Designation: D3340 – 07

Standard Test Method for Lithium and Sodium in Lubricating Greases by Flame Photometer[1]

This standard is issued under the fixed designation D3340; 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.

1. Scope*

1.1 This test method covers determination of the lithium and sodium content of lubricating greases by means of a flame photometer.

1.2 A multi-element analysis method for greases, which includes the measurement of lithium and sodium concentrations using inductively couple plasma-atomic emission spectroscopy (ICP-AES), is available in Test Method D7303.

1.3 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only. The preferred units are mass %.

1.4 *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:* [2]

D1193 Specification for Reagent Water

D6299 Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical Measurement System Performance

D6792 Practice for Quality System in Petroleum Products and Lubricants Testing Laboratories

D7303 Test Method for Determination of Metals in Lubricating Greases by Inductively Coupled Plasma Atomic Emission Spectrometry

3. Summary of Test Method

3.1 The sulfated ash of the grease is extracted with water and the lithium and sodium content of the resulting solution is determined by means of a suitable flame photometer.

4. Significance and Use

4.1 Lubricating greases can contain the lithium soap of hydroxy stearic acid or the sodium soap of various fatty acids as thickeners. The determination of total lithium or total sodium is a measure of the amount of thickener in the grease.

5. Apparatus

5.1 *Flame Photometer*, suitably equipped to determine lithium and sodium over a range from 0 to 15 mg/L lithium and from 0 to 5 mg/L sodium.

6. Reagents

6.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.[3] Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

6.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water as defined by Type II of Specification D1193.

6.3 *Lithium Sulfate, Stock Solution*—1.188 g of lithium sulfate dried to constant weight at 180°C (356°F), is dissolved in water and made up to 1 L. This will contain 150 mg/L lithium.

6.4 *Sodium Sulfate, Stock Solution*—0.1544 g of sodium sulfate, dried to constant weight at 105°C (221°F), is dissolved in water and made up to 1 L. This will contain 50 mg/L sodium.

6.5 *Sulfuric Acid (rel. den. 1.84)*—Concentrated sulfuric acid (H_2SO_4).

7. Sampling

7.1 A homogeneous sample shall be obtained to ensure quantitative analytical results.

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[1] This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.03 on Elemental Analysis.

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[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] *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For Suggestions on the testing of reagents not listed by the American Chemical Society, see *Annual Standards for Laboratory Chemicals,* BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary,* U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.

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