

EPB5Z Plastic Bearings



Product Features

It is a high load material with excellent low friction factor. Marginal load application is acceptable and it is with good wear resistance both for hard and soft shafts.

- Continuous working temperature: -100°C – +250°C
- High load capacity
- Higher speed is permissible
- Marginal pressure is permissible
- Best performance for oscillating movement

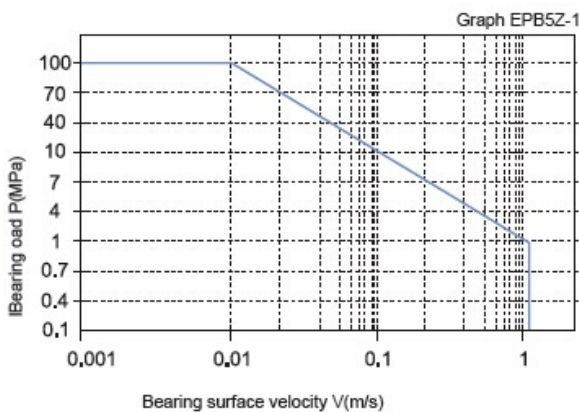
The Material Data Sheet

Common Capability	Testing Method	Unit	EPB5Z
Color			Brown
Density	ISO 1183	g/cm ³	1.40
Dynamic friction /steel (dry)			0.05 - 0.15
Max. PV (dry)		N/mm ² x m/s	1.0
Max. rotating velocity		m/s	1.5
Max. oscillating velocity		m/s	1.1
Max. linear velocity		m/s	5.0
Tensile strength	ISO 527	MPa	90
Compressive strength (Axial)		MPa	65
E-Modul	ISO 527	MPa	2'500
Max. static pressure of the surface, 20°C		MPa	150
Rockwell hardness	ISO 2039-2	HRR	115
Continuous work temperature		°C	-100 – +250
Short-time work temperature		°C	-100 – +310
Thermal conductivity	ASTME1461	W/m*k	0.6
Linear coef. of thermal expansion	ASTMD696	10 ⁻⁵ x K ⁻¹	4
Maisture absorption RH50 / 23°C	ASTMD570	%	0.3
Max. water absorption, 23°C		%	1.1
Flammability	UL94		V0
Volume resistivity	IEC60093	Ωcm	>10 ¹¹
Surface resistivity	IEC60093	Ω	>10 ¹¹

PV Value of Bearings

The max PV value of the EPB5Z series bearing is 1.0 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 EPB5Z-1).

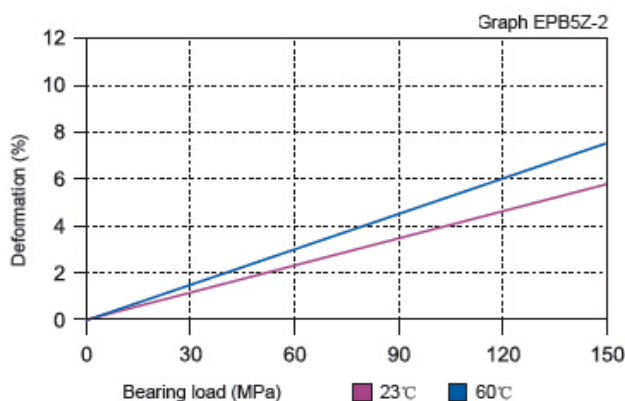
■ Permissible PV



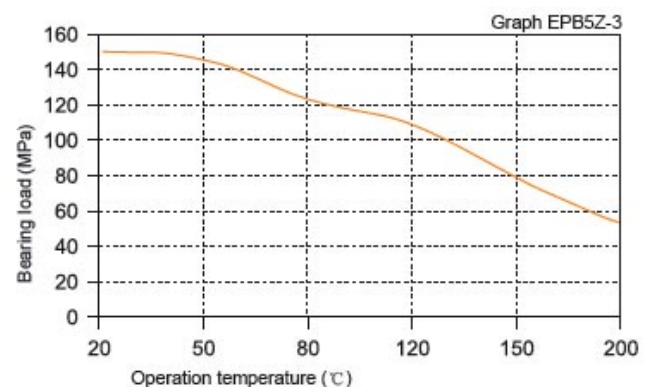
The Relation of Load, Speed and Temperature

EPB5Z allows the Max static load of 150 MPa, The max compressive deformation rate under the max load is listed in Graph EPB5Z-2, The actual load capacity of bearing is slightly less than 150 MPa, The bearing load is variable against the speed and temperature, Fast speed (Vmax: 1.5 m/s) results into higher temperature (Tmax: 250°C) which decreases the load capacity of the bearing. Please refer to the Graph EPB5Z-3 for such variation.

