SIB-MET®

Sintered bronze sliding bearings | Maintenance-free | Oil-impregnated | Self-lubricating | DIN 1850 / ISO 2795

Bearing properties

SIB-MET® is a self-lubricating and maintenance-free sliding bearing. Suitable for high speeds at low loads.

Materials

CuSn10 (SINT B50)

RoHS

Material properties

Maintenance	Maintenance-free
spec. static load	≤ 50 N/mm²
spec. dynamic load	≤ 5 N/mm²
Sliding speed	≤ 6,0 m/s
Friction value	0,05 to 0,20
Temperature strain	-20 to +100 °C
Max. Pv-value	1,6 N/mm² x m/s

Tolerance details

Housing bore-ø	H7
Bushing inner-ø after mounting	H7 / H8
Shaft tolerance	f7

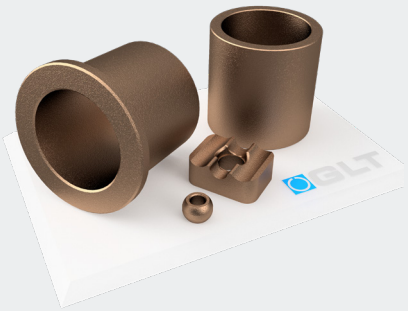
Shaft material

Steel, hardened or untempered, surface roughness ≤ Rz 4 - 6

Mounting instructions

Fitting mandrel	For assembly, we suggest to use an adequate fitting mandrel. Grease lubrication of the outer surface may be necessary when mounting.

* Upon request, further materials are available for higher requirements, e.g. for higher temperature ranges.



SIB-MET® is available as:

Cylindrical bushing **SBZ**

Other common designations:
..BP25
PSM
BKU..
AMS BJ..

Flanged bushing **SBB**

Other common designations:
BB..BP 25
PSMF
BKU..F
AMS BV..

Formed part **SBF**

Blank **SBR**

Cylindrical and flanged bushings, solid pieces and blanks are standard products.
Also available as sintered iron or sintered steel.

Material		Abbreviation	Permitted ranges									Informative examples										
			Density[a]	Porosity	Chemical composition (Mass fraction)					Radial crushing strength	Hardness	Density	Porosity	Chemical composition (Mass fraction)					Radial crushing strength	Compressive yield point	Hardness	Thermal conductivity
		Sint-	ρ	$\frac{\Delta V}{V} \cdot 100$	C	Cu	Sn	Fe	Others	K^c		ρ	$\frac{\Delta V}{V} \cdot 100$ [b]	C	Cu	Sn	Fe	andere	K^c	$\delta_{d\,0,2}$		λ
			g/cm³	%	%	%	%	%	%	N/mm²	HB	g/cm³	%	%	%	%	%	%	N/mm²	N/mm²	HB[c]	W/mK
Sintered iron		**A 00**	5,6 to 6,0	25 ± 2,5	< 0,3	< 1,0	—	Balance	< 2	> 150	> 25	5,9	25	—	—	—	Balance	< 0,2	160	130	30	37
		B 00	6,0 to 6,4	20 ± 2,5						> 180	> 30	6,3	20						190	160	40	43
		C 00	6,4 to 6,8	15 ± 2,5						> 220	> 40	6,7	15						230	180	50	48
Sintered steel	Alloyed Cu	**A 10**	5,6 to 6,0	25 ± 2,5	< 0,3	1 to 5	—	Balance	< 2	> 160	> 35	5,9	25	—	2,0	—	Balance	< 0,2	170	150	40	36
		B 10	6,0 to 6,4	20 ± 2,5						> 190	>40	6,3	20						200	170	50	37
		C 10	6,4 to 6,8	15 ± 2,5						> 230	>55	6,7	15						240	200	65	42
	Alloyed Cu and C	**B 11**	6,0 to 6,4	20 ± 2,5	0,4 to 1,5	1 to 5	—	Balance	< 2	> 270	> 70	6,3	20	0,6	2,0	—	Balance	< 0,2	280	160	80	28
	Alloyed Cu (higher)	**A 20**	5,8 to 6,2	25 ± 2,5	< 0,3	15 to 25	—	Balance	< 2	> 180	> 30	6,0	25	—	20,0	—	Balance	< 0,2	200	140	40	41
		B 20	6,2 to 6,6	20 ± 2,5						> 200	> 45	6,4	20						220	160	50	47
	Alloyed C- and Cu (higher)	**A 22**	5,5 to 6,0	25 ± 2,5	0,5 to 3,0	15 to 25	—	Balance	< 2	> 120	> 20	5,7	25	2,0[d]	20,0	—	Balance	< 0,2	125	100	25	30
		B 22	6,0 to 6,5	20 ± 2,5						> 140	> 25	6,1	20						145	120	30	37
Sintered bronze		**A 50**	6,4 to 6,8	25 ± 2,5	< 0,2	Balance	9 to 11	—	< 2	> 120	> 25	6,6	25	—	Balance	10,0	—	< 0,2	140	100	30	27
		B 50	6,8 to 7,2	20 ± 2,5						> 170	> 30	7,0	20						180	130	35	32
		C 50	7,2 to 7,7	15 ± 2,5						> 200	> 35	7,4	15						210	160	45	37
	Alloyed graphite[e]	**A 51**	6,0 to 6,5	25 ± 2,5	0,5 to 3,0	Balance	9 to 11	—	< 2	> 100	> 20	6,3	25	1,5[e]	Balance	10,0	—	< 0,2	120	80	20	20
		B 51	6,5 to 7,0	20 ± 2,5						> 150	> 25	6,7	20						155	100	30	26
		C 51	7,.0 to 7,5	15 ± 2,5						> 170	> 30	7,1	15						175	120	35	32

