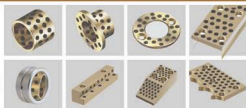


**SB#500 Cast bronze with graphite plug 铜基镶嵌型固体润滑轴承**

**Material Structure 材料组织**

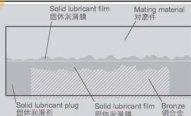
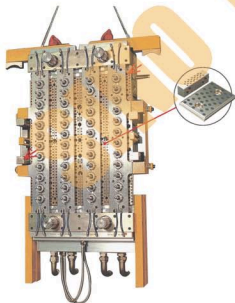


- ① Solid lubricant film 固体润滑膜
- ② Solid lubricant plug 固体润滑剂 (Graphite)
- ③ Bronze backing 铜合金基体



SB#500 material consists of highly wear - resistance copper cast alloy whose sliding surfaces are evenly provided with a certain percentage of solid lubricant plugs according to work condition, high-strength copper alloy provides a high load-bearing capacity and the solid lubricant can be formation of low friction film. Under technical dry running conditions, the bearing surface is designed with thick running-in film which enables the solid lubricant to be transferred to the counter material at the first contact.

SB #500 以高强度铜合金作为基础材料，根据使用工况按一定比例在其工作面加工出孔穴并填入固体润滑剂，高强度的铜合金提供了很高的承载能力而固体润滑剂则可以形成较低的摩擦副。在干摩擦条件下我们在轴承表面设计一层预润滑膜可以确保在最短的时间内将固体润滑剂转移到对偶件上并形成有效的固体润滑膜。



## SB#500 Cast bronze with graphite plug 铜基镶嵌型固体润滑轴承

When the mutual friction occurs between two non-lubricated surfaces, the two contacts with the uneven surface of the peak by the shear, stick-slip and plastic deformation giving rise to friction and wear. Conventional lubricants can significantly reduce these effects, however, the conventional lubricant will be more and more squeezed out of the contact area with increasing surface which formed the dry friction or boundary lubrication, With SB#500, the lubrication is effected by the sliding material itself. The solid lubricant is released from the friction material by micro-movement. This gives the sliding partners smooth surfaces with a firmly adhesive solid lubricant film, the solid lubricant film remains within the contact area even under heavy loads. The embedded solid lubricant plugs can be continuously provided to the friction surface to reduce friction resistance and wear, thus make the bearing can be worked under low wear rate and long-life service.

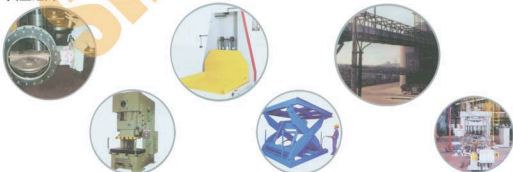
### Material properties

#### 材料特点

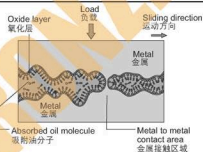
- Allows maintenance-free and long-life operation
- Suitable for high static and dynamic loads
- With low and smoothly coefficient of friction and without stick-slip effects
- Suitable for dirty, corrosion, impact load and edge loading
- The base material provided a good shock-absorbing capacity
- Can be used over a large temperature range
- Suitable for reciprocating, rotating and oscillating movement with start frequency and difficulty to form oil film occasions
- With low wear rate and long life service

### Typical application

#### 典型运用



当两个无润滑的表面相互摩擦时，两个表面凹凸不平的尖峰受到剪切、局部粘附和塑性变形而引起摩擦和磨损。传统的润滑剂能够明显地降低这些作用，然而在停顿时特别是大负载条件下，润滑油和润滑脂被挤压出来从而形成边界润滑或者干摩擦，而 SB#500 润滑源来自于材料本身。一旦轴承产生微观移动后固体润滑材料在受到外力挤压变形或摩擦力的作用下容易产生层状滑移，故而在滑动表面形成一层固体润滑膜，这层膜具有低剪切强度，即使在很大的静载荷条件下仍可牢固附着在轴承表面而不易破裂。这种嵌入式固体润滑剂可以不断地向摩擦表面提供固体润滑剂，减小摩擦阻力和磨损，因而轴承可以在较低的磨损率下长期工作。



