



Designation: D1478 – 20

Standard Test Method for Low-Temperature Torque of Ball Bearing Grease¹

This standard is issued under the fixed designation D1478; 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 U.S. Department of Defense.

1. Scope*

1.1 This test method covers the determination of the extent to which a grease retards the rotation of a slow-speed ball bearing by measuring starting and running torques at low temperatures (below -18°C (0°F)).

1.1.1 Torque measurements are limited by the capacity of the torque-measuring equipment.

1.1.2 This test method is not suitable for greases exhibiting torque values greater than 50 000 g-cm at the selected test temperature.

NOTE 1—When initially developed, the original dynamometer scale limited the torque capacity to approximately 30 000 g-cm; the original dynamometer scale is obsolete, however. The suggested replacement scale has not been evaluated; it could extend the limit to approximately 50 000 g-cm.

1.2 The values stated in SI units are to be regarded as standard.

1.2.1 *Exceptions*—The values given in parentheses are for information only. The exception is torque values that are given in cgs-metric units, which are widely used in grease specifications.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* For specific hazard and warning statements, see 6.1.1, 7.2, 7.4, 8.7, and 8.11.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.G0.05 on Functional Tests - Temperature.

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2. Referenced Documents

2.1 ASTM Standards:²

D4693 Test Method for Low-Temperature Torque of Grease-Lubricated Wheel Bearings

2.2 ANSI/ABMA Standard:

ABMA 20:2011 Radial Bearings of Ball, Cylindrical, Roller, and Spherical Roller Type—Metric Designs (ABMA Code 20BCO2JO)³

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *low-temperature torque, n*—the torque in g-cm required to restrain the outer ring of a No. 6204 size open ball bearing lubricated with the test grease while the inner ring is rotated at $1\text{ r/min} \pm 0.05\text{ r/min}$ at the test temperature.

3.1.2 *running torque, n*—the 15 s average value of the torque after rotation for a specified period of time (60 min).

3.1.3 *starting torque, n*—the maximum torque measured at the start of rotation.

4. Summary of Test Method

4.1 A No. 6204 open ball bearing is packed completely full of the test grease and cleaned off flush with the sides. The bearing remains stationary while ambient temperature is lowered to the test temperature and held there for 2 h. At the end of this time, the inner ring of the ball bearing is rotated at $1\text{ r/min} \pm 0.05\text{ r/min}$ while the restraining force on the outer ring is measured.

4.2 Torque is determined by multiplying the restraining force by the radius of the bearing housing. Both starting torque and torque after 60 min of rotation (running torque) are determined.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from ABMA (American Bearing Manufacturers Association), 330 N. Wabash Ave., Ste. 2000, Chicago, IL 60611.

*A Summary of Changes section appears at the end of this standard