



● 标准产品规格表 Standard specifications: P147

### 产品特性 Product Features

- 高温和良好的化学抗性材料。可在200度下连续使用，也适用于潮湿环境甚至化学液体中。硬质轴材料与之配合使用较好
- 连续使用温度: -40℃/+200℃
- 适合多数中高载荷场合
- 适合干运行、免维护
- 良好的化学抗性
- 适合潮湿环境中使用
- High temperature material with good chemical resistance feature. It could be continuously used under the temperature of 200 °C, it is also suitable to be used in the humid environment and even inside the chemical liquids. It is best to be used against hard materials
- Continuous working temperature: -40 °C/+200 °C
- Suitable for medium and high load operation
- Maintenance-free dry operation
- Good chemical resistance
- Suitable for humid environment

### 技术数据表 Technical data label

材料性能 Material Properties	试验方法 Testing Method	单位 Unit	CSB-EPB4
密度 Density	ISO1183	g/cm <sup>3</sup>	1.70
颜色 Color			黑色Black
对钢的动摩擦系数 Dynamic friction /steel(dry)			0.07-0.20
最大P.V值 Max. PV (dry)		N/mm <sup>2</sup> × m/s	1.4
最大旋转速度值 Max. rotating velocity		m/s	1.0
最大摇摆速度值 Max. oscillating velocity		m/s	0.7
最大直线速度值 Max. linear velocity		m/s	3.0
抗拉强度 Tensile strength	ISO527	MPa	180
抗压强度(轴向) Compressive strength (Axial)		MPa	80
弹性模量 E-module	ISO527	MPa	12000
允许最大表面静压力(20℃)Max. static pressure of the surface, 20℃		MPa	90
邵氏硬度 Shore hardness	ISO 868	D	87
连续工作温度 Continuous work temperature		℃	-40/+200
短时运行温度 Short-time work temperature		℃	-40/+260
导热性 Thermal conductivity	ASTME1461	W / m × k	0.6
线性热膨胀系数 Linear coef. of thermal expansion	ASTMD696	K <sup>-1</sup> × 10 <sup>-5</sup>	4
RH50/23℃时的吸湿性 Moisture absorption RH50/23℃	ASTMD570	%	<0.1
最大吸水率23℃ Max. water absorption, 23℃		%	0.3
燃烧性能 Flammability	UL94		V0
体电阻率 Volume resistivity	IEC60093	Ω.cm	>10 <sup>4</sup>
面电阻率 Surface resistivity	IEC60093	Ω	>10 <sup>5</sup>

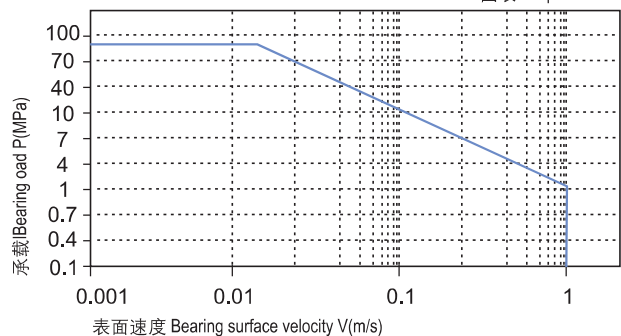
### 轴承PV值 PV Value

CSB-EPB4塑料轴承最大运行PV值1.4N/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EPB4-1。

The max PV value of the CSB-EPB4 plastic bearings is 1.4N/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 EPB4-1).

■ PV图表 Permissible PV value for CSB-EPB4

图表 Graph EPB4-1



## 轴承的载荷、速度、温度 Load, Speed and Temperature

CSB-EPB4塑料轴承可承受最大静载荷为90Mpa，在此载荷下轴承的最大压缩变形量参考图表EPB4-2，轴承实际工作载荷略小于90Mpa，载荷还受到运行速度以及温度的影响，速度越快 (Vmax: 1.0m/s) 会导致摩擦温度上升，而温度上升 (Tmax: 200℃) 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EPB4-3。

CSB-EPB4 allows the Max static load of 90Mpa, The max compressive deformation rate under the max load is listed in Graph EPB4-2, The actual load capacity of bearing is slightly less than 90Mpa, The bearing load is variable against the speed and temperature, Fast speed (Vmax: 1.0m/s) results into higher temperature (Tmax: 200℃) which decreases the load capacity of the bearing. Please refer to the Graph EPB4-3 for such variation.

