

CSB-EPB9 Plastic Bearings

CSB-EPB9 塑料轴承



产品特性 Product Characteristics

连续使用温度: $-40^{\circ}\text{C} \sim 130^{\circ}\text{C}$;
 专用于要求抗静电场合;
 适合低速运动;
 较高的承载能力。

Continuous working temperature: $-40^{\circ}\text{C} \sim 130^{\circ}\text{C}$;
 Specially use for static electricity existing environment;
 Suitable for low speed operation;
 Higher load capacity.

主要性能数据表 The Material Data Sheet

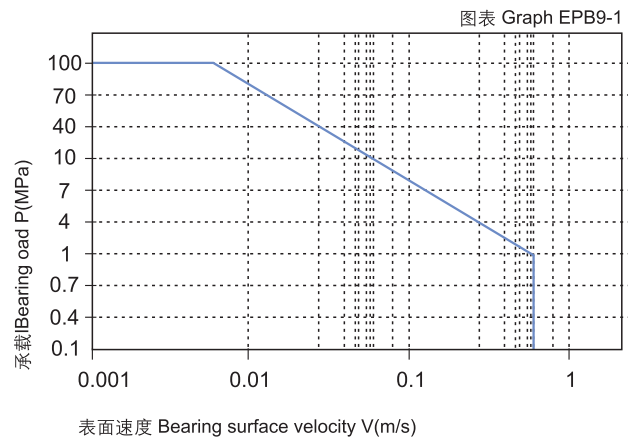
一般性能 Common Capability	试验方法 Testing Method	单位 Unit	CSB-EPB9
密度 Density	ISO1183	g/cm^3	1.24
颜色 Color			黑色Black
对钢的动摩擦系数 Dynamic friction /steel(dry)			0.10-0.40
最大P.V值 Max. PV (dry)		$\text{N}/\text{mm}^2 \cdot \text{m}/\text{s}$	0.3
最大旋转速度值 Max. rotating velocity		m/s	0.8
最大摇摆速度值 Max. oscillating velocity		m/s	0.6
最大直线速度值 Max. linear velocity		m/s	3.0
抗拉强度 Tensile strength	ISO527	MPa	250
抗压强度 (轴向) Compressive strength (Axial)	ISO527	MPa	100
弹性模量 E-module	ISO527	MPa	11000
允许最大表面静压力 (20°C) Max. static pressure of the surface, 20°C		MPa	105
洛氏硬度 Rockwell hardness	ISO2039-2	HRR	110
连续工作温度 Continuous work temperature		$^{\circ}\text{C}$	-40/130
短时运行温度 Short-time work temperature		$^{\circ}\text{C}$	-40/180
导热性 Thermal conductivity	ASTME1461	$\text{W} / \text{m}^{\circ}\text{k}$	0.6
线性热膨胀系数 Linear coef. of thermal expansion	ASTMD696	$\text{K}^{-1} \cdot 10^{-5}$	11
RH50/23°C时的吸湿性 Moisture absorption RH50/23°C	ASTMD570	%	1.8
最大吸水率23°C Max. water absorption, 23°C		%	8.4
燃烧性能 Flammability	UL94		HB
体电阻率 Volume resistivity	IEC60093	Ωcm	$<10^3$
面电阻率 Surface resistivity	IEC60093	Ω	$<10^3$

轴承PV值 PV Value of Bearings

CSB-EPB9系列轴承最大运行PV值为 $0.3\text{N/mm}^2\cdot\text{m/s}$ ；由此决定轴承所承受的载荷与速度成反比，详细查阅图表EPB9-1。

The max PV value of the CSB-EPB9 series bearing is $0.3\text{N/mm}^2\cdot\text{m/s}$ which determines the load capacity of bearing is inversely proportional to the speed. Please refer to the chart for more detailed information (Graph EPB9-1).

