



Designation: D 284 – 88 (Reapproved 1999)

AMERICAN SOCIETY FOR TESTING AND MATERIALS
100 Barr Harbor Dr., West Conshohocken, PA 19428
Reprinted from the Annual Book of ASTM Standards. Copyright ASTM

Standard Test Methods for Chemical Analysis of Mercuric Oxide Pigment¹

This standard is issued under the fixed designation D 284; 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 These test methods cover procedures for the chemical analysis of mercuric oxide pigment.

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.* A specific hazard statement is given in the Note 1 of 11.1.

2. Referenced Documents

2.1 ASTM Standards:

D 1193 Specification for Reagent Water²

D 1208 Test Methods for Common Properties of Certain Pigments³

3. Significance and Use

3.1 These test methods are intended as a quick and reliable procedure for measuring purity of mercuric oxide pigment to determine if it meets purity standards as agreed upon between the producer and the consumer.

4. Purity of Reagents and Materials

4.1 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.

4.2 Unless otherwise indicated, references to water shall be understood to mean reagent water conforming to Type II of Specification D 1193.

¹ These test methods are under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings, Materials, and Applications and are the direct responsibility of Subcommittee D 01.31 on Pigment Specifications.

Current edition approved Oct. 31, 1988. Published December 1988. Originally published as D 284 – 28 T. Last previous edition D 284 – 74 (1987) ϵ ¹.

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

³ *Annual Book of ASTM Standards*, Vol 06.03.

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.

5. Preparation of Sample

5.1 If the sample is large, mix it thoroughly before taking a representative portion. Grind the representative portion to a fine powder and thoroughly mix before taking portions for analysis. Keep the sample in a stoppered glass bottle.

6. Precision

6.1 Repeatability and reproducibility are believed to be well within the limits usually obtained on similar chemical test methods, but no actual figures on precision are available.

ALKALINITY OR ACIDITY

7. Procedure

7.1 Determine alkalinity or acidity in accordance with Test Methods D 1208.

FREE MERCURY

8. Procedure

8.1 Examine a representative specimen of the dry mercuric oxide under a microscope for the presence of free mercury.

TOTAL MERCURY

9. Reagents and Materials

9.1 *Ammonium Thiocyanate, Standard Solution* (1 mL = 0.012 g Hg)—Dissolve 9 g of ammonium thiocyanate (NH₄CNS) in water and dilute to 1 L. Standardize the solution against mercury, as follows: Weigh to 0.1 mg about 4.6 g of mercury, and dissolve it in 40 mL of warm HNO₃ (1+1). Dilute to 200 mL with water and add KMnO₄ solution (50 g/L) dropwise until the pink color persists for 5 min in order to ensure the absence of nitrous acid (HNO₂) and monovalent mercury. Add FeSO₄ solution (50 g/L) dropwise to destroy excess permanganate. Add 4 mL of ferric ammonium sulfate indicator solution, and titrate with the NH₄CNS solution.

9.2 Calculate the mercury equivalent M of the NH₄CNS solution, in grams per millilitre, as follows:

$$M = W_1/V_1$$

where:

W_1 = mercury used, g, and

V_1 = NH₄CNS solution required for titration, g.

9.3 *Ferric Ammonium Sulfate Indicator Solution*—Dissolve enough ferric ammonium sulfate (Fe₂(SO₄)₃·(NH₄)₂SO₄·24H