- 可以长期使用而无需维护；
- 设计用于很高的静承载和动承载；
- 具有很低的且平稳的摩擦系数，无“粘着”现象；
- 具有耐粉尘、耐腐蚀、耐冲击和对边缘负载能力；
- 金属基材具有很好的吸震能力；
- 能够在很宽的温度范围内使用；
- 适合于往复、旋转和摆动等启动频繁又难以形成油膜的情况；
- 具有极低的磨损率，使用寿命长。

## SB#500 Cast bronze with graphite plug 铜基镶嵌型固体润滑轴承

### 材料成份和性能 Material Composition and Properties

SinoBronze Code	SB#500SP	SB#500SP1	SB#500SP2	SB#500SP3	SB#500HP	SB#250	SB#15
材料牌号 Code	CuZn25Al5Mn4Fe3	CuSn5Pb5Zn5	CuAl9Fe4Ni4Mn2	Cu6Ni2	CuZn38Al9Ni3	HT250	Gr15
密度 Density	8.0	8.9	8.5	9.05	8.0	7.3	7.8
硬度 Hardness HB	>190	>70	>150	>80	>280	>190	HRC>58
抗拉强度 N/mm <sup>2</sup> Tensile strength	>750	>200	>800	>200	>540	>250	>1500
伸长率 Elongation/%	>12	>10	>15	>8	>0.3	>5	>15
热膨胀系数 Coefficient of linear expansion 10 <sup>-6</sup> /°C	1.9	1.8	1.9	1.8	1.8	1.0	1.1
温度 Limit Temp °C	-40~+300	-40~+400	-40~+400	-40~+400	-40~+150	-40~+400	-40~+400
最大动载荷 Max load N/mm <sup>2</sup>	100	60	150	70	150	80	200
最大线速度 m/min Max speed (Dry)	15	10	20	10	15	8	5
Max PV最大PV N/mm <sup>2</sup> *m/min	200	60	60	80	200	40	150
压缩永久变形量 300N/mm <sup>2</sup>	<0.01	<0.05	<0.04	<0.05	<0.005	<0.015	<0.002

### 材料对应表 Base Material Interchange

材料代号 SB Material Codes	中国 China Brands GB1178-87	国际 International ISO 1338	德国 Germany DIN	日本 Japan JIS	美国 America ASTM (UNS)	英国 England BS	法国 France NF	适用情况 Applicable conditions
SB#500SP 高力合金铜	ZCu2n25Al6 Fe3Mn3	GCu2n25Al6 Fe3Mn3	DIN1709 G-CuZn25Al5	H5102 CAC304	B30-92 C83600	HTB2		高载荷, 低速, 一般用 High-load, low speed Commonly used
SB#500SP1 铸道锡青铜	ZCuSn5 Pb5Zn5	GCuPb5 Sn5Zn5	DIN1705 G-CuSn5ZnPb	HS111 BC6	B30-92 C83600	LQ2	CuPb5 Sn5Zn5	中载荷, 低速 Mid-load, low speed
SB#500SP2 铸道铝青铜	ZCuAl9Fe4 Ni4Mn2	GCuAl10 FeNi5	DIN17856 G-CuAl10Ni	HS114 AlBC3	B30-92 C95500	AB2	CuAl10 FeNi5	中载荷, 中速, 一般用 Mid-load, mid-speed, Commonly used
SB#250 铸铁	GB5675-85 HT250			FC250	ASTM Class40			中载荷, 低速 Mid-load, low speed

### 固体润滑剂 Solid Lubricant

固体润滑剂 Lubricant	特性 Features	典型用途 Typical application
SL1 高纯石墨+添加剂 Graphite + Additives	很好的耐磨性和化学稳定性, 使用温度<400°C Excellent resistance against chemical attacks and low friction, Temp limit 400°C	应用于一般机械, 在大气中使用 Suit for general machines and under atmosphere
SL4 PTFE+添加剂 PTFE + Additives	最低的摩擦系数和很好的水溶性, 使用温度<300°C Lowest in friction and good of water Lubrication, Temp limit 300°C	应用于水、海水润滑, 如船舶, 水工阀门, 水轮机, 制药饮料机械等。 Ship, hydraulic turbine, gas turbine etc.



