FEDERAL MOGUL

deva.glide®

Maintenance-free, self-lubricating bearings

DEVA

Engineering Services

Our bearing service

- ✔ Profit from more than **60 years of experience in self-lubricating sliding bearings**.
- ✔ Make use of our extensive **material and application** expertise spanning a **very wide range of industries**.
- ✔ Let **our application engineering team assist you in the:**
  - selection of the bearing materials,
  - design, purpose-built to your requirements,
  - assembly and installation,
  - calculation of estimated life time.
- ✔ Benefit from the latest **material developments**, tested using **state of the art facilities**.
- ✔ Ask for a simulation of your **bearing application on our test rigs**.
- ✔ Let us **analyse your bearing problem by FEM**.
- ✔ Expect the highest quality standards, certified to **DIN ISO 9001:2000**, **ISO/TS 16949:2002** and **DIN EN ISO 14001**.

World class bearings from DEVA® save time and money.

deva.glide® Technical Manual – Contents

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Introduction

Contemporary designs represent an enormous challenge for modern-day bearing materials. Zero maintenance is often expected under severe to extreme conditions as well as under maximum loads.
The constant pressure on costs also calls for increasing uptime of machinery and equipment and uncompromising standards of operational reliability.
deva.glide® materials are suitable for applications involving sustained high static and dynamic loads, relatively low sliding speeds and rotary, angular, axial or linear motion. They are also suitable for applications where conventional lubrication is not possible or permissible, or where other properties are required such as durability and resistance to operational and environmental influences or special conditions (e.g. impact load, abrasive stress, etc).

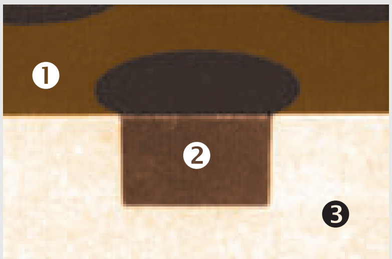
1 Material properties

deva.glide®

- allows maintenance-free operation due to the solid lubricant content of the sliding material.
- can accomodate high static and dynamic loads.
- has a consistently low coefficient of friction without stick-slip effects.
- is resistant to dirt, corrosion, impact stress and edge loading.
- is provided with a vibration absorbing base material.
- can be used over a large temperature range.
- can be used in salt water.
- does not absorb water and guarantees maximum dimensional accuracy.
- is electrically conductive. No electrostatic charging effects occur.
- tolerates a high level of misalignment.
- can also be used in applications involving additional, conventional lubrication.

2 Material structure

deva.glide® materials consist of highly wear-resistant copper cast alloys showing sliding surfaces with evenly provided solid lubricant plugs according to the so-called “macro distribution“ principle. These plugs are arranged according to the movement requirements. The high density of the bronze guarantees high stability under load coupled with good dirt particle embedding properties into the lubricant plugs.
Under dry running conditions, **deva.glide**® is supplied with a 10 - 15 µm thick running-in film which enables the solid lubricant to be transferred to the mating material at the first contact between the sliding partners.



1. Sliding surface with running-in film
2. Solid lubricant plugs
3. Base material (bronze)

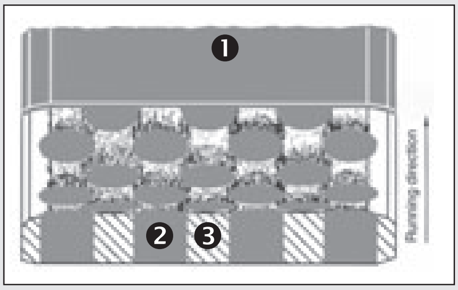


Figure 2.1 – Micrograph of deva.glide®

In conventionally lubricated bronze materials a „separating lubricating film“ can only be formed if the movement conditions and sliding speeds are suitable. Moreover, a conventional lubricant will be sqeezed out of the contact zone as the surface pressure increases. With **deva.glide**®, the lubrication is provided by the sliding material itself. The solid lubricant is released from the bearing material by micro abrasion as soon as the sliding movement begins. This gives the sliding partners smooth surfaces with a firmly adhesive solid lubricant film. The solid lubricant remains within the contact zone even under heavy loads, resulting in a high degree of separation between the sliding surfaces and a sustained low coefficient of friction coupled with minimal wear.

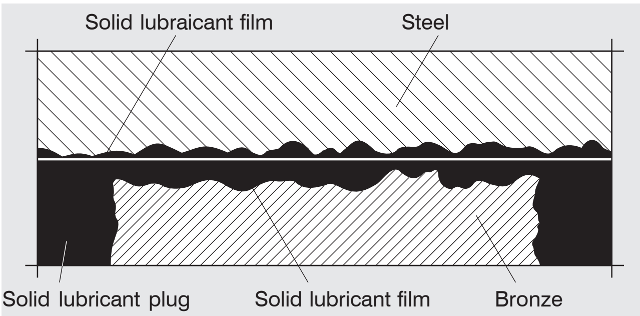


Figure 2.2 – View of sliding process with solid lubrication

2.1 Solid lubricants

The **deva.glide**® material system relies on solid lubricants with optimal film-forming properties, adhesive power, surface affinity and corrosion resistance. **deva.glide**® uses two standard solid lubricants. There are also additional variations available for special applications. In particular, the high-purity natural graphite used in the system is not chemically pretreated and prevents any electrolytic and chemical activity originating in the materials due to its inert property.

