



### 产品特性 Product features

- 高载荷下摇摆运动出色的耐磨材料。高负荷下的低成本解决方案
- 连续使用温度: -40°C/+135°C
- 承受较高载荷
- 适合用于摆动场合
- 抗冲击性能较好
- 抗污垢能力强
- Good wear resistance material suitable for high load and oscillation motions. It is an economic solution for high load applications
- Continuous working temperature: -40°C/+135°C
- Suitable for high load operation
- Good for oscillating operation
- Good impact resistance
- Containment prevention ability

● 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-EPB12         |
|--|---------------|------------------------------------|-------------------|
| 颜色 Color                                       | -             | -                                  | 黑色 Black          |
| 密度 Density                                     | ISO1183       | g/cm <sup>3</sup>                  | 1.32              |
| 最大吸湿率 Max. moisture absorption, 50%RH          | ISO62         | %                                  | 0.9               |
| 最大吸水率 Max. water absorption                    | ISO62         | %                                  | 4.9               |
| 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            | 0.55              |
| 弯曲模量 Flexural modulus                          | ISO178        | MPa                                | 2200              |
| 弯曲强度 Flexural strength                         | ISO178        | MPa                                | 100               |
| 最大静载荷 Max. static load                         | ITS027        | MPa                                | 75                |
| 最大动载荷 Max. dynamic load                        | ITS028        | MPa                                | 43                |
| 邵氏硬度 Shore hardness                            | ISO868        | D                                  | 83                |
| 连续运行温度 Long-term application temperature       | ITS029        | °C                                 | +135              |
| 短时运行温度 Short-term application temperature      | ITS029        | °C                                 | +155              |
| 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> | 5                 |
| 阻燃等级 Flammability                              | UL94          | Class                              | HB                |
| 体电阻率 Volume resistance                         | IEC60093      | Ω · cm                             | >10 <sup>11</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.

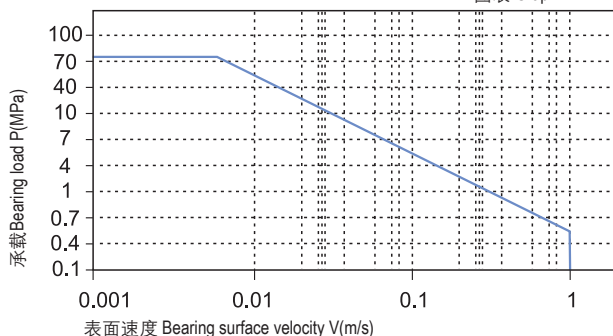
### 轴承PV值 PV value

CSB-EPB12塑料轴承最大运行PV值为0.55N/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EPB12-1。

The max PV value of the CSB-EPB12 plastic bearings is 0.55N/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 EPB12-1).

■ PV图表 Permissible PV value for CSB-EPB12

图表 Graph EPB12-1



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

CSB-EPB12塑料轴承可承受最大静载荷为75Mpa，在此载荷下轴承的最大压缩变形量参考图表EPB12-2，轴承实际工作载荷略小于75Mpa，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: 135℃) 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EPB12-3。

CSB-EPB12 allows the Max static load of 75Mpa, The max compressive deformation rate under the max load is listed in Graph EPB12-2, The actual load capacity of bearing is slightly less than 75Mpa, The bearing load is variable against the speed and temperature, Fast speed (Vmax: 1.0m/s) results into higher temperature (Tmax: 135℃) which decreases the load capacity of the bearing. Please refer to the Graph EPB12-3 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

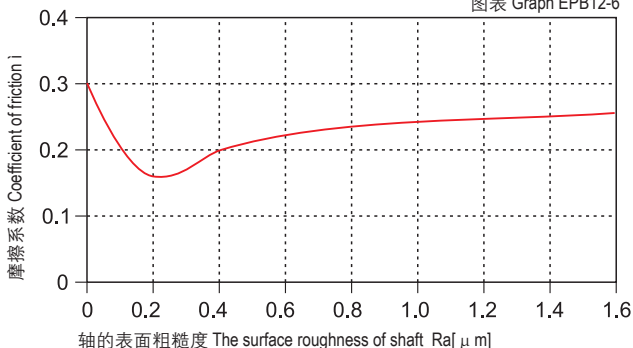
图表EPB12-4表明CSB-EPB12塑料轴承的摩擦系数在载荷保持不变的情况下受速度变化影响比较小；同样在图表EPB12-5表明CSB-EPB12塑料轴承在速度保持不变的情况下受载荷变化的影响相对也比较小；此轴承为所有滑动轴承中摩擦系数不受运行速度以及载荷影响较大的典型轴承。根据图表EPB12-6显示CSB-EPB12塑料轴承的摩擦系数在超过Ra0.4后轴表面粗糙度几乎对轴承的摩擦系数没有任何影响，我们推荐使用轴表面粗糙度为Ra0.1 ~ 0.4um。