PV图表 Permissible PV value for CSB-EPB9

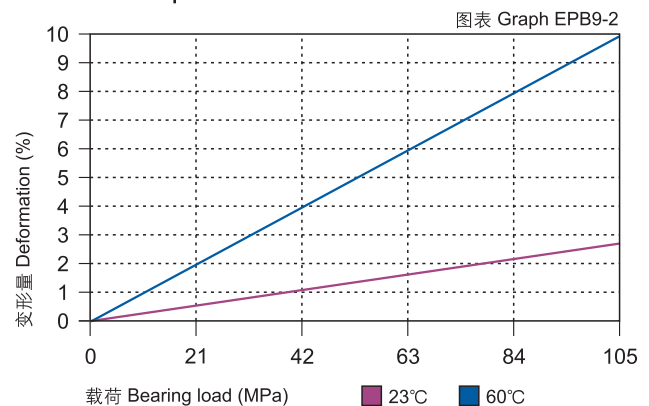


轴承的载荷、速度、温度 The Relation of Load, Speed and Temperature

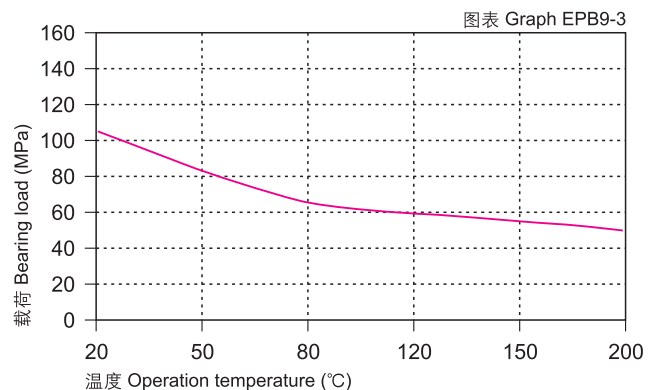
CSB-EPB9系列轴承可承受最大静载荷为105Mpa，在此载荷下轴承的最大压缩变形量参考图表EPB9-2，轴承实际工作载荷略小于105Mpa，载荷还受到运行速度以及温度的影响，速度越快 ($V_{\text{max}}: 0.8\text{m/s}$) 会导致摩擦温度上升，而温度上升 ($T_{\text{max}}: 130^\circ\text{C}$) 会导致轴承的承载能力逐渐减弱，载荷随轴承工作温度变化情况参考图表EPB9-3。

CSB-EPB9 allows the Max static load of 105Mpa, The max compressive deformation rate under the max load is listed in Graph EPB9-2, The actual load capacity of bearing is slightly less than 105Mpa, The bearing load is variable against the speed and temperature, Fast speed ($V_{\text{max}}: 0.8\text{m/s}$) results into higher temperature ($T_{\text{max}}: 130^\circ\text{C}$) which decreases the load capacity of the bearing. Please refer to the Graph EPB9-3 for such variation.

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



载荷-温度图表 Load-Temperature diagrams



CSB-EPB9 Plastic Bearings

CSB-EPB9 塑料轴承

轴承的摩擦系数、磨损、轴材料

摩擦系数 Friction Factor

图表EPB9-4表明CSB-EPB9轴承的摩擦系数相对其它塑料轴承较高，这主要是由于此轴承材料内部植入了导电纤维的原因；这就决定了此轴承在有润滑的情况下摩擦系数更好。图表EPB9-5表明CSB-EPB9轴承的摩擦系数同样会随着载荷的增加而逐步降低；图表EPB9-6表明CSB-EPB9轴承的摩擦系数在轴粗糙度为Ra0.1~0.5之间时随着轴粗糙度的增大而逐步减低，而当轴表面粗糙度在Ra0.5~1.6之间时却影响较小。

Graph EPB9-4 shows that the friction factor of CSB-EPB9 is much higher than those of other materials because the electronic conductive fiber is embedded into the bearing material. It is induced that the friction performance will be better when the bearing is lubricated. Graph EPB9-5 shows that the friction factory is decreasing along with the loading increasing and Graph EPB9-6 shows that the friction factor is increasing along with the shaft roughness increasing when the shaft roughness is between Ra0.1 to Ra0.5. This effecting will be less when the shaft roughness is between Ra0.5 to Ra1.6.

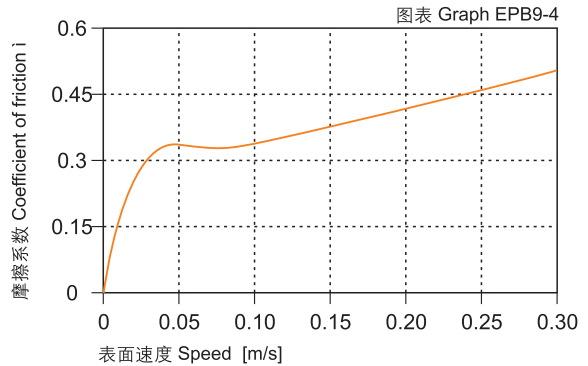
CSB-EPB9	干运行 Dry	油脂 Grease	油 Oil	水 Water
摩擦系数 μ Friction coef.	0.10~0.40	0.09	0.04	0.04

磨损与轴材料 Wearing and shaft material

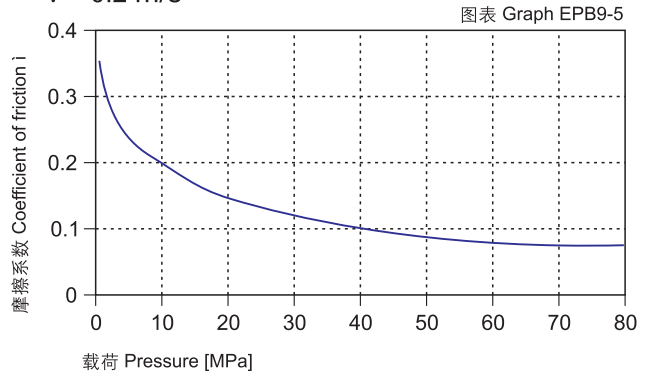
图表EPB9-7与图图表EPB9-8表明了CSB-EPB9轴承在不同轴材料上旋转运动磨损情况。由此可以看出在低载荷旋转运动时，硬铬钢轴比较适合，而在高载旋转运动时，硬化钢轴比较适合。

Graph EPB9-7 shows the different results of the material against different shaft materials. It induces that the bearing material is good for hard chrome steel shaft under low loading operation condition and good for hardened carbon steel shaft under high loading rotation operation.

