4,3	**15**	17	23	9	1	1
EGF15120-E40	5,4	**15**	17	23	12	1	1
EGF15170-E40	7,2	**15**	17	23	17	1	1
EGF16120-E40	5,7	**16**	18	24	12	1	1
EGF16170-E40	7,5	**16**	18	24	17	1	1
EGF18120-E40	6,4	**18**	20	26	12	1	1
EGF18170-E40	8,5	**18**	20	26	17	1	1
EGF18220-E40	10,7	**18**	20	26	22	1	1
EGF20115-E40	11,1	**20**	23	30	11,5	1,5	1,5
EGF20165-E40	14,8	**20**	23	30	16,5	1,5	1,5
EGF20215-E40	18,6	**20**	23	30	21,5	1,5	1,5
EGF25115-E40	13,5	**25**	28	35	11,5	1,5	1,5
EGF25165-E40	18,1	**25**	28	35	16,5	1,5	1,5
EGF25215-E40	22,7	**25**	28	35	21,5	1,5	1,5
EGF30160-E40	29,2	**30**	34	42	16	2	2
EGF30260-E40	44,2	**30**	34	42	26	2	2
EGF35160-E40	33,5	**35**	39	47	16	2	2
EGF35260-E40	51	**35**	39	47	26	2	2
EGF40260-E40	58,9	**40**	44	53	26	2	2

Dimension table · Dimensions in mm							
Designation	Mass	Dimensions					
	m	D_i	D_o	D_{fl}	B	s_{fl}	R
	$\approx$g			±0,5	±0,25	+0,05 −0,2	max.
EGF06080-E40-B	1,7	**6**	8	12	8	1	1
EGF08055-E40-B	1,8	**8**	10	15	5,5	1	1
EGF08095-E40-B	2,7	**8**	10	15	9,5	1	1
EGF10070-E40-B	2,8	**10**	12	18	7	1	1
EGF10120-E40-B	4,1	**10**	12	18	12	1	1
EGF10170-E40-B	5,5	**10**	12	18	17	1	1
EGF12070-E40-B	3,2	**12**	14	20	7	1	1
EGF12090-E40-B	3,9	**12**	14	20	9	1	1
EGF12120-E40-B	4,8	**12**	14	20	12	1	1
EGF15120-E40-B	5,9	**15**	17	23	12	1	1
EGF15170-E40-B	7,8	**15**	17	23	17	1	1
EGF16120-E40-B	6,2	**16**	18	24	12	1	1
EGF18100-E40-B	6	**18**	20	26	10	1	1
EGF18220-E40-B	11,6	**18**	20	26	22	1	1
EGF20115-E40-B	12,1	**20**	23	30	11,5	1,5	1,5
EGF20165-E40-B	16,2	**20**	23	30	16,5	1,5	1,5
EGF25215-E40-B	24,9	**25**	28	35	21,5	1,5	1,5
EGF30160-E40-B	32	**30**	34	42	16	2	2
EGF30260-E40-B	48,6	**30**	34	42	26	2	2
EGF35260-E40-B	56	**35**	39	47	26	2	2
EGF40260-E40-B	64,8	**40**	44	53	26	2	2

Recommended mounting tolerances, see page 27.

Thrust washers

Maintenance-free
With steel backing

EGW
(1) Cutout[1]

