标准产品规格表 Standard specifications: P128

产品特性 Product features

- 中高载荷下的应用能手。作为纤维增强和润滑的结合材料，可在130度下广泛被应用
- 连续使用温度：-40℃/+130℃
- 适合中高载荷，通用性好
- 适合干运行、免维护
- 适用于不同轴材料
- 用于旋转、摆动运动
- 抗灰尘能力强

- Best for middle to high load applications. With the perfect combination of reinforced fibre and good lubrication feature, this material is suitbale to be used under the temperature of 130℃
- Continuous working temperature: -40℃/+130℃
- Suitable for medium and high load operation
- Maintenance-free dry operation
- Applicable for various shaft materials
- Good for rotation and oscillating operation
- Excellent dust resistance

材料数据表 Material properties data table

材料性能 Material properties	测试标准 Standard	单位 Unit	CSB-EPB3
颜色 Color	-	-	深灰 Dark grey
密度 Density	ISO1183	g/cm^3	1.46
最大吸湿率 Max. moisture absorption, 50%RH	ISO62	%	0.7
最大吸水率 Max. water absorption	ISO62	%	4.0
对钢动摩擦系数 Coefficient of sliding friction(steel)	ITS025	μ	0.08-0.18
极限PV值 Max. PV value	ITS026	$N/mm^2 \times m/s$	0.45
弯曲模量 Flexural modulus	ISO178	MPa	8500
弯曲强度 Flexural strength	ISO178	MPa	210
最大静载荷 Max. static load	ITS027	MPa	80
最大动载荷 Max. dynamic load	ITS028	MPa	43
邵氏硬度 Shore hardness	ISO868	D	81
连续运行温度 Long-term application temperature	ITS029	℃	+130
短时运行温度 Short-term application temperature	ITS029	℃	+220
最低运行温度 Lowest application temperature	ITS029	℃	-40
导热性 Thermal conductivity	ISO22007	W/m/K	0.24
线性热膨胀系数 Coefficient of thermal expansion	ISO11359	$K^{-1} \times 10^{-5}$	9
阻燃等级 Flammability	UL94	Class	HB
体电阻率 Volume resistance	IEC60093	Ω·cm	$>10^{13}$
面电阻率 Surface resistance	IEC60093	Ω	$>10^{11}$

*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.

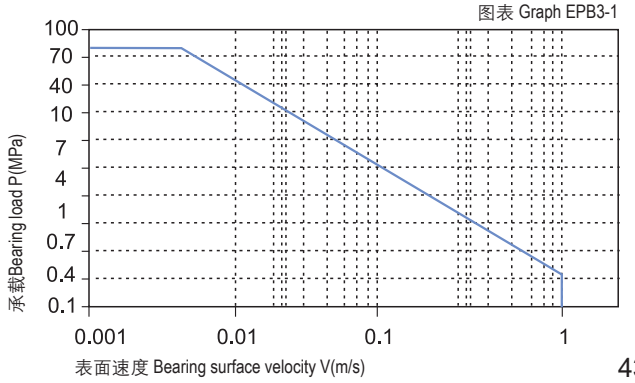
轴承PV值 PV value

CSB-EPB3塑料轴承最大运行PV值为0.45N/mm² × 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EPB3-1。

The max PV value of the CSB-EPB3 plastic bearings is 0.45N/mm² × 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 EPB3-1).

■ PV图表 Permissible PV value for CSB-EPB3

图表 Graph EPB3-1



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

CSB-EPB3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EPB3-2，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: 1.0m/s）会导致摩擦温度上升，而温度上升（Tmax: 130℃）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EPB3-3。

CSB-EPB3 allows the Max static load of 80Mpa, The max compressive deformation rate under the max load is listed in Graph EPB3-2, The actual load capacity of bearing is slightly less than 80Mpa, The bearing load is variable against the speed and temperature, Fast speed (Vmax: 1.0m/s) results into higher temperature (Tmax: 130℃) which decreases the load capacity of the bearing. Please refer to the Graph EPB3-3 for such variation.

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

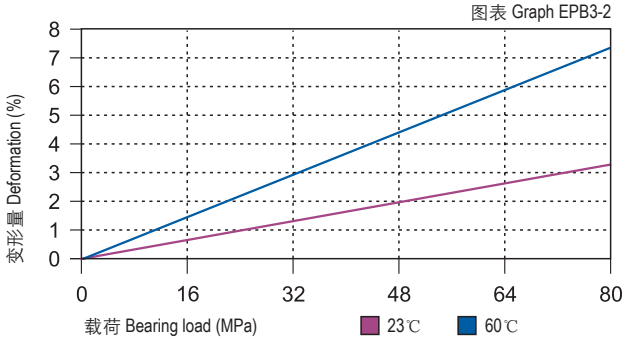
摩擦系数 Friction factor

滑动轴承的摩擦系数与轴承的载荷、运行速度以及轴材料表面粗糙度都息息相关；CSB-EPB3塑料轴承的摩擦系数随着载荷的增加而降低（图表EPB3-5），随着运行速度的增加而升高（图表EPB3-4）；这就表明EPB3塑料轴承适合用于高载低速的应用场合；而轴表面粗糙度越光滑或者越粗糙都会导致轴承的摩擦系数增加，CSB-EPB3塑料轴承推荐的表面粗糙度是在Ra0.5 ~ Ra0.8（图表EPB3-6）。

