



### 产品特性 Product features

- 导电性优良的自润滑材料。主要因用于高载荷下导电性需求
- 连续使用温度: -40°C/+140°C
- 专用于要求抗静电场合
- 适合低速运动
- 较高的承载能力
- Self-lubricated material with good electricity conductivity. Mainly used with the high load and electricity conductive environment
- Continuous working temperature: -40°C/+140°C
- Specially use for static electricity existing environment
- Suitable for low speed operation
- Higher load capacity

● 标准产品规格表 Standard specifications: P128

### 材料数据表 Material properties data table

材料性能 Material properties	测试标准 Standard	单位 Unit	CSB-EPB9
颜色 Color	-	-	黑色 Black
密度 Density	ISO1183	g/cm <sup>3</sup>	1.28
最大吸湿率 Max. moisture absorption, 50%RH	ISO62	%	1.3
最大吸水率 Max. water absorption	ISO62	%	6.5
对钢动摩擦系数 Coefficient of sliding friction(steel)	ITS025	μ	0.10-0.40
极限PV值 Max. PV value	ITS026	N/mm <sup>2</sup> × m/s	0.35
弯曲模量 Flexural modulus	ISO178	MPa	10000
弯曲强度 Flexural strength	ISO178	MPa	250
最大静载荷 Max. static load	ITS027	MPa	105
最大动载荷 Max. dynamic load	ITS028	MPa	58
邵氏硬度 Shore hardness	ISO868	D	82
连续运行温度 Long-term application temperature	ITS029	°C	+140
短时运行温度 Short-term application temperature	ITS029	°C	+180
最低运行温度 Lowest application temperature	ITS029	°C	-40
导热性 Thermal conductivity	ISO22007	W/m/K	0.60
线性热膨胀系数 Coefficient of thermal expansion	ISO11359	K <sup>-1</sup> × 10 <sup>-5</sup>	11
阻燃等级 Flammability	UL94	Class	HB
体电阻率 Volume resistance	IEC60093	Ω · cm	<10 <sup>3</sup>
面电阻率 Surface resistance	IEC60093	Ω	<10 <sup>3</sup>

\*ITS: CSB内部测试标准 CSB company's internal test standards.

\*\*除非特殊说明测试温度为23°C Test temperatures are 23°C unless otherwise stated.

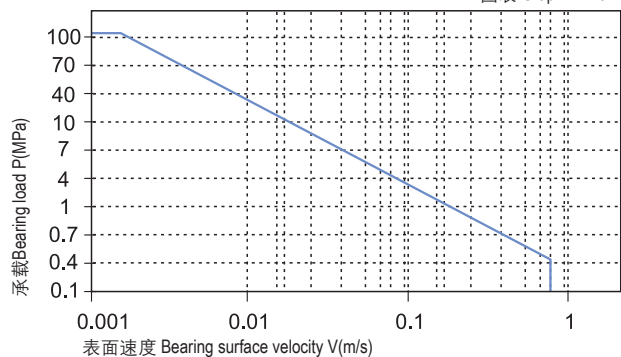
### 轴承PV值 PV value

CSB-EPB9塑料轴承最大运行PV值为0.35N/mm<sup>2</sup> × m/s; 由此决定轴承所承受的载荷与速度成反比, 详细查阅图表EPB9-1。

The max PV value of the CSB-EPB9 plastic bearings is 0.35N/mm<sup>2</sup> × m/s which determines the load capacity of bearing is inversely proportional to the speed. Please refer to the chart for more detailed information (Graph EPB9-1).

