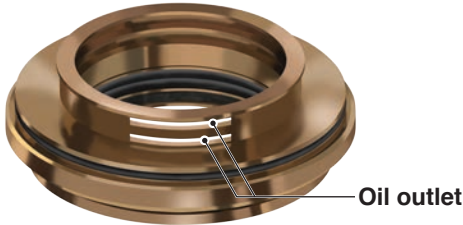




Bearing Gard™ for steam turbines

Installation, Operation and Maintenance Instructions



Section 1 - Description of Use

The Bearing Gard is a permanent, non-wearing bearing protection device used to replace the OEM labyrinth on steam turbines. Its main purpose is to retain lubrication in the bearing housing and prevent the ingress of contamination as this can lead to premature failure of the lubrication and bearings.

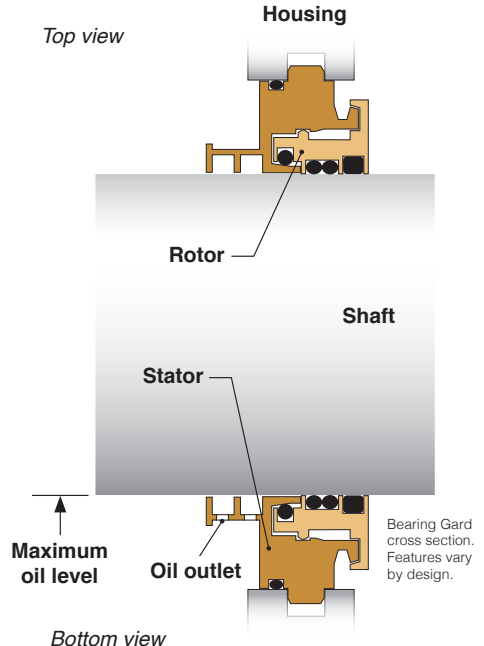
Section 2 - Hazzard Summary

To ensure safe and reliable operation of the Bearing Gard follow all installation, operation, and maintenance instructions. Failure to comply with these instructions may result in frictional heating of the Bearing Gard components and will result in loss in performance.

To find your local Flowserve representative and find out more about Flowserve Corporation, visit www.flowserve.com

Section 3 - Preparations for Installation

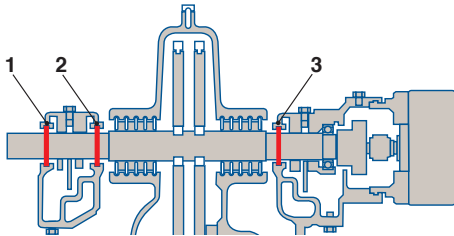
- 3.1 Remove the oil seal from the housing.
- 3.2 Inspect for and remove sharp edges from the housing bore, keyways, and shaft steps where Bearing Gard O-rings must pass.
- 3.3 Thoroughly clean both the shaft and housing bore.
- 3.4 Ensure Bearing Gard shaft O-ring position is located on an area of the shaft free from scratches, nicks, or dings.
- 3.5 Shaft and housing surface finish must be 0.8 micrometer (32 μin) or better.
- 3.6 Concentricity of the housing bore to the shaft must be maintained within 0.26 mm (0.010 inch) TIR.



Section 4 - Installation

Bearing Gard locations

Figure 1



- 4.1 Do not disassemble the Bearing Gard. It is designed to be installed as a unit.
- 4.2 Lightly lubricate O-rings and shaft with the lubrication provided.
- 4.3 Push the Bearing Gards into position on the shaft with rotor pointing away from the bearing.
- 4.4 Lower the rotor assembly into the bottom half of the housing taking care not to crush the Bearing Gards and keep the oil outlets at the 6 o'clock position.
- 4.5 Complete turbine assembly.
- 4.6 After assembly is complete, confirm the Bearing Gard rotor is seated against the stator in Locations 1 and 3. See Figure 2.
- 4.7 For Location 2, pull the rotor by hand from the stator until it stops, approximately 0.63 mm (0.025 inch). See Figure 3.

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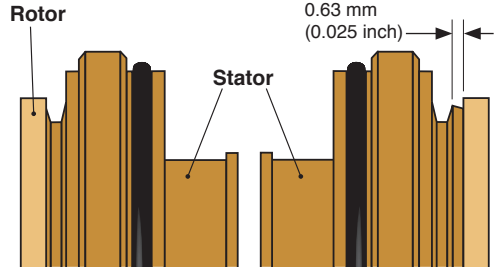
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Location 1 and 3

Figure 2



Location 2

Figure 3

Section 5 - Operation

- 5.1 Shaft tolerance ± 0.051 mm (0.002 inch)
- 5.2 Housing tolerance ± 0.025 mm (0.001 inch)
- 5.3 Maximum axial movement: 0.63 (0.025 inch) TIR away from bearing (Location 1 and 3)
Maximum axial movement: 0.063 (0.025 inch) TIR towards bearing (Location 2)
Maximum radial runout: 0.26 mm (0.010 inch) TIR
- 5.4 Speed 5000 rpm maximum
- 5.5 Maximum shaft temperature (under drive O-rings) 205°C (400°F)
- 5.6 Bearing Gard's labyrinth is designed to repel water and steam. It is not designed for use in either horizontal or vertical applications that are flooded with oil or other liquids.

Section 6 - Maintenance

- 6.1 Contact your Flowserve seal representative for technical support of the Bearing Gard.