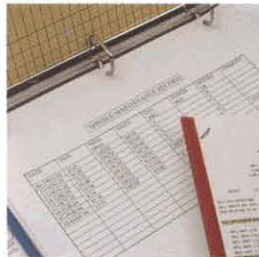


HANDLING AND MOUNTING PRECISION BALL BEARINGS



PRECISION BEARINGS: HANDLE WITH CARE

Barden Super Precision ball bearing tolerances are measured in millionths of an inch. Such stringent standards produce bearings that offer exceptional benefits including reduced noise and vibration levels, lower operating temperatures, greater accuracy, higher running speeds and longer life.

Unfortunately, all too often bearing problems can be traced back to improper handling. Reaping the full benefits of such highly refined bearings requires users to observe proper installation techniques, to assure long and trouble-free performance.

Send for Barden's "Bearing Failure: Causes and Cures" booklet and wall chart. These excellent diagnostic resources are free upon request.

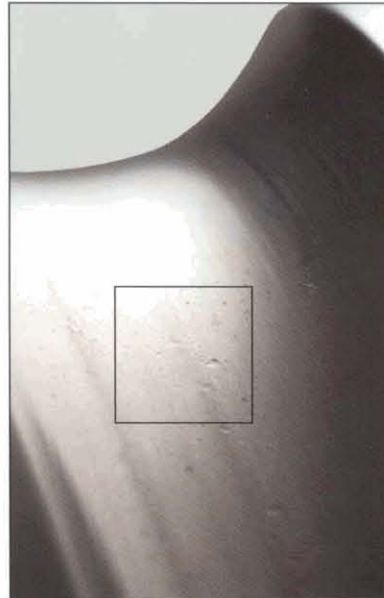
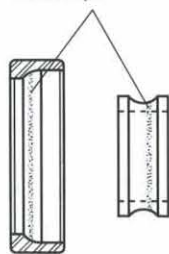


DAMAGE CAUSED BY DIRT AND CONTAMINANTS

Foreign particles entering a bearing can do severe damage by causing minute denting of the raceways and balls. The outward signs that contamination may be present include increased vibration, accelerated wear, the inability to hold tolerances and elevated running temperatures. All of these conditions could eventually lead to bearing failure.

Close examination of inner or outer ring races will show irregular dents, scratches or a pock-marked appearance. Balls will be similarly dented, dulled or scratched. The effects of some types of contamination may be hard to see at first because of their microscopic nature.

Irregular dents or material embedded in raceways.



Sometimes, the effects of contamination are barely visible, as this magnified image shows.



**BARDEN
PRECISION
BEARINGS**

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THE IMPORTANCE OF CLEANLINESS

If getting bearings to perform at their peak is the desired goal, then cleanliness is a topic that cannot be overstressed. Whenever bearings are handled, it is essential to keep them clean. Even microscopic particles of dirt can kill a bearing fast. Consider every kind of foreign matter a potential enemy to bearing performance.