Solid lubricant plug  
固体润滑剂(Graphite)

Bronze backing  
铜合金基体



Solid lubricant plug  
固体润滑剂(PTFE)

Bronze backing  
铜合金基体

**SB#500 Cast bronze with graphite plug 铜基镶嵌型固体润滑轴承**
**Chemical Resistance 化学性能**

The following table shows the chemical resistance of the SB#500 alloys. We recommend to test the actual performance under realistic operating conditions.

SB#500的化学性能取决于金属的基材, 各类铜合金在各种化学介质的耐腐蚀性能如下; 建议有可能的话在使用前进行试验来确认。

**Chemical resistance 化学性能**

Chemical Substance 化学物质	Conc. ratio 浓度 %	Temp. 温度 °C	SB #500SP	SB #500SP1	SB #500SP2	SB #500SP3
<b>Strong acids 强酸</b>						
盐酸 Hydrochloric acid	5	20	×	×	×	×
氢氟酸 Hydrofluoric acid	5	20	×	△	△	△
硝酸 Nitric acid	5	20	×	×	×	×
硫酸 Sulphuric acid	5	20	×	△	△	△
磷酸 Phosphoric acid	5	20	×	△	△	△
<b>Light acid 弱酸</b>						
醋酸 Acetic acid	5	20	×	×	○	○
甲酸 Formic acid	5	20	×	×	○	○
硼酸 Boric acid	5	20	×	×	○	○
柠檬酸 Citrus acid	5	20	×	×	○	○
<b>Bases 碱</b>						
氨 Ammonia	10	20	×	×	×	×
氢氧化钠 Sodium hydroxide	5	20	△	△	○	○
氢氧化钾 Potassium hydroxide	5	20	△	△	○	○
<b>Solvents 溶剂</b>						
丙酮 Acetone	20	20	△	△	○	○
四氯化碳 Carbon tetrachloride	20	20	△	△	○	○
乙醇 Ethyl alcohol	20	20	△	△	○	○
醋酸乙酯 Ethyl acetate	20	20	△	△	○	○
乙基氯 Ethyl chloride	20	20	△	△	○	○
甘油 Glycerol	20	20	△	△	○	○
<b>Salts 盐</b>						
硝酸铵 Ammonium nitrate			×	×	×	×
氯化钙 Calcium chloride			○	○	○	○
氯化镁 Magnesium chloride			○	○	○	○
硫酸镁 Magnesium sulphate			○	○	○	△
氯化钠 Sodium chloride			○	○	○	○
硝酸钠 Sodium nitrate			○	○	○	○
氯化钾 Potassium chloride			×	×	○	×
硫酸锌 Zinc sulphate			△	△	○	○
<b>Gases 气体</b>						
氨 Ammonium gas			△	△	△	△
氯 Chlorine gas			×	×	×	×
二氧化碳 Carbon dioxide			△	△	○	○
氟氯化物 Fluorine			×	×	×	×
二氧化硫 Sulphur dioxide			×	△	△	△
硫化氢 Hydrogen sulphide			×	△	△	△
氮 Nitrogen oxide			×	△	○	○
氢 Hydrogen			×	△	○	○
<b>Lubricants and fuel 润滑剂和燃油</b>						
石蜡 Paraffin			○	○	○	○
汽油 Petrol			○	○	○	○
煤油 Fuel oil			○	○	○	○
柴油 Diesel fuel			○	○	○	○
矿物油 Mineral oil			○	○	○	○
HFA-ISO46油/乳液 HFA ISO46 oil/water emulsion			○	○	○	○
HFC-水/乙二胺 HFC Water/ethylene			○	○	○	○
HFD-磷酸酯 HFD Phosphate ester			○	○	○	○
<b>Others 其它</b>						
水 Water			△	○	○	○
海水 Sea water			△	△	×	○
树脂 Resin			△	○	○	○
碳氢化合物 Hydrocarbon			△	○	○	○

说明: ○: 耐腐蚀 △: 取决于浓度温度等情况 ×: 不推荐

Remark: ○: Excellent △: Conditionally resistant depend on concentration, temperature etc. ×: Not recommended