Designation: D 2375 – 85 (Reapproved 1999)

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

This standard is issued under the fixed designation D 2375; 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 a titrimetric determination of manganese in liquid paint driers that can be dissolved in a toluene-alcohol mixture and utilizes the disodium salt of ethylenediaminetetraacetic acid dihydrate (EDTA).

1.2 This test method is not applicable to drier blends.

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

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:*

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 Chemicals[4]

E 300 Practice for Sampling Industrial Chemicals[4]

3. Summary of Test Method

3.1 The liquid drier is dissolved in toluene and ethyl alcohol and treated with an excess of standard EDTA solution. The excess is titrated with standard zinc chloride solution using Eriochrome Black-T as the indicator.

4. Significance and Use

4.1 The amount of manganese drier used in oxidizing-type coatings significantly affects their drying properties. This test method may be used to confirm the stated manganese content of pure liquid manganese drier soluble in toluene-alcohol and manufactured for use by the coatings industry.

5. Apparatus

5.1 *Centrifuge*, capable of developing 1000 to 2000 g.

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 Chloride* (NH_4Cl).

6.4 *Ammonium Hydroxide* (sp gr 0.90)—Concentrated ammonium hydroxide (NH_4OH).

6.5 *l-Ascorbic Acid.*

6.6 *Buffer Solution*—Add 350 mL of concentrated NH_4-OH (sp gr 0.90) to 54 g of NH_4Cl and dilute to 1 L with water.

6.7 *Eriochrome Black-T Indicator*—Triturate 0.2 g of Eriochrome Black-T and 100 g of NaCl, and store the mixture in a tightly stoppered bottle. This mixture remains stable for several years.

6.8 *Ethyl Alcohol* (95 %), pure or denatured.

6.9 *EDTA, Standard Solution* (0.05 *M*)—Dissolve 18.62 g of EDTA in water and dilute to 1 L. Store in a polyethylene or borosilicate glass bottle.

6.10 *Hydrochloric Acid* (sp gr 1.19)—Concentrated (hydrochloric acid (HCl).

6.11 *Sodium Chloride* (NaCl).

6.12 *Toluene.*

6.13 *Zinc, Granular.*

6.14 *Zinc Chloride, Standard Solution* (0.05 *M*)—Weigh 3.2690 g of zinc to the nearest 0.5 mg and dissolve in 50 mL of dilute HCl (14 mL of concentrated HCl (sp gr 1.19) to 36 mL of water). Warm if necessary. Dilute the zinc chloride ($ZnCl_2$) solution to 1 L in a volumetric flask.

$$M_1 = 3.2690/65.37 \quad (1)$$

[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 D01.21 on Chemical Analysis of Paints and Paint Materials.

Current edition approved Nov. 29, 1985. Published January 1986. Originally published as D 2375 – 65 T. Last previous edition D 2375 – 79.

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

[3] *Annual Book of ASTM Standards*, Vols 06.01 and 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.