### ■ PV图表 Permissible PV value for CSB-EPB9

图表 Graph EPB9-1



## 轴承的载荷、速度、温度 Load, speed and temperature

CSB-EPB9塑料轴承可承受最大静载荷为105Mpa，在此载荷下轴承的最大压缩变形量参考图表EPB9-2，轴承实际工作载荷略小于105Mpa，载荷还受到运行速度以及温度的影响，速度越快 (Vmax: 0.8m/s) 会导致摩擦温度上升，而温度上升 (Tmax: 140℃) 会导致轴承的承载能力逐渐减弱，载荷随轴承工作温度变化情况参考图表EPB9-3。

CSB-EPB9 allows the Max static load of 105Mpa, The max compressive deformation rate under the max load is listed in Graph EPB9-2, The actual load capacity of bearing is slightly less than 105Mpa, The bearing load is variable against the speed and temperature, Fast speed (Vmax: 0.8m/s) results into higher temperature (Tmax: 140℃) which decreases the load capacity of the bearing. Please refer to the Graph EPB9-3 for such variation.

## 轴承的摩擦系数、磨损、轴材料 Friction factor, wear and shaft material

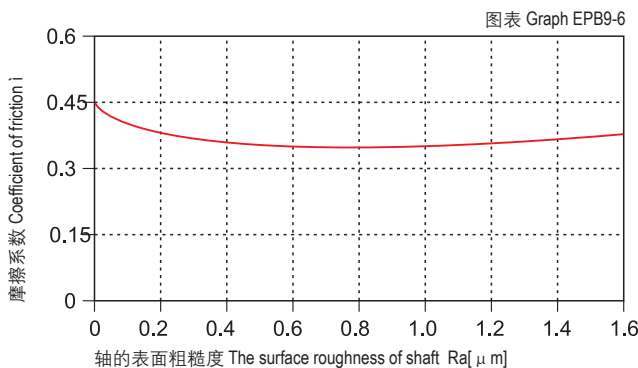
### 摩擦系数 Friction factor

图表EPB9-4表明CSB-EPB9塑料轴承的摩擦系数相对其它塑料轴承较高，这主要是由于此轴承材料内部植入了导电纤维的原因；这就决定了此轴承在有润滑的情况下摩擦系数更好。图表EPB9-5表明CSB-EPB9塑料轴承的摩擦系数同样会随着载荷的增加而逐步降低；图表EPB9-6表明CSB-EPB9塑料轴承的摩擦系数在轴粗糙度为Ra0.1 ~ 0.5之间时随着轴粗糙度的增大而逐步减低，而当轴表面粗糙度在Ra0.5 ~ 1.6之间时却影响较小。

Graph EPB9-4 shows that the friction factor of CSB-EPB9 is much higher than those of other materials because the electronic conductive fiber is embedded into the bearing material. It is induced that the friction performance will be better when the bearing is lubricated. Graph EPB9-5 shows that the friction factory is decreasing along with the loading increasing and Graph EPB9-6 shows that the friction factor is increasing along with the shaft roughness increasing when the shaft roughness is between Ra0.1 to Ra0.5. This effecting will be less when the shaft roughness is between Ra0.5 to Ra1.6.