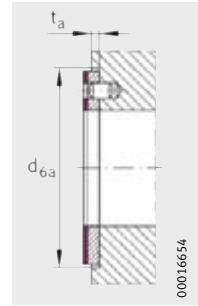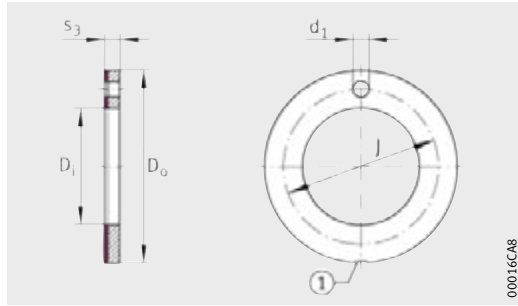| Dimension table · Dimensions in mm								
Designation	Mass	Dimensions					Mounting dimensions	
	m	D_i	D_o	s_3	J	d_1	t_a	d_{6a}
	$\approx$ g	+0,25	−0,25	−0,05	±0,12	+0,4 +0,1	±0,2	+0,12
EGW10-E40[2]	2,6	**10**	20	1,5	–	–	1	20
EGW12-E40	3,7	**12**	24	1,5	18	1,5	1	24
EGW14-E40	4,1	**14**	26	1,5	20	2	1	26
EGW16-E40	5,6	**16**	30	1,5	22	2	1	30
EGW18-E40	6,1	**18**	32	1,5	25	2	1	32
EGW20-E40	7,7	**20**	36	1,5	28	3	1	36
EGW22-E40	8,3	**22**	38	1,5	30	3	1	38
EGW26-E40	10,9	**26**	44	1,5	35	3	1	44
EGW28-E40	13,1	**28**	48	1,5	38	4	1	48
EGW32-E40	16,4	**32**	54	1,5	43	4	1	54
EGW38-E40	20,9	**38**	62	1,5	50	4	1	62
EGW42-E40	22,5	**42**	66	1,5	54	4	1	66
EGW48-E40	37,3	**48**	74	2	61	4	1,5	74
EGW52-E40	39,8	**52**	78	2	65	4	1,5	78
EGW62-E40	50,2	**62**	90	2	76	4	1,5	90

Thrust washers in special sizes available by agreement.

[1] Cutouts permissible on the inside or outside diameter in any quantity and position.

[2] No fixing hole.

Thrust washers

Maintenance-free
With bronze backing


EGW
① Cutout[1]

Dimension table · Dimensions in mm									
Designation	Mass	Dimensions						Mounting dimensions	
	m	D_i	D_o	s_3	J	d_1	t_a	d_{6a}	
	$\approx$ g	+0,25	−0,25	−0,05	±0,12	+0,4 +0,1	±0,2	+0,12	
EGW10-E40-B[2]	2,8	**10**	20	1,5	–	–	1	20	
EGW12-E40-B	4,1	**12**	24	1,5	18	1,5	1	24	
EGW14-E40-B	4,5	**14**	26	1,5	20	2	1	26	
EGW16-E40-B	6,1	**16**	30	1,5	22	2	1	30	
EGW18-E40-B	6,6	**18**	32	1,5	25	2	1	32	
EGW20-E40-B	8,4	**20**	36	1,5	28	3	1	36	
EGW22-E40-B	9,1	**22**	38	1,5	30	3	1	38	
EGW26-E40-B	11,9	**26**	44	1,5	35	3	1	44	
EGW28-E40-B	14,4	**28**	48	1,5	38	4	1	48	
EGW32-E40-B	17,9	**32**	54	1,5	43	4	1	54	
EGW38-E40-B	22,8	**38**	62	1,5	50	4	1	62	
EGW42-E40-B	24,7	**42**	66	1,5	54	4	1	66	
EGW48-E40-B	41	**48**	74	2	61	4	1,5	74	
EGW52-E40-B	43,7	**52**	78	2	65	4	1,5	78	
EGW62-E40-B	55,1	**62**	90	2	76	4	1,5	90	

Thrust washers in special sizes available by agreement.

[1] Cutouts permissible on the inside or outside diameter in any quantity and position.

[2] No fixing hole.
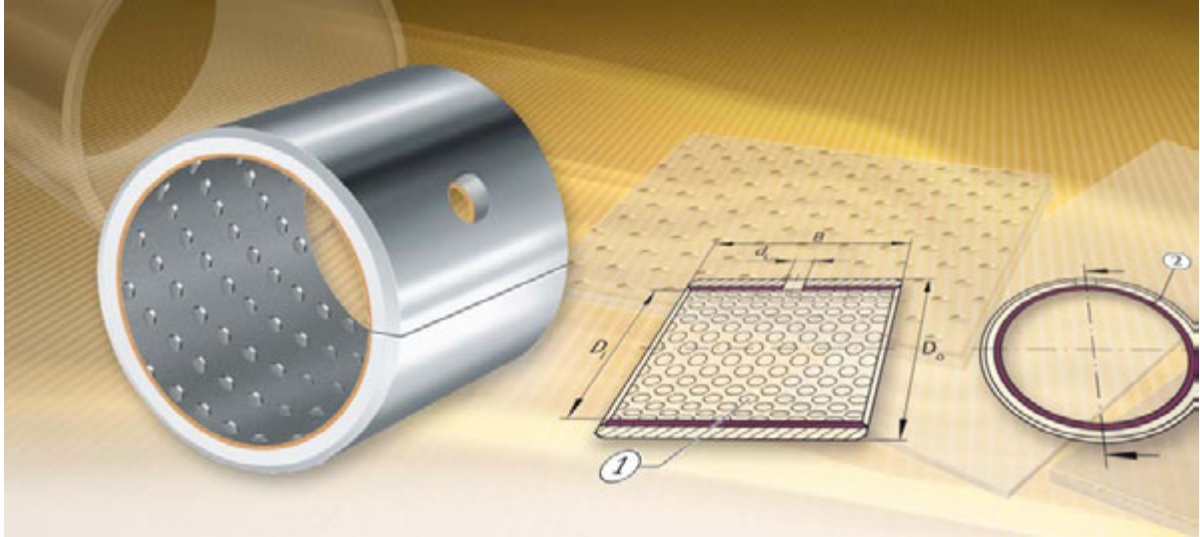
Metal/polymer composite
plain bearings, low-maintenance

