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An American National Standard

## Standard Test Method for Low-Temperature Torque of Grease-Lubricated Wheel Bearings<sup>1</sup>

This standard is issued under the fixed designation D 4693; 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.

<sup>ε1</sup> NOTE—Warning information was moved editorially from notes to section text in September 2002.

### 1. Scope

1.1 This test method determines the extent to which a test grease retards the rotation of a specially-manufactured, spring-loaded, automotive-type wheel bearing assembly when subjected to low temperatures. Torque values, calculated from restraining-force determinations, are a measure of the viscous resistance of the grease. This test method was developed with greases giving torques of less than 35 N·m at -40°C.

1.2 The values stated in SI units are to be regarded as the standard. The values in parentheses 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. Referenced Documents

#### 2.1 ASTM Standards:

D 217 Test Methods for Cone Penetration of Lubricating Grease<sup>2</sup>

D 1403 Test Method for Cone Penetration of Lubricating Grease Using One-Quarter and One-Half Scale Cone Equipment<sup>2</sup>

D 3527 Test Method for Life Performance of Automotive Wheel Bearing Grease<sup>3</sup>

D 4175 Terminology Relating to Petroleum, Petroleum Products, and Lubricants<sup>3</sup>

E 1 Specification for ASTM Thermometers<sup>4</sup>

E 77 Test Method for Inspection and Verification of Thermometers<sup>4</sup>

E 220 Test Method for Calibration of Thermocouples by Comparison Techniques<sup>4</sup>

E 230 Specification and Temperature-Electromotive Force

(EMF) Tables for Standardized Thermocouples<sup>4</sup>

E 563 Practice for Preparation and Use of Freezing Point Reference Baths<sup>4</sup>

E 585/E 585M Specification for Compacted Mineral-Insulated, Metal-Sheathed, Base-Metal Thermocouple Cable<sup>4</sup>

E 608 Specification for Metal-Sheathed Base-Metal Thermocouples<sup>4</sup>

2.2 *Military Standard:*<sup>5</sup>

MIL-G-10924F Specification for Automotive and Artillery

2.3 *Other Standard:*

Anti-Friction Bearing Manufacturer Assoc. (AFBMA) Standard 19, 1974 (ANSI B. 3.19-1975)

### 3. Terminology

#### 3.1 Definitions:

3.1.1 *automotive wheel bearing grease, n*—a lubricating grease specifically formulated to lubricate automotive wheel bearings at relatively high grease temperatures and bearing speeds.

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3.1.2 *lubricant, n*—any material interposed between two surfaces that reduces the friction or wear between them.

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3.1.3 *lubricating grease, n*—a semi-fluid to solid product of a dispersion of a thickener in a liquid lubricant.

3.1.3.1 *Discussion*—The dispersion of the thickener forms a two-phase system and immobilizes the liquid lubricant by surface tension and other physical forces. Other ingredients are commonly included to impart special properties. **D 217**

3.1.4 *thickener, n*—*in lubricating grease*, a substance composed of finely-divided, particles dispersed in a liquid lubricant to form the product's structure.

3.1.4.1 *Discussion*—The solid thickener can be fibers (such as various metallic soaps) or plates or spheres (such as certain non-soap thickeners) which are insoluble or, at the most, only very slightly soluble in the liquid lubricant. The general requirements are that the solid particles be extremely small,

<sup>1</sup> This test method is under the jurisdiction of Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.G0 on Lubricating Grease.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 05.01.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 05.02.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 14.03.

<sup>5</sup> Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.