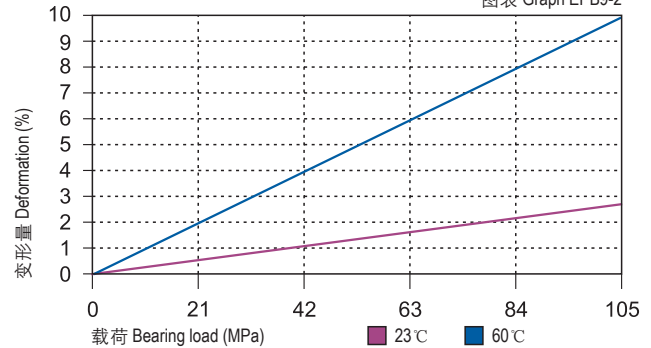
### 摩擦系数与轴表面粗糙度关系图表

Coefficient of friction & the surface roughness of shaft



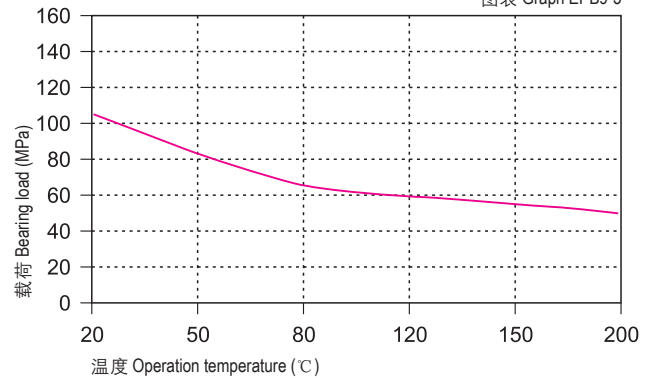
### 载荷-温度-变形量图表 Load-Temperature deformation

图表 Graph EPB9-2



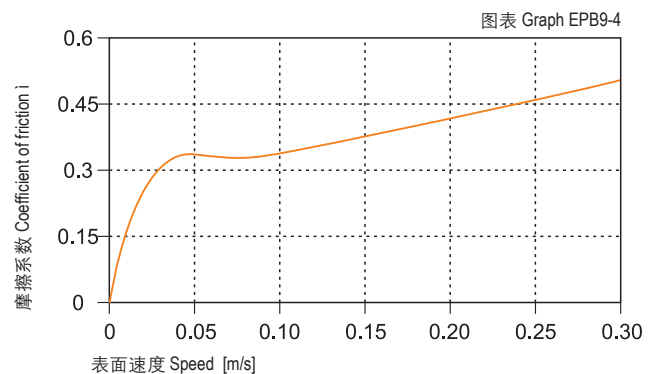
### 载荷-温度图表 Load-Temperature diagrams

图表 Graph EPB9-3



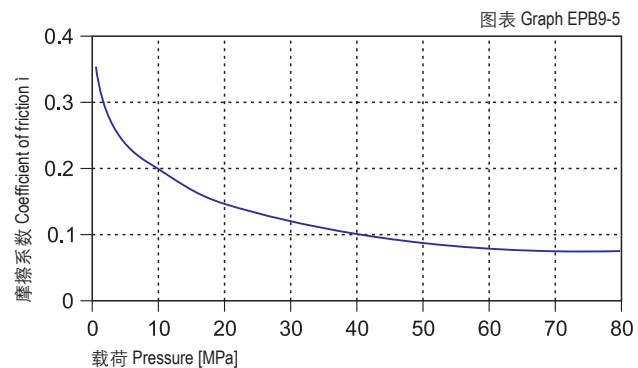
### 摩擦系数与速度变化关系图表 P=2MPa

Coefficient of friction & the speed of bearing, p = 2 MPa



### 摩擦系数与载荷变化关系图表 v=0.2m/s

Coefficient of friction & the pressure of bearing, v = 0.2 m/s



CSB-EPB9	干运行 Dry	油脂 Grease	油 Oil	水 Water
摩擦系数 $\mu$ Friction coef.	0.10~0.40	0.09	0.04	0.04

### 磨损与轴材料 Wearing and shaft material

图表EPB9-7与图表EPB9-8表明了CSB-EPB9塑料轴承在不同轴材料上旋转运动磨损情况。由此可以看出在低载荷旋转运动时，硬铬钢轴比较适合，而在高载旋转运动时，硬化钢轴比较适合。

Graph EPB9-7 and EPB9-8 shows the different results of the material against different shaft materials. It induces that the bearing material is good for hard chrome steel shaft under low loading operation condition and good for hardened carbon steel shaft under high loading rotation operation.

### 化学抗性 Chemical resistance

CSB-EPB9塑料轴承能抵抗弱碱以及各类润滑油的腐蚀。CSB-EPB9 is good at chemical resistance against weak acidic medium and various kinds of lubricants.

### 吸水性 Water absorption

CSB-EPB9塑料轴承在标准大气中的吸湿率为1.3%。浸泡在水中最高吸水率为6.5%。由于高吸水率的特性，我们必须考虑此轴承的应用环境。

The moisture absorption of CSB-EPB9 plastic plain bearings is 1.3% in standard atmosphere. The max. water absorption is 6.5% in water. The application environment has to be considered due to the high water absorption properties.

