

## EPB21 Plastic Bearings



### Product Features

Low friction and good wear resistance for high temperature applications. The excellent chemical resistance of the material ensures the applications for high temperature and high chemical erosion applications.

- Continuous working temperature: -40°C – +200°C
- Very low coefficient of friction
- Maintenance-free dry operation
- High temperature and good chemical resistance
- Suitable for humid environment

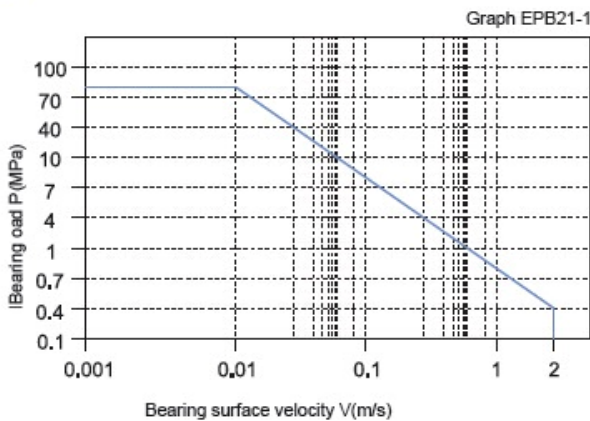
### The Material Data Sheet

Common Capability	Testing Method	Unit	EPB21
Color			Buff
Density	ISO 1183	g/cm <sup>3</sup>	1.53
Dynamic friction /steel (dry)			0.05 - 0.20
Max. PV (dry)		N/mm <sup>2</sup> x m/s	0.8
Max. rotating velocity		m/s	2.0
Max. oscillating velocity		m/s	1.0
Max. linear velocity		m/s	5.0
Tensile strength	ISO 527	MPa	55
Compressive strength (Axial)		MPa	78
E-Modul	ISO 527	MPa	2'800
Max. static pressure of the surface, 20°C		MPa	80
Shore hardness	ISO 868	D	77
Continuous work temperature		°C	-40 – +200
Short-time work temperature		°C	-40 – +240
Thermal conductivity	ASTME1461	W/m*k	0.5
Linear coef. of thermal expansion	ASTMD696	10 <sup>-5</sup> x K <sup>-1</sup>	5
Maisture absorption RH50 / 23°C	ASTMD570	%	0.1
Max. water absorption, 23°C		%	0.3
Flammability	UL94		V0
Volume resistivity	IEC60093	Ωcm	>10 <sup>12</sup>
Surface resistivity	IEC60093	Ω	>10 <sup>11</sup>

## PV Value of Bearings

The max PV value of the EPB21 series bearing is 0.8 N/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 EPB21-1).

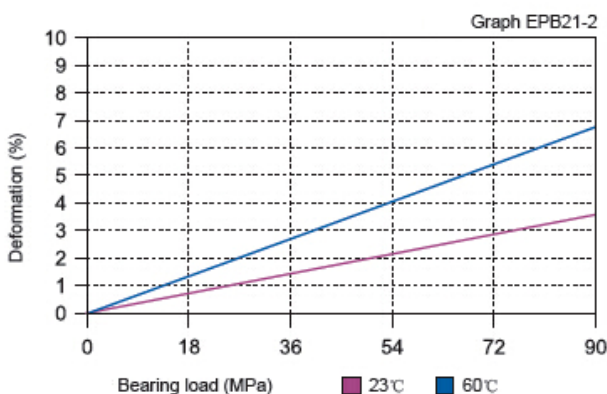
### ■ Permissible PV value



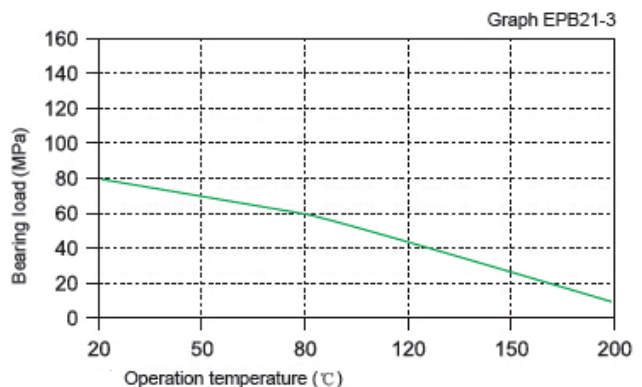
## The Relation of Load, Speed and Temperature

EPB21 allows the Max static load of 80 MPa. The max compressive deformation rate under the max load is listed in Graph EPB21-2. The actual load capacity of bearing is slightly less than 80 MPa. The bearing load is variable against the speed and temperature. Fast speed (Vmax: 2.0 m/s) results into higher temperature (Tmax: 200°C) which decreases the load capacity of the bearing. Please refer to the Graph EPB21-3 for such variation.