The friction factor of the sliding bearings is relative to the bearing load, operation speed and the roughness of the shaft material.CSB-EPB3 Bearing Friction factor decreased along with the increasing of the loading (See Graph EPB3-5) and increased along with the increasing of the operation speed(See Graph EPB3-4). The above feature induces the CSB-EPB3 material is applicable for the high load and low speed operation while too smooth and too rough surface may result into the increasing of friction factor. The recommended surface roughness of CSB-EPB3 is Ra0.5~Ra0.8 (See Graph EPB3-6).

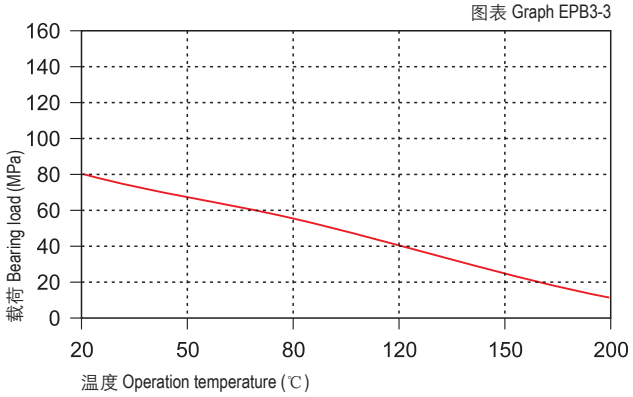
■ 载荷-温度-变形量图表 Load-Temperature deformation

图表 Graph EPB3-2



■ 载荷-温度图表 Load-Temperature diagrams

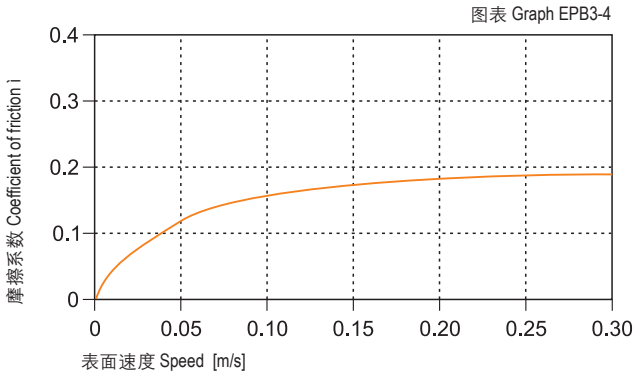
图表 Graph EPB3-3



■ 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

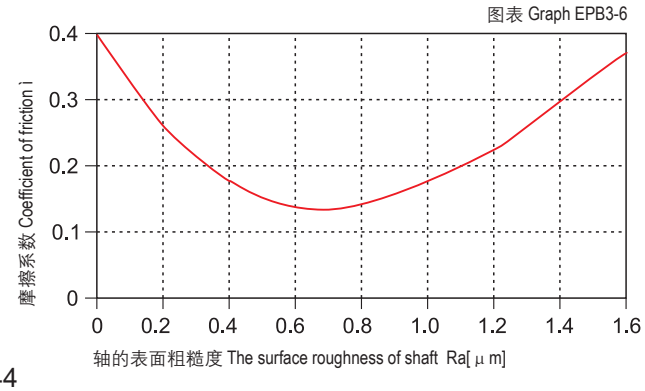
图表 Graph EPB3-4



■ 摩擦系数与轴表面粗糙度关系图表

Coefficient of friction & the surface roughness of shaft

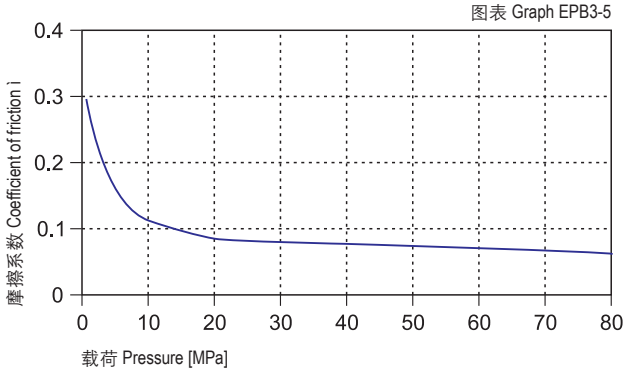
图表 Graph EPB3-6



■ 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 EPB3-5



CSB-EPB3	干运行 Dry	油脂 Grease	油 Oil	水 Water
摩擦系数 μ Friction coef.	0.08~0.18	0.09	0.04	0.04