dg 12	dg 16
Base graphite + additives	Base PTFE + additives

3 Materials

3.1 Composition and properties

deva.glide®	Composition and properties													
dg	DIN	Material No. delivery form[1)]	Designation	ASTM standard		Proportional weights		Physical properties (min.)						
				Standard	Alloy No.	DIN	ASTM	Density	0.2% Strain	Tensile strength	Strain	E-modulus	Hardness	Application
Symbol								ρ	δ_y	δ_T				
Unit						%	%	g/cm³	MPa	MPa	%	MPa	HB	
01	1705	2.1090.01	CuSn7ZnPb	B 584	C932 00	Cu 81 - 85 Sn 6 - 8 Zn 3 - 5 Pb 5 - 7 permissible max. portions Ni 2.0 Sb 0.3	Cu 81 - 85 Sn 6,3 - 7.5 Zn 2 - 4 Pb 6 - 8 Ni 1 Sb 0.35	8.8	120	240	15	106.000	65	Standard material for the most applications international standardized
		2.1090.03	CuSn7ZnPb	B 271	C932 00			8.8	130	270	13	106.000	75	
		2.1090.04	CuSn7ZnPb	B 505	C932 00			8.8	120	270	16	106.000	70	
02	1705	2.1061.01	CuSn12Pb	not yet standardized		Cu 84 - 87 Sn 11 - 13 Pb 1 - 2 permissible max. portions Ni 2.0 Sb 0.2 P 0.2	Cu 85 - 88 Sn 10 - 12 Pb 1 - 1.5 Ni 0.8 - 1.5	8.7	140	260	10	112.000	80	Material for high loads and/or corrosion stress attack international only partially standardized
		2.1061.03	CuSn12Pb	not yet standardized				8.7	150	280	5	112.000	90	
		2.1061.04	CuSn12Pb	B 505	C925 00			8.7	140	280	7	112.000	85	
03	1714	2.0975.01	CuAl10Ni	B 584	C955 00	Cu min. 75 Al 8.5 - 11.0 Ni 4.0 - 6.5 Fe 3.5 - 5.5 permissible max. portions Mn 3.3	Cu min. 78 Al 10 - 11.5 Ni 3 - 5.5 Fe 3 - 5 Mn max. 3.5	7.6	270	600	12	122.000	140	Material for extreme loads and/or high corrosive environments international standardized
		2.0975.02	CuAl10Ni	B 30	C955 00			7.6	300	600	14	122.000	150	
		2.0975.03	CuAl10Ni	B 271	C955 00			7.6	300	700	13	122.000	160	
		2.0975.04	CuAl10Ni	B 505	C955 00			7.6	300	700	13	122.000	160	
04	1709	2.0598.01	CuZn25Al5	B584	C863 00	Cu 60 - 67 Al 3 - 7 Fe 1.5 - 4 Mn 2.5 - 5 Zn rest permissible max. portions Ni max. 3	Cu 60 - 66 Al 5 - 7.5 Fe 2 - 4 Mn 2.5 - 5 Zn 22 - 28 Ni max. 1	8.2	450	750	8	115.000	180	Material for highest loads without corrosive attack, international partially standardized to a large extend
		2.0598.02	CuZn25Al5	B 30	C863 00			8.2	480	750	8	115.000	180	
		2.0598.03	CuZn25Al5	B 271	C863 00			8.2	480	750	5	115.000	190	
05	1705	2.1052.01	CuSn12	not yet standardized		Cu 84 - 88 Sn 11 - 13 Pb 1 Ni 2.0 Sb 0.2 P 0.2	Cu 85 - 88 Sn 10 - 12 Pb 1 - 1.5 Ni 0.8 - 1.5	8.6	140	260	12	110.000	80	Material with good wear resistance, corrosion and sea water resistant international partially standardized
		2.1052.03	CuSn12	not yet standardized				8.6	150	280	8	110.000	90	
		2.1052.04	CuSn12	not yet standardized				8.7	140	280	8	110.000	95	

1) delivery form: .01 = sand casting, .02 = gravity casting, .03 = centrifugal casting, .04 = continuous casting

Table 3.1.1 – Composition and physical properties of deva.glide®

deva.glide®	Bearing properties								
dg	Max. permissible load [1)]	Max. sliding speed	Max. p̄U-value	Temperature range		Friction coefficient [2)]	Friction coefficient [2)]	Min. shaft hardn.	Shaft surface finish
		dry	dry	max.	min.	dry	in water		optimal
Symbol	$\bar{p}_{stat/max}$	U_{max}	$\bar{p}U_{max}$	T_{max}	T_{min}	f	f		R_a
Unit	MPa	m/s	MPa x $\frac{m}{s}$	°C	°C			HB	µm
01	75	0.4	1.0	250	-100	0.10 – 0.12	0.08 – 0.12	180	0.2 – 0.8
02	110	0.4	1.0	250	-100	0.10 – 0.12	0.08 – 0.12	180	0.2 – 0.8
03	150	0.4	1.5	250	-100	0.10 – 0.13	0.08 – 0.12	300	0.2 – 0.8
04	150	0.4	1.5	250	-100	0.12 – 0.15	not recommended	300	0.2 – 0.8
05	110	0.4	1.0	250	-100	0.10 – 0.12	0.08 – 0.12	180	0.2 – 0.8

1) Under optimum operating conditions.

2) The stated sliding friction coefficients are not guaranteed properties. They have been determined on our test rigs using field-proven parameters that do not necessarily reflect the actual application of our products and their service environment. We offer customer-specific friction and wear tests on request.

Table 3.1.2 – deva.glide® bearing properties

3.2 Chemical resistance

Table 3.2.1 shows the chemical resistance of the **deva.glide**® alloys. However, we recommend testing the actual performance of the chosen **deva.glide**® alloy under realistic operating conditions.

