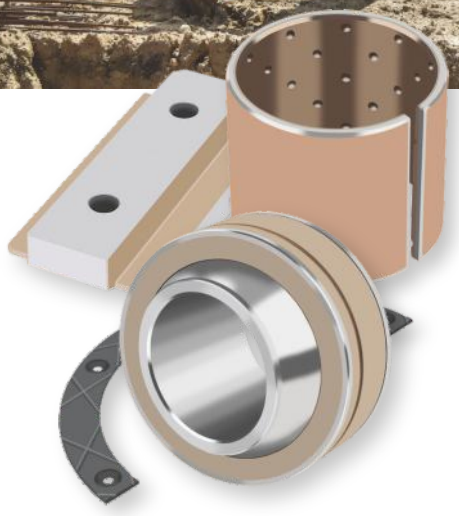
GGB
BY TIMKEN



GGB-CSM® and GGB-CBM®

SELF-LUBRICATING LEAD-FREE METAL AND BIMETAL BEARING SOLUTIONS

Content

Product Information

GGB gives an assurance that the products described in this document have no manufacturing errors or material deficiencies.

The details set out in this document are registered to assist in assessing the material's suitability for the intended use. They have been developed from our own investigations as well as from generally accessible publications. They do not represent any assurance for the properties themselves.

Unless expressly declared in writing, GGB gives no warranty that the products described are suited to any particular purpose or specific operating circumstances. GGB accepts no liability for any losses, damages or costs however they may arise through direct or indirect use of these products.

GGB's sales and delivery terms and conditions, included as an integral part of quotations, stock and price lists, apply absolutely to all business conducted by GGB. Copies can be made available on request.

Products are subject to continual development. GGB retains the right to make specification amendments or improvements to the technical data without prior announcement.

Edition 2023 (This edition replaces earlier editions which hereby lose their validity).

Statement Regarding Lead Content in GGB Products and EU Directive Compliance

GGB is committed to adhering to all U.S., European and international standards and regulations with regard to lead content. We have established internal processes that monitor any changes to existing standards and regulations, and we work collaboratively with customers and distributors to ensure that all requirements are strictly followed. This includes RoHS and REACH guidelines.

GGB makes it a top priority to operate in an environmentally conscious and safe manner. We follow numerous industry best practices, and are committed to meeting or exceeding a variety of internationally recognized standards for emissions control and workplace safety.

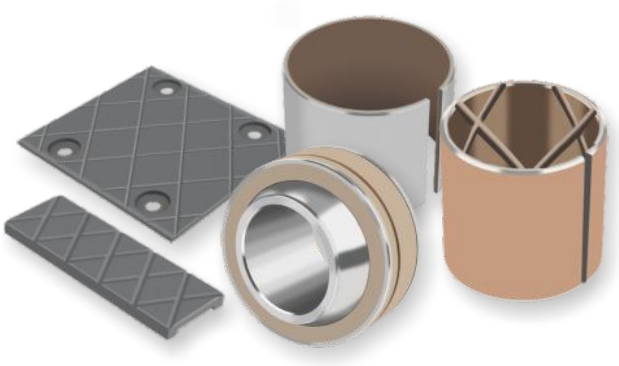
Each of our global locations has management systems in place that adhere to ISO TS 16949, ISO 9001, ISO 14001, ISO 50001 and ISO 45001 quality regulations.

All of our certificates can be found here: https://www.ggbearings.com/en/certificates
A detailed explanation of our commitment to REACH and RoHS directives can be found at https://www.ggbearings.com/en/who-we-are/quality-and-environment

GGB-CSM® and GGB-CBM®

Today's equipment and systems place high demanding operating (or running or working, etc) conditions. The bearings should work with minimal or no maintenance, but also they are expected to ensure increased reliability, longer durability and lower operating costs.

The self-lubricating, maintenance-free GGB-CSM® and GGB-CBM® plain bearings have been designed for users with high specific loads, long idle times under static load, and low sliding speeds, as well as in applications for which customary lubrication is not possible. Furthermore, they can be used to replace existing lubricated bearings.



SELF LUBRICATING MATERIALS

GGB-CSM® and GGB-CBM® materials are powder-metallurgic manufactured self-lubricating materials with homogeneously distributed solid lubricant in a metallic matrix such as bronze. Formation of a lubricating film during the relative movement makes these materials self-lubricating and maintenance-free.

- Self-lubricating and maintenance free performance
- High load capacity
- Wide temperature range operation
- Resistance to abrasive environments
- Lead free alloys are available

CHARACTERISTICS

Available as solid material GGB-CSM® or as bimetal GGB-CBM® (lubricating layer sintered on metallic bearing material), the features of these materials are:

- High load capacity
- Good frictional properties
- Wide temperature range operation
- Resistant to abrasive environments
- Compatible with additional lubricant
- Machinable
- Available in special shaped parts

RECOMMENDED MARKET APPLICATIONS*

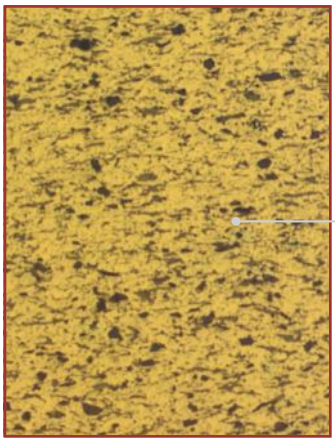
GGB-CSM® and GGB-CBM® bearings are perfectly suited to a wide range of applications, such as:

- General mechanical engineering
- Steelworks and Civil engineering
- Water, steam and gas turbines
- Pumps and compressors
- Iron, steel and aluminum industry
- Food and beverage industry
- Packaging machines
- Mining and excavation equipment
- Handling devices
- Agricultural and construction equipment
- Injection molding machines
- Tyre molds
- Offshore and marine applications

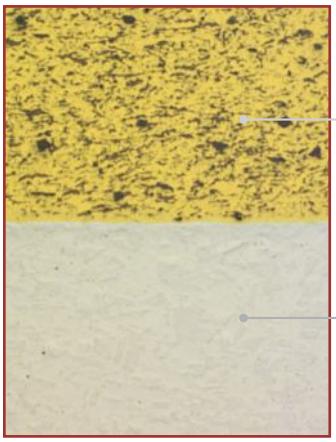
*Inquire with GGB Applications Engineering Team for other possible applications.

MATERIAL STRUCTURE

MICROSECTION - GGB-CSM®



MICROSECTION - GGB-CBM®



DRY-RUNNING OPERATION

A thin film of solid lubricant coats the counter surface and remains in place during the entire lifetime of the bearing. The type and amount of solid lubricant has a significant effect on the tribological characteristics of the sliding material. The mainly used lubricants are graphite and MoS_2, where graphite can be used in different structures from fine-grained to coarse-grained.

Available Designs

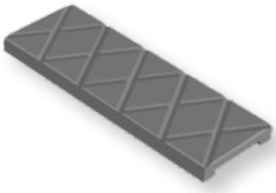
We offer extensive technical expertise and state-of-the-art testing capabilities to optimize application-specific bearing solutions. CSM® and CBM® materials are available by special order to customer-supplied designs and drawings.