摩擦系数与速度变化关系图表 P=2MPa Coefficient of friction & the speed of bearing, $p = 2 \text{ MPa}$

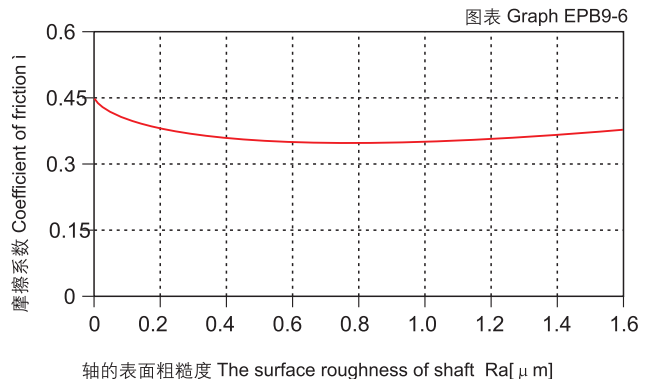


摩擦系数与载荷变化关系图表 v=0.2m/s Coefficient of friction & the pressure of bearing, $v = 0.2 \text{ m/s}$



摩擦系数与轴表面粗糙度关系图表

Coefficient of friction & the surface roughness of shaft



化学抗性 Chemical Resistance

CSB-EPB9塑料轴承能抵抗弱碱以及各类润滑油的腐蚀。

CSB-EPB9 is good at chemical resistance against weak acidic medium and various kinds of lubricants.

吸水性 Water Absorbability

在标准大气压中，CSB-EPB9塑料轴承的吸水率为1.5%，浸泡水中最大平衡吸水率为7.6%；由于此吸水率的特性，我们必须考虑此轴承的应用环境。

The water absorb rate of CSB-EPB9 is 1.5% under the atmospheric pressure while it is 7.6% when the material is immersed into water. The application environment has to be considered because of its water absorb properties.

抗UV性能 UV Resistance

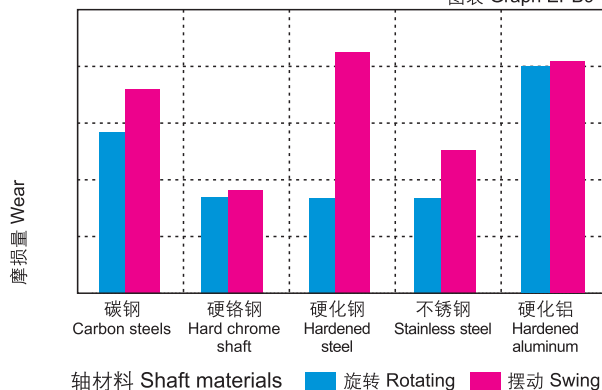
CSB-EPB9长久暴露在紫外线下材料性能基本都不会发生改变。

When CSB-EPB9 is exposed into the UV ray, the material performance stays stable.

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

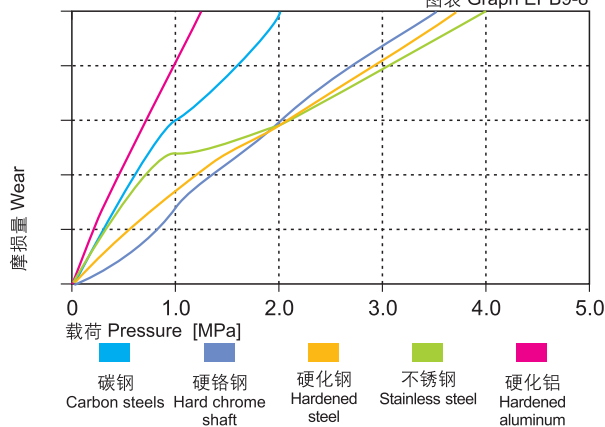
The bearing wear under rotating with different shaft materials, $p = 2 \text{ MPa}$, $v = 0.2 \text{ m/s}$

图表 Graph EPB9-7



■ 旋转磨损随轴材料与压力变化关系 $v=0.2\text{m/s}$
The bearing wear & pressure under rotating with different shaft materials, $v = 0.2 \text{ m/s}$

图表 Graph EPB9-8



■ 吸水性的影响
Effect of moisture absorption on EPB9 bearings

图表 Graph EPB9-9

