Designation: D 3804 – 02

Standard Test Method for Iron in Paint Driers by EDTA Method[1]

This standard is issued under the fixed designation D 3804; 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 the titrimetric determination of iron in liquid iron driers soluble in isopropyl alcohol and utilizes the disodium salt of ethylenediaminetetraacetic acid dihydrate (EDTA).

1.2 This test method is limited to the determination of the iron content of a liquid drier that does not contain other drier elements. This method is not applicable to drier blends.

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 600 Specification for Liquid Paint Driers[2]

D 1193 Specification for Reagent Water[3]

E 180 Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial and Specialty Chemicals[4]

E 300 Practice for Sampling Industrial Chemicals[4]

3. Summary of Test Method

3.1 The liquid iron drier is diluted with isopropyl alcohol and the iron chelated with excess standard EDTA. The solution is buffered and the excess EDTA is titrated with standard zinc chloride solution to the Eriochrome Black T end point.

4. Significance and Use

4.1 This test method may be used to confirm the stated content of a liquid iron drier soluble in isopropyl alcohol and manufactured for use in the coatings industry. The content determines activity level.

5. Interferences

5.1 All cations that can be titrated with EDTA in alkaline media interfere and must not be present in the sample or must be masked.

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.[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.

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

6.3 *Ammonium Hydroxide* (1+3)—Add 10 mL of concentrated ammonium hydroxide (NH_4OH, sp gr 0.90) to 30 mL water.

6.4 *Buffer Solution*—Add 350 mL of concentrated ammonium hydroxide (NH_4OH) to 54 g of ammonium chloride (NH_4Cl) and dilute to 1 L with water.

6.5 *EDTA, Standard Solution* (0.01 *M*)—Weigh to 10 mg about 3.73 g of the disodium salt of ethylenediaminetetraacetic acid dihydrate (EDTA), dissolve in water, and dilute to approximately 1 L in a polyethylene or borosilicate glass bottle.

6.6 *Hydrochloric Acid* (1+3)—Add 3 mL of concentrated hydrochloric acid (HCl, sp gr 1.19) to 9 mL of water.

6.7 *Eriochrome Black-T Indicator*—Titrate 0.20 g of the concentrated dye with 100 g of NaCl and store in a tightly stoppered jar. This mixture remains stable for several years.

6.8 *Isopropyl Alcohol* (99.5 %).

6.9 *Zinc Chloride, Standard Solution* (0.01 *M*)—Weigh to 0.5 mg about 0.65 g of zinc (Note 1) onto a glazed paper.

[1] This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.21 on Chemical Analysis of Paints and Paint Materials.

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[2] *Annual Book of ASTM Standards*, Vol 06.04.

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

[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.