



Designation: D 3021 – 01

## Standard Specification for Phthalocyanine Green Pigments<sup>1</sup>

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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

### 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 Pigments<sup>2</sup>
- D 281 Test Method for Oil Absorption of Pigments by Spatula Rub-Out<sup>3</sup>
- D 387 Test Method for Color and Strength of Chromatic Pigments with a Mechanical Muller<sup>3</sup>
- D 1135 Test Methods for Chemical Analysis of Blue Pigments<sup>2</sup>

### 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 H<sub>2</sub>SO<sub>4</sub> (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 H<sub>2</sub>SO<sub>4</sub> (sp gr 1.84). The absorption maxima are so sharp and well defined that they may be

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 06.03.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 06.01.