

● 标准产品规格表 Standard specifications: P128

### 产品特性 Product features

- 用于水下的自润滑材料。适合在水中做低载荷下的快速旋转运动
- 连续使用温度: -50℃/+90℃
- 适用于中低载荷
- 适用于水下
- 高速场合应用
- A self-lubricating material for applications in water. It is suitable for high speed motion under low load
- Continuous working temperature: -50℃/+90℃
- Suitable for medium load operation
- For underwater operation
- For high speed movement

### 材料数据表 Material properties data table

材料性能 Material properties	测试标准 Standard	单位 Unit	CSB-EPB20
颜色 Color	-	-	黑色 Black
密度 Density	ISO1183	g/cm <sup>3</sup>	1.53
最大吸湿率 Max. moisture absorption, 50%RH	ISO62	%	0.2
最大吸水率 Max. water absorption	ISO62	%	0.8
对钢动摩擦系数 Coefficient of sliding friction(steel)	ITS025	μ	0.15-0.35
极限PV值 Max. PV value	ITS026	N/mm <sup>2</sup> × m/s	0.15
弯曲模量 Flexural modulus	ISO178	MPa	7200
弯曲强度 Flexural strength	ISO178	MPa	120
最大静载荷 Max. static load	ITS027	MPa	70
最大动载荷 Max. dynamic load	ITS028	MPa	35
邵氏硬度 Shore hardness	ISO868	D	79
连续运行温度 Long-term application temperature	ITS029	℃	+90
短时运行温度 Short-term application temperature	ITS029	℃	+110
最低运行温度 Lowest application temperature	ITS029	℃	-50
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>	6
阻燃等级 Flammability	UL94	Class	HB
体电阻率 Volume resistance	IEC60093	Ω · cm	<10 <sup>5</sup>
面电阻率 Surface resistance	IEC60093	Ω	<10 <sup>5</sup>

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

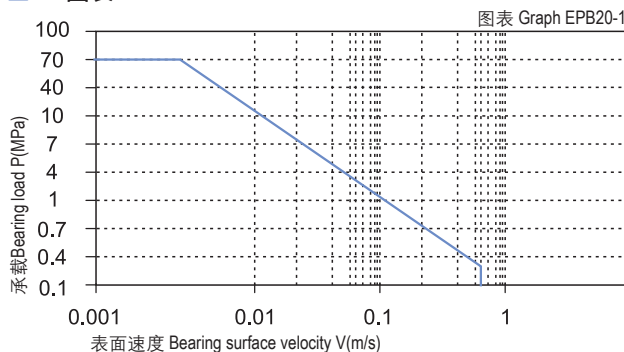
\*\*除非特殊说明测试温度为23℃ Test temperatures are 23℃ unless otherwise stated.

### 轴承PV值 PV value

CSB-EPB20塑料轴承最大运行PV值为0.15N/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EPB20-1。

The max PV value of the CSB-EPB20 plastic bearings is 0.15N/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 EPB20-1).

■ PV图表 Permissible PV value for CSB-EPB20



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

CSB-EPB20塑料轴承可承受最大静载荷为70Mpa，在此载荷下轴承的最大压缩变形量参考图表EPB20-2，轴承实际工作载荷略小于70Mpa，载荷还受到运行速度以及温度的影响，速度越快 (Vmax: 0.5m/s) 会导致摩擦温度上升，而温度上升 (Tmax: 90℃) 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EPB20-3。

CSB-EPB20 allows the Max static load of 70Mpa, The max compressive deformation rate under the max load is listed in Graph EPB20-2, The actual load capacity of bearing is slightly less than 70Mpa, The bearing load is variable against the speed and temperature, Fast speed (Vmax: 0.5m/s) results into higher temperature (Tmax: 90℃) which decreases the load capacity of the bearing. Please refer to the Graph EPB20-3 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

