



Designation: D 2373 – 85 (Reapproved 1999)

Standard Test Method for Determination of Cobalt in Paint Driers by EDTA Method¹

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1. Scope

1.1 This test method covers a titrimetric determination of cobalt in liquid paint driers that can be dissolved in glacial acetic acid and utilizes the disodium salt of ethylenediamine-tetraacetic acid dihydrate (EDTA).

1.2 This test method is not applicable to drier blends. If driers other than cobalt are present, they may interfere by reacting with EDTA under the conditions used for analysis.

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 Driers²

D 1193 Specification for Reagent Water³

E 180 Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial Chemicals⁴

E 300 Practice for Sampling Industrial Chemicals⁴

3. Summary of Test Method

3.1 The liquid drier is dissolved in glacial acetic acid, diluted with isopropyl alcohol and water, and treated with an excess of standard EDTA solution. The excess is titrated with standard cupric sulfate solution using PAN as the metal indicator.

4. Significance and Use

4.1 The amount of cobalt drier used in oxidizing-type coatings significantly affects their drying properties. This test method may be used to confirm the stated cobalt content of a

pure liquid cobalt drier soluble in glacial acetic acid 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 *Buffer Solution (pH 10.0)*—Dissolve 67.5 g of NH_4Cl in water, add 570 mL of concentrated NH_4OH (*sp gr 0.90*), and dilute to 1 L.

6.6 *Cupric Sulfate, Standard Solution (0.05 M)*—Dissolve 12.5 g of cupric sulfate pentahydrate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) in water and dilute to 1 L.

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

6.8 *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.

6.9 *Glacial Acetic Acid* (*sp gr 1.06*).

6.10 *Isopropyl Alcohol, 99.5%*.

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.

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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.