



● 标准产品规格表 Standard specifications: P128

### 产品特性 Product features

- 高温下的低摩擦系数和耐磨性同样出色材料。抗化学腐蚀优良。被用于高温、高化学抗性要求下耐磨轴承的优选材料
- 连续使用温度: -40°C/+200°C
- 非常低的摩擦系数
- 适合干运行、免维护
- 高温和良好的化学抗性
- 适合潮湿环境中使用
- Low friction and good wear resistance for high temperature applications. The excellent chemical resistance of the material ensures the applications for high temperature and high chemical erosion applications
- Continuous working temperature: -40°C/+200°C
- Very low coefficient of friction
- Maintenance-free dry operation
- High temperature and good chemical resistance
- Suitable for humid environment

### 材料数据表 Material properties data table

材料性能 Material properties	测试标准 Standard	单位 Unit	CSB-EPB21
颜色 Color	-	-	米色 Beige
密度 Density	ISO1183	g/cm <sup>3</sup>	1.53
最大吸湿率 Max. moisture absorption, 50%RH	ISO62	%	0.1
最大吸水率 Max. water absorption	ISO62	%	0.3
对钢动摩擦系数 Coefficient of sliding friction(steel)	ITS025	μ	0.05-0.20
极限PV值 Max. PV value	ITS026	N/mm <sup>2</sup> × m/s	0.80
弯曲模量 Flexural modulus	ISO178	MPa	2800
弯曲强度 Flexural strength	ISO178	MPa	55
最大静载荷 Max. static load	ITS027	MPa	80
最大动载荷 Max. dynamic load	ITS028	MPa	37
邵氏硬度 Shore hardness	ISO868	D	77
连续运行温度 Long-term application temperature	ITS029	°C	+200
短时运行温度 Short-term application temperature	ITS029	°C	+240
最低运行温度 Lowest application temperature	ITS029	°C	-40
导热性 Thermal conductivity	ISO22007	W/m/K	0.24
线性热膨胀系数 Coefficient of thermal expansion	ISO11359	K <sup>-1</sup> × 10 <sup>-5</sup>	6
阻燃等级 Flammability	UL94	Class	V0
体电阻率 Volume resistance	IEC60093	Ω · cm	>10 <sup>12</sup>
面电阻率 Surface resistance	IEC60093	Ω	>10 <sup>11</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.

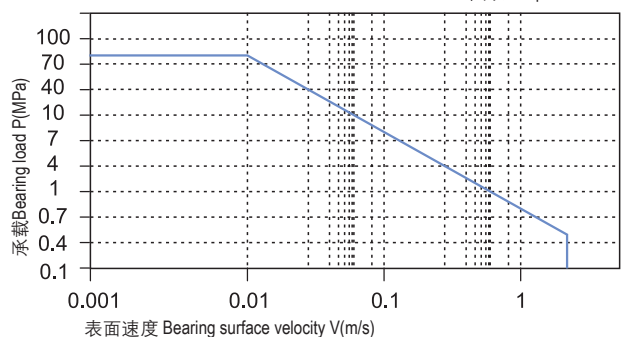
### 轴承PV值 PV value

CSB-EPB21塑料轴承最大运行PV值0.8N/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EPB21-1。

The max PV value of the CSB-EPB21 plastic bearings is 0.8N/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 EPB21-1).

### PV图表 Permissible PV value for CSB-EPB21

图表 Graph EPB21-1



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

CSB-EPB21塑料轴承可承受最大静载荷为80Mpa，在此载荷下轴承的最大压缩变形量参考图表EPB21-2，轴承实际工作载荷略小于80Mpa，载荷还受到运行速度以及温度的影响，速度越快 (Vmax: 1.5m/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EPB21-3。

CSB-EPB21 allows the Max static load of 80Mpa, The max compressive deformation rate under the max load is listed in Graph EPB21-2, The actual load capacity of bearing is slightly less than 80Mpa, The bearing load is variable against the speed and temperature, Fast speed (Vmax: 1.5m/s) results into higher temperature (Tmax: 200℃) which decreases the load capacity of the bearing. Please refer to the Graph EPB21-3 for such variation.