### 抗UV性能 UV resistance

CSB-EPB9塑料轴承长久暴露在紫外线下材料性能基本都不会发生改变。

When CSB-EPB9 is exposed into the UV ray, the material performance stays stable.

### 安装公差 Installation tolerances

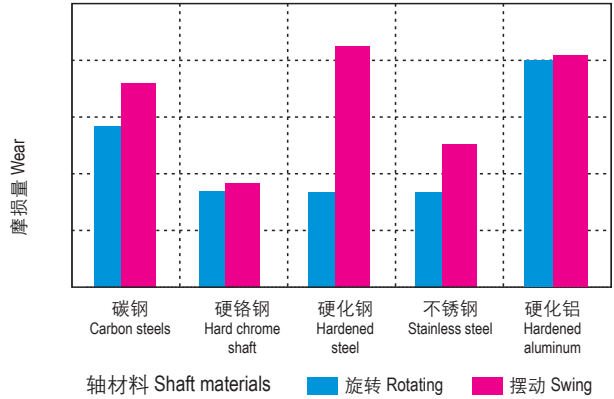
CSB-EPB9塑料轴承压装后公差 Tolerances after pressfit

直径 Di. [mm]	CSB-EPB9 E10 [mm]	座孔 Housing H7 [mm]	轴 Shaft h9 [mm]
>0 ~ 3	+0.014 ~ +0.054	0 ~ +0.010	0 ~ -0.025
>3 ~ 6	+0.020 ~ +0.068	0 ~ +0.012	0 ~ -0.030
>6 ~ 10	+0.025 ~ +0.083	0 ~ +0.015	0 ~ -0.036
>10 ~ 18	+0.032 ~ +0.102	0 ~ +0.018	0 ~ -0.043
>18 ~ 30	+0.040 ~ +0.124	0 ~ +0.021	0 ~ -0.052
>30 ~ 50	+0.050 ~ +0.150	0 ~ +0.025	0 ~ -0.062
>50 ~ 80	+0.060 ~ +0.180	0 ~ +0.030	0 ~ -0.074
>80 ~ 120	+0.072 ~ +0.212	0 ~ +0.035	0 ~ -0.087
>120 ~ 180	+0.085 ~ +0.245	0 ~ +0.040	0 ~ -0.100

### 在不同轴材料上旋转时的磨损量 $p=2\text{MPa}$ , $v=0.2\text{m/s}$

Wear under rotating with different shaft materials,  $p = 2 \text{ MPa}$ ,  $v = 0.2 \text{ m/s}$

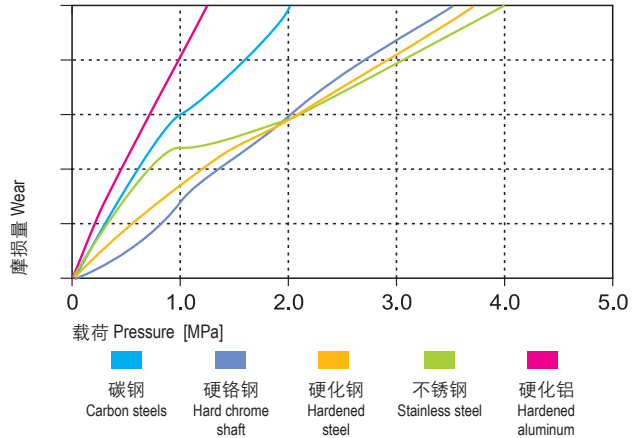
图表 Graph EPB9-7



### 旋转磨损随轴材料与压力变化关系 $v=0.2\text{m/s}$

Wear & pressure under rotating with different shaft materials,  $v = 0.2 \text{ m/s}$

图表 Graph EPB9-8



### 吸水性的影响

Effect of moisture absorption on EPB9 bearings

图表 Graph EPB9-9