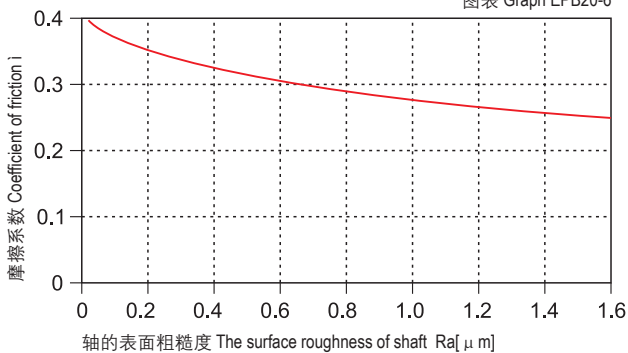
与其它塑料轴承基本一样，图EPB20-4表明CSB-EPB20塑料轴承在载荷保持不变的情况下摩擦系数随着运行速度的增加而升高；图EPB20-5表明CSB-EPB20塑料轴承在保持速度不变时摩擦系数随着载荷的增加而逐步减低。根据图EPB20-6表明CSB-EPB20塑料轴承的摩擦系数会随着轴表面粗糙度的变化而不同，我们推荐使用轴粗糙度为Ra0.3~0.6um；

Similar with most of the plastic bearings, the friction factor of CSB-EPB20 is increased along with the operation speed when the loading is stable (see Graph EPB20-4) and is decreased along with the loading increasing when the operation speed is stable (see Graph EPB20-5). From Graph EPB20-6, it shows the friction factor of CSB-EPB20 is variable against different shaft surface roughness. The recommended shaft surface roughness is Ra0.3~0.6.

#### 摩擦系数与轴表面粗糙度关系图表

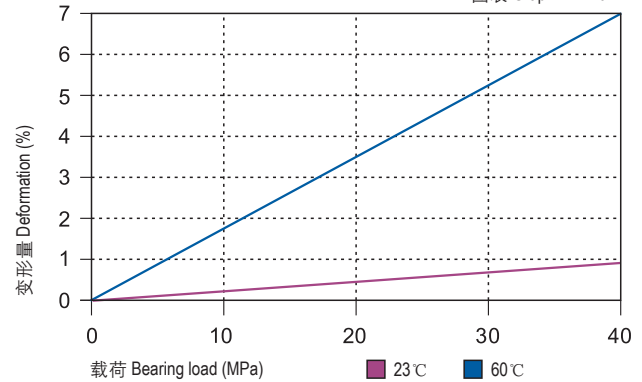
Coefficient of friction & the surface roughness of shaft

图表 Graph EPB20-6



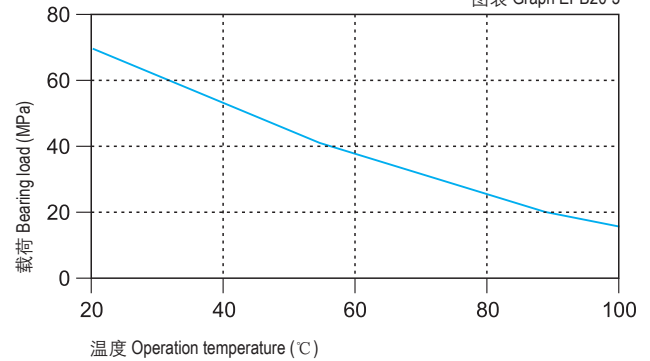
#### 载荷-温度-变形量图表 Load-Temperature deformation

图表 Graph EPB20-2



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

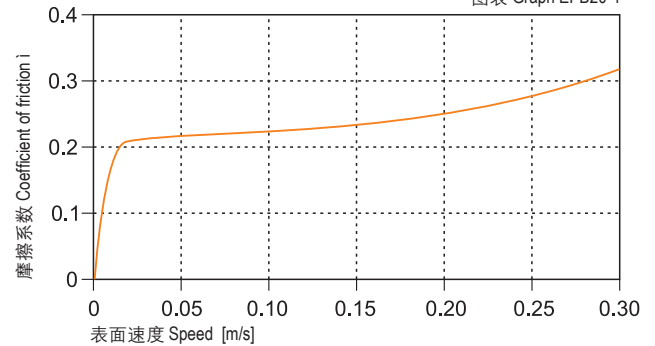
图表 Graph EPB20-3



#### 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

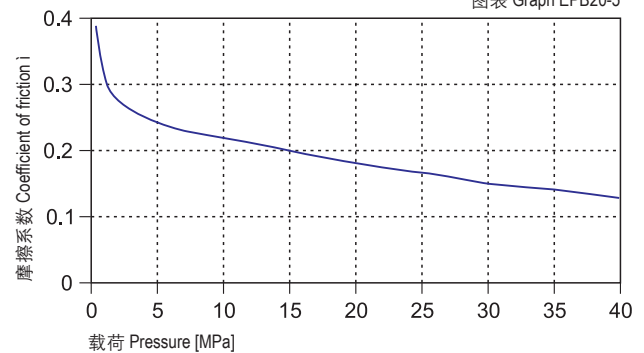
图表 Graph EPB20-4



#### 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 EPB20-5



CSB-EPB2	干运行 Dry	油脂 Grease	油 Oil	水 Water
摩擦系数 $\mu$ Friction coef.	0.15-0.35	0.09	0.04	0.04