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

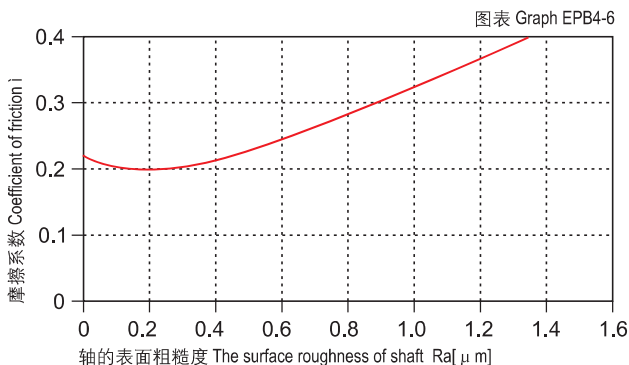
### 摩擦系数 Friction Factor

图表EPB4-4表明CSB-EPB4轴承在载荷保持不变时旋转下的摩擦系数会随着速度的增加而略有减低；图表EPB4-5表明CSB-EPB4轴承在速度保持不变时旋转下的摩擦系数会随着载荷的增加而逐步降低，特别是在在载荷小于30Mpa的情况下。图表EPB4-6表明CSB-EPB4轴承的对磨轴粗糙度在Ra0.1 ~ 0.4um时摩擦系数几乎没有变化，但当轴表面粗糙度大于Ra0.4时摩擦系数会快速上升；我们推荐使用轴的粗糙度为Ra0.1 ~ 0.4um。

Friction factor will be slightly decreased along with the speed increasing under certain loading of the rotation operation (see Graph EPB4-4) and it will be slightly decreased along with the loading increasing under certain speed of the rotation operation especially when the loading is less than 30Mpa. Graph EPB4-5 tells that the friction of the CSB-EPB4 is not changed at all when the shaft roughness is between Ra0.1 to Ra0.4 and will be considerably increased when the shaft roughness is over Ra0.4. So the recommended shaft roughness is Ra0.1-Ra0.4.

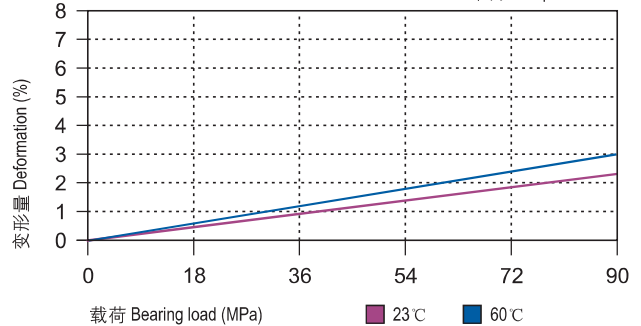
### 摩擦系数与轴表面粗糙度关系图表

Coefficient of friction & the surface roughness of shaft



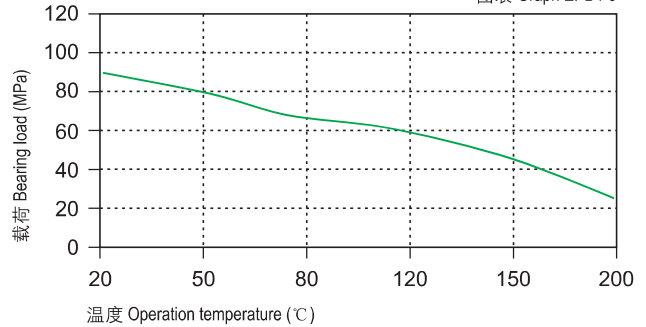
### 载荷-温度-变形量图表 Load-Temperature deformation