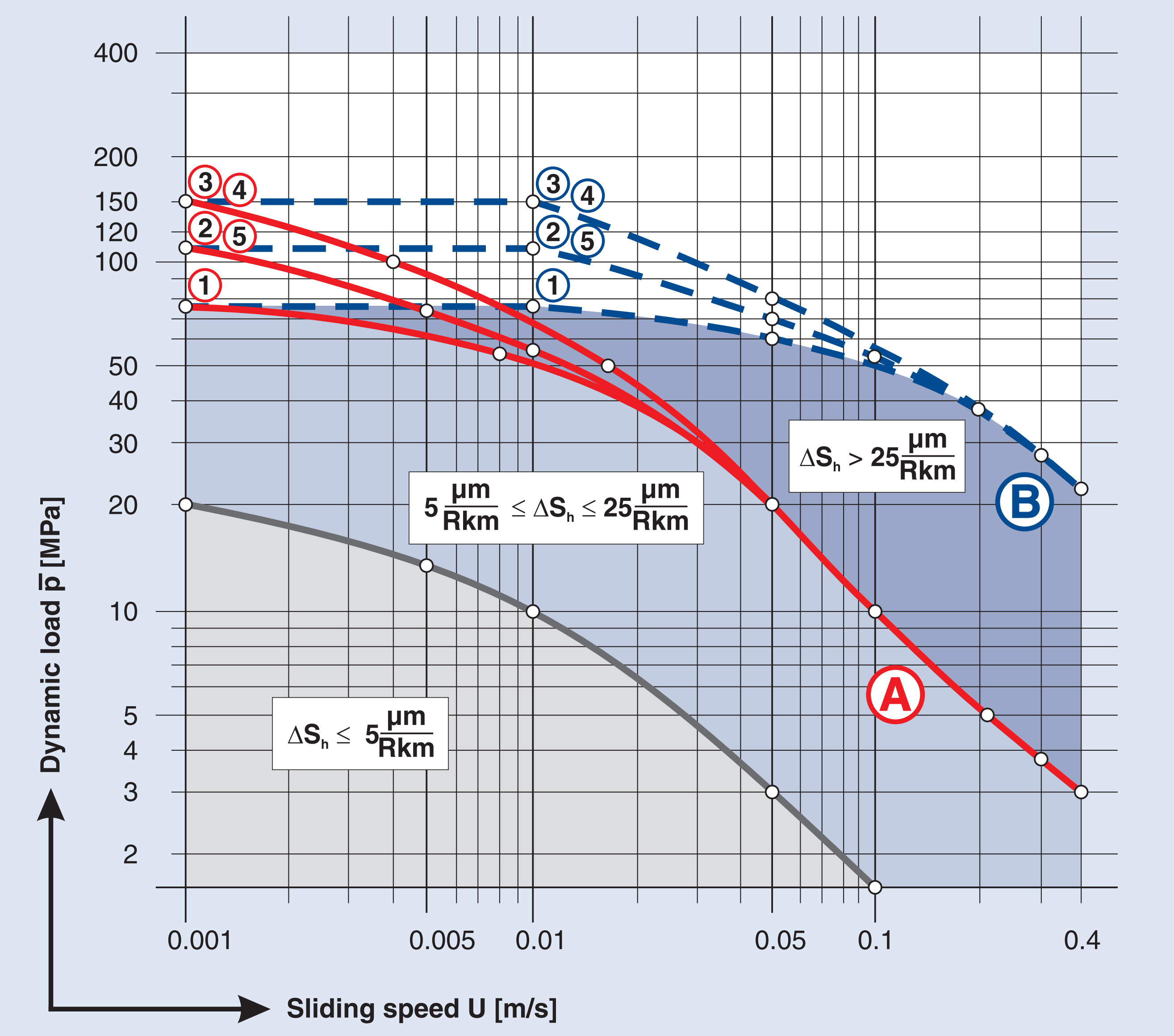
Evaluation:
- ✚ Resistant
- ⋆ Limited resistance, depending on concentration, oxygen content, temperature, etc.
- ○ Not recommended

Chemical substance	Conc. in %	Temp. in °C	Alloy dg01	Alloy dg02	Alloy dg03	Alloy dg04	Alloy dg05
Strong acids							
Hydrochlorid acid	5	20	○	○	○	○	○
Hydrofluoric acid	5	20	⋆	⋆	⋆	○	⋆
Nitric acid	5	20	○	○	○	○	○
Sulphuric acid	5	20	⋆	✚	✚	○	✚
Phosphoric acid	5	20	⋆	✚	✚	○	✚
Weak acids							
Ethanoic acid	5	20	○	✚	✚	○	✚
Formic acid	5	20	○	✚	✚	○	✚
Boric acid	5	20	○	✚	✚	○	✚
Citric acid	5	20	○	✚	✚	○	✚
Bases							
Ammonia	10	20	○	○	○	○	○
Sodium hydroxide	5	20	⋆	✚	✚	⋆	✚
Potassium hydroxide	5	20	⋆	✚	✚	⋆	✚
Solvents							
Acetone		20	⋆	✚	✚	⋆	✚
Carbon tetrachloride		20	⋆	✚	✚	⋆	✚
Ethyl alcohol		20	⋆	✚	✚	⋆	✚
Ethyl acetate		20	⋆	✚	✚	⋆	✚
Ethyl chloride		20	⋆	✚	✚	⋆	✚
Glycerine		20	⋆	✚	✚	⋆	✚
Salts							
Ammonium nitrate			○	○	○	○	○
Calcium chloride			✚	✚	✚	✚	✚
Magnesium chlorid			✚	✚	✚	✚	⋆
Magnesium sulphate			✚	✚	✚	✚	⋆
Sodium chloride			✚	✚	✚	✚	✚
Sodium nitrate			✚	✚	✚	✚	✚
Zinc chloride			○	○	✚	○	○
Zinc sulphate			⋆	✚	✚	⋆	✚
Gases							
Ammonia gas			⋆	⋆	⋆	⋆	⋆
Chlorine gas			○	○	○	○	○
Carbon dioxide			✚	✚	✚	⋆	✚
Fluorine			○	○	○	○	○
Sulphur dioxide			⋆	✚	✚	○	✚
Hydrogen sulphide			⋆	⋆	⋆	⋆	⋆
Nitrogen			⋆	✚	✚	○	✚
Hydrogen			⋆	✚	✚	○	✚
Lubricants and fuel							
Paraffin		20	✚	✚	✚	✚	✚
Petroleum		20	✚	✚	✚	✚	✚
Fuel oil		20	✚	✚	✚	✚	✚
Diesel fuel		20	✚	✚	✚	✚	✚
Mineral oil		70	✚	✚	✚	✚	✚
HFA - ISO46 oil-water emulsion		70	✚	✚	✚	✚	✚
HFC - Water/ethylene		70	✚	✚	✚	✚	✚
HFD Phosphate ester		70	✚	✚	✚	✚	✚
Miscellaneous							
Water		20	✚	✚	✚	⋆	✚
Sea water		20	⋆	✚	✚	○	✚
Resin			✚	✚	✚	⋆	✚
Hydrocarbons			✚	✚	✚	⋆	✚

Table 3.2.1 – Chemical properties of deva.glide®

Materials

3.3 p̄U diagramm



Explanation:

Ⓐ = Continuous operation
Ⓑ = Intermittent operation

① = dg01
② = dg02
③ = dg03
④ = dg04
⑤ = dg05

Figure 3.3.1 – load (p̄), speed (U) and specific wear (ΔS_h) diagram for deva.glide®

Specific wear ΔS_h for continuous operation

The specific wear is an absolute measure of wear within the main load zone [μm] which occurs in the bearing material due to micro abrasion. It is measured in relation to the friction path (friction kilometres = Rkm). The ΔS_h values indicated in the diagram show the tendential development of the specific wear at average p̄U values. The friction path is the sliding distance between the sliding partners towards each other during the relative movement.

4 Mating materials

In order to ensure a sustainable low coefficient of friction with minimal wear, it is necessary to maintain appropiate mating surface properties, for example surface hardness and roughness. Table 4.1 shows the recommended hardness values and surface finish for optimal use of the **deva.glide®** materials.