Contact GGB Sales for your product consultation/selection or visit **www.ggbearings.com**

GGB-CSM® Bearing with Cleaning Grooves

GGB-CSM® Bearing with Cleaning Grooves

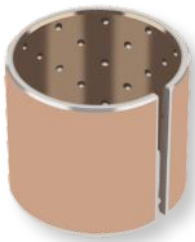
GGB-CSM® Bearing



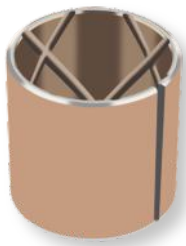
GGB-CSM® Sliding Plate

GGB-CSM® Spherical Bearing

GGB-CBM® Cylindrical Bearing

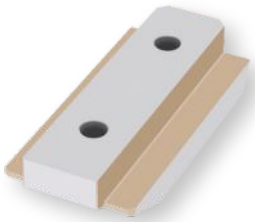


GGB-CBM® Bearing with Lubrication Indents

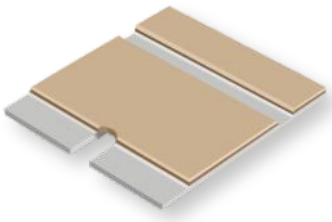


GGB-CBM® Bearing with Cleaning Grooves

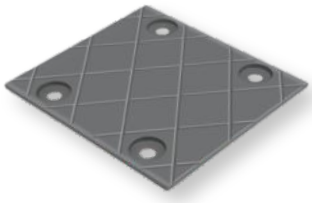
GGB-CBM® with Welded Gap



GGB-CBM® T-Piece



GGB-CBM® Sliding Plate



GGB-CBM® Sliding Plate

GGB-CBM® Axial and Radial Segment Rings

Material Properties

5.1 MECHANICAL PROPERTIES GGB-CSM®

MECHANICAL PROPERTIES	UNITS	GGB-CSM®101 GGB-CSM®107 GGB-CSM®108	GGB-CSM®103 GGB-CSM®109 GGB-CSM®110	GGB-CSM®105 GGB-CSM®161 GGB-CSM®162	GGB-CSM®172	GGB-CSM®118	GGB-CSM®124	GGB-CSM®125
Tensile strength R_m	MPa	57	55	85	90	85	60	70
Compressive strength σ_c	MPa	310	250	350	400	560	405	385
Minimum hardness	HB	45	50	65	50	80	45	40
Coefficient of thermal expansion α	10^{-6}/K	18	18	18	18	13	15	16
Density ρ	kg/dm³	6,3	6,2	6,4	6,7	6,0	6,0	6,2
Metallic matrix	-	Bronze	Bronze	Bronze	Bronze	Fe - Ni	Ni	Ni - Cu
ρ_{max} static -dynamic	MPa	200 100	180 90	230 115	260 130	155 70	100 55	110 55
Maximum sliding speed U_{max}	m/s	0,5	0,35	0,35	0,5	0,2	0,2	0,2
Max. pU value - dry	MPa x m/s	1,5	1,5	1,5	1,5	1,0	0,8	0,8
Coeff. of friction f - dry	-	0,12 - 0,18	0,11 - 0,16	0,12 - 0,18	0,14 - 0,20	0,25 - 0,45	0,24 - 0,45	0,28 - 0,50
Coeff. of friction f - water	-	0,11 - 0,16	0,11 - 0,14	0,11 - 0,17	0,08 - 0,18	n/a	n/a	n/a
Operating temp. T_{max}	°C	150/350/350	150/350/350	150/350/350	150	650	200	450
Operating temp. T_{min}	°C	-100	-100	-100	-100	0	-200	-200
MATING MATERIAL								
Hardness	-	>180 HB	>35 HRC	>35 HRC	>180 HB	>45 HRC	>45 HRC	>45 HRC
Surface roughness, ground, Ra	µm	0,2 - 0,8	0,2 - 0,8	0,2 - 0,8	0,2 - 0,8	0,2 - 0,8	0,2 - 0,8	0,2 - 0,8

Table 1: Mechanical properties of GGB-CSM

5.2 TYPICAL APPLICATIONS OF GGB-CSM®

ALLOY	APPLICATION	CHARACTERISTICS
GGB-CSM® 101	General	Standard material for general engineering
GGB-CSM® 105/161/162	Iron, steel, aluminum industry	High abrasion and temperature resistance
GGB-CSM® 172	Civil engineering	High load, corrosion and sea-water resistance
GGB-CSM® 101	Food and beverage machines	Long runtime
GGB-CSM® 105	Heavy industry	High load and abrasion resistance
GGB-CSM® 118	Furnace construction	High temperature resistance
GGB-CSM® 125	Exhaust or smoke flaps	High temperature and corrosion resistance

Table 2: Typical Applications for GGB-CSM

5.3 MECHANICAL PROPERTIES GGB-CBM®

MECHANICAL PROPERTIES	UNITS	GGB-CBM®301 GGB-CBM®302	GGB-CBM®411 GGB-CBM®412	GGB-CBM®421 GGB-CBM®422	GGB-CBM®441 GGB-CBM®442
Tensile strength R_m	MPa	500-700	500-700	270-350	500-700
Compressive strength σ_c	MPa	320	320	300	300
Minimum hardness	HB	40	40	40	40
Coefficient of thermal expansion α	10^{-6}/K	16	16	12	16
Density ρ	kg/dm³	6,5	6,5	6,5	6,5
Metallic matrix	-	Bronze	Bronze	Bronze	Bronze
ρ_{max} static	MPa	320	290	260	290
ρ_{max} -dynamic	MPa	150	80	100	100
Maximum sliding speed U_{max}	m/s	0,3	0,5	0,5	0,5
Max. pU value - dry	MPa x m/s	0,5	1,0	1,0	1,0
Coeff. of friction f - dry	-	0,10 - 0,20	0,10 - 0,20	0,10 - 0,20	0,10 - 0,20
Coeff. of friction f - water	-	0,10 - 0,15	0,10 - 0,15	n/a	0,10 - 0,15
Operating temp. T_{max}	°C	280	280	280	280
Operating temp. T_{min}	°C	-150	-150	-150	-150
Backing Material	-	1.4301*	1.4301*	1.0338*	1.4301*
MATING MATERIAL					
Hardness	HB	>180	>180	>250	>250
Surface roughness, ground, Ra	µm	0,2 - 0,8	0,2 - 0,8	0,2 - 0,8	0,2 - 0,8

Table 3: Mechanical Properties of GGB-CBM

*Possible alternative bearing materials: sea-water resistant steel or bronze.
Specific properties available on request

5.4 TYPICAL APPLICATIONS OF GGB-CBM®

ALLOY	APPLICATION	CHARACTERISTICS
GGB-CBM® 412	General	Standard material for general engineering
GGB-CBM® 422/442	Iron, steel, aluminum industry	High abrasion resistance
GGB-CBM® 302	Civil engineering	High load and corrosion resistance
GGB-CBM® 442	Food and beverage machines	High sliding speeds
GGB-CBM® 422/442	Heavy industry	High load and abrasion resistance

Table 2: Typical Applications for GGB-CSM

5.5 CHEMICAL RESISTANCE OF GGB-CSM® / GGB-CBM®

CHEMICAL SUBSTANCE	GGB-CSM® ALL WITH BRONZE MATRIX	GGB-CSM®118	GGB-CSM®124	GGB-CSM®125	GGB-CBM® WITH CARBON STEEL BACKINGS	GGB-CBM® WITH STAINLESS STEEL BACKINGS 1.4301
BASES						
Ammoniac	-	+	+	+	-	-
Potassium Hydroxide	+	+	+	+	-	+
Sodium Hydroxide	+	+	+	+	-	+
GASES						
Ammoniac Gas	o	+	-	o	-	o
Chlorine Gas	-	-	-	o	-	-
Fluorine	-	o	+	+	-	-
Carbon Dioxide	+	o	o	-	-	+
Sulfur Dioxide	+	-	o	o	-	+
Hydrogen Sulfide	o	-	o	+	-	o
Nitrogen	+	+	+	+	-	+
Hydrogen	+	+	+	+	-	+
SOLVENTS						
Acetone	+	+	+	+	-	+
Ethyl Acetate	+	+	+	+	-	+
Ethyl Alcohol	+	+	+	+	-	+
Ethyl Chloride	+	-	+	+	-	+
Glycerin	+	+	+	+	o	+
Carbon Tetrachloride	+	+	+	+	-	+
SALTS						
Ammonium Nitrate	_	o	-	-	-	-
Calcium Chloride	+	+	+	+	-	+
Magnesium Chloride	+	o	o	o	-	+
Magnesium Sulfate	+	o	o	o	-	+
Sodium Chloride	+	o	o	+	-	+
Sodium Nitrate	+	+	o	+	-	+
Zinc Chloride	-	-	o	-	-	-
Zinc Sulfate	+	o	o	-	-	+

