



Designation: D3989 – 01 (Reapproved 2012)

Standard Test Method for Total Rare Earth Metals in Paint Driers by EDTA Method¹

This standard is issued under the fixed designation D3989; 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 rare earth metals in liquid rare earth metal driers and utilizes the disodium salt of ethylenediaminetetraacetic acid dihydrate (EDTA).

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

1.3 This test method has been tested in concentrations of 6 % cerium and 6 % rare earth metals, but there is no reason to believe that it is not suitable for higher or lower drier metal concentrations provided specimen size is adjusted accordingly.

1.4 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.5 *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:²

D600 Specification for Liquid Paint Driers

D1193 Specification for Reagent Water

E180 Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial and Specialty Chemicals (Withdrawn 2009)³

E300 Practice for Sampling Industrial Chemicals

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 For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

3. Summary of Test Method

3.1 A diluted solution of the drier is complexed with an excess of EDTA, the pH adjusted to 5.0, and then titrated with zinc chloride solution to a xylenol orange end point.

4. Significance and Use

4.1 This test method may be used to confirm the stated content of a pure, liquid rare earth metal drier manufactured for use in the coatings industry.

5. Interferences

5.1 Calcium does not interfere at low pH.

5.2 All other cations that can be titrated with EDTA in acidic media will interfere and must not be present in the drier.

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.⁴ 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, reference to water shall be understood to mean reagent water conforming to Type II of Specification **D1193**.

6.3 *Ammonium Chloride—Ammonium Hydroxide Buffer Solution*—Add 350 mL of concentrated ammonium hydroxide (NH₄OH) to 54 g of ammonium chloride (NH₄Cl), and dilute to 1 L with water.

6.4 *Ammonium Hydroxide* (NH₄OH), (1+1).

6.5 *Ascorbic Acid*.

6.6 *Eriochrome Black T Indicator*—Mix and grind thoroughly in a mortar a mixture of 0.2 g of Eriochrome Black T

⁴ *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.