Deva Code	DIN	Minimum hardness of mating material	Average roughness R_a (produced by grinding)
dg01	2.1090	180 HB	0.2 to 0.8 μm
dg02	2.1061	180 HB	0.2 to 0.8 μm
dg03	2.0975	300 HB	0.2 to 0.8 μm
dg04	2.0598	300 HB	0.2 to 0.8 μm
dg05	2.1052	180 HB	0.2 to 0.8 μm

Table 4.1 – Hardness values and surface finish for mating materials of deva.glide®

In order to obtain a suitable surface finish it is also possible to use shaft sleeves of a suitable hardness. With restrictions hard-facing or galvanic protective layers (normally coated, hard-chromium-plated or nickel-plated) are thinkable.
The required corrosion protection of the mating material is determined by actual operating conditions. The adjacent table provides an overview of some of the possible mating materials.

Mating materials for normal applications [1]				
Material number	DIN designation	Comparable standards		
		USA AISI	GB B.S. 9 70	F AFNOR
1.0543	St 60-2	Grade 65	55C	A60-2
1.0503	C45	1045	080M46	CC45
1.7225	42CrMo4	4140	708M40	42CD4

Mating materials for corrosive environments [1]				
Material number	DIN designation	Comparable standards		
		USA AISI	GB B.S. 9 70	F AFNOR
1.4021	X 20Cr13	420	420S37	Z20C13
1.4057	X 22CrNi17	431	432S29	Z15CN16.02
1.4112	X 90CrMoV18	440B		(Z70CV17)
1.4122	X 35CrMo17			

Mating materials for use in sea water [1]				
Material number	DIN designation	Comparable standards		
		USA AISI	GB B.S. 9 70	F AFNOR
1.4460	X 8CrNiMo275329			
1.4462	X2CrNiMoN22-5-3	UNS531803	318513	Z3CND24-08
2.4856	Inconel 625			

[1] Materials in the table are not suitable for use with dg03 and dg04 without surface treatment due to their hardness < 300 HB.

Table 4.2 – Recommended mating materials

Mating materials

5 Fits

Fits and tolerances for reliable operation

For sliding bearings with an outer diameter D_1 greater than 300 mm the fits must be determined according to the actual requirements. For this purpose please contact our technical department. The subsequent proposals are valid for sliding bearings with a diameter D_1 smaller than 300 mm.

Description	Tolerance
Housing bore	H7
Outer diameter of bearing under normal operating conditions ($t \approx 80°$ C)	r6 / s6
Bearing bore prior to installation into housing	E8
Bearing bore after installation into housing (approx. within) The press-fit leads to a contraction of the bearing bore from E8 to approx. H10	H10
Tolerance of bearing length	average
Surface finish standard of housing bore	(ISO:N8) R_a to 3.2 μm
Sureface finish standard of shaft, ground	R_a 0.2 to 0.8 μm
Tolerance of shaft: under normal operating conditions ($t < 80°$ C)	c8 / d8

Table 5.1 – Reliable fits and tolerances for deva.glide®

deva.glide® bearings are installed into the housing with interference or supercooling. The housing bore should have a H7 tolerance with an average roughness of $R_a = 3.2\ \mu$m. To facilitate bearing installation, the housing bore should be provided with a lead in chamfer of 1 mm x 15° to 20°.

Depending on the application, customised fits and tolerances are possible. Please contact our technical department.

6 Design

In order to ensure proper operation of the sliding bearing and to prevent the counter surface from damaging the sliding surface, the mating surface should be free of flats and grooves and should always extend beyond the bearing surface.

deva.glide® bearings can tolerate misalignment to a certain extent. Nevertheless the shaft and housing should be correctly aligned for optimum running conditions. In cases of lateral thrust due to axial forces, the **deva.glide®** flanged bearing is likely to be the most economic solution for small dimensions. With larger diameters, on the other hand, the combined use of a **deva.glide®** bearing with an additional **deva.glide®** thrust washer can provide an economic alternative.

6.1 Bearing design


Fig. 6.1.1 – deva.glide® plain bearing


Fig. 6.1.2 – deva.glide® flanged bearing

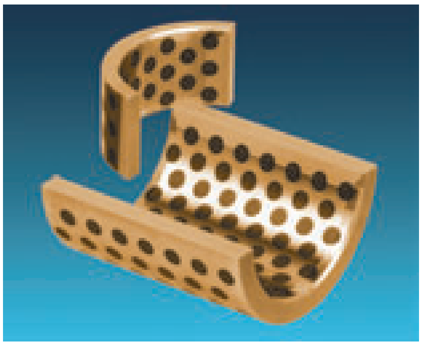


Fig. 6.1.3 – deva.glide® half-shells

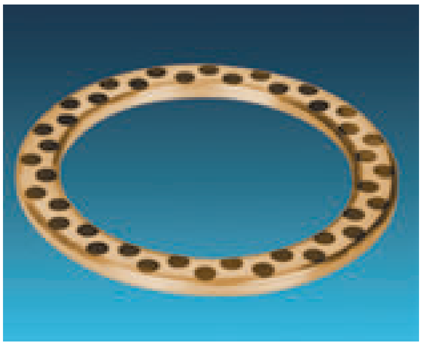


Fig. 6.1.4 – deva.glide® thrust washer

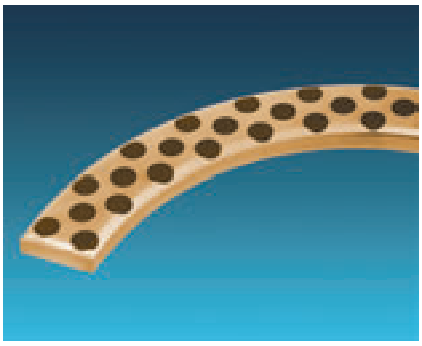


Fig. 6.1.5 – deva.glide® axial and radial bearing segments

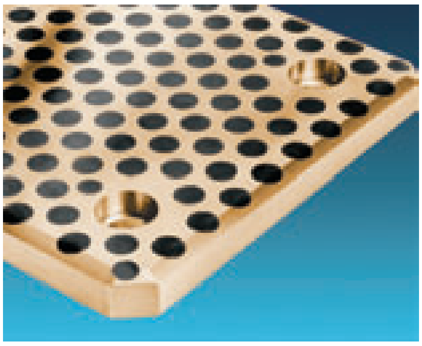


Fig. 6.1.6 – deva.glide® sliding plate

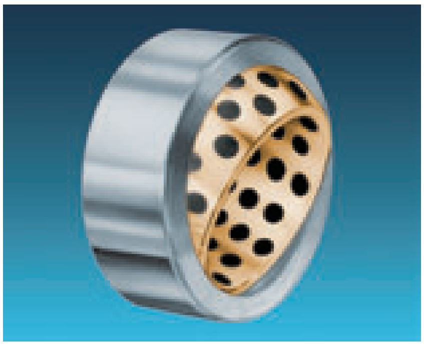


Fig. 6.1.7 – deva.glide® spherical bearing, floating


Fig. 6.1.8 – deva.glide® spherical bearing, fixed

The illustrated **deva.glide®** sliding bearings are shown without a running-in film.