### ■ Load-Temperature deformation



### ■ Load-Temperature diagrams



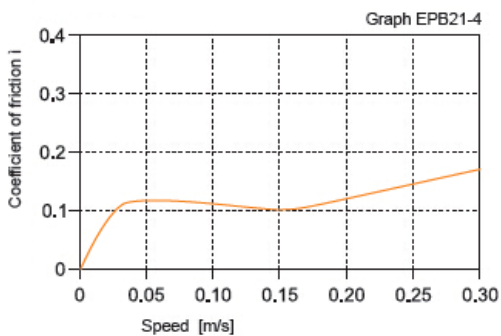
## The Relation of Friction Factor, Wearing and shaft material

### Friction Factor

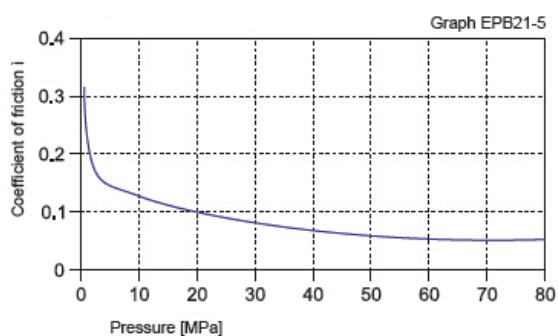
Friction factor will be slightly decreased along with the speed increasing under certain loading of the rotation operation (see Graph EPB21-4) and it will be slightly decreased along with the loading increasing under certain speed of the rotation operation especially when the loading is less than 30 MPa. Graph EPB21-5 tells that the friction of the EPB21 is not changed at all when the shaft roughness is between Ra 0.3 - 0.4 and will be considerably increased when the shaft roughness is over Ra 0.4. So the recommended shaft roughness is Ra 0.3 - 0.4.

EPB21	Dry	Grease	Oil	Water
Friction coef. $\mu$	0.03 - 0.15	0.09	0.04	0.04

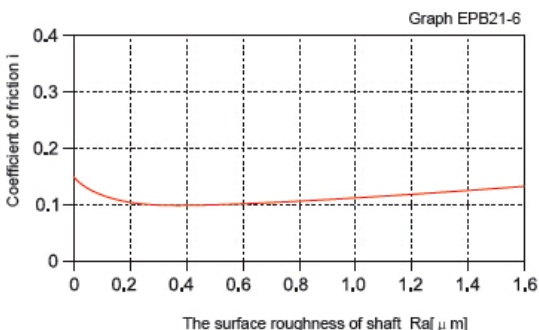
■ Coefficient of friction & the speed of bearing,  
 $p = 2 \text{ MPa}$



■ Coefficient of friction & the pressure of bearing,  
 $v = 0.2 \text{ m/s}$



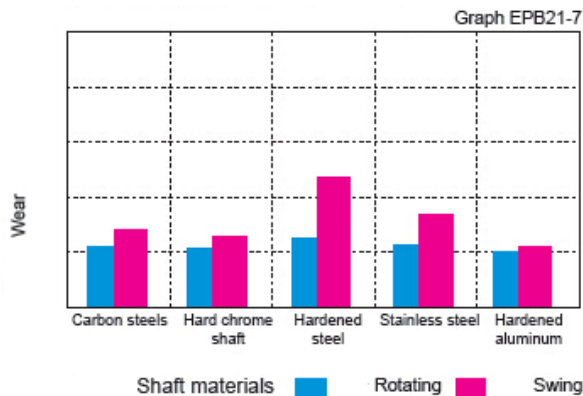
■ Coefficient of friction & the surface roughness of shaft



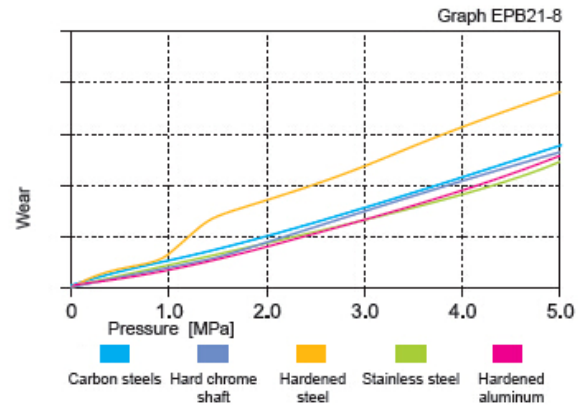
### Wearing and shaft material

Graph EPB21-7 shows that EPB21 is suitable for most of the shaft materials under low loading rotation operation and it is good for hardened carbon steel shaft under high loading rotation operation (see Graph EPB21-7). From Graph EPB21-8, we can also read that EPB21 is suitable for stainless steel shaft under oscillation operation and good for hot rolled carbon steel and hardened carbon steel shaft under rotation operation.

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



■ The bearing wear & pressure under rotating with different shaft materials,  $v = 0.2 \text{ m/s}$



### Chemical Resistance

The Chemical Resistance of EPB21 is fairly good against most of Acid and Alkalis.

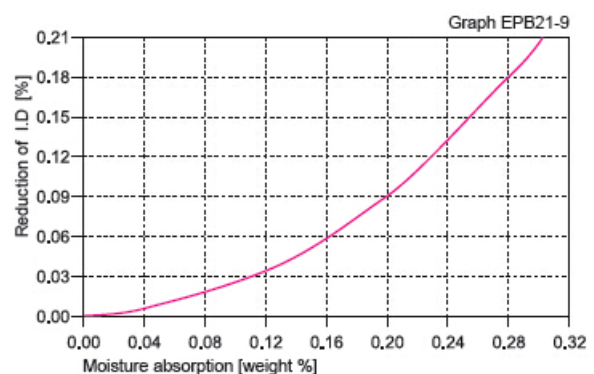
### UV Resistance

Disintegration could be possible for the material EPB21 after long period of exposing under the UV ray and therefore the compressive strength will be reduced.

### Water Absorbability

The water absorb rate of EPB21 is 0.1% under the atmospheric pressure while it is 0.3% when the material is immersed into water. The material performance and dimensions of the material is stabilized for the applications under humid environment.

■ Effect of moisture absorption on EPB21 bearings



### NOTES

Data herein is typical and not the maximum values of the material specifications. Unless otherwise specified, all data listed is for all specification products. We reserve the right to change tech-Data without notice due to the improvement of material technology.