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

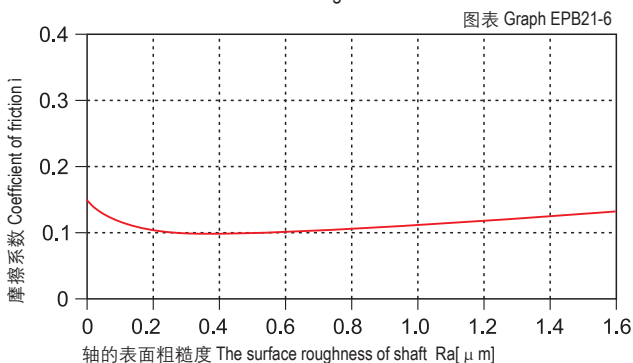
### 摩擦系数 Friction factor

图表EPB21-4表明CSB-EPB21塑料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EPB21-5表明CSB-EPB21塑料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，特别是在载荷小于30Mpa的情况下。图表EPB21-6表明CSB-EPB21塑料轴承的对磨轴粗糙度在Ra0.3 ~ 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Ra0.3 ~ 0.4um。

Friction factor will be slightly decreased along with the speed increasing under certain loading of the rotation operation (see Graph EPB21-4) 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 EPB21-5 tells that the friction of the CSB-EPB21 is not changed at all when the shaft roughness is between Ra0.3 to Ra0.4 and will be considerably increased when the shaft roughness is over Ra0.4. So the recommended shaft roughness is Ra0.3-Ra0.4.

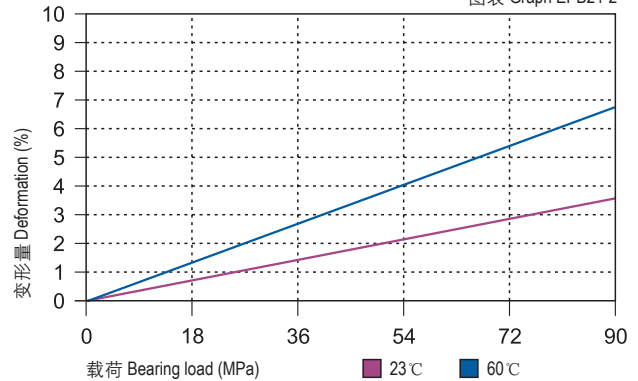
### 摩擦系数与轴表面粗糙度关系图表

Coefficient of friction & the surface roughness of shaft



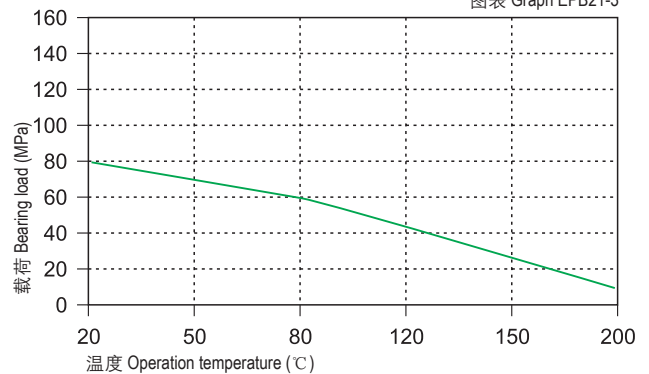
### 载荷-温度-变形量图表 Load-Temperature deformation

图表 Graph EPB21-2



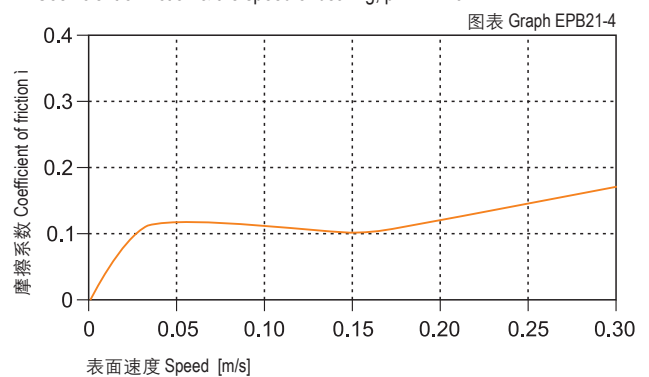
### 载荷-温度图表 Load-Temperature diagrams

图表 Graph EPB21-3



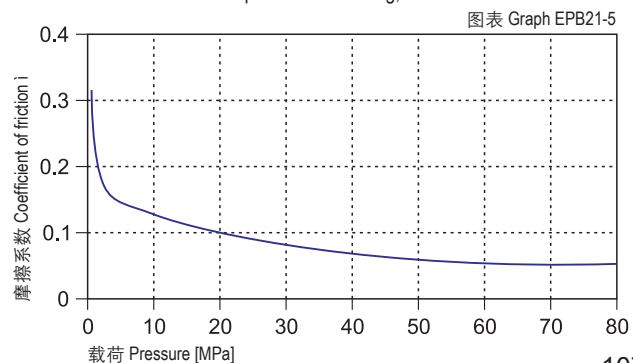
### 摩擦系数与速度变化关系图表 P=2MPa

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-EPB21	干运行 Dry	油脂 Grease	油 Oil	水 Water
摩擦系数 $\mu$ Friction coef.	0.05-0.20	0.09	0.04	0.04

