



Designation: ~~D1845 – 86 (Reapproved 2008)~~ D1845 – 86 (Reapproved 2014)

Standard Test Methods for Chemical Analysis of Strontium Chromate Pigment¹

This standard is issued under the fixed designation D1845; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

- 1.1 These test methods cover the chemical analysis of strontium chromate pigment.
- 1.2 The analytical procedures appear in the following order:

	Sections
Strontium by the Strontium Sulfate Method	7 to 10
Chromium by the Thiosulfate Method	11 to 14
Chloride Content	15
Sulfate Content	16
Moisture and Other Volatile Matter	17
Coarse Particles	18
Mass Color and Tinting Strength	19

- 1.3 This values stated in SI units are to be considered the standard. The values given in parentheses are for information only.

1.4 *This standard does not purport to address the safety concerns 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

[D185 Test Methods for Coarse Particles in Pigments](#)

[D280 Test Methods for Hygroscopic Moisture \(and Other Matter Volatile Under the Test Conditions\) in Pigments](#)

[D387 Test Method for Color and Strength of Chromatic Pigments with a Mechanical Muller](#)

[D444 Test Methods for Chemical Analysis of Zinc Yellow Pigment \(Zinc Chromate Yellow\)](#)

[D1193 Specification for Reagent Water](#)

3. Significance and Use

- 3.1 These test methods may be used to confirm the stated strontium oxide and chromium oxide content of strontium chromate.

4. Apparatus

- 4.1 *Gooch crucible.*
- 4.2 *Electric Furnace*, capable of 800°C.

5. Purity of Reagents

5.1 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

¹ These test methods are under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and are the direct responsibility of Subcommittee D01.31 on Pigment Specifications.

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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.

available.³ 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.

5.2 Unless otherwise indicated, references to water shall be understood to mean Type II of Specification **D1193**.

6. Preparation of Sample

6.1 Mix the sample thoroughly. Take a sufficient quantity for chemical analysis and pass it through a No. 325 (4- μ m) sieve.

STRONTIUM BY THE STRONTIUM SULFATE METHOD

7. Reagents

7.1 *Acetic Acid (glacial)*.

7.2 *Ammonium Hydroxide (1+3)*—Mix 1 volume of concentrated ammonium hydroxide (NH_4OH , sp gr 0.90) with 3 volumes of water.

7.3 *Ethyl Alcohol*, conforming to Formula No. 2B or No. 30 of the U.S. Bureau of Alcohol, Tobacco, and Firearms.

7.4 *Hydrochloric Acid (1+1)*—Mix equal volumes of concentrated hydrochloric acid (HCl , sp gr 1.19) and water.

7.5 *Sulfuric Acid (1+19)*—Mix 1 volume of concentrated sulfuric acid (H_2SO_4 , sp gr 1.84) with 19 volumes of water.

8. Procedure

8.1 Weigh to 0.1 mg about 0.5 g of the sample into a 400-mL beaker. Add 40 mL of HCl (1+1) and heat the solution to dissolve the pigment. Add 40 mL of ethyl alcohol until the chromium is reduced, as this is indicated by a dark coloration of the solution. Add to the solution 100 mL of water and sufficient NH_4OH (1+3) to form a slight persistent precipitate.

8.2 Add HCl dropwise until the precipitate just redissolves (**Note 1**). Heat the solution to just under boiling and add 20 mL of H_2SO_4 (1+19). Add 100 mL of ethyl alcohol and allow the precipitate to settle for several hours or overnight.

NOTE 1—For a cleaner precipitate, add HCl until a pH of 2.0 is reached, instead of adding HCl dropwise until the precipitate is just dissolved. Then add 25 mL of acetic acid to minimize the tendency of the sulfate to form a complex with trivalent chromium. Finally, heat the solution, and add H_2SO_4 (1+19).

8.3 Filter the precipitate through a Gooch crucible that has been previously dried to constant weight. Wash the precipitate several times with a solution of equal volumes of ethyl alcohol, water, and H_2SO_4 (1+19). Dry the crucible in an oven and then ignite for $\frac{1}{2}$ h at 800°C or until constant weight is attained (weight loss less than 0.1 mg). Cool and weigh the crucible.

9. Calculation

9.1 Calculate the percent of strontium oxide (SrO) as follows:

$$\text{SrO, \%} = [(P \times 0.56416) / S] \times 100$$

where:

P = SrSO_4 precipitate, g, and
 S = pigment specimen, g.

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 S = pigment specimen, g.

$$0.56416 = \frac{\text{molecular weight of SrO}}{\text{molecular weight of SrSO}_4} = \frac{103.63}{163.70}$$

10. Precision

10.1 *Within Laboratory*—The usual difference between duplicate runs performed by the same analyst is approximately 0.2 % of the SrO content of the pigment tested.

10.2 *Between Laboratories*—The average difference between two determinations performed by different analysts in different laboratories is approximately 0.5 % of the SrO content of the pigment tested.

³ *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.