



● 标准产品规格表 Standard specifications: P147

### 产品特性 Product Features

- 高温250度自润滑材料。高化学抗性可被用于多数腐蚀性液体中。高承载能力，一般用于高温或高化学腐蚀场合
- 连续使用温度: -100℃/+250℃
- 适合高载荷运用
- 高温下保持较高的承载能力
- 较广泛的化学抗性
- 非常低的吸水率
- 较高的抗压强度
- Self-lubricated material for high temperature up to 250 °C. With its high chemical resistance feature, it could be used inside most common chemical liquids. It is a high load material for the applications of high temperature and critical chemical environments
- Continuous working temperature: -100°C/+250°C
- Suitable for high load operation
- High load capacity at higher temperature
- Good chemical resistance
- Low water absorption
- High pressure resistance

### 技术数据表 Technical data label

材料性能 Material Properties	试验方法 Testing Method	单位 Unit	CSB-EPB5
密度 Density	ISO1183	g/cm <sup>3</sup>	1.44
颜色 Color			黑色Black
对钢的动摩擦系数 Dynamic friction /steel(dry)			0.09-0.25
最大P.V值 Max. PV (dry)		N/mm <sup>2</sup> × m/s	1.5
最大旋转速度值 Max. rotating velocity		m/s	1.5
最大摇摆速度值 Max. oscillating velocity		m/s	1.1
最大直线速度值 Max. linear velocity		m/s	5.0
抗拉强度 Tensile strength	ISO527	MPa	170
抗压强度 (轴向) Compressive strength (Axial)		MPa	100
弹性模量 E-module	ISO527	MPa	7900
允许最大表面静压力(20℃)Max. static pressure of the surface, 20℃		MPa	150
邵氏硬度 Shore hardness	ISO 868	D	85
连续工作温度 Continuous work temperature		℃	-100/+250
短时运行温度 Short-time work temperature		℃	-100/+315
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>	5
RH50/23℃时的吸湿性 Moisture absorption RH50/23℃	ASTMD570	%	0.1
最大吸水率23℃ Max. water absorption, 23℃		%	0.5
燃烧性能 Flammability	UL94		V0
体电阻率 Volume resistivity	IEC60093	Ω cm	>10 <sup>8</sup>
面电阻率 Surface resistivity	IEC60093	Ω	>10 <sup>7</sup>

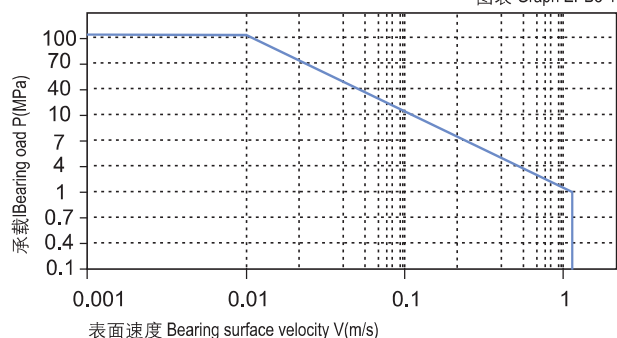
### 轴承PV值 PV Value

CSB-EPB5塑料轴承最大运行PV值为1.5N/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EPB5-1。

The max PV value of the CSB-EPB5 plastic bearings is 1.5N/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 EPB5-1).

■ PV图表 Permissible PV value for CSB-EPB5

图表 Graph EPB5-1



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

CSB-EPB5塑料轴承可承受最大静载荷为150Mpa，在此载荷下轴承的最大压缩变形量参考图表EPB5-2，轴承实际工作载荷略小于150Mpa，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: 250℃)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EPB5-3。

CSB-EPB5 allows the Max static load of 150Mpa, The max compressive deformation rate under the max load is listed in Graph EPB5-2, The actual load capacity of bearing is slightly less than 150Mpa, The bearing load is variable against the speed and temperature, Fast speed (Vmax: 1.5m/s) results into higher temperature (Tmax: 250℃) which decreases the load capacity of the bearing. Please refer to the Graph EPB5-3 for such variation.

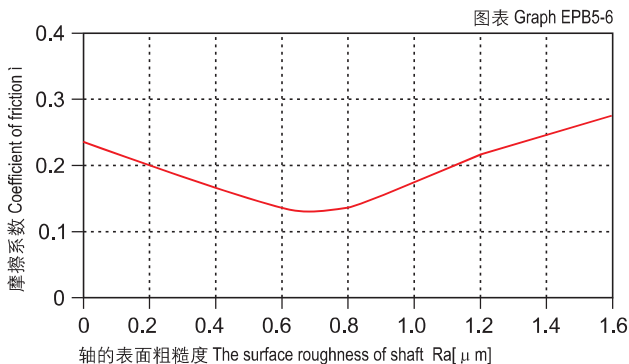
### 轴承的摩擦系数、磨损、轴材料 Friction factor, Wear and shaft material