### 磨损与轴材料 Wearing and shaft material

图表EPB21-7与EPB21-8表明CSB-EPB21塑料轴承在旋转运动时适合大都数轴材料，而在高载旋转下不锈钢轴表现尤为特出（见图表EPB21-8）；CSB-EPB21塑料轴承比较适合用于摆动运动，在旋转运动中不锈钢和硬化铝轴效果比较好。

Graph EPB21-7 and EPB21-8 shows that CSB-EPB21 is suitable for most of the shaft materials under rotation operation and it is good for stainless steel shaft under high loading rotation operation (see Graph EPB21-8). CSB-EPB21 is suitable for oscillation operation, Stainless steel shaft and hardened aluminum shaft is suitable for the bearing under rotation operation.

### 化学抗性 Chemical resistance

CSB-EPB21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-EPB21 is fairly good against most of Acid and Alkalis.

### 吸水性 Water absorption

CSB-EPB21塑料轴承在标准大气中的吸湿率为0.1%。浸泡在水中的最高吸水率为0.3%。极低吸水率不会导致轴承发生性能和尺寸变化，非常适合用于潮湿环境。

The moisture absorption of CSB-EPB21 plastic plain bearings is 0.1% in standard atmosphere. The max. water absorption is 0.3% in water. These values are very low, CSB-EPB21 plastic plain bearings is very well suited for used in wet applications.

### 抗UV性能 UV resistance

CSB-EPB21塑料轴承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-EPB21 after long period of exposing under the UV ray and therefore the compressive strength will be reduced.

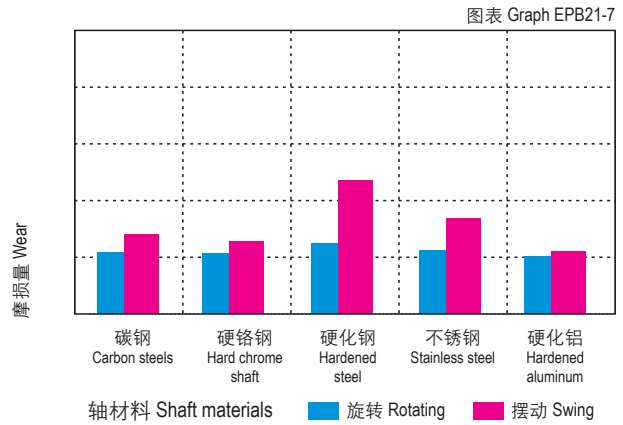
### 安装公差 Installation tolerances

CSB-EPB21塑料轴承压装后公差 Tolerances after pressfit

直径 Di. [mm]	CSB-EPB21 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

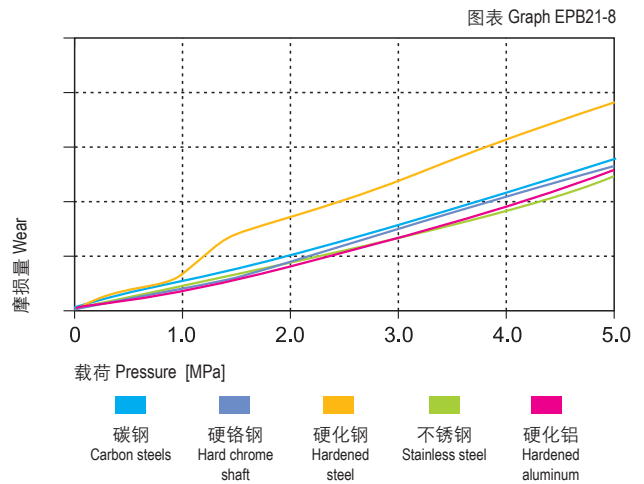
### 在不同轴材料上旋转时的磨损量 $p=2\text{MPa}$ , $v=0.2\text{m/s}$

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



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



### 吸水性的影响

Effect of moisture absorption on EPB21 bearings

