

EPB13 Plastic Bearings



Product Features

Low friction and high wear resistance. It could maintain a good stable wear resistance and friction factor for the rotation, linear and oscillation movement. It has no critical hardness requirement to the shaft.

- Continuous working temperature: -50°C – 90°C
- Maintenance-free dry operation
- Small wear off amount against various shaft mat.
- Suitable for soft shaft
- Lower friction

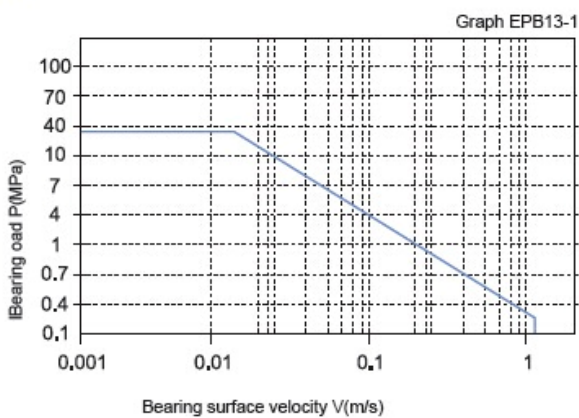
The Material Data Sheet

Common Capability	Testing Method	Unit	EPB13
Color			Yellow
Density	ISO 1183	g/cm ³	1.48
Dynamic friction /steel (dry)			0.05 - 0.15
Max. PV (dry)		N/mm ² x m/s	0.4
Max. rotating velocity		m/s	1.5
Max. oscillating velocity		m/s	1.1
Max. linear velocity		m/s	8
Tensile strength	ISO 527	MPa	75
Compressive strength (Axial)		MPa	60
E-Modul	ISO 527	MPa	2400
Max. static pressure of the surface, 20°C		MPa	35
Rockwell hardness	ISO 2039-2	HRR	107
Continuous work temperature		°C	-50 – +90
Short-time work temperature		°C	-50 – +120
Thermal conductivity	ASTME1461	W/m*k	0.25
Linear coef. of thermal expansion	ASTMD696	10 ⁻⁵ x K ⁻¹	9
Maisture absorption RH50 / 23°C	ASTMD570	%	0.2
Max. water absorption, 23°C		%	1.2
Flammability	UL94		HB
Volume resistivity	IEC60093	Ωcm	>10 ¹³
Surface resistivity	IEC60093	Ω	>10 ¹²

PV Value of Bearings

The max PV value of the EPB13 series bearing is 0.4 N/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 EPB13-1).

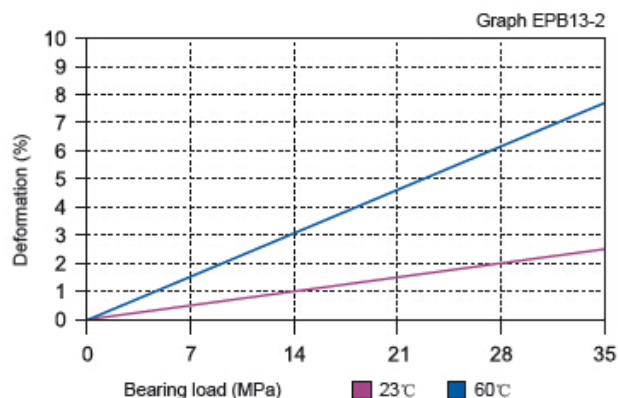
■ Permissible PV



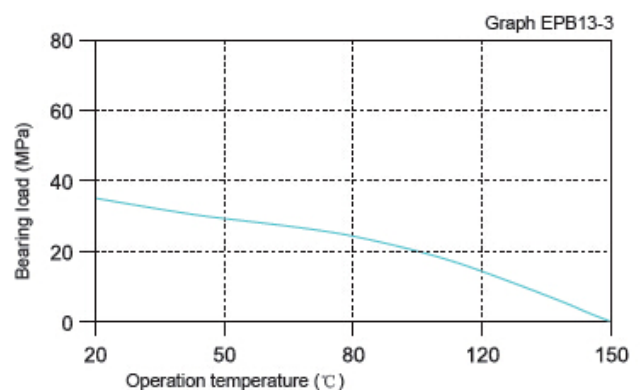
The Relation of Load, Speed and Temperature

EPB13 allows the max static load of 35 MPa. The max compressive deformation rate under the max load is listed in Graph EPB13-2. The actual load capacity of bearing is slightly less than 35 MPa. The bearing load is variable against the speed and temperature. Fast speed (Vmax: 1.5 m/s) results into higher temperature (Tmax: 90°C) which decreases the load capacity of the bearing. Please refer to the Graph EPB13-3 for such variation.

