



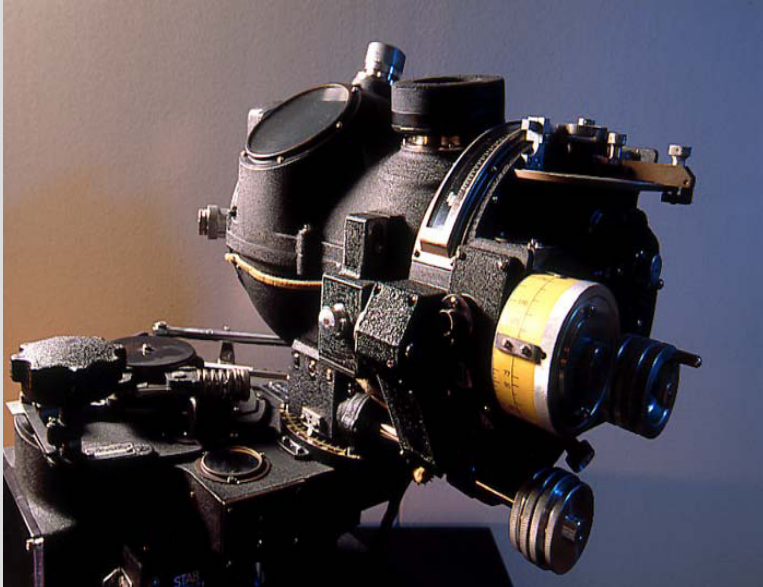
**The Barden Corporation**

A Member of the Schaeffler Group

*...Insist on Precision*

## Barden Gyroscope Bearings

For over 65 years The Barden Corporation has been offering precision gyro bearings, and assemblies. Increased performance requirements of gyros in terms of drift rate, life and size have created a demand for bearings produced to carefully controlled tolerances of less than .000020 inches.



This accuracy plus close control of contact surface geometry and finish, cleanliness and ball retainer oil impregnation, results in a number of benefits:

- Decreased vibration levels
- Longer useful life with fewer lubrication failures
- Greater stability of preload
- Reduced mass shift due to wear
- Greater performance uniformity from unit to unit

### **CAPABILITY**

- Complete manufacture – Precision ball bearings & spacers
- Precision bearings running from outer diameter: less than 0.25 inches to approx. 13 inches)
- Specialty ball plant
- Make to print & design capability

### **NON DESTRUCTIVE TESTING**

- Testing can identify flaws and imperfections in bearing components that otherwise may not be detected
- NADCAP Accreditation
- Eddy Current, Barkhausen, Magnetic Particle, Fluorescent Penetrant
- Ultrasonic inspection for ceramic balls

### **ASSEMBLY & TEST**

- Assemble, test, and package all components in clean room environments as low as class 100 as appropriate
- Functionally inspect bearings for vibration, torque (starting and running), and high speed performance
- Specialty lubricants – barrier coating, vacuum impregnation, centrifuge, high temp., cryogenic, and low outgas.

### **HEAT TREATMENT**

- In house vacuum and atmospheric
- Comprehensive metallurgical services

### **SPECIAL PROCESSES**

- DFARS Compliant capable for U.S. government and military requirements
- Welding capabilities to join a wide variety of different materials using unique joints and TiG, laser, EB, friction methods
- Design and manufacture sub-assemblies and provide kits.

### **GRINDING & SUPER FINISHING**

- Shaft capability - grinding on centers (Length less than 0.25 to approx. 20in)
- ABEC 7 and 9+ precision
- Finishes achieved: .000010 inches roundness with surfaces finishes less than 1 AA

For consultation or more information contact:

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# Barden Gyroscope Bearings

For a gyroscope to function accurately it requires an extremely smooth running rotor, and nearly frictionless gimbal pivots. This can only be achieved through the utilization of high precision ABEC 7& 9 bearings.

## Typical Gimbal Bearings (Oscillatory type motion):

- Deep groove type with shields
- R133 through R2 size (3/32" through 1/8" bore size)
- 52100 ball and ring material-smooth running
- Two piece metal ribbon ball retainer.
- Lubrication oil, controlled quantity.



Gimbal Bearings



Rotor Bearings

## Typical Rotor Bearings (Rotational type motion):

- Deep groove/Angular Contact type
- R2 through R4 size (1/8" through 1/4" bore size)
- 52100 ball and ring material
- Phenolic ball retainer.
- Lubrication oil vacuum impregnated into ball retainer and grease.

## Classic Causes of Gyro Failure

- Misalignment:** shoulder wobble, rough shoulders, nicks, burrs, chips, coarse threads
- Contamination:** fibers, chemical, silicones, fluid, dirt
- Preload:** changes in temperature, too tight, hang-ups, shift looseness
- Handling Damage:** hammers, presses, dirty tools, assembly techniques
- Noise:** vibration, dirt, location, brinelling, cage instability, unbalance, lubricant placement
- Lubricant:** quantity, black residue, dryness



Reverse Loading

Tight Fit

True Brinelling

Contamination

False Brinelling

Lubricant Failure

Misalignment