#### 摩擦系数 Friction Factor

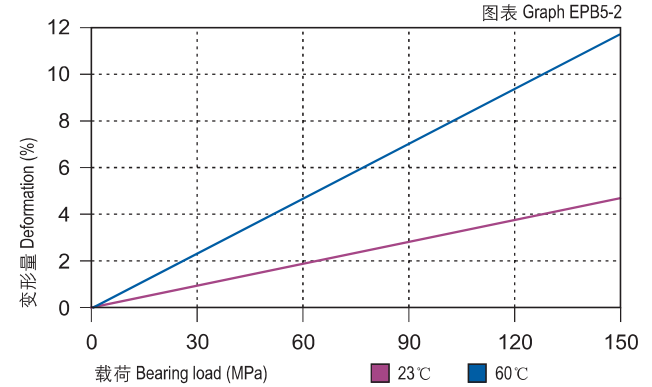
图表EPB5-4表明CSB-EPB5轴承的摩擦系数数在载荷一定时随着运行速度的增加而逐渐升高；图表EPB5-5表明CSB-EPB5轴承在速度一定载荷在20Mpa以内时摩擦系数会随着载荷的逐步增加而快速降低，而当载荷高于20Mpa时摩擦系数的变化却比较平缓。图表EPB5-6表明CSB-EPB5轴承比较适合轴表面粗糙度为Ra0.6 ~ 0.8 $\mu$ m。

CSB-EPB5 Bearing Friction factor is increased along with the increasing of the operation speed under certain loading (See Graph EPB5-4). The friction factor of CSB-EP5 is decreased along with the loading increasing not over 20Mpa (see Graph EPB5-5). The friction factor will not change much along with the speed when the loading is over 20Mpa. The Graph EPB5-6 shows that the bearing could achieve its best performance when the counter shaft surface roughness is around Ra0.6 to Ra0.8.

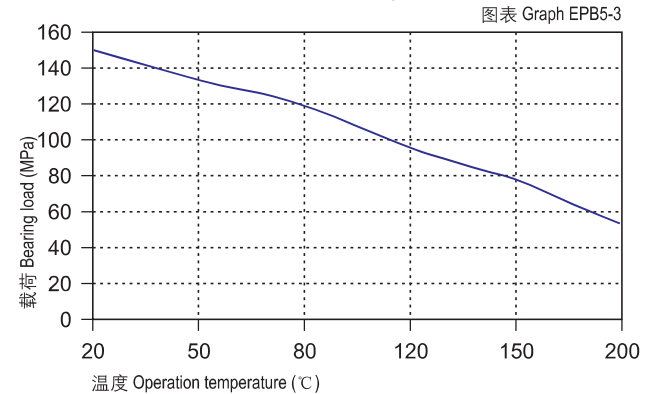
#### 摩擦系数与轴表面粗糙度关系图表 Coefficient of friction & the surface roughness of shaft



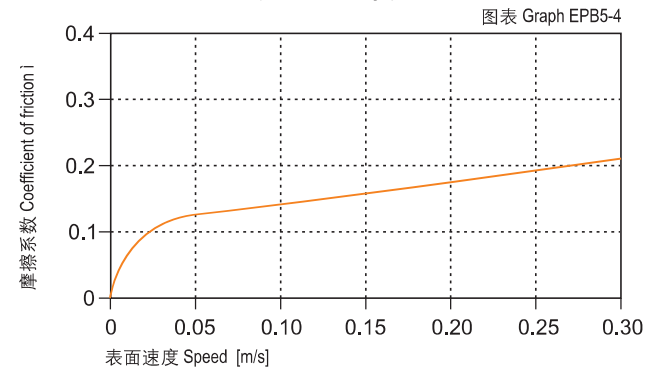
#### 载荷-温度-变形量图表 Load-Temperature deformation



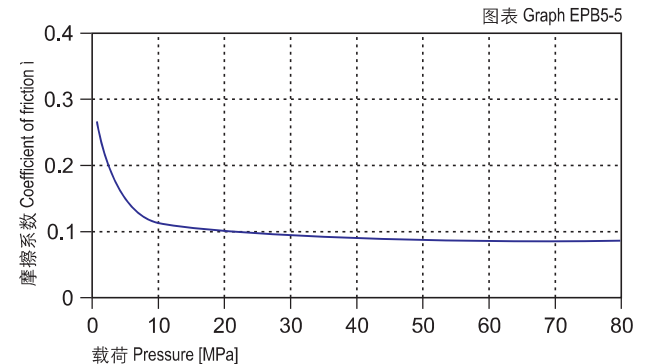
#### 载荷-温度图表 Load-Temperature diagrams



#### 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-EPB10	干运行 Dry	油脂 Grease	油 Oil	水 Water
摩擦系数 $\mu$ Friction coef.	0.09~0.25	0.09	0.04	0.04

### 磨损与轴材料 Wearing and shaft material

图表EPB5-7和图表EPB5-8测试表明了CSB-EPB5轴承在不同轴材料上的运行磨损对比, 在载荷2Mpa以下旋转运动时不锈钢轴和碳钢轴比较适合, 而当载荷超过2Mpa时在硬化钢轴和碳轴上的运行效果较好。图表EPB5-7表明CSB-EPB5轴承比较适合用于旋转运动; 特别值得注意的是图表EPB5-9表明CSB-EPB5轴承在常温23℃下的摩擦磨损性能并没有在高温150℃下优秀。