■ Load-Temperature deformation



■ Load-Temperature diagrams



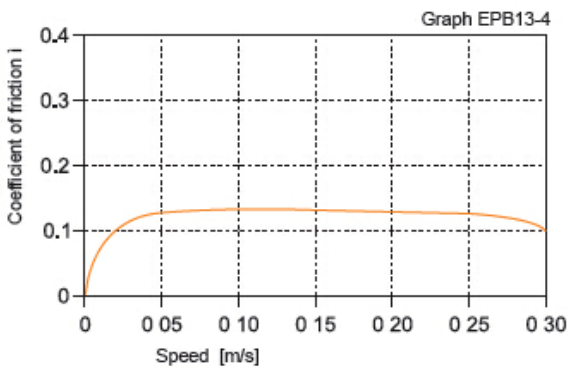
The Relation of Friction Factor, Wearing and shaft material

Friction Factor

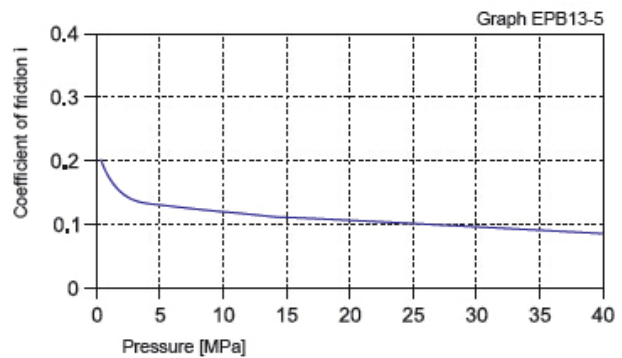
EPB13 Bearing friction factor varies only little amount along with the operation speed changing (see Graph EPB13-4). When the operation speed is relatively stable, the friction factor varies a lot while the load is less than 10 MPa (see Graph EPB13-5). At the same time, it does not vary much when the loading is greater than 10 MPa. Rough surface may result into the increasing of friction factor of the EPB13 material but when the roughness of the surface is greater than Ra 0.5, the friction factor will remain relatively stable again. The recommended shaft surface roughness is Ra 0.1 - 0.4 for the EPB13 material.

EPB13	Dry	Grease	Oil	Water
Friction coef. μ	0.03 - 0.15	0.09	0.04	0.04

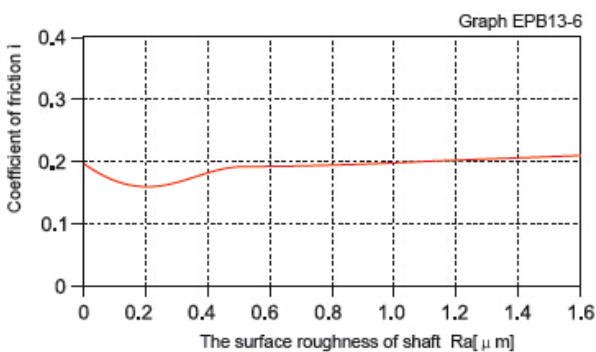
■ Coefficient of friction & the speed of bearing,
 $p = 2 \text{ MPa}$



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



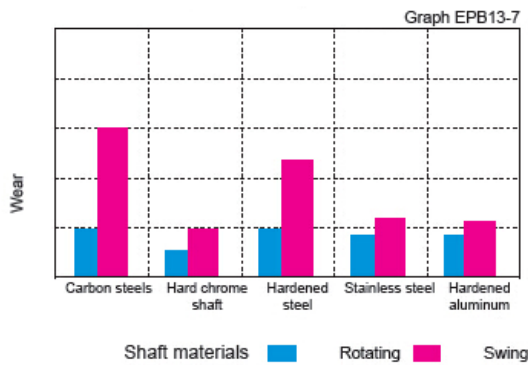
■ Coefficient of friction & the surface roughness of shaft



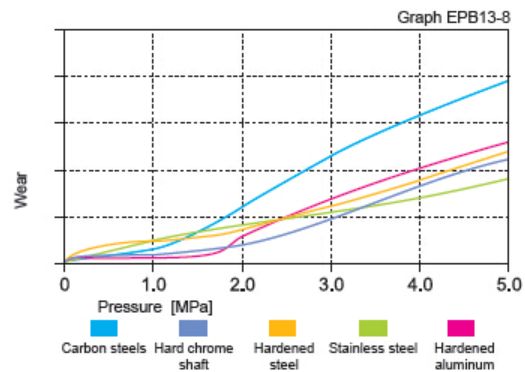
Wearing and shaft material

Test of the bearing against various shaft materials shows that the material EPB13 features the best performance where the shaft material is hard chrome steel with loading less than 2 MPa. (see Graph EPB13-7). Therefore, the higher the load is increased, the wear resistance of the bearing will be better against the stainless steel shaft. Refer to Graph EPB13-8, the material EPB13 is suitable for rotation operation. Either to be used under rotation operation or the oscillation operation, it is the best suitable material for the application against hard chrome steel shaft.

■ 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

EPB13 is good at chemical resistance against mild base, weak acidic medium and various kinds of lubricants.

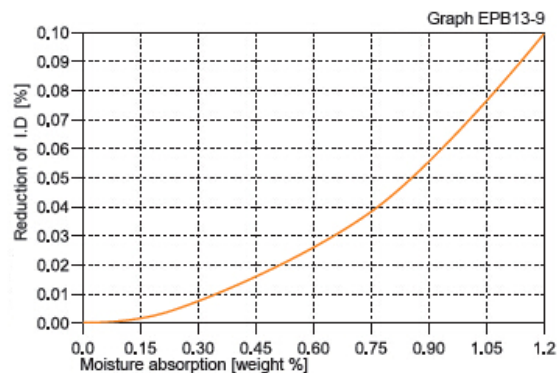
UV Resistance

EPB13 can maintain its colour unchanged when it is exposed into the UV ray. The hardness, Compressive strength and wear resistance of the material is also stable under such condition.

Water Absorbability

The water absorb rate of EPB13 is 0.2% under the atmospheric pressure while it is 1.2% when the material is immersed into water. With its low water absorbability, the material is suitable for humid environment applications.

■ Effect of moisture absorption on EPB13 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.