Designation: D 3337 – 91 (Reapproved 2002)

Standard Test Method for Determining Life and Torque of Lubricating Greases in Small Ball Bearings[1]

This standard is issued under the fixed designation D 3337; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method describes a procedure for the determination of grease life and torque in small bearings. Although this test method is not the equivalent of a long-time field-service test, it is intended to predict the relative grease life at high temperature in a reasonable period of testing time. In addition, this test method measures the running torque at both low (1 r/min) and high (12 000 r/min) speeds.

1.2 Except for torque, which is measured in g·cm, the values stated in inch-pound units are to be regarded as the standard in this test method. The SI values given in parenthesis are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Terminology

2.1 *Definitions of Terms Specific to This Standard:*

2.1.1 *grease life*—a measure of the durability of the grease in a small bearing at elevated temperatures.

2.1.2 *grease torque*—a measure of the amount of friction due to viscous shear of the grease.

2.1.3 *running torque*—a measure of the amount of friction in a rotating bearing due to load, speed, and viscous shear of the grease.

3. Summary of Test Method

3.1 A single row ball bearing with the test lubricating grease is rotated at a high speed under a constant load and selected temperature. Total running time is determined at completion of the test as a measure of the durability of the grease.

3.2 Running torque can be obtained for a single row ball bearing with the test lubricating grease rotating at 1 r/min and 12 000 r/min.

4. Significance and Use

4.1 This test method is a screening test to differentiate among the expected life of greases in ball bearings running at high temperatures. If torque is a factor in selection of a grease, the test method provides for measurements at both low (1 r/min) and high (12 000 r/min) speeds.

5. Apparatus

5.1 The apparatus required for this test method is described in detail in Annex A1. A new R-4 bearing is used for each test. It is run at 12 000 r/min ½-lbf (2.2-N) radial load and 5-lbf (22-N) axial load.

6. Reagents and Materials

6.1 *Grease Sample*—Procure the grease sample from below the surface of the grease container. Do not let separated oil get in contact with the sample; pour the excess oil off if present. Screen the grease using a 40-µm retention filter. A technique for screening is described in Annex A2.

6.2 *Test Bearing*:

6.2.1 *Specifications*—the test bearing[2] is size R-4.

6.2.2 *Size*—0.2500 in. (6.350 mm) bore, 0.6250 in. (15.875 mm) OD, 0.1960 in. (4.978 mm) wide.

6.2.3 *Material*—Type 440C stainless steel, heat stabilized.

6.2.4 *Precision Class*—AFBMA (Anti-Friction Bearing Manufacturers Association) Class 7.

6.2.5 *Radial Clearance*—0.0003 to 0.0005 in. (0.007 to 0.013 mm).

6.2.6 *Retainer*—stainless steel ribbon type.

6.2.7 *Shields*—removable with snap rings.

6.2.8 *Packaging*—bearing, shields, and snap rings packaged individually in clean and sealed envelopes.

7. Grease Packing of Test Bearing

7.1 Pack the test bearing in a clean environment with a quantity of test grease to fill one third of the free space in the bearing.

[1] This test method is under the jurisdiction of ASTM Committee F34 on Rolling Element Bearings and is the direct responsibility of Subcommittee F34.02 on Tribology.

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[2] A suitable bearing is Barden No. SR4SSW4, shipped without lubricant and with shields and snap rings unassembled, available from O. P. Schuman and Sons, Inc., County Line and Titus Rd., Warrington, PA 18976.

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