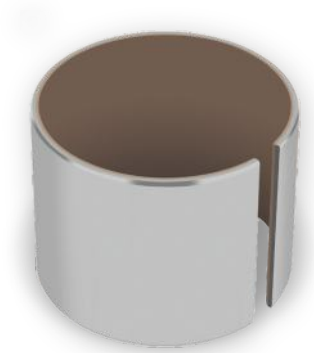
Definitions:
+ recommended **o** acceptable **-** not recommended

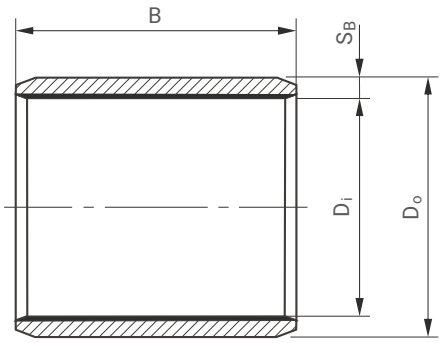
CHEMICAL SUBSTANCE	GGB-CSM® ALL WITH BRONZE MATRIX	GGB-CSM®118	GGB-CSM®124	GGB-CSM®125	GGB-CBM® WITH CARBON STEEL BACKINGS	GGB-CBM® WITH STAINLESS STEEL BACKINGS 1.4301
WEAK ACIDS						
Formic Acid	+	-	o	+	-	+
Boric Acid	+	-	+	+	-	+
Acetic Acid	+	-	o	+	-	+
Citric Acid	+	o	+	+	-	+
STRONG ACIDS						
Hydrofluoric Acid	o	o	+	+	-	o
Phosphoric Acid	+	-	o	o	-	+
Nitric Acid	-	-	-	-	-	-
Hydrochloric Acid	o	-	o	o	-	-
Sulfuric Acid	+	-	+	+	-	+
LUBRICANTS AND FUELS					-	
Gasoline	+	+	+	+	+	+
Diesel Fuel	+	+	+	+	+	+
Heating Oil	+	+	+	+	+	+
HFA - ISO46 Oil-Water Emulsion	+	+	+	+	+	+
HFC - Water-Ethylene	+	+	+	+	+	+
HFD - Phosphate Ester	+	+	+	+	+	+
Mineral Oil	+	+	+	+	+	+
Paraffin	+	+	+	+	+	+
OTHERS						
Zinc Chloride	+	+	+	+	+	+
Hydrocarbon	+	+	+	+	-	+
Sea Water	+	+	+	+	-	+
Water	+	+	+	+	-	+

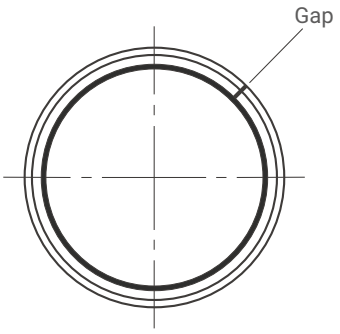
Table 5: Chemical resistance of GGB-CSM and GGB-CBM

Dimensions

6.1 GGB-CBM® CYLINDRICAL PLAIN BEARINGS







DIMENSIONS OF CYLINDICAL GGB-CBM® PLAIN BEARINGS [MM]

Inner Ø D_i	Outer Ø D_o	Wall thickness S_B	Width B									
			10	15	20	25	30	40	50	60	70	80
10	12	1,0	●	●								
12	14		●	●								
14	16		●	●	●							
15	17		●	●	●							
16	18		●	●	●							
18	20		●	●	●	●						
20	23	1,5	●	●	●	●	●					
22	25			●	●	●	●					
24	27			●	●	●	●					
25	28			●	●	●	●					
28	32	2,0		●	●	●	●	●				
30	34			●	●	●	●	●				
32	36				●	●	●	●				
35	39				●	●	●	●	●			
36	40				●	●	●	●	●			
38	42				●	●	●	●	●			
40	44				●	●	●	●	●	●		
42	46					●	●	●	●	●		
45	50	2,5				●	●	●	●	●		
50	55					●	●	●	●	●	●	
55	60						●	●	●	●	●	●
60	65						●	●	●	●	●	●
65	70							●	●	●	●	●
70	75							●	●	●	●	●

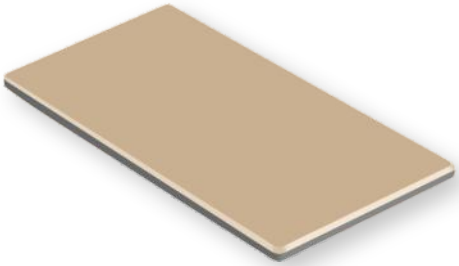
Table 6: Dimensions of cylindrical GGB-CBM plain bearings

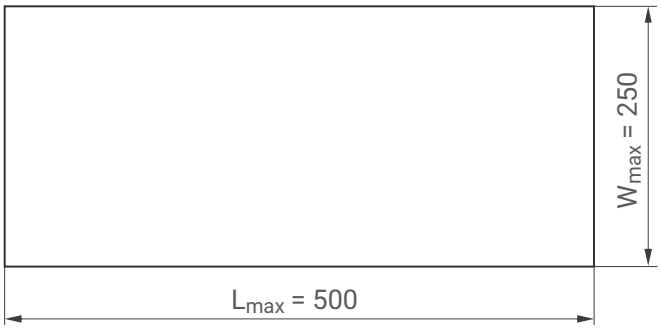
DIMENSIONS OF CYLINDICAL GGB-CBM® PLAIN BEARINGS [MM]

Inner Ø D_i	Outer Ø D_o	Wall thickness S_B	Width B										
			50	60	70	80	100	120	140	150	160	180	200
75	81	3,0	●	●	●	●	●						
80	86		●	●	●	●	●	●					
85	91		●	●	●	●	●	●					
90	96		●	●	●	●	●	●					
95	101		●	●	●	●	●	●	●				
100	106		●	●	●	●	●	●	●	●			
105	111			●	●	●	●	●	●	●			
110	116			●	●	●	●	●	●	●	●		
115	121			●	●	●	●	●	●	●	●		
120	126			●	●	●	●	●	●	●	●	●	
125	131				●	●	●	●	●	●	●	●	
130	136				●	●	●	●	●	●	●	●	
135	141				●	●	●	●	●	●	●	●	●
140	146				●	●	●	●	●	●	●	●	●
145	151					●	●	●	●	●	●	●	●
150	156					●	●	●	●	●	●	●	●
160	166					●	●	●	●	●	●	●	●
180	186						●	●	●	●	●	●	●
200	206						●	●	●	●	●	●	●
220	226	5,0					●	●	●	●	●	●	●
240	246						●	●	●	●	●	●	●
250	260						●	●	●	●	●	●	●

More dimensions and alternative sizes on request.
Bore tolerance after installation: D_i 10 - 18 mm = H9,
D_i 20 - 42 mm =H8, D_i 45 - 250 mm = H8 (Precision) / H9 (Standard)

6.2 GGB-CBM® SLIDING PLATES





Available in common thicknesses of:

- 2,5 mm, 3,0 mm, 5,0 mm and 10,0 mm. Additional plate thicknesses S_S up to over 30 mm can be manufactured.
- Sliding layer thicknesses S_L of 0,5 mm to 6 mm.
- Other dimensions on request.