Graph EPB12-4 shows that the friction factor of CSB-EPB12 is not considerably affected by the operation speed when the loading is stable. At the meantime, Graph EPB12-5 shows that the friction factor of CSB-EPB12 is not considerably affected by the loading when the operation speed is stable. This bearing is the only typical material whose friction factor is not sensitive to the operation speed and loading. Graph EPB12-6 tells that the friction factor of CSB-EPB12 will not be affected by the shaft roughness when the shaft roughness is better than Ra0.4. The recommended Shaft roughness is Ra0.1~0.4.

#### 摩擦系数与轴表面粗糙度关系图表

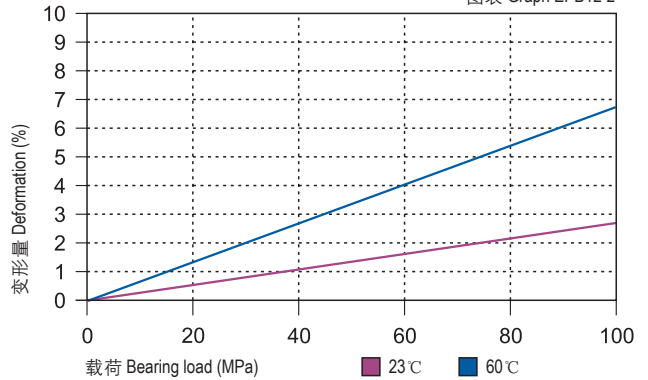
Coefficient of friction & the surface roughness of shaft

图表 Graph EPB12-6



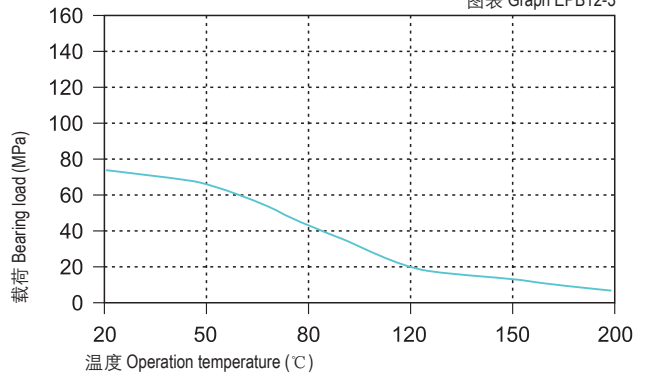
#### 载荷-温度-变形量图表 Load-Temperature deformation

图表 Graph EPB12-2



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

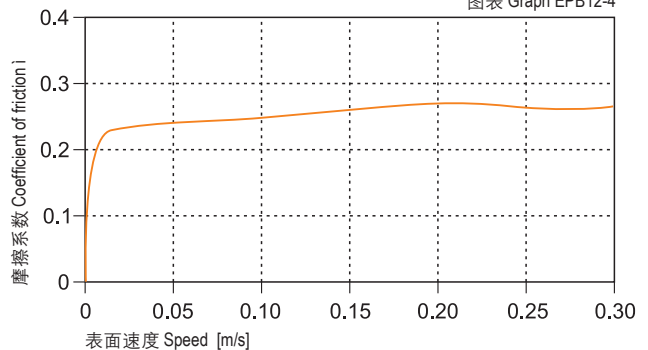
图表 Graph EPB12-3



#### 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

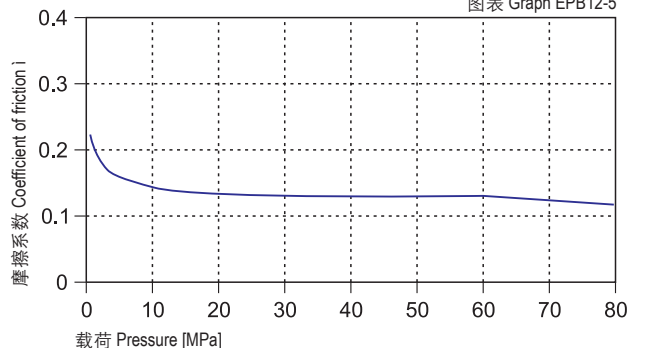
图表 Graph EPB12-4



#### 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

图表 Graph EPB12-5



|                              |            |              |          |            |
|------------------------------|------------|--------------|----------|------------|
| CSB-EPB12                    | 干运行<br>Dry | 油脂<br>Grease | 油<br>Oil | 水<br>Water |
| 摩擦系数 $\mu$<br>Friction coef. | 0.05-0.20  | 0.09         | 0.04     | 0.04       |