7 Installation

Mounting of deva.glide® bearings by press-fitting

Press-fit mandrel

deva.glide® bearing

Housing

Press-fit procedure

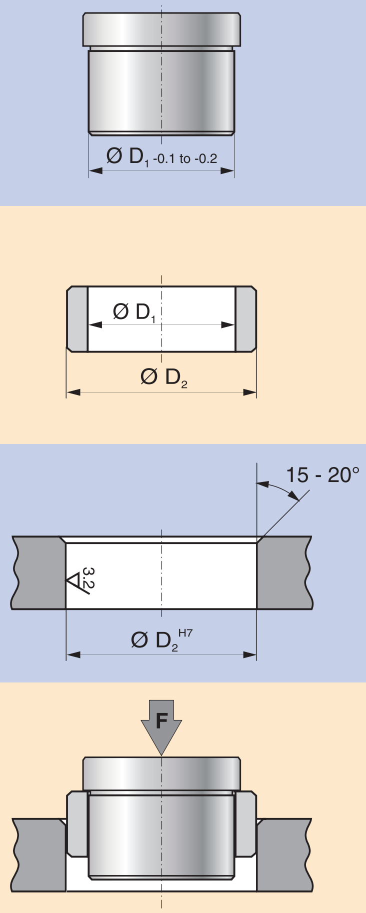


Figure 7.1 – Press-fitting of deva.glide® radial bearings

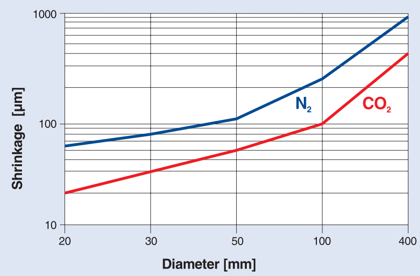
Mounting of deva.glide® bearings by supercooling

deva.glide® bearings may also be supercooled to faciliate assembly. The shrinkage (s) is calculated using the following equation:

$$s = 0.8 \times \alpha_1 \times \Delta T \times D_2 \text{ (mm)}$$

where:

α_1 = linear coefficient of thermal expansion (1/10⁶K)
ΔT = temperature difference (°C)
D_2 = outer diameter (mm)



If using dry ice (CO_2), we recommend using a wodden box fully lined with polystyrene as a cooling container. An insulating lid ensures quicker cooling of the bearings. Always wear protective goggles and gloves when handling dry ice or liquid nitrogen, as well as the cooled parts. In order to ensure uniform supercooling, the dry ice should be crushed into walnut size. It takes between 0.5 and 2 hours for complete cooling of the bearings. The supercooled parts can then be inserted without effort into the housing bore.
Federal-Mogul Deva recommends supercooling with liquid Nitrogen for bearings D_1 < 200 mm and dry ice for D_1 > 200 mm.

Figure 7.2 – Supercooling installation

Mounting of deva.glide® sliding strips

Countersunk screws

Mechanical location

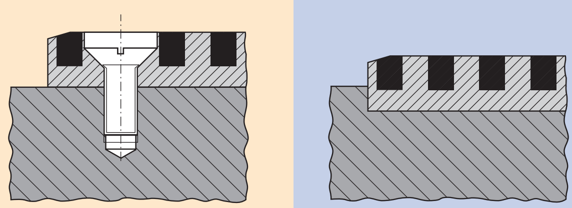


Figure 7.3 – Fastening of deva.glide® sliding strips

Sealing

The structure of the **deva.glide**® bearings enables dirt particles to become embedded in the relatively soft solid lubricant plug thus reducing damage to the bearing and shaft. This embedding process allows the bearing to be used without performance restrictions. However, if the ingress of highly abrasive partlicles cannot be avoided it is advisable to seal the bearing area.

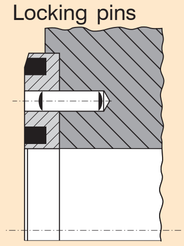
Mounting of deva.glide® thrust washers

Thrust washers should be fixed on the outer diameter e.g. in a recess of the housing. The inner diameter of the thrust washer must exceed the shaft diameter in order to avoid wear and chip removal. Thrust washers can also be fixed with locking pins if there is no suitable recess in the housing.

Note:

- The locking pins should be recessed below the bearing surface with sufficient allowance for wear.
- Screws should be countersunk below the bearing surface also observing sufficient allowance for wear.
- Ensure that the inside diameter of the washer does not touch the shaft after assembly.