Mating Material

The performance of the GGB-CSM® and GGB-CBM® bearings is directly dependant on the surface roughness and hardness, as well as the material type of the mating surface.

The required specifications for hardness and surface roughness are provided in the tables "Mechanical Properties" on pages 8 and 9. Suitable mating materials are stainless steel and carbon steel according to the operation conditions.

It is recommended that the use of non-ferrous materials or steels with special coatings needs to be confirmed by tests.

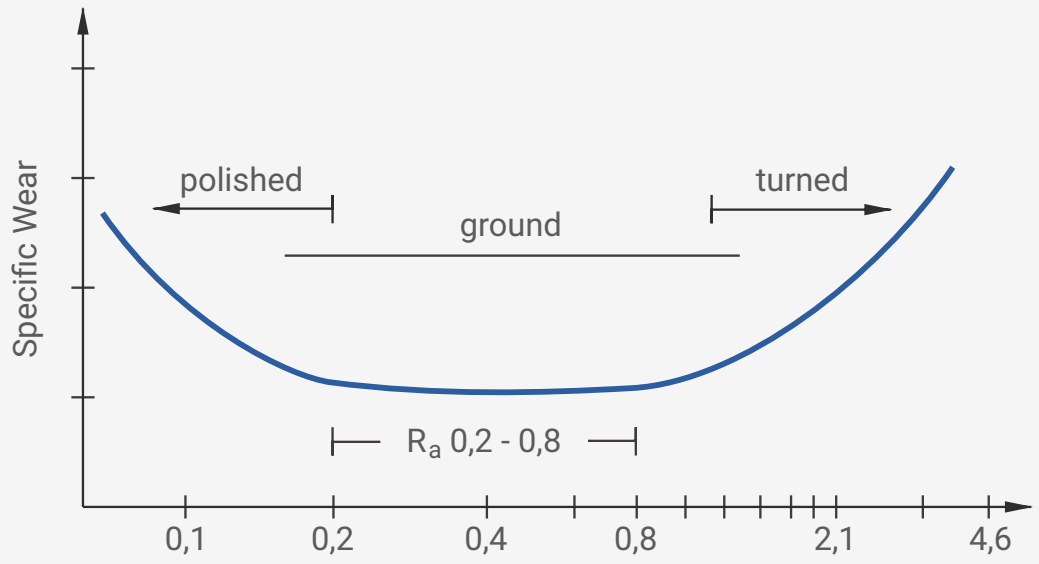


Illustration of test results based on various trials

Fig. 3: Influence of surface roughness on the wear rate

7.1 POSSIBLE MATING MATERIALS

MATCHING MATERIALS FOR GENERAL APPLICATIONS				
Material Number	DIN Designation	Comparable standards USA - ANSI	GB - B.S. 9 70	F - AFNOR
1.0543	ZSt 60-2	Grade 65	55C	A60-2
1.0503	C45	1045	080M46	CC45
7.225	42CrMo4	4140	708M40	42CD4

Table 7: Mating materials for normal applications

MATING MATERIALS FOR CORROSIVE ENVIRONMENTS				
Material Number	DIN Designation	Comparable standards USA - ANSI	GB - B.S. 9 70	F - AFNOR
1.4021	X20Cr13	420	420S37	Z20C13
1.4057	X17CuNi-16.2	431	431S29	Z15CN16.02
1.4112	X90CrMoV18	440B	-	(Z70CV17)
1.4122	X35CrMo17-1	-	-	-

Table 8: Mating materials for corrosive environments

MATING MATERIALS FOR SEA WATER APPLICATIONS				
Material Number	DIN Designation	Comparable standards USA - ANSI	GB - B.S. 9 70	F - AFNOR
1.4460	X3CrNiMoN27-5-3	329	-	-
1.4462	X2CrNiMoN22-5-3	UNS531803	318513	Z3CND24-08
2.4856	Inconel 625	-	-	-

Table 9: Mating materials for sea water applications

Bearing Installation

8.1 INSTALLATION OF GGB-CSM® PLAIN BEARINGS BY PRESS IN

Cylindrical plain bearings should be assembled into the housing by using a hydraulic or screw press with an appropriate press tool as shown in figure 4. To avoid damage to the bearing damage, the press in force must be applied evenly on the side face of the bearing. Hitting the bearing, for example by a hammer, is not permitted as damage to the bearing can be caused. During assembly, the bearing inner diameter will be reduced by an amount equal to the value of interference between the bearing outer diameter and housing inner diameter. This reduction has been taken into consideration when the recommended tolerances of housing inner diameter D_h and shaft outer diameter D_S indicated in table 10 are followed.

RECOMMENDED TOLERANCES*	
Housing Ø **D_h**	**H7**
Shaft Ø **D_s**	**h7**
Bearing outer **D_o**	**r6**
Bearing inner **D_I**	prior to installation **C7** after installation **D8**

Table 10: Recommended tolerances

* for temperatures up to 100°C
For temperatures above 100°C or special tolerances, please contact our application engineering department.

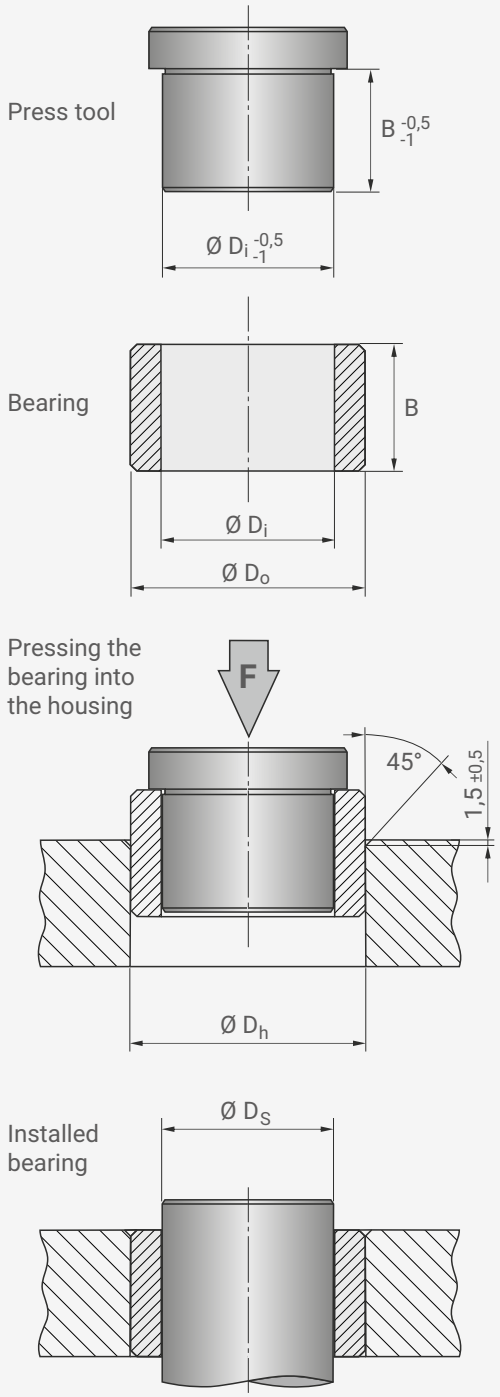


Fig. 4: Installation of GGB-CSM bearing

8.2 FIXATION OF GGB-CSM® SLIDING PLATES USING COUNTERSUNK SCREWS

Preparation

The thread holes should be machined in the housing part according to ISO Standard. Before installation, the sliding plate has to be tightly fixed with the housing part using suitable clamping tools (e.g. clamping tongs).