a Not impregnated

b The oil content is at least 90 % of the open porosity.

c Measured on calibrated bearings ∅ 10/16 × 10

d C is mainly present in the form of free graphite.

e C is present in the form of free graphite.

Coefficient of thermal linear expansion α (irrespective of density)

Sintered iron and steel: $\alpha \sim 12 \cdot 10^{-6}$/K

Sintered bronze: $\alpha \sim 18 \cdot 10^{-6}$/K

Information on sliding bearings

Sliding bearings are the most commonly used bearings in mechanical engineering. In the following, we would like to inform you about various properties of sliding bearings to give you the best possible insight. Our extensive range of bearings offers products for every need.

Advantages of sliding bearings

Due to the largely completely different application properties of sliding bearings, even the most difficult requirements can usually be optimally fulfilled. Some sliding bearings are relatively insensitive to impacts, vibrations and shocks due to the material and the damping properties of the bearing surface.

Sliding bearings run predominantly quietly, are robust, usually also very impervious to dirt and only rarely require additional seals.

Bushings are also available in split versions, which serve their requisite purpose in certain constructions.

Disadvantages of sliding bearings

With some types of sliding bearings, a higher starting torque is inevitable. Non-maintenance-free sliding bearings always require adequate maintenance and lubrication.

The efficiency of sliding bearings can generally be assumed to be somewhat lower than that of rolling bearings.

PV value

The PV value has a significant influence on the service life. It is the product of specific bearing load (p) and speed (v). The service life decreases as the PV value increases.

Friction

The friction value depends on the following factors:

- Selection of the material pairing
- Roughness of the counter surfaces
- Specific bearing load
- Sliding speed
- Bearing temperature
- Type of lubrication

Preferred use

For bearing arrangements with low speeds, for pivoting or axial movements, for shock loads and dirt loads. Also for bearing arrangements with all-purpose requirements, in agricultural machinery, construction machinery, vehicle construction, etc.

Mechanical engineering sliding bearings are also used in applications that require a simple design and a low price.

The sliding bearings are also suitable for bearing arrangements at high or low temperatures and with special corrosion resistance. They are also used for bearing arrangements in long-term applications that require a long service life and where wear-free running is required, usually in the area of liquid friction. These include water and steam turbines, generators, centrifugal pumps, heavy ship shaft bearings and the like.