Locking pins



Screw

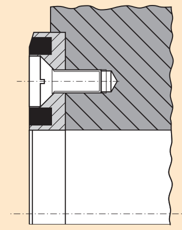


Figure 7.4 – Fastening of deva.glide® thrust washers

Installation

8 Recommended dimensions

Plain bearing, radial					Flanged bearing					Thrust washer			Spherical bearing					
Fig. 8.1, page 14					Fig. 8.2, page 14					Fig. 8.3, page 14			Fig. 8.4 and Fig. 8.5, page 15					
D_1	D_2	B_1			D_1	D_2	D_3	S_F	B_1	D_5	D_6	S_T	D_1		D_K	D_2	B_1	B_F
		1.0 x d min.	0.75 x d min.	1.25 x d max.									Floating bearing	Fixed bearing				
50	60	50	35	65	50	60	80	5.0	On request.		80	5.0						
55	65	55	40	70	55	65	85	5.0			85	5.0						
60	75	60	45	75	60	75	90	7.5			90	7.5						
65	80	65	45	80	65	85	95	7.5			95	7.5						
70	85	70	50	85	70	85	100	7.5			100	7.5						
75	90	75	55	90	75	90	105	7.5			105	7.5						
80	95	80	60	100	80	95	110	7.5			110	7.5						
85	100	85	60	105	85	100	115	7.5			115	7.5						
90	105	90	65	115	90	105	120	7.5			120	7.5						
95	115	95	70	120	95	115	125	10.0			125	10.0						
100	120	100	75	125	100	120	140	10.0			140	10.0		100	130	150	70	55
110	130	110	80	140	110	130	150	10.0			150	10.0	100	110	140	160	70	55
120	140	120	90	150	120	140	160	10.0			160	10.0	110	120	160	180	85	70
140	160	140	100	175	140	160	180	10.0			180	10.0	120	140	180	210	90	70
150	170	150	110	185	150	170	190	10.0			190	10.0						
													140	160	200	230	105	80
180	205	180	135	225	180	205	230	12.5		185	230	12.5	160	180	225	260	105	80
200	225	200	150	250	200	225	250	12.5		205	250	12.5	180	200	250	290	130	100
													200	220	275	320	135	100
225	250	225	170	280	225	250	275	12.5		230	275	12.5						
													220	240	300	340	140	100
250	278	250	190	315	250	278	300	14.0		255	300	14.0						
													240	260	325	370	150	110
280	310	280	210	350	280	310	340	15.0		285	340	15.0	260	280	350	400	155	120
300	332	300	225	375	300	332	360	16.0		305	360	16.0	280	300	375	430	165	120
													300	320	380	440	160	135
													320	340	400	460	160	135
350	385	350	260	435	350	385	420	17.5		355	420	17.5						
													340	360	420	480	160	135
													360	380	450	520	190	160
400	440	400	300	500	400	440	480	20.0		405	480	20.0	380	400	470	540	190	160
													400	420	490	560	190	160
													420	440	520	600	218	185
450	495	450	340	580	450	495	530	22.5		455	530	22.5						
													440	460	540	620	218	185
													460	480	565	650	230	185
500	550	500	375	625	500	550	600	25.0		510	600	25.0	480	500	585	670	230	195
													500	530	620	710	243	205
550	605	550	415	690	550	605	650	25.0		560	650	25.0						
													530	560	655	750	258	215
600	660	600	450	750[1]	600	660	720	25.0		610	720	25.0	560	600	700	800	272	230
													600	630	740	850	300	260
650	715	650	490	815[1]	650	715	780	25.0		660	780	25.0						
													630	670	785	900	308	260
700	770	700	525	875[1]	700	770	840	25.0		710	840	25.0						
													670	710	830	950	325	275
750	825	750[1]	560	940[1]	750	825	900	25.0		760	900	25.0	710	750	875	1000	335	280
800	880	800[1]	600	1000[1]	800	880	960	25.0		810	960	25.0	750	800	930	1030	355	300
850	935	850[1]	640	1060[1]	850	935	1020	25.0		860	1020	25.0	800	850	985	1120	365	310
900	990	900[1]	675	1125[1]	900	990	1080	25.0		910	1080	25.0	850	900	1040	1180	375	320
950	1045	950[1]	710[1]	1200[1]	950	1045	1140	25.0		960	1140	25.0	900	950	1100	1250	400	340
1000	1100	1000[1]	750[1]	1250[1]	1000	1100	1200	25.0		1010	1200	25.0	950	1000	1160	1320	438	370
1200	1320	1200[1]	900[1]	1500[1]	1200	1320	1440	25.0		1210	1440	25.0						

[1] Length of bearing subdivided (2 x 0.5) for production reasons.
Further sizes available on request.

Table 8.1 – Size table for deva.glide® (all dimensions in mm)

Plain bearing, radial – shape code 2KB155

Standard version
$\varnothing D_1 \leq 500$ mm

The direction of movement determines the arrangement of the lubrication plugs.

All **deva.glide**® bearings can be provided with a running-in film (not shown in order to give a clearer view).

Note:
In the standard version $\varnothing D_1 > 500$ mm and special versions, solid lubricant pugs are introduced into blind holes if required.

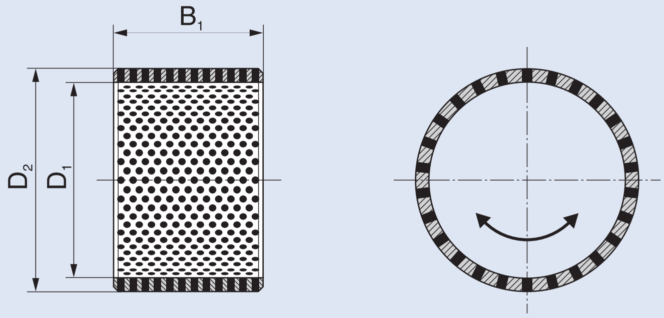


Figure 8.1 – Plain bearing, radial

Flanged bearing – shape code 2KB356

For $\varnothing D_1 > 150$ mm, it may be advantageous to use a combination of plain bearing and thrust washer (subject to consultation with DEVA®).

The direction of movement determines the arrangement of the lubrication plugs.

All **deva.glide**® bearings can be provided with a running-in film (not shown in order to give a clearer view).

The flange will be provided with solid lubricant plugs only if demanded by the operating conditions.

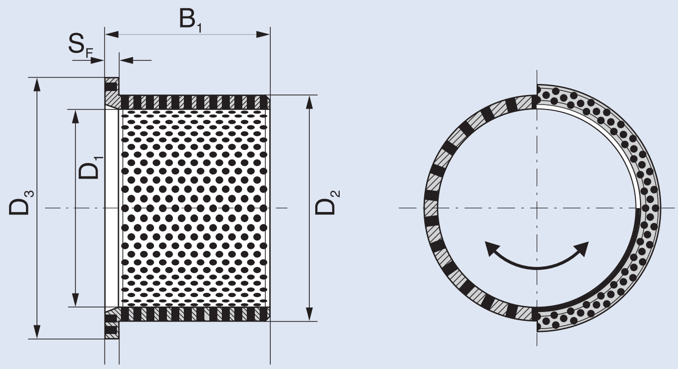


Figure 8.2 – Flanged bearing

Thrust washer (axial bearings) – shape code 2KE105

Standard version
$\varnothing D_5 > 150$ mm
Special version
$\varnothing D_5 \leq 150$ mm

The direction of movement determines the arrangement of the lubrication plugs.

All **deva.glide**® bearings can be provided with a running-in film (not shown in order to give a clearer view).

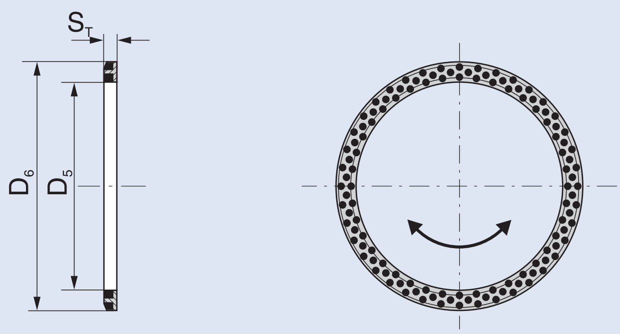


Figure 8.3 – Thrust washer / axial bearings

Spherical bearing – shape code 2PP030

Floating bearing

The direction of movement determines the arrangement of the lubrication plugs.