Low-maintenance plain bearing material
Bushes
Thrust washers

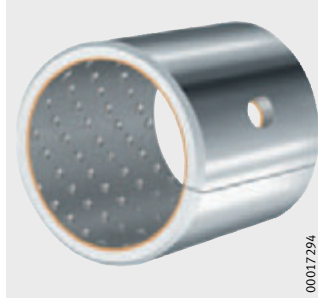# Metal/polymer composite plain bearings, low-maintenance

Product overview **Metal/polymer composite plain bearings, low-maintenance**
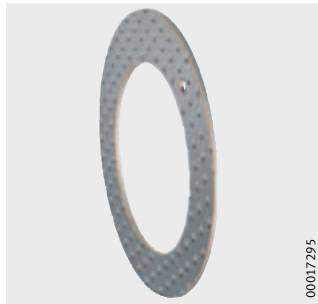
Bushes
With steel backing

EGB..-E50

00017294

Thrust washers
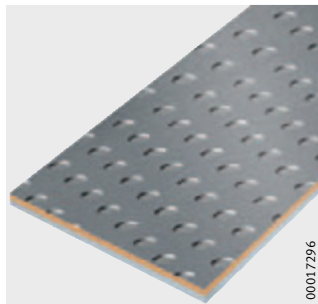With steel backing

EGW..-E50

00017295

Strips
With steel backing

Available by agreement

EGS..-E50

00017296

Metal/polymer composite plain bearings, low-maintenance

Features

Low-maintenance plain bearings are available as bushes, thrust washers and strips.

⚠️ If the plain bearings are to be used in the medical or aerospace sectors or in the food or pharmaceuticals industry, please contact the engineering service of the Schaeffler Group.

Resistance of the plain bearing material

The resistance of the material E50 depends on the chemical characteristics of the individual layers:

■ The material E50 is resistant to many greases.

■ The tin-plated steel surface gives adequate protection against corrosion in most cases.

⚠️ The material E50 is not resistant to acidic (pH $<$ 5) and alkaline media (pH $>$ 9).

Sliding layer E50

The sliding layer E50 is a low-maintenance, low-wear material with good damping characteristics and long relubrication intervals. It can be used for rotary and oscillating motion and for long stroke linear motion, is only slightly sensitive to edge loads and is insensitive to shocks.

Technical data for E50

For the important mechanical and physical characteristics of the low-maintenance plain bearing material, see table.

Characteristics of E50

Characteristics	Load		
Maximum pv value		pv	$3\ \text{N/mm}^2 \cdot \text{m/s}$
Permissible specific bearing load	Static	p_{max}	$140\ \text{N/mm}^2$
	Rotary, oscillating		$70\ \text{N/mm}^2$
Permissible sliding speed		v_{max}	$2{,}5\ \text{m/s}$
Permissible operating temperature		ϑ	$-40\ °\text{C}$ to $+110\ °\text{C}$
Coefficient of thermal expansion	Steel backing	α_{St}	$11 \cdot 10^{-6}\ \text{K}^{-1}$
Coefficient of thermal conductivity	Steel backing	λ_{St}	$<4\ \text{Wm}^{-1}\text{K}^{-1}$
Coefficient of friction		μ	$0{,}02$ to $0{,}2$

Strips, with steel backing, available by agreement

By agreement, Schaeffler Group also supplies strips with steel backing. These are not tin-plated and have a copper layer on the back.

