Designation: D 1767 – 89 (Reapproved 1995)ε1

Standard Test Method for Ethylene Diamine Tetraacetate (EDTA) in Soaps or Synthetic Detergents[1]

This standard is issued under the fixed designation D 1767; 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.

ε[1] NOTE—Keywords were added editorially in February 1995.

1. Scope

1.1 This test method covers the determination of ethylene diamine tetraacetate (EDTA) in soaps and synthetic detergents. Throughout this test method EDTA represents the hydrated disodium salt containing 2 moles of H_2O. In the chemical literature this is frequently abbreviated to $Na_2H_2Y_4 \cdot 2H_2O$.

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.* Material Safety Data Sheets are available for reagents and materials. Review them for hazards prior to usage.

2. Referenced Documents

2.1 *ASTM Standards:*

D 1193 Specification for Reagent Water[2]

3. Purity of Reagents

3.1 *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.

3.2 Unless otherwise indicated, references to water shall be understood to mean reagent water conforming to Specification D 1193.

4. Reagents

4.1 *Copper Sulfate Solution (1 mL = 0.0037 g EDTA disodium salt)*—Dissolve 2.497 g of copper sulfate ($CuSO_4 \cdot 5H_2O$) in water and dilute to 1 L. The actual EDTA equivalent should be determined by the titration of a known weight of EDTA disodium salt.

4.2 *PAN Indicator Solution*—Dissolve 0.1 g of 1-(2 pyridylazo)-2-naphathol[4] in 100 mL of methyl alcohol.

5. Procedure

5.1 Weigh to the nearest 0.001 g a 3 to 5-g portion of the sample estimated to contain 1 % of EDTA disodium salt. Vary the amount of the sample used depending upon the actual amount of EDTA present. Weigh into a 250-mL beaker, dilute to approximately 75 mL with water, and adjust the pH to approximately 5.0 by the addition of acetic acid (Note 1). Add 4 drops of the PAN indicator solution. Titrate the sample with $CuSO_4$ solution to a transition in color from yellow to red.

NOTE 1—Removal of soap fatty acids by filtration through a wet filter paper prior to titration will sharpen the end point.

6. Calculation

6.1 Calculate the percentage of EDTA disodium salt in the sample as follows:

$$EDTA, \text{ weight } \% = (AB/C) \times 100 \quad (1)$$

where:

A = millilitres of $CuSO_4$ solution required for titration of the sample,

B = grams of EDTA disodium salt equivalent to 1 mL of the $CuSO_4$ solution, and

C = grams of sample used.

7. Precision and Bias

7.1 The following criteria should be used for judging the acceptability of results (95 % probability):

7.1.1 *Liquid Soap*—Duplicate results by the same operator should not be considered suspect unless they differ by more than ±0.01 %. The overall reproducibility is ±0.03 %.

[1] This test method is under the jurisdiction of ASTM Committee D-12 on Soaps and Other Detergents, and is the direct responsibility of D12.12 on Analysis of Soaps and Synthetic Detergents.

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

[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 *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmaceutical Convention, Inc. (USPC), Rockville, MD.

[4] Eastman Organic Chemical No. 7192 has been found satisfactory for this purpose.