图表 Graph EPB4-2



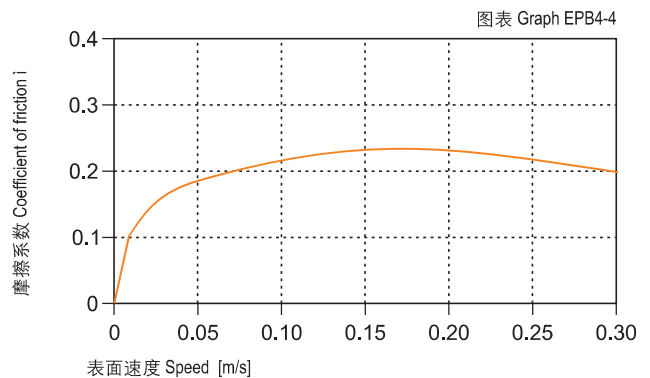
### 载荷-温度图表 Load-Temperature diagrams

图表 Graph EPB4-3



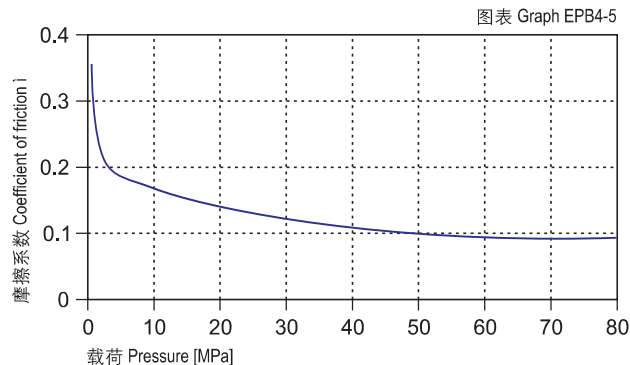
### 摩擦系数与速度变化关系图表 P=2MPa

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-EPB4	干运行 Dry	油脂 Grease	油 Oil	水 Water
摩擦系数 $\mu$ Friction coef.	0.07~0.20	0.09	0.04	0.04

### 磨损与轴材料 Wearing and shaft material

图表EPB4-7表明CSB-EPB4轴承在低载荷旋转运动时适合大多数轴材料，而在高载旋转下硬化钢轴表现尤为特出（见图表EPB4-7）；图表EPB4-8显示CSB-EPB4轴承在采用不锈钢轴摆动运动下较为合适，而在旋转运动中碳钢轴和硬化钢轴效果比较好。

Graph EPB4-7 shows that CSB-EPB4 is suitable for most of the shaft materials under low loading rotation operation and it is good for hardened carbon steel shaft under high loading rotation operation (see Graph EPB4-7). From Graph EPB4-8, we can also read that CSB-EPB4 is suitable for stainless steel shaft under oscillation operation and good for hot rolled carbon steel shaft under rotation operation.

### 化学抗性 Chemical Resistance

CSB-EPB4塑料轴承具有很好的化学抗性，能抵抗绝大多数酸碱。

The Chemical Resistance of CSB-EPB4 is fairly good against most of Acid and Alkalis.

### 吸水性 Water Absorbability

在标准大气压中，CSB-EPB4塑料轴承的吸水率极低0.1%，浸泡水中最大平衡吸水率为0.3%；因此材料不会吸水而发生性能和尺寸变化，适用于潮湿环境甚至水下。

The water absorb rate of CSB-EPB4 is 0.1% under the atmospheric pressure while it is 0.3% when the material is immersed into water. The material performance and dimensions of the material is stabilized for the applications under humid environment.

### 抗UV性能 UV Resistance

CSB-EPB4长久暴露在紫外线下材料表面会发生蜕变，抗压强度会下降。

Disintegration could be possible for the material CSB-EPB4 after long period of exposing under the UV ray and therefore the compressive strength will be reduced.