Metal/polymer composite plain bearings, low-maintenance

Sealing The plain bearings are not sealed, but can be protected against the ingress of contamination and moisture by the use of external seals.

Lubrication The low-maintenance sliding layer E50 must be lubricated with grease or fluid.

The sliding layer E50 has lubrication pockets that retain the lubricant. The initial lubrication is therefore adequate in most cases.

The operating life increases if relubrication is carried out regularly.

The lubricant also protects the bearing arrangement against corrosion.

Greases Lithium soap greases with a mineral oil base are highly suitable.

Grease additives such as molybdenum disulphide and zinc sulphide are unfavourable since they increase wear. Greases may contain max. 5% MoS_2.

Operating temperature The permissible operating temperature for low-maintenance plain bearings is between −40 °C and +110 °C.

Suffixes Suffixes for available designs: see table.

Available designs

Suffix	Description	Design
E50	Low-maintenance sliding layer, with lubrication pockets, ready-to-fit	Standard

Further information For further designs and products, especially strips, please contact the engineering service of the Schaeffler Group.

Bushes

Low-maintenance
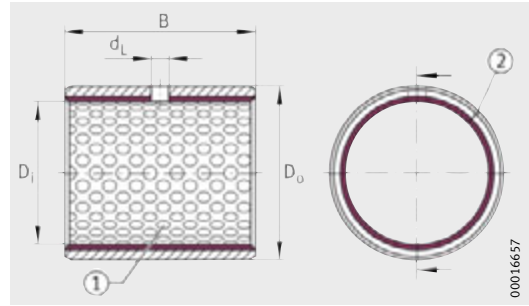
EGB
① Lubrication pockets, ② butt joint

Dimension table · Dimensions in mm					
Designation	Mass m ≈g	Dimensions			
		D_i	D_o	B ±0,25	d_L
EGB0808-E50	1,2	**8**	10	8	[1]
EGB0810-E50	1,5	**8**	10	10	[1]
EGB0812-E50	1,8	**8**	10	12	[1]
EGB1008-E50	1,6	**10**	12	8	[1]
EGB1010-E50	1,9	**10**	12	10	3
EGB1015-E50	2,7	**10**	12	15	3
EGB1210-E50	2,1	**12**	14	10	3
EGB1212-E50	2,5	**12**	14	12	3
EGB1215-E50	3,3	**12**	14	15	3
EGB1220-E50	4,4	**12**	14	20	3
EGB1420-E50	4,9	**14**	16	20	3
EGB1510-E50	2,7	**15**	17	10	3
EGB1515-E50	4	**15**	17	15	3
EGB1525-E50	6,8	**15**	17	25	3
EGB1612-E50	3,3	**16**	18	12	3
EGB1615-E50	4,3	**16**	18	15	3
EGB1620-E50	5,8	**16**	18	20	3
EGB1815-E50	4,7	**18**	20	15	3
EGB1820-E50	6,4	**18**	20	20	3
EGB2015-E50	8,4	**20**	23	15	3
EGB2020-E50	11,2	**20**	23	20	3
EGB2025-E50	14	**20**	23	25	3
EGB2030-E50	16,9	**20**	23	30	3
EGB2220-E50	12,2	**22**	25	20	3
EGB2515-E50	10,3	**25**	28	15	4
EGB2520-E50	13,8	**25**	28	20	4
EGB2525-E50	17,3	**25**	28	25	4
EGB2530-E50	20,8	**25**	28	30	4
EGB2830-E50	34,3	**28**	32	30	4
EGB3020-E50	24,2	**30**	34	20	4
EGB3025-E50	30,4	**30**	34	25	4
EGB3030-E50	36,6	**30**	34	30	4
EGB3040-E50	48,9	**30**	34	40	4
EGB3230-E50	38,9	**32**	36	30	4

[1] No lubrication hole.

