Designation: D7638 – 10

StandardTest Method for Determination of Fatty Acids and Esters in Glycerin[1]

This standard is issued under the fixed designation D7638; 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 provides the quantitative determination of the fatty acid and ester content in purified glycerin by the titrimetric method.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *This standard may involve hazardous materials, operations and equipment. 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.* Specific precautions are listed in Section 8.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1193 Specification for Reagent Water

D4725 Terminology for Engine Coolants and Related Fluids

2.2 *Other Standards:*

The United States Pharmacopoeia 31 Glycerin Monograph – Fatty Acids and Esters[3]

3. Terminology

3.1 *Definitions:*

3.1.1 *glycerin*—propane-1,2,3-Triol, $C_3H_5(OH)_3$ (also known as glycerine), 1,2,3-propanetriol, 1,2,3-trihydroxypropane, glyceritol, glycyl alcohol. CAS #56-81-5

3.1.2 *FA&E*—Fatty acid and Esters

3.1.3 For other definitions of terms used in this specification, refer to Terminology D4725.

4. Significance and Use

4.1 Any residual fatty acid and esters (FA&E) should be present only at very low levels in purified glycerine.

4.2 This procedure requires the addition of a measured volume of sodium hydroxide, in excess of the amount actually needed to react with FA&E in the glycerine sample. After boiling, the excess sodium hydroxide is back titrated with standardized hydrochloric acid. The quantity of the substance being titrated is calculated as the difference between the volumes of the sodium hydroxide solution originally added, corrected by means of a blank titration, and that was consumed by the titrant in the back titration.

NOTE 1—The standardized solutions for sodium hydroxide and hydrochloric acid are commercially available.

5. Apparatus

5.1 *Standard Type A Glassware.*

5.2 *Erlenmeyer flask*, 200 to 250 mL, alkali-resistant with a standard tapered 24/40 ground glass neck joint, or equivalent.

5.3 *Microburette* having a capacity of 5 mL, graduated to 0.02 mL and calibrated to meet the NIST specification. An automatic titrator with a minimum capacity of 5 mL can also be used.

5.4 *Pipette*, standard or automatic that can accurately deliver 5 ± 0.01 mL.

5.5 *Air reflux condenser* with standard taper ground glass joint which fits the Erlenmeyer flask in 5.1. Minimum length, 550 mm.

6. Purity of Reagents and Water

6.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society where such specifications are available. 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 indicated otherwise, references to water shall be understood to mean Type II reagent water as defined in Specification D1193.

[1] This test method is under the jurisdiction of ASTM Committee D15 on Engine Coolants and Related Fluids and is the direct responsibility of Subcommittee D15.93 on Research and Long Range Planning.

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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] Available from U.S. Pharmacopeia (USP), 12601 Twinbrook Pkwy., Rockville, MD 20852-1790, http://www.usp.org.