



Designation: D 2080 – 92 (Reapproved 1998)

Standard Test Method for Average Molecular Weight of Fatty Quaternary Ammonium Chlorides¹

This standard is issued under the fixed designation D 2080; 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 method was prepared jointly by the American Society for Testing and Materials and the American Oil Chemists' Society.

1. Scope

1.1 This test method covers the determination of the average molecular weight of a fatty quaternary ammonium chloride by converting to the acetate, titrating potentiometrically, and correcting for the nonquaternary components.

1.2 *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 1193 Specification for Reagent Water²
- D 2076 Test Methods for Acid Value and Amine Value of Fatty Quaternary Ammonium Chlorides³
- D 2077 Test Method for Ash in Fatty Quaternary Ammonium Chlorides³
- D 2079 Test Method for Nonvolatile Matter (Solids) in Fatty Quaternary Ammonium Chlorides³
- E 70 Test Method for pH of Aqueous Solutions With the Glass Electrode⁴

3. Apparatus

3.1 *Buret*, having a capacity of 25 mL.

3.2 *Glass Electrode pH Meter*, conforming to the requirements of Test Method E 70⁴ or similar potentiometric titrator, and carefully standardized in accordance with the manufacturer's instructions.

3.3 *Magnetic Stirrer*, with inert plastic-coated stirring bar.

4. Reagents

4.1 *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.⁵ 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.

4.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water conforming to Specification D 1193, Type II.

4.3 *Acetic Acid (Glacial)* (CH_3COOH).

4.4 *Acetic Anhydride* ($(\text{CH}_3\text{CO})_2\text{O}$).

4.5 *Chloroform* (CHCl_3).

4.6 *Mercuric Acetate Solution*—Dissolve 6 g of mercuric acetate [$\text{Hg}(\text{C}_2\text{H}_3\text{O}_2)_2$] in 100 mL of glacial acetic acid. Prepare fresh for each determination.

Caution—Mercury compounds are harmful and accumulate in the aquatic environment. Mixtures containing mercury compounds should not be flushed down a drain but disposed of as a hazardous waste.

4.7 *Perchloric Acid, Standard Solution (0.1 N)*:

4.7.1 Add 28.4 g of 70 to 72 % perchloric acid (HClO_4) to 1000 mL of glacial acetic acid in a 2-L beaker while stirring. Carefully add 46.6 g of acetic anhydride while stirring. Carefully pour the solution through a glass funnel into a 2-L volumetric flask and dilute to mark with glacial acetic acid. Mix the solution and allow to stand for 24 h before standardizing.

¹ This test method is under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.32 on Drying Oils.

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² *Annual Book of ASTM Standards*, Vol 11.01.

³ *Annual Book of ASTM Standards*, Vol 06.03.

⁴ *Annual Book of ASTM Standards*, Vol 15.05.

⁵ *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 *Analar 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.