Dimension table (continued) · Dimensions in mm					
Designation	Mass m ≈g	Dimensions			
		D_i	D_o	B ±0,25	d_L
EGB3520-E50	28	**35**	39	20	4
EGB3530-E50	42,3	**35**	39	30	4
EGB3550-E50	70,9	**35**	39	50	4
EGB4020-E50	31,8	**40**	44	20	4
EGB4030-E50	48,1	**40**	44	30	4
EGB4040-E50	64,3	**40**	44	40	4
EGB4050-E50	80,5	**40**	44	50	4
EGB4540-E50	95,2	**45**	50	40	5
EGB4550-E50	119	**45**	50	50	5
EGB5025-E50	65,2	**50**	55	25	5
EGB5040-E50	105	**50**	55	40	5
EGB5060-E50	159	**50**	55	60	5
EGB5540-E50	115	**55**	60	40	6
EGB6030-E50	93,4	**60**	65	30	6
EGB6040-E50	125	**60**	65	40	6
EGB6060-E50	189	**60**	65	60	6
EGB7040-E50	145	**70**	75	40	6
EGB7050-E50	182	**70**	75	50	6
EGB7070-E50	256	**70**	75	70	6
EGB7540-E50	155	**75**	80	40	6
EGB7580-E50	313	**75**	80	80	6
EGB8040-E50	166	**80**	85	40	6
EGB8055-E50	229	**80**	85	55	6
EGB8060-E50	250	**80**	85	60	6
EGB8080-E50	334	**80**	85	80	6
EGB9060-E50	280	**90**	95	60	6
EGB10050-E50	258	**100**	105	50	6
EGB10060-E50	310	**100**	105	60	6

Recommended mounting tolerances, see page 27.

Thrust washers

Low-maintenance
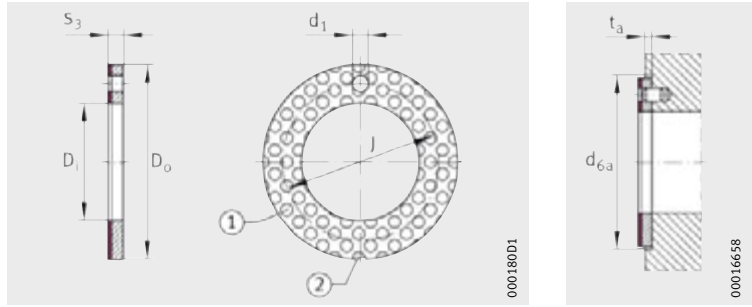
EGW
① Lubrication pockets, ② cutout[1]

Dimension table · Dimensions in mm								
Designation	Mass	Dimensions					Mounting dimensions	
	m	D_i	D_o	s_3	J	d_1	t_a	d_{6a}
	$\approx$g	$\pm0,25$	$-0,25$	$-0,05$	$\pm0,12$	$+0,4$ $+0,1$	$\pm0,2$	$+0,12$
EGW12-E50	2,8	**12**	24	1,5	18	1,5	1	24
EGW14-E50	3,1	**14**	26	1,5	20	2	1	26
EGW18-E50	4,6	**18**	32	1,5	25	2	1	32
EGW20-E50	5,8	**20**	36	1,5	28	3	1	36
EGW22-E50	6,3	**22**	38	1,5	30	3	1	38
EGW26-E50	8,3	**26**	44	1,5	35	3	1	44
EGW28-E50	9,9	**28**	48	1,5	38	4	1	48
EGW32-E50	12,4	**32**	54	1,5	43	4	1	54
EGW38-E50	15,8	**38**	62	1,5	50	4	1	62
EGW42-E50	17	**42**	66	1,5	54	4	1	66
EGW48-E50	30,6	**48**	74	2	61	4	1,5	74
EGW52-E50	32,6	**52**	78	2	65	4	1,5	78

Thrust washers in special sizes available by agreement.

[1] Cutouts permissible on the inside or outside diameter in any quantity and position.

Special designs,
special materials

Special designs, special materials

In addition to the catalogue range of metal/polymer composite plain bearings, there are numerous special designs which are run in either a predominantly rotary direction or a predominantly linear direction. The Schaeffler Group can produce further special designs by agreement.

In addition to the materials named in this Technical Product Information, there are further materials such as the sliding material E60 for film bearings.

For special designs or special materials, please contact the engineering service of the Schaeffler Group.

Special designs
A small selection of special designs already produced is shown below, *Figure 1*, page 62 to *Figure 3*, page 62.

