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EPB5A Plastic Bearings

Product Features

- Continuous working temperature: -100°C – +250°C
- Suitable for high load and low speed operation
- High load capacity at higher temperature
- Good chemical resistance
- FDA grade

The Material Data Sheet

Common Capability	Testing Method	Unit	EPB5A
Color			Grey
Density	ISO 1183	g/cm³	1.50
Dynamic friction /steel (dry)			0.10 - 0.25
Max. PV (dry)		N/mm² x m/s	0.9
Max. rotating velocity		m/s	0.6
Max. oscillating velocity		m/s	0.4
Max. linear velocity		m/s	1.0
Tensile strength	ISO 527	MPa	150
Compressive strength (Axial)		MPa	100
E-Modul	ISO 527	MPa	7'900
Max. static pressure of the surface, 20°C		MPa	120
Rockwell hardness	ISO 2039-2	HRR	120
Continuous work temperature		℃	-100 – +250
Short-time work temperature		℃	-100 – +315
Thermal conductivity	ASTME1461	W/m*k	0.6
Linear coef. ofthermal expansion	ASTMD696	10^{-5} x K^{-1}	6
Maisture absorption RH50 / 23℃	ASTMD570	%	0.1
Max. water absorption, 23"C		%	0.5
Flammability	UL94		V0
Volume resistivity	IEC60093	Ωcm	$>10^{15}$
Surface resistivity	IEC60093	Ω	$>10^{15}$

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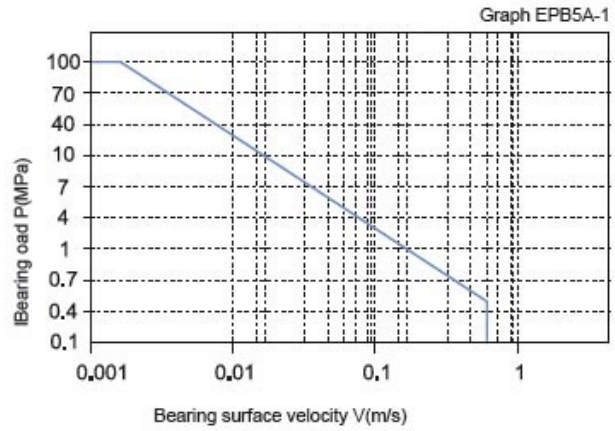
PV Value of Bearings

The max PV value of the EPB5A series bearing is 0.9 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 EPB5A-1).

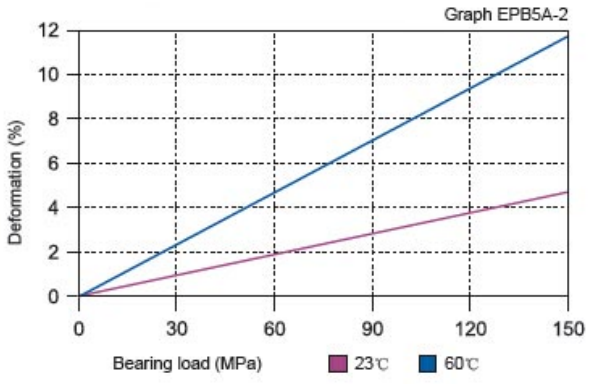
Permissible PV value



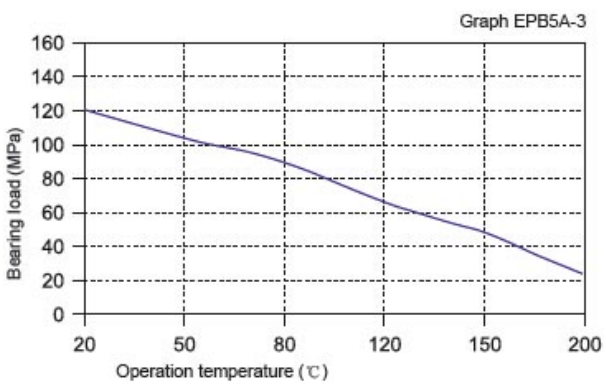
The Relation of Load, Speed and Temperature

EPB5A allows the max static load of 120 MPa. The max compressive deformation rate under the max load is listed in Graph EPB5A-2. The actual load capacity of bearing is slightly less than 120 MPa. The bearing load is variable against the speed and temperature. Fast speed (Vmax: 0.6 m/s) results into higher temperature (Tmax: 250°C) which decreases the load capacity of the bearing. Please refer to the Graph EPB5A-3 for such variation.

Load-Temperature deformation



Load-Temperature diagrams



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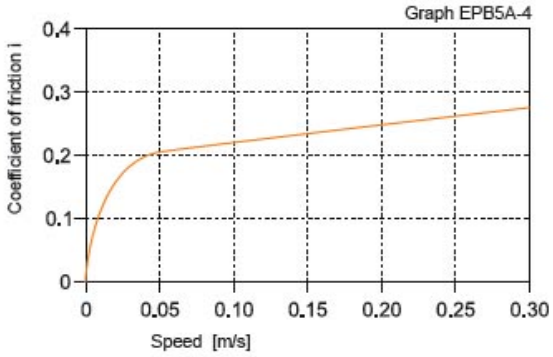
The Friction Factor, Wearing and shaft material