磨损与轴材料 Wearing and shaft material

通过轴承在不同轴上的测试表明CSB-EPB3塑料轴承低载时在碳钢轴和硬铬轴运行性能更好（见图表EPB3-7和图表EPB3-8）；当然，随着轴承承受载荷的增加，对轴硬度要求也越高；较软的轴容易先产生磨损，导致轴承磨损也随之加大。当轴承的载荷超过2Mpa时，轴承的磨损会随着轴硬度的增加而随之减少。图表EPB3-7表明CSB-EPB3在摆动运动下的效果要好于旋转运动，在同等的工况条件下摆动运动下的磨损要小于旋转运动，特别是在高载荷下这种趋势就越明显。

Test of the bearing against various shaft materials shows that the material CSB-EPB3 features the best performance where the shaft material is carbon steel and hard chrome steel under low loading. (See Graph EPB3-7 and Graph EPB3-8). Therefore, the higher the load is, the more critical the hardness of the shaft will have to be. The softer shaft will be worn off sooner and as a result, the bearing wearing will be increased. But when the loading is increased over 2Mpa, the wearing of the bearing will be better along with the increasing of the shaft hardness.

Refer to Graph EPB3-7 It shows that the material CSB-EPB3 is better under the oscillation operation comparing with the rotation operation. Under the same condition, the wearing feature of the oscillation operation is much better than that of the rotation operation. This feature is sharply improved under higher loading.

化学抗性 Chemical resistance

CSB-EPB3塑料轴承能抵抗弱碱以及各类润滑油的腐蚀。

CSB-EPB3 is good at chemical resistance against weak acidic medium and various kinds of lubricants.

吸水性 Water absorption

CSB-EPB3塑料轴承在标准大气中的吸湿率为0.7%。 浸泡在水中最高吸水率为4.0%。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-EPB3 plastic plain bearings is 0.7% in standard atmosphere. The max. water absorption is 4.0% in water. The application environment has to be considered due to the high water absorbtion properties.

抗UV性能 UV resistance

CSB-EPB3塑料轴承长久暴露在紫外线下颜色基本不会改变。材料性能基本都不会发生改变。

CSB-EPB3 can maintain its color unchanged when it is exposed into the UV ray. The material performance stays stable.

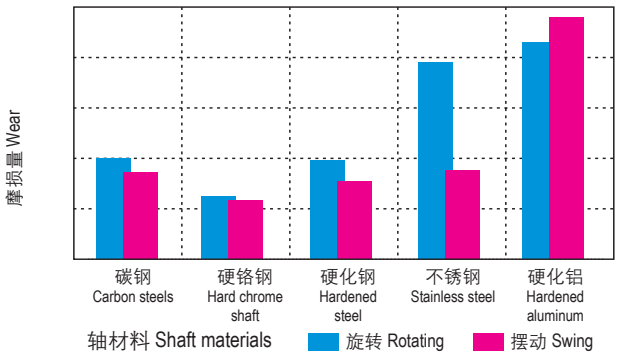
安装公差 Installation tolerances

CSB-EPB3塑料轴承压装后公差 Tolerances after pressfit

在不同轴材料上旋转时的磨损量 p=2MPa, v=0.2m/s

Wear under rotating with different shaft materials, p = 2 MPa, v = 0.2 m/s

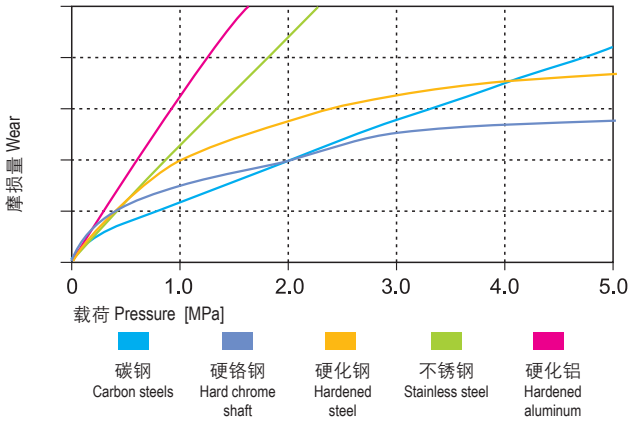
图表 Graph EPB3-7



旋转磨损随轴材料与压力变化关系 v=0.2m/s

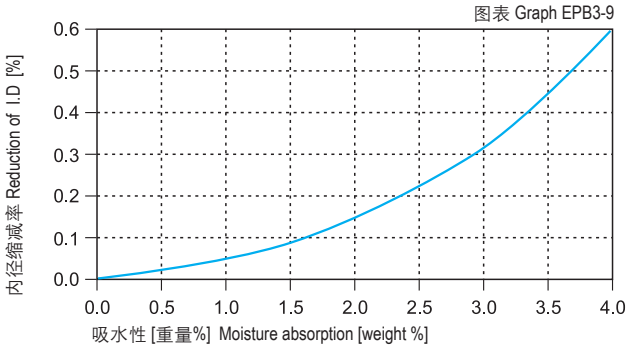
Wear & pressure under rotating with different shaft materials, v = 0.2 m/s

图表 Graph EPB3-8



吸水性的影响 Effect of moisture absorption on EPB3 bearings

图表 Graph EPB3-9



直径 Di. [mm]	CSB-EPB3 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

◉ 标准产品规格表 Standard specifications: P128

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