The following special designs are possible:
- made from any plain bearing material
- with different dimensions from the catalogue products
- as combined components
  - pressed into rings
  - with plastic moulded parts
  - bushes with windows and holes
  - bushes with stamped oil grooves
  - blanked components
  - ball cups
  - bearing shells
- in different shapes
- with the sliding layer on the outside
- with different butt joint geometries.

Linear plain bearings
- Linear plain bearings PAB comprise an outer ring with a pressed-in plain bearing bushes EGB..-E50.
  The design PABO has a segment cut out for supported shafts.
- Linear plain bearing units PAGH and PAGBA consist of a housing and a pressed-in linear plain bearing PAB or PABO.
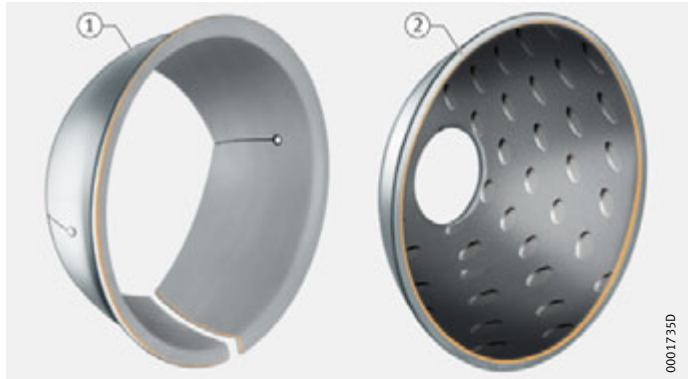
Special designs, special materials

① Bush with external coating
② Pivoting cradle bearing

Figure 1
Special designs
with external coating

① Maintenance-free
② Low-maintenance

Figure 2
Ball cups

① Linear plain bearing
PAB..-PP-AS
② Linear plain bearing unit
PAGBAO..-PP-AS

Figure 3
Linear plain bearings

Possible special designs

⚠ The feasibility of special designs should be checked as early as possible. This applies to the geometry and also to the costs.

| Special materials | By agreement, Schaeffler Group supplies film bearings with the material E60. This maintenance-free special material also conforms to the regulations for lead-free plain bearings as stated in the Technical Principles. |

Film bearings E60 E60 is the new plain bearing material of Schaeffler Group Industrial for maintenance-free film bearings. The metal/polymer composite consists of a bronze rib mesh that is filled with a dry lubricant made from polytetrafluorethylene PTFE with embedded chemically non-reactive additives.

Structure The material consists of a rib mesh and a sliding layer, *Figure 4*.

A sliding layer made from PTFE is rolled into and sintered into the rib mesh. The mesh thus functions as both a carrier and a sliding layer.

000170A4
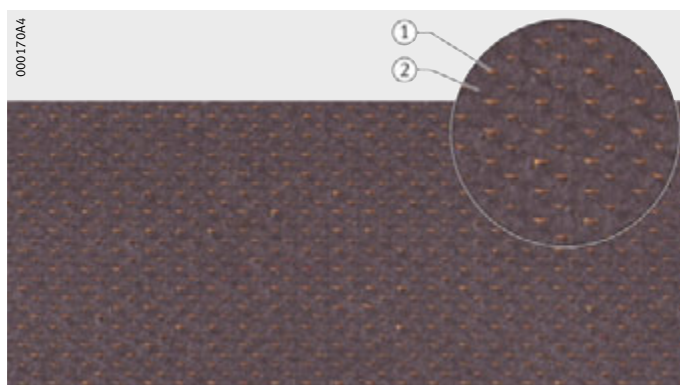
① Rib mesh
② Sliding layer

Figure 4
Maintenance-free
plain bearing material E60

Rib mesh and sliding layer

Chemical element	Proportion of mass w %	
	Rib mesh	Sliding layer
Tin Sn	6	–
Copper Cu	94	–
Polytetrafluoroethylene PTFE	–	86
Fillers	–	14

Film thickness The plain bearing material is available in a film thickness of 0,5 mm.

Technical data for E60 For the important mechanical and physical characteristics of the maintenance-free plain bearing material E60, see table.

Data

Characteristics	Loads		
Permissible specific bearing load	Static	p	$100 \, N/mm^2$
	Dynamic	p	$80 \, N/mm^2$
Permissible sliding speed		v_{max}	1 m/s
Permissible operating temperature		ϑ	−200 °C to +260 °C