Graph EPB5-7 and Graph EPB5-8 show the test results of the material CSB-EPB5 running against different shaft materials. It is suitable for stainless steel and hot rolled carbon steel shaft when the loading is less than 2Mpa and it will be more suitable for heat treated steel and carbon steel shaft when the loading is over 2Mpa. Graph EPB5-7 shows CSB-EPB5 is good for rotation operation. Specially, from the Graph EPB5-9, it is read that CSB-EPB5 is with better performance under high temperature around 150℃ comparing with under the ambient temperature of 23℃.

### 化学抗性 Chemical Resistance

CSB-EPB5塑料轴承具有极好的化学抗性, 能抵抗浓度65%的强酸。

Chemical Resistance of CSB-EPB5 is very good. It can work well in the heavy acid of 65%.

### 吸水性 Water Absorbability

在标准大气压中, CSB-EPB5塑料轴承的吸水率极低0.1%, 浸泡水中最大平衡吸水率为0.5%; 因此材料不会吸水而发生性能和尺寸变化, 适合用于潮湿环境。

The water absorb rate of CSB-EPB5 is less than 0.1% under the atmospheric pressure while it is 0.5% 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-EPB5长久暴露在紫外线下材料性能不会发生变化。

CSB-EPB5 can maintain its performance to be stable even exposed in the UV ray for long period.

### 安装公差 Installation Tolerances

CSB-EPB5 塑料轴承压装后公差 Tolerances after pressfit

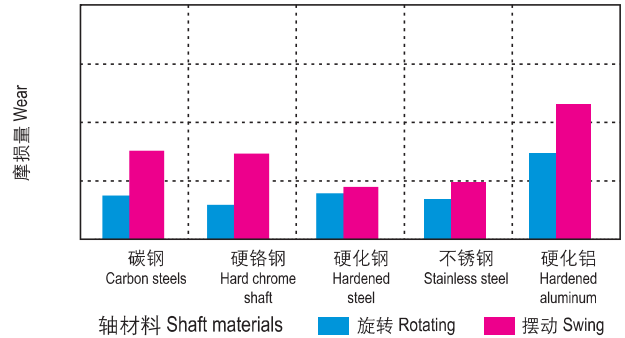
直径 Di. [mm]	CSB-EPB5 F10 [mm]	座孔 Housing H7 [mm]	轴 Shaft h9 [mm]
>0 ~ 3	+0.006 +0.046	0 ~ +0.010	0 ~ -0.025
>3 ~ 6	+0.010 +0.058	0 ~ +0.012	0 ~ -0.030
>6 ~ 10	+0.013 +0.071	0 ~ +0.015	0 ~ -0.036
>10 ~ 18	+0.016 +0.086	0 ~ +0.018	0 ~ -0.043
>18 ~ 30	+0.020 +0.104	0 ~ +0.021	0 ~ -0.052
>30 ~ 50	+0.025 +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

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

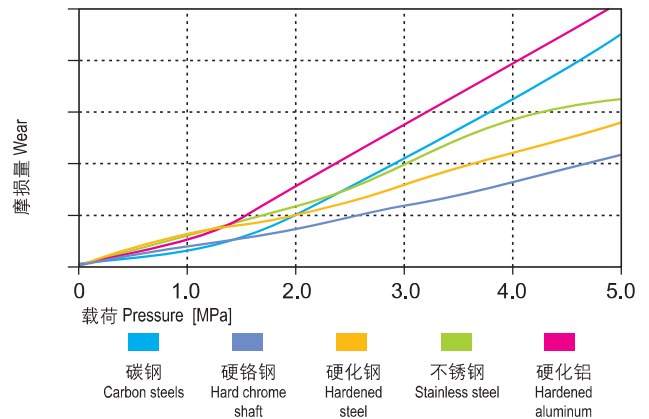
图表 Graph EPB5-7



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

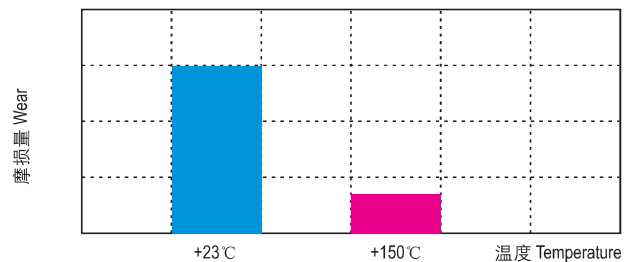
图表 Graph EPB5-8



### 在不同温度下的磨损量 $p=2\text{MPa}, v=0.2\text{m/s}$

The bearing wear under rotating with different temperature  $p = 2 \text{ MPa}, v = 0.2 \text{ m/s}$

图表 Graph EPB5-9



### 吸水性的影响 Effect of moisture absorption on EPB5 bearings

图表 Graph EPB5-10