### 磨损与轴材料 Wearing and shaft material

图表EPB12-7与图表EPB12-8表明CSB-EPB12塑料轴承比较适合采用硬铬钢轴或硬化钢轴；图表EPB12-7表明CSB-EPB12塑料轴承在做摆动运动下的磨损性能要优越于在旋转运动下的磨损性能。图表EPB12-8表明CSB-EPB12塑料轴承在摆动运动时选择硬铬钢轴和硬化钢轴比较适合，在旋转运动中也是选择硬铬钢轴和硬化钢轴比较理想。

Graph EPB12-7 and Graph EPB12-8 tells that CSB-EPB12 is suitable for both hard chrome steel shaft and hardened steel shaft. Graph EPB12-8 shows that the wearing feature of CSB-EPB12 is better in oscillation operation than in rotation operation. Hardened chrome steel shaft and hardened steel shaft is the better choice under oscillation operation and hardened steel shaft and hardened chrome steel shaft is the better choice under rotation operation.

### 化学抗性 Chemical resistance

CSB-EPB12塑料轴承能抵抗弱碱以及各类润滑油的腐蚀。

CSB-EPB12 is good at chemical resistance against weak acidic medium and various kinds of lubricants.

### 吸水性 Water absorption

CSB-EPB12塑料轴承在标准大气中的吸湿率为0.9%。浸泡在水中最高吸水率为4.9%。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-EPB12 plastic plain bearings is 0.9% in standard atmosphere. The max. water absorption is 4.9% in water. The application environment has to be considered due to the high water absorption properties.

### 抗UV性能 UV resistance

CSB-EPB12塑料轴承长久暴露在紫外线下长久后材料可能会变脆，不能承受冲击力。

CSB-EPB12 can become brittle and lost its impact resistance when it is exposed into UV ray for a certain period of time.

### 安装公差 Installation tolerances

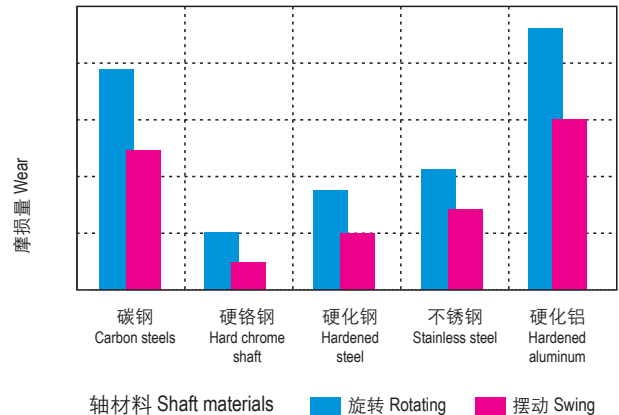
CSB-EPB12塑料轴承压装后公差 Tolerances after pressfit

| 直径 Di<br>[mm] | CSB-EPB12<br>E10 [mm] | 座孔 Housing<br>H7 [mm] | 轴 Shaft<br>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,  $p = 2 \text{ MPa}$ ,  $v = 0.2 \text{ m/s}$

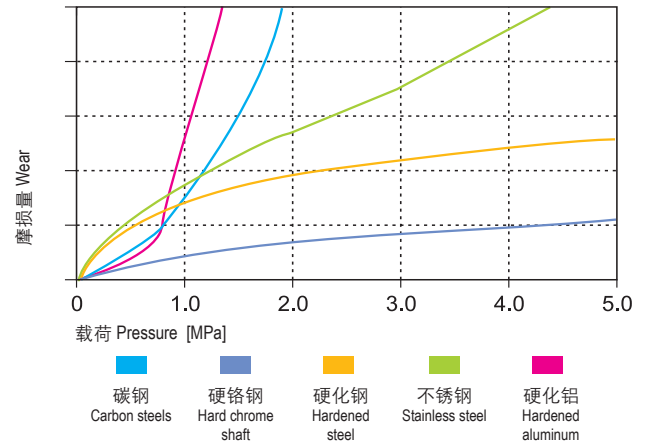
图表 Graph EPB12-7



### 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 EPB12-8



### 吸水性的影响

Effect of moisture absorption on EPB12 bearings

图表 Graph EPB12-9