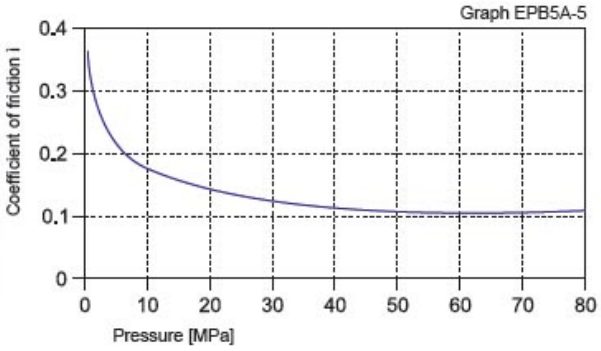
EPB5A Bearing Friction factor is increased along with the increasing of the operation speed under certain loading (see Graph EPB5A-4). The friction factor of EP5A is decreased along with the loading increasing not over 20 MPa (see Graph EPB5A-5). The friction factor will not change much along with the speed when the loading is over 20 MPa. The Graph EPB5A-6 shows that the bearing could achieve its best performance when the counter shaft surface roughness is around Ra0.4 to Ra0.9.

EPB5A	Dry	Grease	Oil	Water
Friction coef. μ	0.09 ~ 0.25	0.09	0.04	0.04

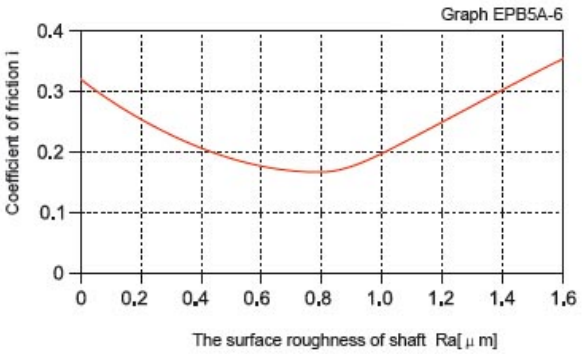
Coefficient of friction & the speed of bearing, p = 2 MPa



Coefficient of friction & the pressure of bearing, v = 0.2 m/s



Coefficient of friction & the surface roughness of shaft



Wearing and shaft material

Graph EPB5A-7 and Graph EPB5A-8 show the test results of the material EPB5A running against different shaft materials. It is suitable for hard Aluminium and hard chrome steel shaft. The hard chrome steel shaft will be better when the loading is getting heavier. Graph EPB5A-7 shows EPB5A is good for oscillation operation. Specially, from the Graph EPB5A-8, it is read that EPB5A is with better performance under high temperature around 150°C comparing with under the ambient temperature of 23°C.

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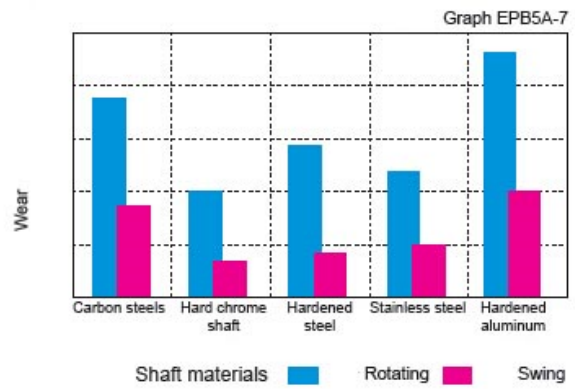
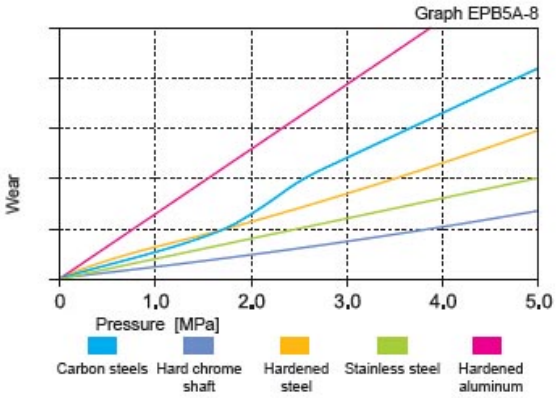
The bearing wear under rotating with different shaft materials, p = 2 MPa, v = 0.2 m/s



The bearing wear & pressure under rotating with different shaft materials, v = 0.2 m/s



Chemical Resistance

Chemical Resistance of EPB5A is very good. It can work well in the heavy acid of 65%.

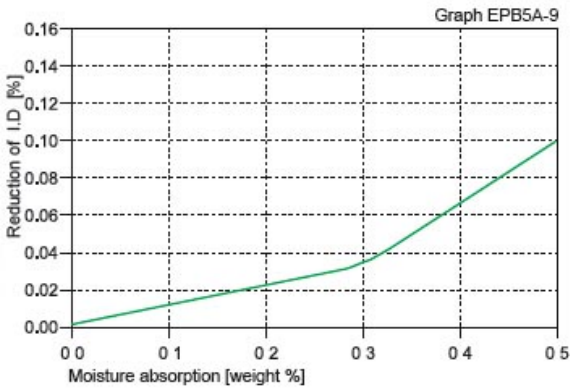
UV Resistance

The water absorb rate of EPB5A is less than 0.1% under the atmospheric pressure while it is 0.5% when the material is immerged into water. The material performance and dimensions of the material is stabilized for the applications under humid environment.

Water Absorbability

The water absorb rate of EPB5A is less than 0.1% under the atmospheric pressure while it is 0.5% when the material is immerged into water. The material performance and dimensions of the material is stabilized for the applications under humid environment.

Effect of moisture absorption on EPB5A 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.