All **deva.glide®** bearings can be provided with a running-in film (not shown in order to give a clearer view).

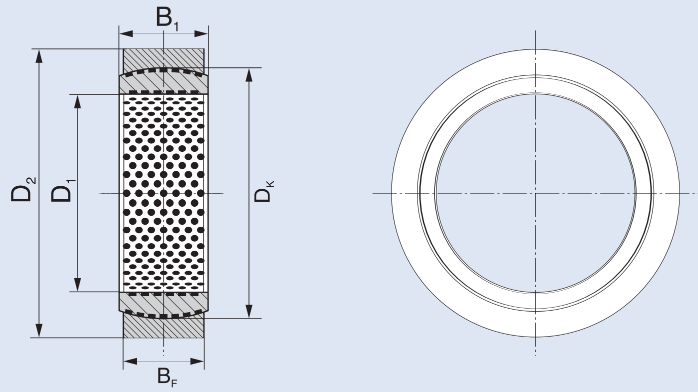


Figure 8.4 – Spherical bearing, floating

Spherical bearing – shape code 2PP090

Fixed bearing

All **deva.glide®** bearings can be provided with a running-in film (not shown in order to give a clearer view).

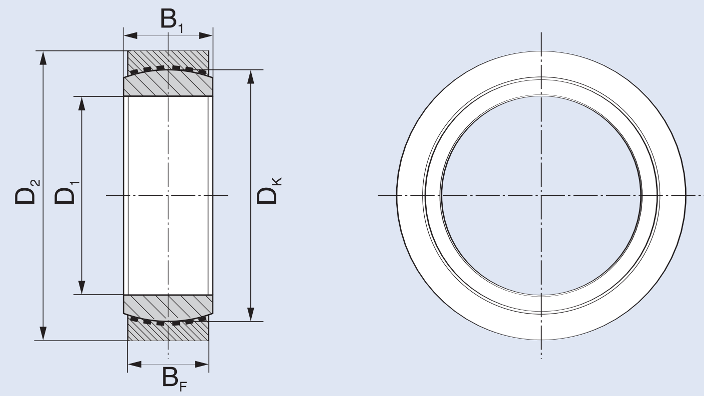


Figure 8.5 – Spherical bearing, fixed

Sliding plates (slideways) – shape code 2KG101

The direction of movement determines the arrangement of the lubrication plugs.

All **deva.glide®** bearings can be provided with a running-in film (not shown in order to give a clearer view).

All dimensions on request.

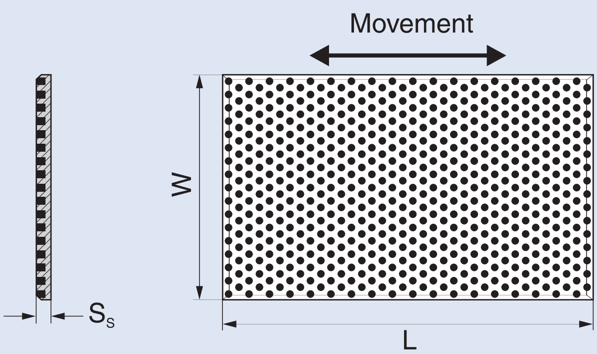


Figure 8.6 – Sliding plates

9 Order specifications deva.glide®

Order designation (example): 2KB155 | 01. | 12. | 22 | (61) | D_1=200; D_2=225; B_1=200

Shape code[1)]	2KB155	(see figure 8.1 to 8.6, page 14 and 15)
Base material	01.	01 to 05 (see table 3.1.1 and 3.1.2, page 6)
Solid lubricant plugs	12.	12 = base graphite 16 = base PTFE
Running-in film	22	22 = base graphite 26 = base PTFE
Adhesive bonding agent	(61)	61 = -100 °C to +100 °C 62 = -100 °C to +250 °C
Dimensions[1)]	D_1=200; D_2=225; B_1=200	(see table 8.1, page13)

[1)] Further sizes and forms available on request.

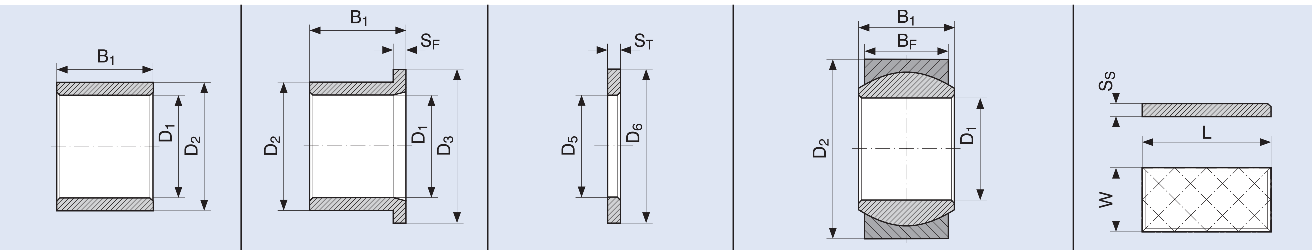
10 Data relevant to the design of DEVA® bearings

Description of application: ______________________________

____

____

Project / No. ______________________________ ☐ **New design** ☐ **Existing design**



☐ Plain bearing ☐ Flanged bearing ☐ Thrust washer

Spherical bearing ☐ Floating bearing ☐ Fixed bearing

☐ Sliding plate

☐ Shaft rotates ☐ Bearing rotates ☐ Angular motion ☐ Axial motion

	Item 1	Item 2	Item 3
Quantity			

Dimensions (in mm)	Item 1	Item 2	Item 3
Inner diameter D_1 (D_5)			
Outer diameter D_2 (D_6)			
Bearing width B_1			
Outer ring width B_F			
Flange outer dia. D_3			
Flange thickness S_F			
Wall thickness S_T			
Plate length L			
Plate width W			
Plate thickness S_S			

Loading	Item 1	Item 2	Item 3
Static	☐	☐	☐
Dynamic	☐	☐	☐
Alternating	☐	☐	☐
Impact	☐	☐	☐
Radial load in kN			
Axial load in kN			
Surface pressure			
Radial in MPa			
Axial in MPa			