Installation

Fix the sliding plate with a countersunk screw.

Additional screw securing

If required the screws may be secured with metal adhesives like "Loctite 603". The instructions from the manufacturer must be adhered to.

Maximum wear depth: $w_{max} = S - a - k$

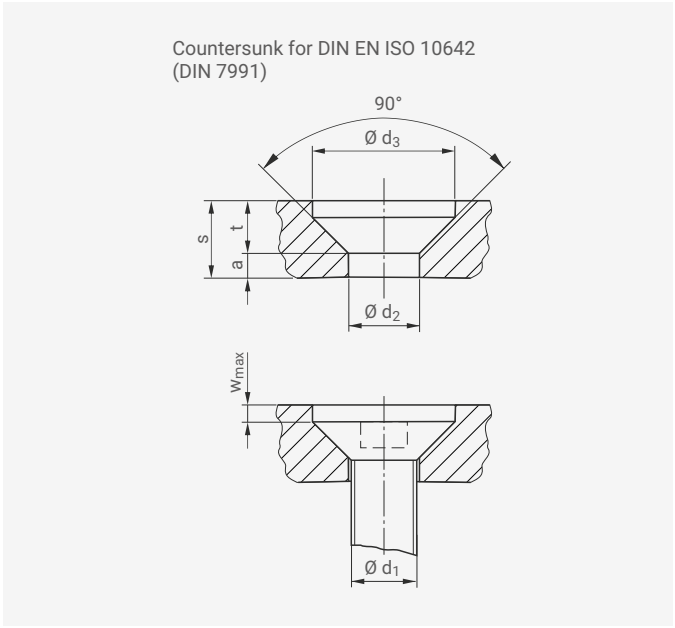


Fig. 5: Countersunk for DIN EN ISO 10642

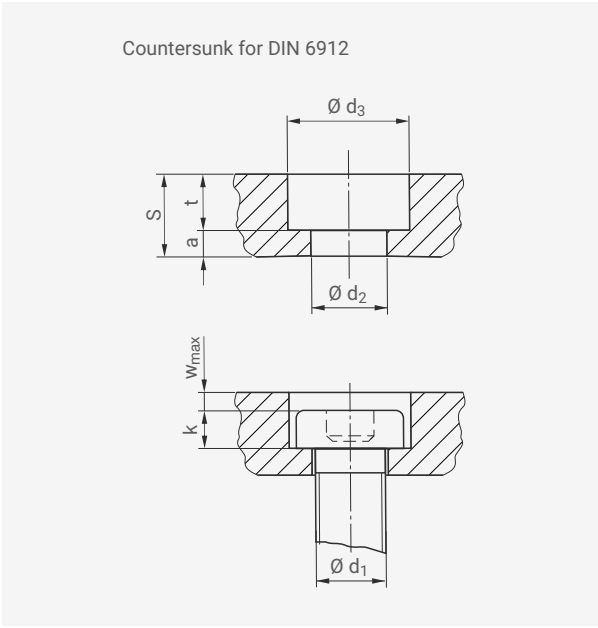


Fig. 6: Countersunk for DIN 6912

DIN EN 10642	BORE IN SLIDING PLATE			
d_1	d_2	d_3	$\sim a_{min}$	$\sim s_{min}$
M6	6,6	14	3	8
M8	9	18,5	4	10
M10	11	23	5	12
M12	13,5	27,5	6	15
M16	17,5	34,5	8	18
M20	22	41	10	21

Table 11: Dimensions for bore in sliding plate according to DIN EN ISO 10642

DIN 6912	BORE IN SLIDING PLATE			
d_1	d_2	d_3	$\sim a_{min}$	$\sim s_{min}$
M6	6,6	11	3	8
M8	9	15	4	10
M10	11	18	5	13
M12	13,5	20	6	15
M16	17,5	26	8	20
M20	22	33	10	24

Table 12: Dimensions for bore in sliding plate according to DIN 6912

8.3 MECHANICAL FIXING OF GGB-CSM® PLAIN BEARINGS

In addition to the standard press fit, mechanical fixing should be employed if the bearing operates:

– at temperatures above 130°C, or,

– with large temperature variations, or,

– with high alternating loads due to vibration, impact or edge loading.

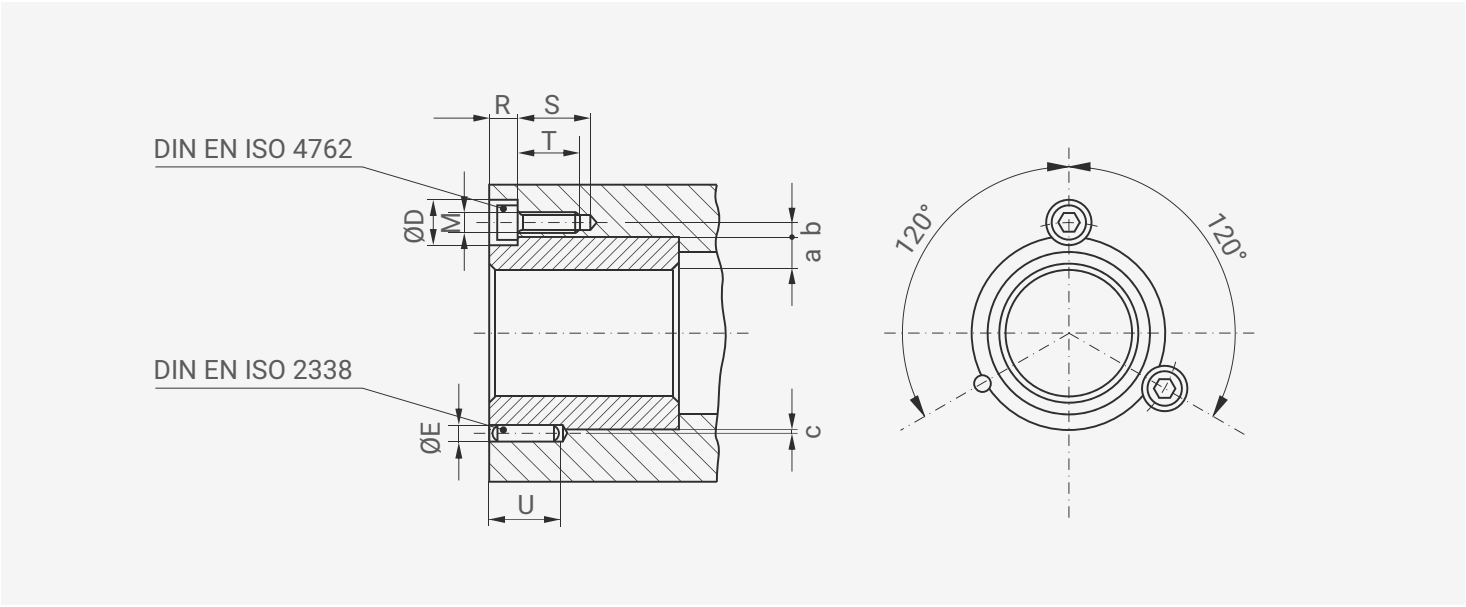


Fig. 7: Combined fixing against rotary and translational displacement

a	DIN EN ISO 4762						DIN EN ISO 2338			
	M	b	ØD	R	S	T	E_{PIN}	ØE*	U	C
<5	M6 x 12	3,5	11	7	19	14	4_{m6}	4 H7	16	0,8
5-7	M8 x 16	4,5	14	9	25	18	5_{m6}	5 H7	18	1
≥7	M10 x 20	6	17	11	28	22	6_{m6}	6 H7	20	1,2

