



Designation: **D126 – 87 (Reapproved 2012) D126 – 87 (Reapproved 2019)**

Standard Test Methods for Analysis of Yellow, Orange, and Green Pigments Containing Lead Chromate and Chromium Oxide Green¹

This standard is issued under the fixed designation D126; 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 procedures for the chemical analysis of yellow, orange, and green pigments containing lead chromate and chromium oxide green.

1.2 The analytical procedures appear in the following order:

	Sections
CHROME YELLOW, CHROME ORANGE, AND MOLYBDATE ORANGE	
Organic Colors and Lakes	7
Moisture and Other Volatile Matter	8
Matter Soluble in Water	9
Lead Chromate	10 and 11
Total Lead	12
Sulfate	13 and 14
Carbon Dioxide	15
Molybdenum	16 and 17
Extenders	18 – 22
Calculation of Substances Other than Insoluble Lead Compounds	23 and 24
PURE CHROME GREEN AND REDUCED CHROME GREEN	
Organic Colors and Lakes	25
Moisture and Other Volatile Matter	26
Matter Soluble in Water	27
Iron Blue	28
Lead Chromate	29 and 30
Barium Sulfate and Insoluble Siliceous Material	31
Total Lead	32
Sulfate	33
Calcium Oxide Soluble in Acid	34 and 35
Extenders	36
Calculation of Insoluble Lead Compounds	37
CHROMIUM OXIDE GREEN	
Organic Colors and Lakes	38
Moisture and Other Volatile Matter	39
Matter Soluble in Water	40
Total Chromium as Chromium Oxide	41

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* Specific hazard statements are given in **Note 3**.

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

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.

Current edition approved June 1, 2012 June 1, 2019. Published August 2012 June 2019. Originally approved in 1922. Last previous edition approved in 2006 2012 as D126 – 87 (2006) (2012). DOI: 10.1520/D0126-87R12.10.1520/D0126-87R19.

2. Referenced Documents

2.1 ASTM Standards:²

- D280** Test Methods for Hygroscopic Moisture (and Other Matter Volatile Under the Test Conditions) in Pigments
- D521** Test Methods for Chemical Analysis of Zinc Dust (Metallic Zinc Powder)
- D1013** Test Method for Determining Total Nitrogen in Resins and Plastics (Withdrawn 2007)³
- D1193** Specification for Reagent Water
- E11** Specification for Woven Wire Test Sieve Cloth and Test Sieves

3. Summary of Test Methods

3.1 *Chrome Yellow, Chrome Orange, and Molybdate Orange:*

3.1.1 Organic colors and lakes are determined qualitatively by boiling the sample in water, then ethyl alcohol, and finally chloroform.

3.1.2 Moisture and other volatile matter are determined in accordance with Test Method A of Test Methods **D280**.

3.1.3 Matter soluble in water is determined by boiling in water and filtering.

3.1.4 Lead chromate is determined by dissolving the sample in dilute HCl, filtering and titrating potentiometrically with FeSO₄ solution after addition of HClO₄.

3.1.5 Total lead is determined by precipitation as lead sulfide solution with H₂SO₄ and final precipitation as lead sulfate.

3.1.6 Sulfate is determined by dissolving the sample in acetic acid, neutralizing with sodium carbonate, plus addition of HCl to an aliquot followed by addition of BaCl₂ to precipitate as barium sulfate.

3.1.7 Carbon dioxide is determined by evolution.

3.1.8 Molybdenum is determined by precipitation as the sulfide, solution in HNO₃ and H₂SO₄, addition of NH₄OH and H₂SO₄. The solution is reduced in a Jones reductor, collected under Fe₂(SO₄)₃ solution and titrated with KMnO₄ solution.

3.1.9 Extenders are either:

3.1.9.1 Calcium carbonate, calcium sulfate, magnesium carbonate or;

(a) The compounds in **3.1.9.1** are determined qualitatively by precipitation with ammonium solution.

(b) If chromium is present, it is reduced and the lead salts dissolved in dissolving solution. Hydroxides and hydrous oxides are precipitated by addition of HCl and NH₄OH and filtered. CaC₂O₄ is precipitated with calcium oxalate solution and filtered, ashed and weighed as CaO. Alternatively, the precipitate is dissolved in H₂SO₄ and titrated with KMnO₄. Magnesium is determined on the filtrate from calcium determination by precipitation as the phosphate with ammonium phosphate solution.

3.2 *Chromium Oxide Green:*

3.2.1 Organic colors and lakes are determined qualitatively by boiling the sample in water, then ethyl alcohol, and finally chloroform.

3.2.2 Moisture and other volatile matter are determined in accordance with Test Method A of Test Methods **D280**.

3.2.3 Matter soluble in water is determined by boiling in water and filtering.

3.2.4 Total chromium as chromium oxide is determined by dissolving the sample in dilute HCl, filtering and titrating potentiometrically with FeSO₄ solution after addition of HClO₄.

4. Significance and Use

4.1 These test methods are for analysis designed as an aid in quality of yellow, orange, and green pigments containing lead chromate and chromium oxide green. Some sections may be applicable to analysis of these pigments when extracted from whole paints.

5. Purity of Reagents and Water

5.1 *Reagents*—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.

5.2 *Water*—Unless otherwise indicated, references to water for use in the preparation of reagents and in analytical procedures shall be understood to mean reagent water conforming to Type II of Specification **D1193**.

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.

³ The last approved version of this historical standard is referenced on www.astm.org.

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.