Service life factors:

- Specific bearing load
- Sliding speed
- PV value
- Material and surface roughness of the sliding partners
- Load zone allocation
- Duty cycle
- Temperature
- Lubrication
- Operating conditions (e.g. dirt)

etc.

Delivery condition of the sliding bearings

Our sliding bearings (as well as brass bushings or sliding bearing bushings) are mainly delivered in a ready-to-install condition. As to a few types of bearings, specifications suitable for post-machining are possible. Please do not hesitate to ask us!

Proper storage of sliding bearings

Bronze, stainless steel and plastic sliding bearings are corrosion-resistant and do not require any special storage. Steel sliding bearings should be stored in dry rooms with low humidity. It is recommended to remove these bearings from their packaging only immediately before installation.

What you should consider when choosing a plain bearing

It is particularly important to note that the material and lubricant must be matched to each other. It is important that the material has good emergency running properties, high wear resistance and high thermal conductivity. The lubricant must coat the friction surface well.

Mounting of sliding bearings

In the case of wrapped sliding bearing bushes, slight deviations in the round shape as well as an open butt joint due to the manufacturing process cannot be prevented. These differences have been anchored in the applicable standards.

The circumference of these bearing bushes is dimensioned so that they are round and have a sufficient press fit after installation in a housing bore.

The press-fitting of sliding bearings should always be carried out with an fitting mandrel. For rolled plain bearing bushes with a diameter larger than 50 mm, it is recommended to additionally use a mounting ring (see supplementary sheet).

For easier installation of bearing bushes, a chamfer of 15° - 30° is required on the housing.

For flanged bushings, an additional chamfer of 1.0 x 45° (for larger bushings 1.5 to 2 x 45°) should be provided so that the flange rests completely and flat on the housing surface.

To ensure proper assembly of the bolt, the shaft ends must also be chamfered or rounded. Sharp edges can damage the sliding surface during assembly and reduce the function of the sliding bearing.

The tolerances of the inner diameter stated in the respective data sheets, in assembled condition, can only be guaranteed if the assembly has been carried out correctly and a locating hole has been made in the middle of the required tolerance field.

Gluing of bearing bushes and more

Bushings, thrust washers, strips and special parts made of metal or plastic can be secured not only by screwing or pinning but also by gluing.

Plastic bushings in particular are very often additionally secured by gluing them into the housing. This is often used when plastic bushings are exposed to high temperature fluctuations.

Lubrication (oil lubrication, grease lubrication, dry lubricant)

Oil lubrication

This type is preferable for high rotational speeds and loads, but also applicable for low rotation speeds. The type of lubricating oil depends on the particular application of the sliding bearing. Additives of molybdenum disulphide or graphite can improve the lubrication properties by increasing the adhesion and smoothing the sliding surfaces.

Grease lubrication

Grease lubrication of sliding bearings is mainly used for low speeds, oscillating movements and shock loads or when floating friction cannot be achieved.

Only high-quality plain bearing greases should be used for grease lubrication.

Lubricants with a solid additive of more than 2 % are not recommended, as these can cause premature wear. Under no circumstances should greases containing molybdenum sulphide be used to lubricate plastic sliding bearings. (e.g. Molicote grease)

Dry lubricant

Solid bronze bearing bushes with solid lubricant inserts in the sliding surface can also be used maintenance-free. All-plastic sliding bearings can increasingly be provided for demanding dry bearings and are often a better solution than bronze or steel sliding bearings. The application limits of these plastic sliding bearings are usually set by the specific thermal conductivity and thermal expansion.

However, specially developed plastics are also available for these applications. Dry lubricants such as molybdenum disulphide (MoS2) or graphite are used at high temperatures or for emergency running and one-time lubrication.

Running-in process of sliding bearings

During the running-in process, the lubricant or parts of the dry sliding layer are transferred to the mating surface. This fills and compensates for the surface roughness in the running surface. This results in a sliding pairing that has a very low friction coefficient. Only after this process can a positive sliding behaviour with low operating values develop.