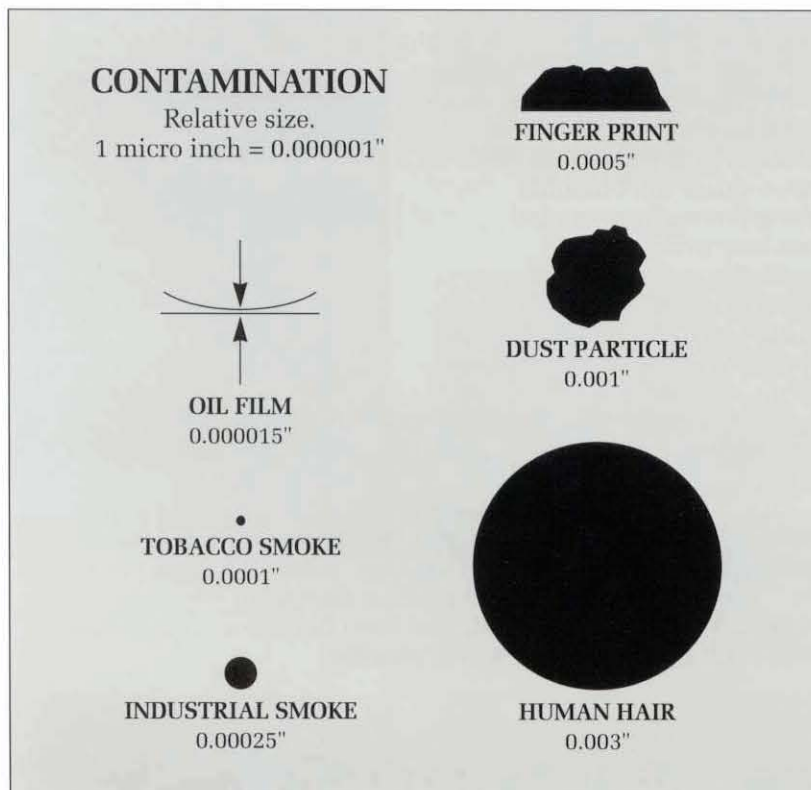


Chart compares relative sizes of typical contaminants. Oil film under boundary lubrication conditions is only 15 micro inches thick, and can be easily penetrated by even a single particle of tobacco smoke.

Dirt and contaminants are of three varieties:

- 1) Airborne contaminants — lint, metal fines, abrasive fines, smoke, dust.
 - 2) Transferred contaminants — dirt which is picked up from one source and passed along to the bearing from hands, work surfaces, packaging, tools and fixtures.
 - 3) Introduced dirt — typically from dirty solvents/lubricants.
- Contaminants that are often overlooked are humidity and moisture, fingerprints (transferred through handling), dirty greases and oils, and cigarette smoke. All of the above sources should be considered abrasive, corrosive or leading causes of degradation of bearing performance. It should be noted that cleanliness extends not just to the bearings themselves, but to all work and storage areas, benches, transport equipment, tools, fixtures shafts, housings and other bearing components.

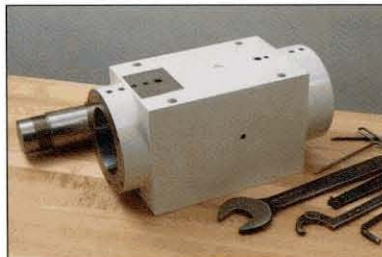
WORK AREA

Good bearing installation habits begin with a clean work area. Work bench surface materials include wood, rubber, metal and plastic. Generally, painted metal is not desirable as a work surface because it can chip, flake or rust. Plastic laminates may be acceptable and are easy to keep clean, but are also more fragile than steel or wood and are prone towards static electricity build-up. Stainless steel, splinter-free hardwoods such as maple, or dense rubber mats that won't shred or granulate and have no oily residue are all suitable work surfaces.

A clutter-free work area, with good lighting, organized tool storage, handy parts bins and appropriate work holding devices constitute an ideal working environment.

Under no circumstances should food or drink be consumed on or near work surfaces. Smoking should not be allowed in the room where bearings are being replaced. Locate bearing installation operations away from other machining operations (grinding, drilling, etc.) to help minimize contamination problems.

Static electricity—or any operation that may cause steel rings and balls to become magnetized—could result in dust or fine metallic particles being introduced into bearings. Since all Barden precision bearings are demagnetized before being shipped, if you suspect bearings have become magnetized, pass them through a demagnetizer while still in their original sealed pouches.



Good bearing installation habits begin with a clean work surface and the proper tools.

PROPER TOOLS

Every workbench should have a well-stocked compliment of proper tools to facilitate bearing removal and replacement. Tools required include wrenches and spanners (unplated and unpainted only), drifts, gages, gage blocks and bearing pullers.



An arbor press is used for interference fits with small shaft/small bore instrument bearings.

Bearing installers will also want to have access to a variety of diagnostic tools. These may include a run-in stand for spindle testing, a bearing balancer and a portable vibration analyzer.

Most spindle bearings are installed with an induction heater (using the principle of thermal expansion) which enlarges the inner ring slightly so the bearing can be slipped over the shaft. An arbor press can be used for installing small shaft/small bore miniature and instrument bearings.



HOOK SPANNERS
For disassembly and re-assembly of components.



INDUCTION HEATER
Heat expands inner ring for fitting onto shaft.



DRIFTS
Facilitate ring installation.



VIBRATION ANALYZER
Portable diagnostic tool.



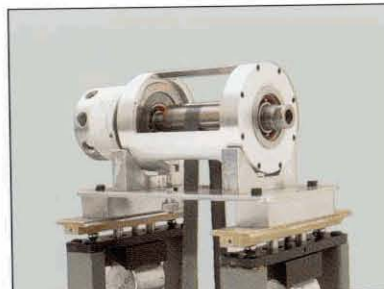
OPEN END WRENCHES
Always use unplated tools.



RUN IN STAND
For testing spindle performance.



GAGES AND GAGE BLOCKS
Accurate to .0001".



BALANCER
Weight distribution analysis.