■ Load-Temperature deformation



■ Load-Temperature diagrams



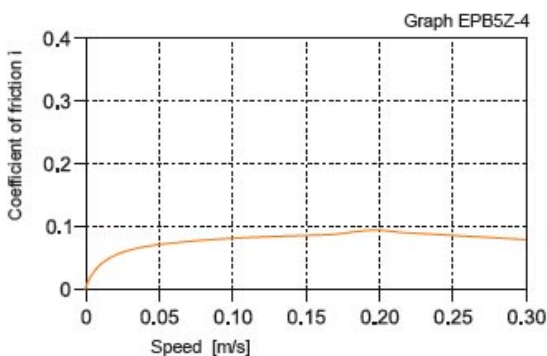
The Relation of Friction Factor, Wearing and shaft material

Friction Factor

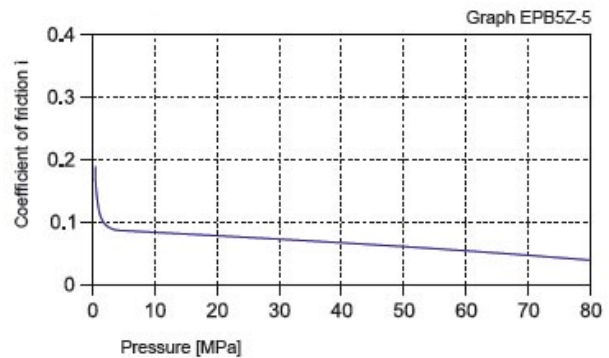
Graph EPB5Z-4 shows that the friction factor of EPB5Z is initially increased along with the operation speed increasing when the loading is stable but when the speed reaches over 0.2 m/s, it is decreased along with the operation speed increasing. Graph EPB5Z-5 shows that the friction factor of EPB5Z is decreasing along with the loading increasing when the operation speed is stable. The best shaft roughness for this material is Ra 0.4 - 0.7.

EPB	Dry	Grease	Oil	Water
Friction coef. μ	0.05 - 0.15	0.09	0.04	0.04

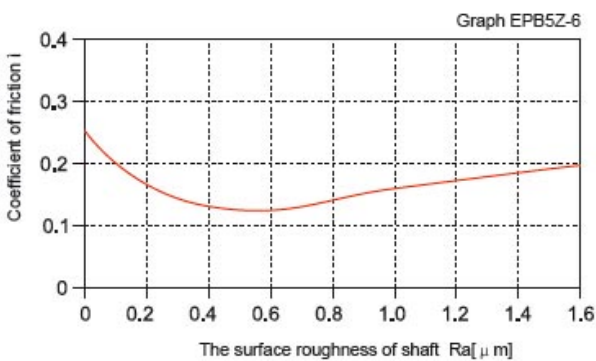
■ Coefficient of friction & the speed of bearing, $p = 2 \text{ MPa}$



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



■ Coefficient of friction & the surface roughness of shaft

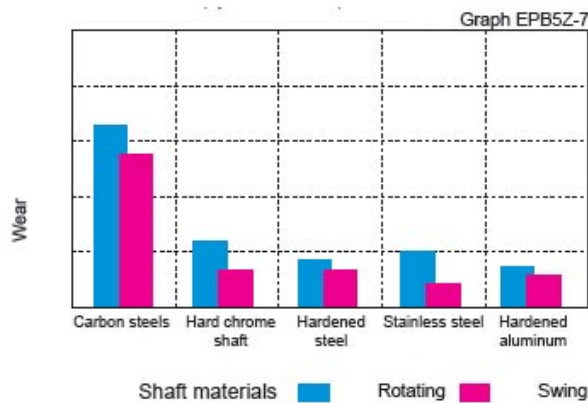


Wearing and shaft material

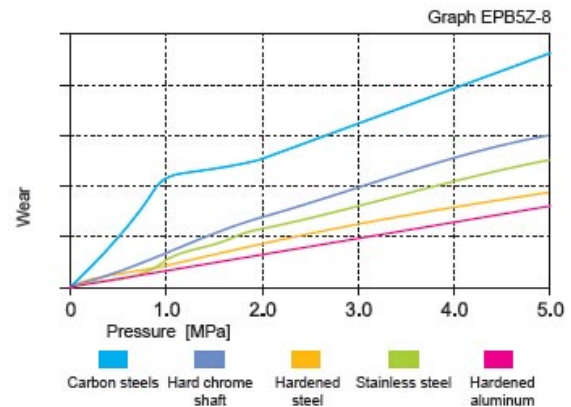
Graph EPB5Z-7 and Graph EPB5Z-8 shows that the wearing speed of EPB5Z is similar with most of the other materials under lower loading but it will be much better when the loading is higher. It also tells that the hardened steel shaft is good for EPB5Z bearings. Graph EPB5Z-8 shows the wearing rate is less in oscillation

operation than in rotation operation especially when the loading is over 20 MPa. Heat-treated steel shaft is recommended in rotation operation and stainless steel and hardened chrome steel shaft is recommended in oscillation 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

EPB5Z is good at chemical resistance against mild base, weak acidic medium and various kinds of lubricants.

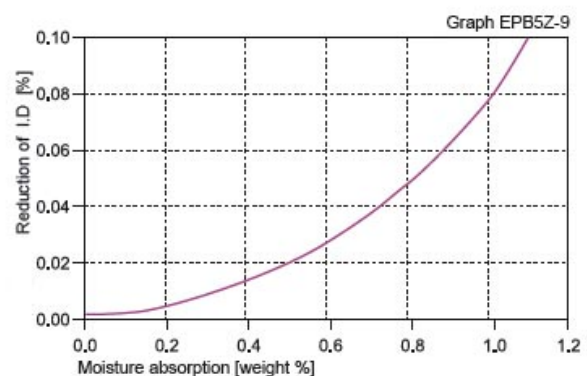
UV Resistance

The material performance of EP5Z will be lowered if it is exposed in the UV ray for long period.

Water Absorbability

The water absorb rate of EPB5Z is less than 0.3% under the atmospheric pressure while it is 1.1% 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 EPB5Z 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.