### 磨损与轴材料 Wearing and shaft material

图EPB20-7与图EPB20-8表明低载时硬化钢轴与硬铬钢轴比较适合用于CSB-EPB20塑料轴承。图EPB20-7表明CSB-EPB20塑料轴承在用于摆动运动时磨损值明显要优越于用于旋转运动。

Graph EPB20-7 and EPB20-8 shows that CSB-EPB20 is rather suitable for hardened steel shaft and hardened chrome steel shaft under lower loading and Graph EPB20-7 shows that CSB-EPB20 wearing feature is better for oscillation operation than of rotation operation.

### 化学抗性 Chemical resistance

CSB-EPB20塑料轴承能抵抗部分弱酸以及各类润滑油的腐蚀。

CSB-EPB20 is good at chemical resistance against weak acidic medium and various kinds of lubricants.

### 吸水性 Water absorption

CSB-EPB20塑料轴承在标准大气中的吸湿率为0.2%。浸泡在水中的最高吸水率为0.8%。低吸水性不会导致轴承发生性能和尺寸变化，非常适合用于水下。

The moisture absorption of CSB-EPB20 plastic plain bearings is 0.2% in standard atmosphere. The max. water absorption is 0.8% in water. These values are very low, CSB-EPB20 plastic plain bearings is very well suited for used in water.

### 抗UV性能 UV resistance

CSB-EPB20塑料轴承长久暴露在紫外线下颜色会发生褪变。材料性能会有所下降。

Disintegration could be possible for the material CSB-EPB20 after long period of exposing under the UV ray and therefore the performance of the material will be reduced.

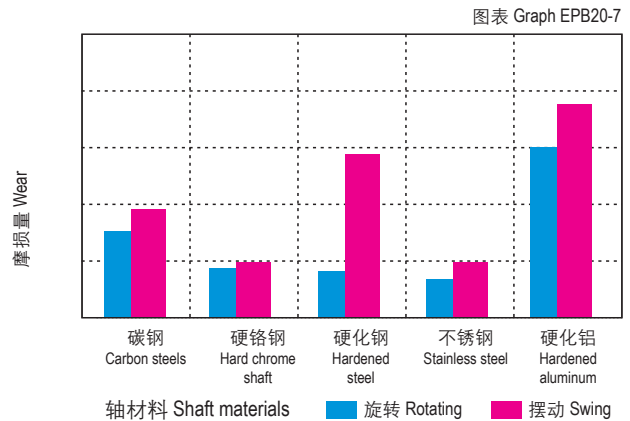
### 安装公差 Installation tolerances

CSB-EPB20塑料轴承压装后公差 Tolerances after pressfit

直径 Di. [mm]	CSB-EPB20 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

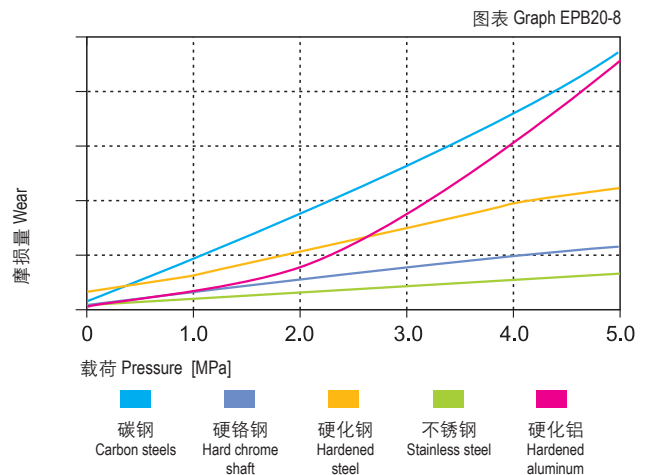
### 在不同轴材料上旋转时的磨损量 $p=2\text{MPa}$ , $v=0.2\text{m/s}$

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 EPB20 bearings