Table 13: Dimensions for fixing against rotary and translational displacement *drilled with drilling jig

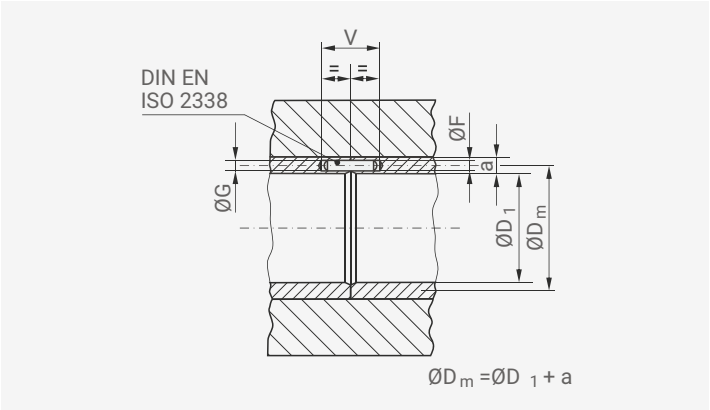


Fig. 8: Fixing against rotary displacement of split bearing

a	DIN EN ISO 2338			
	F_{Pin}**	ØF	G	V
<8	3_{m6}	3 H7	3,5	16
8-12	4_{m6}	4 H7	4,5	18
≥12	5_{m6}	5 H7	5,5	80

Table 14: Dimensions for fixing split bearings
**cylinder pins should be inserted with metal adhesive, e.g. Loctite 603

8.4 INSTALLATION OF GGB-CBM® PLAIN BEARINGS BY PRESS IN

Radial bearings should be pressed into the housing using a hydraulic or screw press together with pressing tools as shown on the figure 9. Lightly oiling the inside of the housing bore can assist the assembly of the bearing. The press-in force has to be applied evenly. Installation by using a hammer will damage the bearing and is not permitted. The bearing will deform, reducing the bore by an amount equal to a part of the measure of interference with the housing. This has been considered in the following tolerance table.

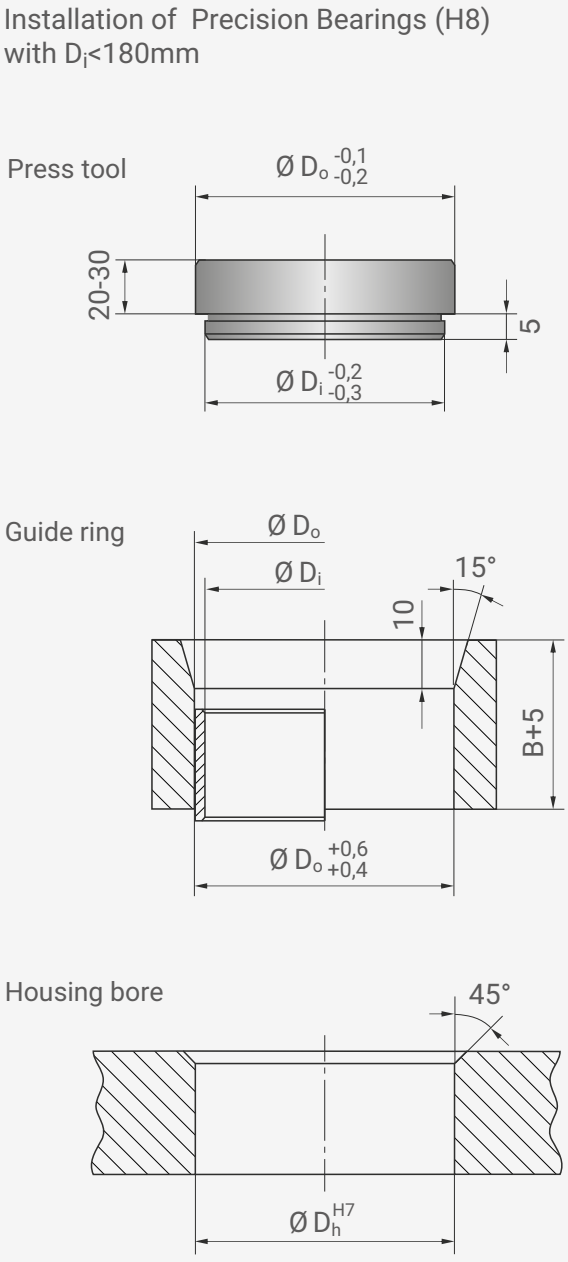


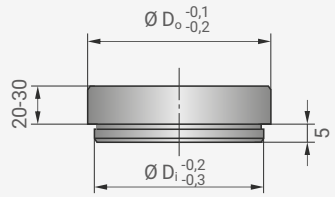
Fig. 9: Installation of GGB-CBM Plain Bearings

RECOMMENDED TOLERANCES	
Housing Ø **D_h**	**H7**
Shaft Ø **D_I**	**c7, d7, e7**
Bearing inner Ø **D_h**	after installation: **H8,** (Precision ≥ 20mm) **H9** (standard)

Table 15: Recommended tolerances for installing precision bushes

Installation of:

– H9 standard bearings – H8 precision bearings $D_i \geq 180...<550$ mm – Bearings with machining allowance

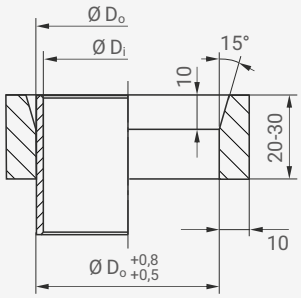


Press Tool

for standard and precision plain bearings

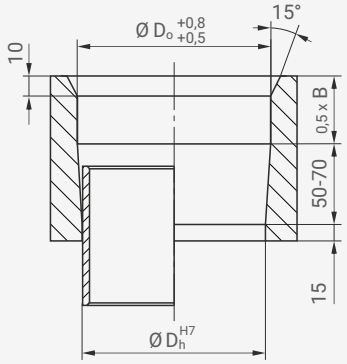
for bearings with machining allowance

D_i must be reduced accordingly



Support ring

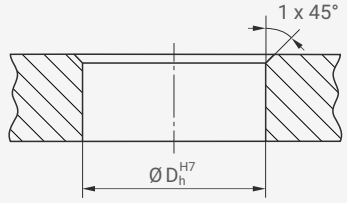
only for longer bearings **B / D_o >2**



Guide Ring

made of cast iron or carbon steel,

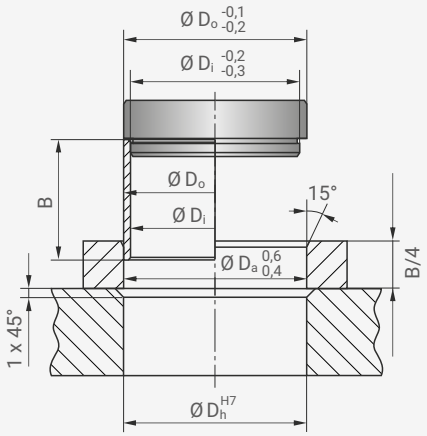
for regular use, use tempered steel



Housing Bore

Slightly oiling of the housing bore

might be favorable



Installation of large-size bearings > 550 mm

Press Tool

Guide Bush

Housing Bore

Slightly oiling of the housing bore

might be favorable

Fig. 10: Installation of GGB-CBM Plain Bearings

8.5 FIXATION OF GGB-CBM® SLIDING PLATES USING COUNTERSUNK SCREWS

Preparation

The tapping drill hole, countersunk bore and thread should be machined in the housing part according the figure 11. Before installation, the sliding plate has to be tightly fixed with the housing part using suitable clamping tools (e.g. clamping tongs).

