



Standard Specification for Phthalocyanine Green Pigments¹

This standard is issued under the fixed designation D 3021; 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 specification covers chlorinated and chlorinated-brominated copper phthalocyanine green pigments in dry powder form, for use in paints, printing inks, and related products. A variety of commercial types are available to meet the requirements of different end uses.

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 281 Test Method for Oil Absorption of Pigments by Spatula Rub-Out³

D 387 Test Method for Color and Strength of Chromatic Pigments with a Mechanical Muller³

D 1135 Test Methods for Chemical Analysis of Blue Pigments²

3. Composition and Properties

3.1 The pigments shall consist of the product known commercially as phthalocyanine green, with or without phthalocyanine blue or other ingredients incorporated during manufacture to improve or alter the properties of the pigment, but free of any other coloring matter either organic or inorganic. The pigment shall conform to the following requirements:

Moisture and other volatile matter, max, %	3.0
Coloring matter other than phthalocyanines	none

3.2 *Mass Color and Character of Tint*—The mass color, and the character of the tint formed by mixture with a white pigment, and the strength, shall be within mutually agreed-upon limits of a standard acceptable to both the purchaser and the seller.

3.3 *Oil Absorption*—The oil absorption shall be between 90 and 110 % of that of a reference sample mutually agreed upon between the purchaser and the seller.

3.4 *Reaction in Identification Tests*—The pigment shall show the same reaction in identification tests (5.5-5.8) as a

reference sample mutually agreed upon between the purchaser and the seller.

4. Sampling

4.1 Two samples shall be taken at random from different packages from each lot, batch, day's pack, or other unit of production in a shipment. When no markings distinguishing between units of production appear, samples shall be taken from different packages in the ratio of two samples for each 4545 kg or (10 000 lb), except that for shipments of less than 1000 lb, two samples shall be taken. At the option of the purchaser, each sample may be tested or samples from the same production may be blended in equal quantities to form a composite sample.

5. Test Methods

5.1 Tests shall be conducted in accordance with the appropriate ASTM test methods. Test procedures not covered by ASTM test methods shall be mutually agreed upon between the purchaser and the seller.

5.2 *Moisture and Other Volatile Matter*—Method A of Test Methods D 280.

5.3 *Mass Color and Tinting Strength*—Test Method D 387.

5.4 *Oil Absorption*—Test Method D 281.

5.5 *Identification:*

5.5.1 To about 50 mg of the sample in a 50-mL beaker, add 30 mL of H₂SO₄ (sp gr 1.84). Stir occasionally for 15 min, heating if necessary. A dark greenish yellow to a dark reddish color forms, depending on the degree of bromination. Pour the solution into 250 mL of water and stir. The phthalocyanine green will immediately precipitate as a flocculent mass.

5.5.2 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 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, indicating 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 are so sharp and well defined that they may be used for positive qualitative identification of the various phthalocyanine pigments. Phthalocyanine green has maxima at approximately 820 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.

¹ This specification is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.31 on Pigment Specifications.

Current edition approved June 10, 2001. Published August 2001. Originally published as D 3021 – 72. Last previous edition D 3021 – 82 (1995)¹.

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

³ *Annual Book of ASTM Standards*, Vol 06.01.

5.6 *Basic Dye Derivatives*—Test Method D 1135.

5.7 *Other Organic Coloring Matter*—Test Method D 1135.

5.8 *Chrome Green and Iron Blue*—Test Method D 1135.

6. Keywords

6.1 chlorinated brominated copper phthalocyanine green; chlorinated copper phthalocyanine green; phthalocyanine green; pigment

The American Society for Testing and Materials takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).