

Bearing Basics

THE QUESTION

BEARINGS BASICS Q&A: IN CASE YOU DIDN'T KNOW...

Answers Provided by: Romax Technology Limited

Are there any special work surface or site requirements for installing bearings?

All bearings require meticulous attention to detail when fitting. The bearings need to be stored in their original wrappings in a clean and dry environment. When fitting bearings it's important to avoid any contamination to avoid potential damage to particles. Therefore, when fitting, we recommend that the bearings should remain in their wrappings until the very last moment, and they need to be unwrapped in a clean, draught free environment.

We recommend using induction heaters, with thermostatic control, to ensure the bearings are evenly heated to allow successful fitting without damaging the bearing. The fitting of the bearing is of critical importance to its life. The designated clearances must be achieved in order to give the bearing any chance of lasting.

As an example, Romax often fits bearings when installing a double-row TRB of, say, 250 mm OD; this might have a design axial clearance of 220 microns. A variance of more than ± 20 microns could halve the life of the bearing. As a result, it is important to ensure that your mechanical design can be realized in the flesh. Any damage to either the races or the rollers will significantly reduce the life of the bearing, so it is important to consider how the bearing will be held and or supported while it is being fitted.

Accounting for the application, what is the best way to choose a bearing lubrication method?

You need to consider cooling requirements, packaging space available in your design and life cycle cost. You will also need to consult the bearing supplier for guidance on cooling requirements; there are usually simple empirical rules based on load and speed.

Packaging requirements mean that it can often be difficult to find space for the required seals for each side of the bearing or to find a sealed variant for your bearing.

If cooling requirements are low, then grease can be the lower cost. If the life of the application exceeds the grease life, then you need to take account of the cost of re-greasing.

Oil bath introduces many extra components and costs into your application: pump, filters, oil ways, and magnetic plug. And like grease, the oil may also need changing at the end of its life.

In lubricating the bearing, is anything gained by using extra grease?

The best way to use grease in a bearing is to only fill the un-swept volume so that the bulk of the grease is not continuously churned as the bearing rotates. Oil will gradually bleed out of the grease pack onto the rolling surfaces.

Extra grease (more than recommended) often causes churning of the grease and increases friction torque and heating of the bearing. The grease may even escape from the bearing due to the reduction in grease viscosity and over-temperature of the seals and can therefore be a bad thing. For example: depending on the application, on a wind turbine there is circumstantial evidence of over greasing leading to bearing over temperature; however this can be very different from changing grease regularly, which can prolong the bearing life. Debris in old grease can be damaging and ideally you want lubrication, not grinding paste.

Is less bearing radial clearance a good thing?

It is very complicated; reduced radial clearance can affect the bearing life either beneficially or detrimentally or very little — depending on how a system deflects and loads are shared. Romax uses its software tools specifically to study this question in great detail for specific applications. If the clearance is too low, there are risks of additional failure modes such as cage breakage or bearing overheating.

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