Installation

The sliding plate must be fixed with EN ISO 10642 countersunk screws.

Additional screw securing

If required the screws may be secured with metal adhesives like “Loctite 603”.

The instructions from the manufacturer must be adhered to.

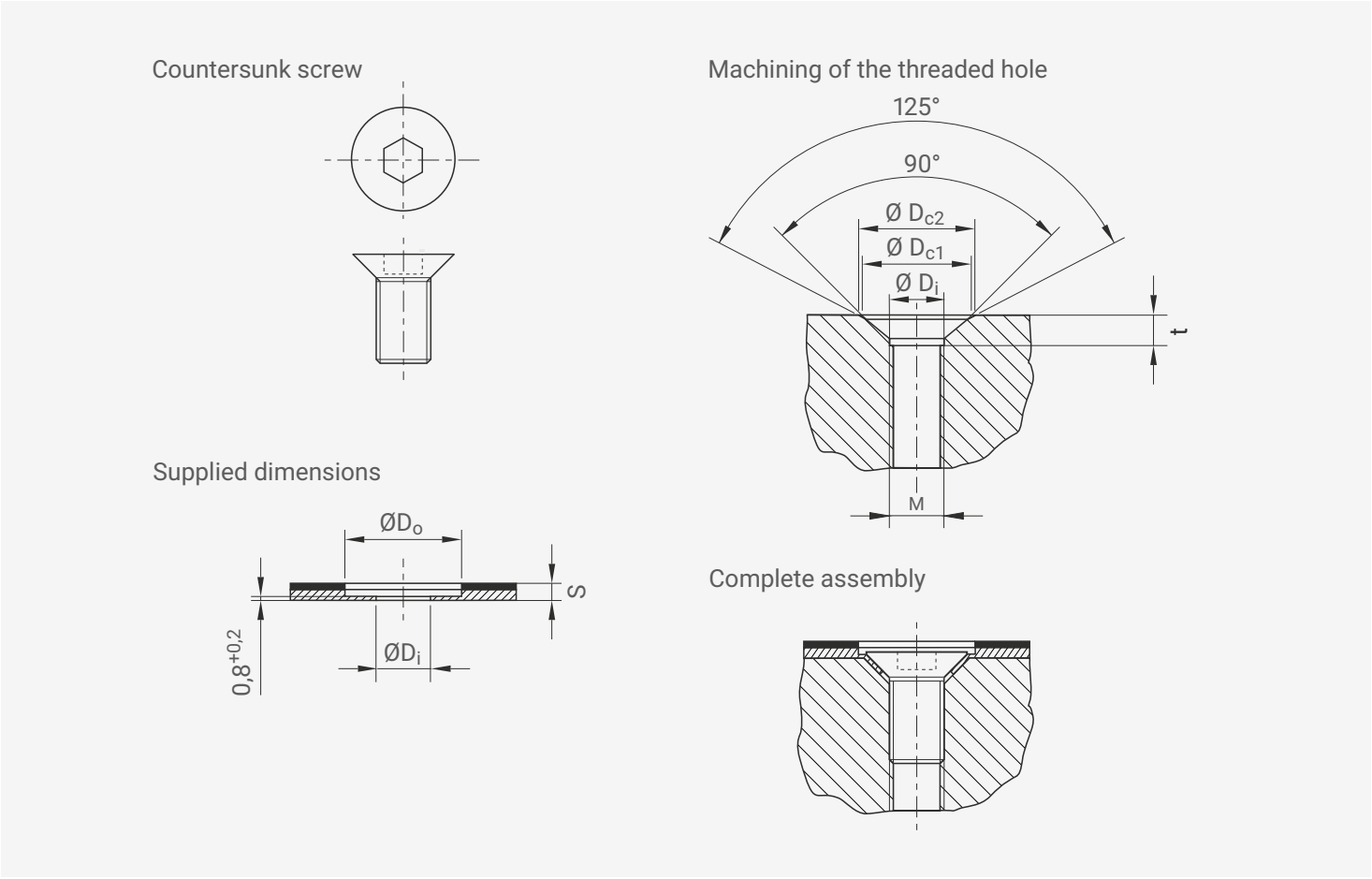


Fig. 11: Fixation of GGB-CBM sliding plates using countersunk screws

DIN EN ISO 4762	SLIDING PLATE BORE			HOUSING PART BORE		
M	D_i	D_o	S	D_{c1}	D_{c2}	t_{min}
M6	6,4	16	1,5 / 2 / 2,5 / 3 / 5	14	15	5
M8	8,4	20	1,5 / 2 / 2,5 / 3 / 5	18	19	6
M10	10,5	25	2 / 2,5 / 3 / 5	22	23	8

Table 16: Bore dimensions for the fixing of sliding plates

8.6 QUANTITY AND POSITIONING OF SCREWS IN GGB-CBM® SLIDING PLATES

Number of screws

The number and size of screws depends on the occurring forces and the resulting shearing forces.
The following guidelines are based on experience in the field for recommended screw sizes M6 to M10.

Screw positioning

The holes should be equally distributed as shown in the example drawings. It's important to fix each corner of the sliding plate in order to avoid distortion in these areas.

