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***If you haven't found it, you probably haven't tried MBA***

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## Bearing Failure

### Before You Blame the Bearing

A miniature ball bearing is a precisely machined piece of mechanical equipment. Bearings are not expected to last forever. They will fail at some point.

Bearings may fail due to normal wear and tear, or they may fail due to any number of adverse conditions or mistreatment. These days, bearing manufacturing technology and quality control is so good that bearing failure is almost never due to poor manufacturing of the bearing itself.

Before you blame the bearing for premature failure, it is worthwhile considering the seven most common reasons miniature bearings fail early. Take a look at the conditions your bearing has been subjected to and try to determine if one of these is the real reason for the failure.

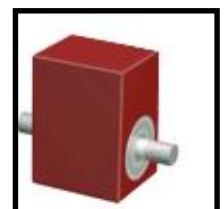
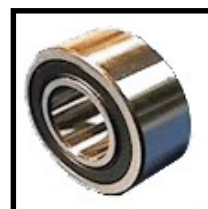
### The Seven Most Common Problems

#### Contamination

Miniature bearings are precision parts with raceways ground and hardened to exacting tolerances. The smallest speck of dust can be enough to cause a bearing to fail.

#### Tolerances of Mating Parts

Good machining is needed for shafts and housing bores used with all bearings, but the parts used with miniature bearings have to be especially well machined to exacting tolerances. Bearings are usually manufactured in runs exceeding 100,000 pieces at a time, so if strict quality control is not adhered to, a bearing manufacturer will find themselves out of business in no time. However, short runs of shafts or housings can sometimes be made with incorrect tolerances. Poor fitting parts can reduce the internal clearance of the bearing causing overheating and early failure.





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For new applications, an engineer needs to determine the correct fit required. It is essential that shafts and housings are made to the correct tolerances.

Existing components should be checked for irregularities and damage. A good question to ask is whether the problem that caused the original bearing to fail is also causing a new bearing to fail early.

### **Axial Preloading**

Correct procedure must be followed when assembling bearings. Even pressure must be maintained on both the inner and outer ring of the bearing otherwise axial preloading may occur. Axial preloading causes the balls to run off centre around the raceway. Radial ball bearings are not designed to handle these types of loads and will fail early under these conditions.

### **Axial Loading from Application**

Some applications cause undue axial loading on a bearing. Axially loaded applications would usually call for either an angular contact type bearing or some form of mechanical stopper or thrust bearing to prevent axial load being transmitted through a radial ball bearing. Some applications we have found that may cause excessive axial loading if they are poorly designed or incorrectly assembled include fans and computer engraving spindles. Check that you have used the correct bearing type. Check that all components have been reassembled correctly.

### **Vibration**

Excessive vibration is extremely damaging to bearing races. Vibration should be reduced to a minimum.

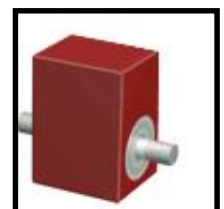
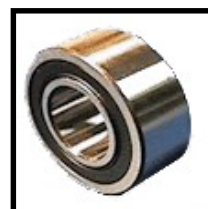
### **Lubrication**

Early failure can be the result of too much or too little lubricant. Mixing of lubricant types can also lead to problems.

### **Clearance**

Bearing clearance selected incorrect for the application. See our website for information on clearances and clearance selection.

<http://www.minibearings.com.au/technical/bearings/clearance/>





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## Other Causes

The above seven problems would account for 99.9% of all premature miniature bearing failures. If you can confidently rule out all of the above factors then identification of your particular problem will require a much closer look at the application and assembly procedures.