Mating material	Item 1	Item 2	Item 3
Material No./type			
Hardness in HB/HRC			
Roughness R_a in μm			

Lubrication	Item 1	Item 2	Item 3
Dry running	☐	☐	☐
Permanent lubrication	☐	☐	☐
Medium lubrication	☐	☐	☐
Medium			
Lubricant			
Assembly lubrication	☐	☐	☐
Hydrodyn. lubrication	☐	☐	☐
Dynamic viscosity			

Motion	Item 1	Item 2	Item 3
Speed in rpm			
Sliding speed in m/s			
Stroke length in mm			
Double strokes/ min			
Angle α^0			
Frequency in n/ min			

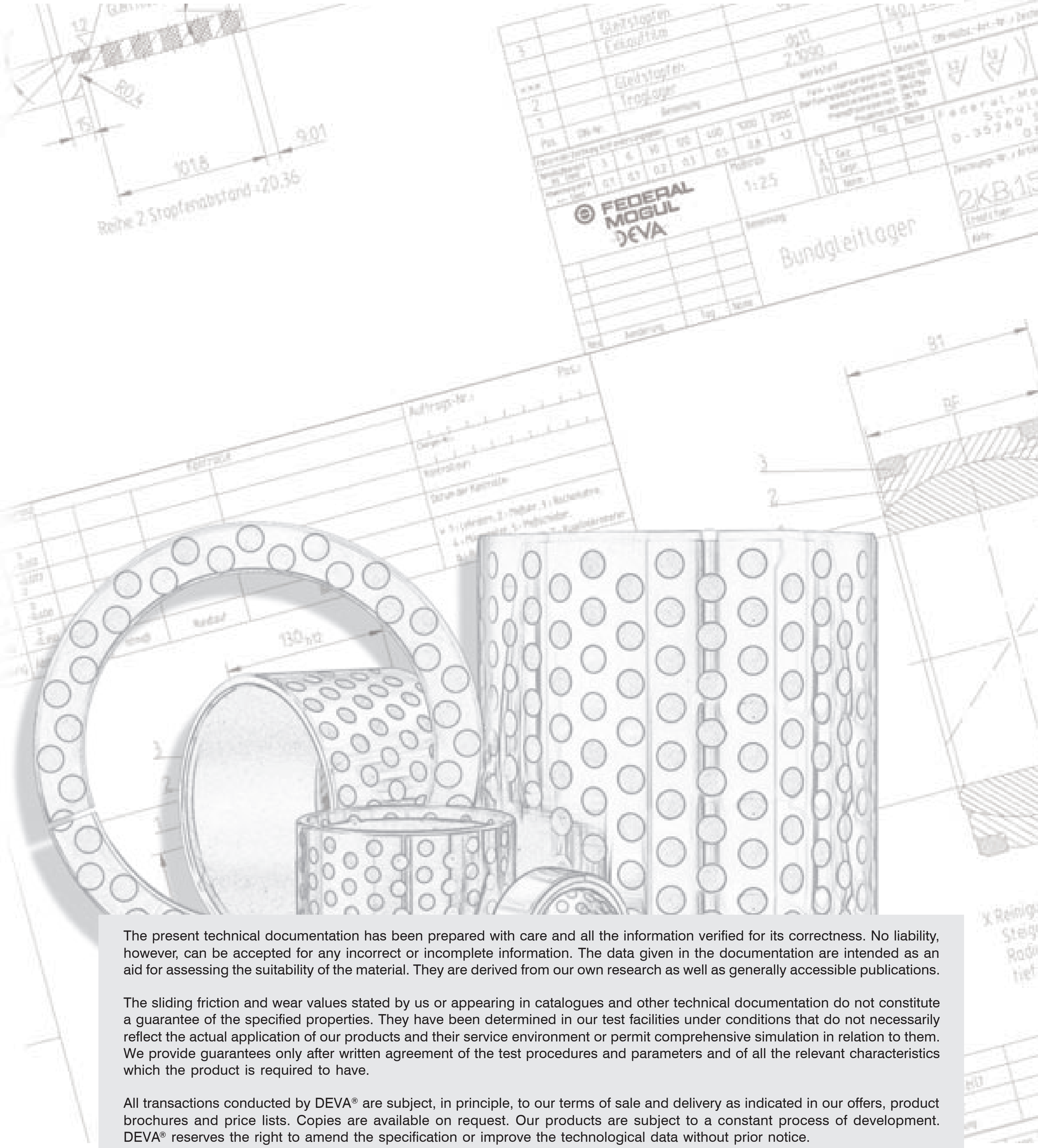
Operating time	Item 1	Item 2	Item 3
Continuous operation			
Intermittent operation			
Duty cycle	%/h	%/h	%/h
Days/years			
Frictional distance in km			

Fits and tolerances	Item 1	Item 2	Item 3
Shaft			
Bearing holder			

Environm. conditions	Item 1	Item 2	Item 3
Temperature at bearing	°C	°C	°C
Contact medium			
Other influences			

Lifetime	Item 1	Item 2	Item 3
Desired operating time	h	h	h
Permissible wear	mm	mm	mm

Company address / contact



The present technical documentation has been prepared with care and all the information verified for its correctness. No liability, however, can be accepted for any incorrect or incomplete information. The data given in the documentation are intended as an aid for assessing the suitability of the material. They are derived from our own research as well as generally accessible publications.

The sliding friction and wear values stated by us or appearing in catalogues and other technical documentation do not constitute a guarantee of the specified properties. They have been determined in our test facilities under conditions that do not necessarily reflect the actual application of our products and their service environment or permit comprehensive simulation in relation to them. We provide guarantees only after written agreement of the test procedures and parameters and of all the relevant characteristics which the product is required to have.

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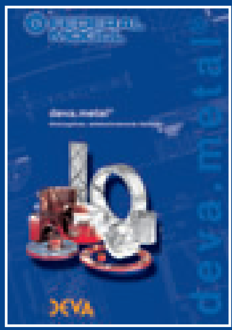

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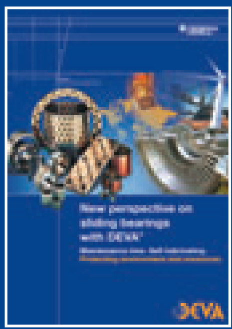

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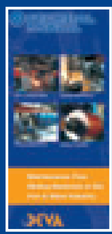

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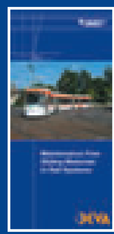

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