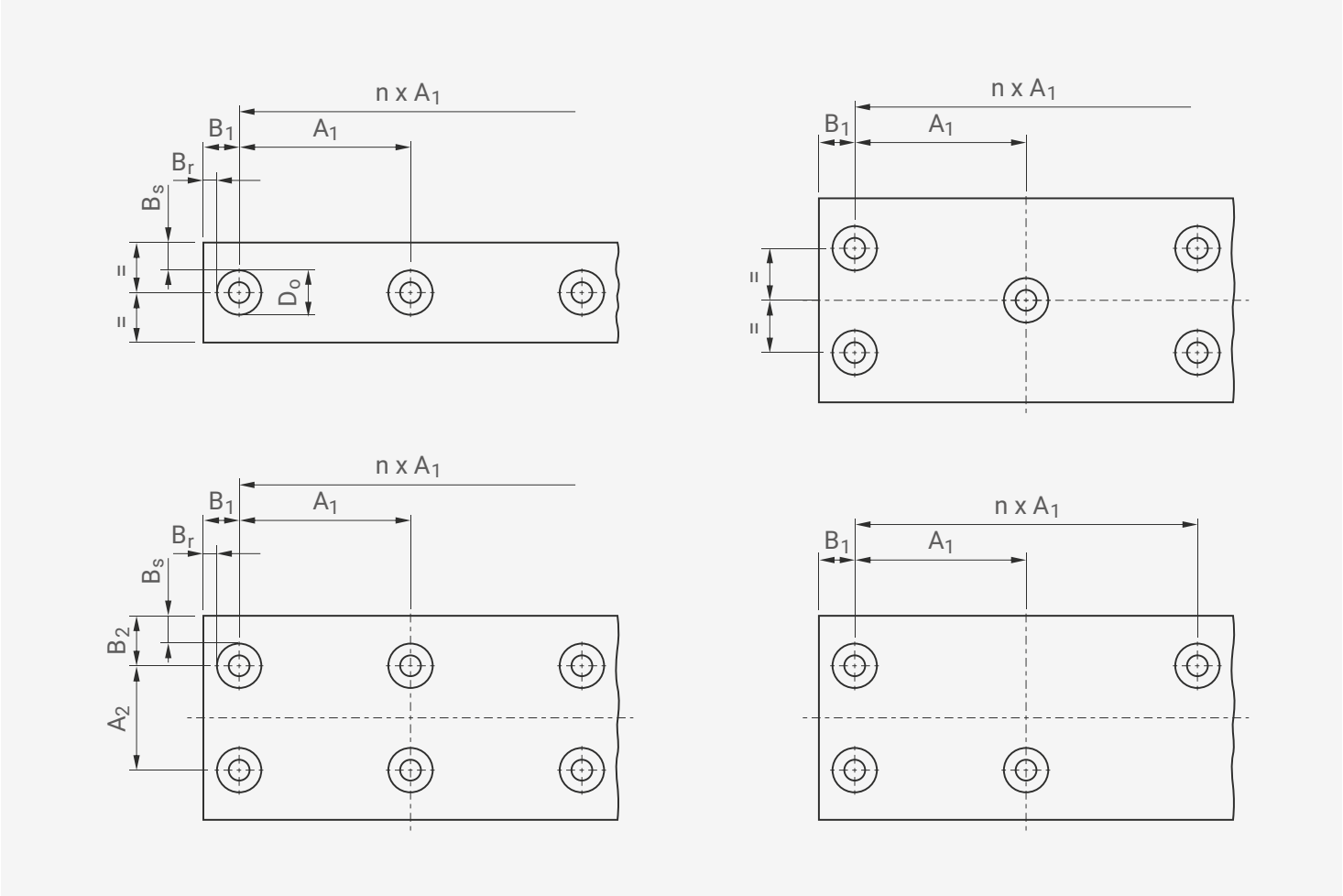


Fig. 12: Quantity and positioning of the screws in GGB-CBM sliding plates

Br, Bs	10 . . . 30 mm
B1, B2	1 . . . 1,5 x D_o
A1, A2	60 . . . 150 mm

Table 17: Recommended screw sizes

Bearing Application Data Sheet

Not sure which GGB part fits your application requirements?
Please complete the form below and share it with your GGB sales person or distributor representative.

DATA FOR BEARING DESIGN CALCULATION

Application: _____

_____

Project/No.: _____ Quantity: _____ ☐ New Design ☐ Existing Design

☐ Steady load ☐ Rotating load ☐ Rotational movement ☐ Oscillating movement ☐ Linear movement

DIMENSIONS [MM]

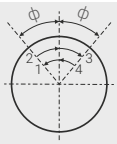
Inside diameter	D_i	
Outside diameter	D_o	
Length	B	
Flange Diameter	D_{fl}	
Flange thickness	B_{fl}	
Wall thickness	S_T	
Length of slideplate	L	
Width of slideplate	W	
Thickness of slideplate	S_S	

LOAD

☐ Static load
☐ Dynamic load

Axial load F	[N]	
Radial load F	[N]	

MOVEMENT

Rotational speed	N [1/min]	
Speed	U [m/s]	
Length of stroke	L_S [mm]	
Frequency of stroke	[1/min]	
Oscillating cycle 	ϕ [°]	
Osc. frequence	N_{osz} [1/min]	

MATING SURFACE

Material		
Hardness	HB/HRC	
Surface finish	Ra [µm]	

FITS & TOLERANCES

Shaft	D_J	
Bearing housing	D_H	

OPERATING ENVIRONMENT

Ambient temperature	T_{amb}[°]	
Bearing housing material		

☐ Housing with good heating transfer properties
☐ Light pressing or insulated housing with poor heat transfer properties
☐ Non metal housing with poor heat transfer properties
☐ Alternate operation in water and dry

LUBRICATION

☐ Dry
☐ Continuous lubrication
☐ Process fluid lubrication
☐ Initial lubrication only
☐ Hydrodynamic conditions

Process fluid		
Lubricant		
Dynamic viscosity	η[mPas]	

SERVICE HOURS PER DAY

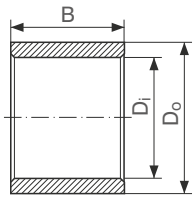
Continuous operation	
Intermittent operation	
Operating time	
Days per year	

SERVICE LIFE

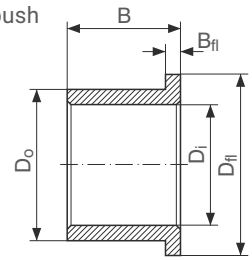
Required service life	L_H [h]	

BEARING TYPE

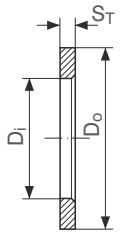
☐ Cylindrical bush



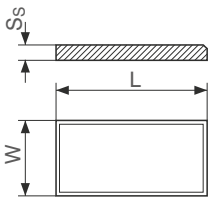
☐ Flanged bush



☐ Thrust washer



☐ Slideplate



☐ Special parts (sketch)

CUSTOMER INFORMATION

Company _____

Street _____

City / State / Province / Post Code _____

Telephone _____ Fax _____

Name _____

Email Address _____ Date _____

GGB Tribological Solutions

FOR MORE THAN 120 YEARS, GGB HAS IMPROVED SURFACE ENGINEERING TO MOVE THE WORLD FORWARD.

GGB began in 1899 as Glacier Antifriction Metal Company, producing plain bearings and introducing many successful new products to the market, including internationally recognized polymer materials. Over the past 115 years, our company has continued forming strategic partnerships, continuously expanding into a global network of manufacturing facilities, increasing production capabilities and resources to become who we are today: world leaders in tribological innovation.

Today, our products can be found everywhere–from scientific vessels at the bottom of the ocean to race cars speeding down the tarmac to jumbo jets slicing through the sky to the Curiosity rover exploring the surface of Mars.

Throughout our history, safety, excellence and respect have formed the foundational values for the entire GGB family. They are of paramount importance as we seek to maximize personal possibility, achieve excellence and establish open, creative work environments with the highest safety standards in the industry.

SAFETY

GGB's deep-rooted culture of safety places a relentless focus on creating a secure, healthy work environment for all. A core value of GGB, safety is critical at all levels of business in order to achieve our goal of having the safest employees in the industry.

EXCELLENCE

A world-class organization is built by fostering excellence throughout the company, across all roles. Our world-class manufacturing plants are certified in quality and excellence in the industry according to ISO 9001, TS 16949, ISO 14001, ISO 50001 and ISO 45001, allowing us to access the industry's best practices while aligning our quality management system with global standards.

RESPECT

We believe that respect is consistent with the growth of individuals and groups. Our teams work together with mutual respect regardless of background, nationality or function, embracing the diversity of people and learning from one another.

QUALITY / CERTIFICATION

Our world-class manufacturing plants in the United States, Brazil, China, Germany, France and Slovakia are **CERTIFIED IN QUALITY AND EXCELLENCE IN THE INDUSTRY** according to ISO 9001, TS 16949, ISO 14001, ISO 50001 and ISO 45001. This allows us to access the industry's best practices while aligning our quality management system with global standards.

For a complete listing of our certifications, please visit: **https://www.ggbearings.com/en/certificates**

PUSHING BOUNDARIES TO CO-CREATE A HIGHER QUALITY OF LIFE

GGB
BY TIMKEN

GGB NORTH AMERICA

P.O. Box 189 | 700 Mid Atlantic Parkway
USA | Thorofare, New Jersey, 08086
Tel: +1 856 848 3200
www.ggbearings.com

IN605ENG03-23USA