### 安装公差 Installation Tolerances

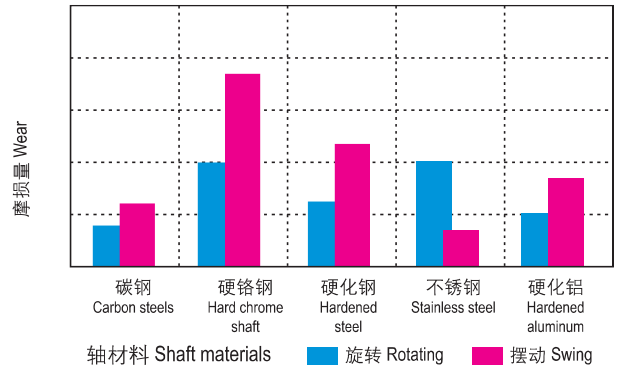
CSB-EPB4塑料轴承压装后公差 Tolerances after pressfit

直径 Di. [mm]	CSB-EPB4 F10 [mm]	座孔 Housing H7 [mm]	轴 Shaft h9 [mm]
>0 ~ 3	+0.006 +0.046	0 ~ +0.010	0 ~ -0.025
>3 ~ 6	+0.010 +0.058	0 ~ +0.012	0 ~ -0.030
>6 ~ 10	+0.013 +0.071	0 ~ +0.015	0 ~ -0.036
>10 ~ 18	+0.016 +0.086	0 ~ +0.018	0 ~ -0.043
>18 ~ 30	+0.020 +0.104	0 ~ +0.021	0 ~ -0.052

### 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,  $p = 2 \text{ MPa}$ ,  $v = 0.2 \text{ m/s}$

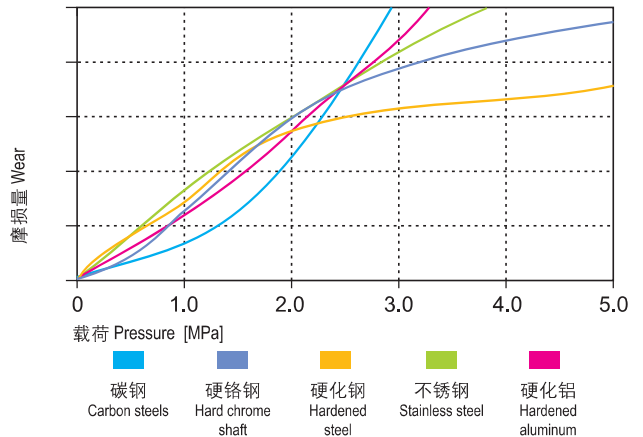
图表 Graph EPB4-7



### 旋转磨损随轴材料与压力变化关系 $v=0.2\text{m/s}$

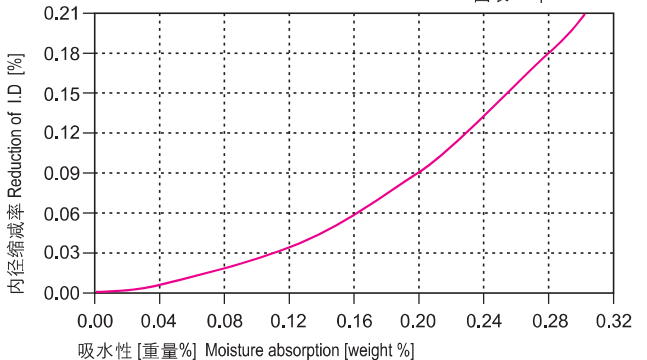
Wear & pressure under rotating with different shaft materials,  $v = 0.2 \text{ m/s}$

图表 Graph EPB4-8



### 吸水性的影响 Effect of moisture absorption on EPB4 bearings

图表 Graph EPB4-9



直径 Di. [mm]	CSB-EPB4 F10 [mm]	座孔 Housing H7 [mm]	轴 Shaft h9 [mm]
>30 ~ 50	+0.025 +0.125	0 ~ +0.025	0 ~ -0.062
>50 ~ 80	+0.030 +0.150	0 ~ +0.030	0 ~ -0.074
>80 ~ 120	+0.036 +0.176	0 ~ +0.035	0 ~ -0.087
>120 ~ 180	+0.043 +0.203	0 ~ +0.040	0 ~ -0.100