



Standard Test Methods for Chemical Analysis of Phthalocyanine Blue and Green Pigments¹

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1. Scope

1.1 These test methods cover procedures for the qualitative chemical analysis of pigments known commercially as copper phthalocyanine blue and green.

1.2 The procedures appear in the following order:

	Section
Identification	5
Moisture and Other Volatile Matter	6
Detection of Basic Dye Derivatives	7
Detection of Other Organic Coloring Matter	8
Detection of Ultramarine Blue	9
Detection of Iron Blue or Chrome Green	10

1.3 *This standard does not purport to address 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 280 Test Methods for Hygroscopic Moisture (and Other Matter Volatile Under the Test Conditions) in Pigments²
- D 1193 Specification for Reagent Water³

3. Significance and Use

3.1 These test methods are suitable for determining if impurities are present and establishing that the required pigments are present. These test methods may be used for manufacturing and purchasing quality control.

4. Reagents

4.1 *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.

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

5. Identification

5.1 To about 0.05 g of the sample in a 50-mL beaker, add 30 mL of sulfuric acid (H₂SO₄, sp gr 1.84). Stir occasionally for 15 min, heating if necessary to accelerate the solution of the pigment. Formation of a dark greenish yellow solution indicates phthalocyanine blue and a dark reddish color indicates brominated green pigment. Pour the solution into 250 mL of water and stir. The phthalocyanine pigment should immediately precipitate as a flocculent mass.

5.2 Filter off the precipitate, washing once or twice with water. Scrape a small amount of the precipitate off the filter, place on a clean platinum wire moistened with hydrochloric acid (HCl), and subject it to the low flame of a bunsen burner. As the precipitate burns, a light blue-green flame should be clearly evident. This indicates organically combined copper.

NOTE 1—Characteristic spectrophotometric absorption spectra in the near infrared range (700 to 900 nm) are exhibited by dilute solutions of copper phthalocyanine pigments (2 to 50 mg/L) in H₂SO₄ (sp gr 1.84). The absorption maxima, being sharp and well-defined, may be used for positive qualitative identification of phthalocyanine pigments. Phthalocyanine green has maxima at approximately 820 nm and 860 nm for bromine-free types; for the chlorinated-brominated types, the maxima appear at approximately 830 to 840 nm and 875 to 885 nm.

6. Moisture and Other Volatile Matter

6.1 Determine moisture in accordance with Method A of Test Methods D 280.

7. Detection of Basic Dye Derivatives

7.1 Add to 1 g of the sample, 50 mL of a mixture of equal parts of ammonium hydroxide NH₄OH (sp gr 0.90) and

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.

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² *Annual Book of ASTM Standards*, Vol 06.03.

³ *Annual Book of ASTM Standards*, Vol 11.01.

⁴ “Reagent Chemicals, American Chemical Society Specifications,” Am. Chemical Soc., Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see “Reagent Chemicals and Standards,” by Joseph Rosin, D. Van Nostrand Co., Inc., New York, NY, and the “United States Pharmacopeia.”