



Designation: ~~D1209-00~~ Designation: D 1209 – 05<sup>ε1</sup>

## Standard Test Method for Color of Clear Liquids (Platinum-Cobalt Scale)<sup>1</sup>

This standard is issued under the fixed designation D 1209; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval. ~~This standard has been approved for use by agencies of the Department of Defense.~~

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$\epsilon^1$  NOTE—Updated research report information in Footnote 11 editorially in September 2008.

### 1. Scope\*

1.1 This test method describes a procedure for the visual measurement of the color of essentially light colored liquids (Note 1). It is applicable only to materials in which the color-producing bodies present have light absorption characteristics nearly identical with those of the platinum-cobalt color standards used.

NOTE 1—A procedure for estimating color of darker liquids, described for soluble nitrocellulose base solutions, is given in Methods Guide D 365.

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

1.3 For purposes of determining conformance of an observed or a calculated value using this test method to relevant specifications, test result(s) shall be rounded off “to the nearest unit” in the last right-hand digit used in expressing the specification limit, in accordance with the rounding-off method of Practice E 29.

1.4 This standard does not purport to address all of 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. For specific hazard statements see Section 6.

~~1.3~~1.5 For specific hazard information, see the Material Safety Data Sheet.

### 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

D 156 Test Method for Saybolt Color of Petroleum Products (Saybolt Chromometer Method)

~~D 365 Test Methods~~ Guide for Soluble Nitrocellulose Base Solutions

D 1193 Specification for Reagent Water

~~D 1209 Test Method for Color of Clear Liquids (Platinum-Cobalt Scale)~~ E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E 202 Test Methods for Analysis of Ethylene Glycols and Propylene Glycols

E 346 Test Methods for Analysis of Methanol

### 3. Significance and Use

3.1 The property of color of a solvent varies in importance with the application for which it is intended, the amount of color that can be tolerated being dependent on the color characteristics of the material in which it is used. The paint, varnish, and lacquer solvents, or diluents commercially available on today's market normally have little or no color. The presence or absence of color in such material is an indication of the degree of refinement to which the solvent has been subjected or of the cleanliness of the shipping or storage container in which it is handled, or both.

~~3.2 For a number of years the term “water-white” was considered sufficient as a measurement of solvent color. Several expressions for defining “water-white” gradually appeared and it became evident that a more precise color standard was needed. This was accomplished in 1952 with the adoption of Test Method D1209 using the platinum-cobalt scale. This test method is similar to the description given in *Standard Methods for the Examination of Water and Waste Water* and is referred to by many~~

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D-01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.35 on Solvents, Plasticizers, and Chemical Intermediates.

Current edition approved May 10, 2000; 15, 2005. Published July 2000; May 2005. Originally published as D1209-52; approved in 1952. Last previous edition D1209-97; approved in 2000 as D 1209 – 00.

<sup>2</sup> 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*, Vol 05.01, volume information, refer to the standard's Document Summary page on the ASTM website.

\*A Summary of Changes section appears at the end of this standard.

as “APHA Color.” The preparation of these platinum-cobalt color standards was originally described by A. Hazen in the *American Chemical Journal* in which he assigned the number 5 (parts per ten thousand) to his platinum-cobalt stock solution. Subsequently, in their first edition (1905) of *Standard Methods for the Examination of Water*, the American Public Health Association, using exactly the same concentration of reagents, assigned the color designation 500 (parts per million) which is the same ratio. The parts per million nomenclature is not used since color is not referred directly to a weight relationship. It is therefore recommended that the incorrect term “Hazen Color” should not be used. Also, because it refers primarily to water, the term “APHA Color” is undesirable. The recommended nomenclature for referring to the color of organic liquids is “Platinum-Cobalt Color, Test Method D1209.”

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3.3 The petroleum industry uses the Saybolt colorimeter Test Method D 156 for measuring and defining the color of hydrocarbon solvents; however, this system of color measurement is not commonly employed outside of the petroleum industry. It has been reported by various sources that a Saybolt color of +25 is equivalent to 25 in the platinum-cobalt system or to colors produced by masses of potassium dichromate ranging between 4.8 and 5.6 mg dissolved in 1 L of distilled water. Because of the differences in the spectral characteristics of the several color systems being compared and the subjective manner in which the measurements are made, exact equivalencies are difficult to obtain.

## 4. Apparatus

4.1 *Spectrophotometer*, equipped for liquid samples and for measurements in the visible region.

NOTE 2—The spectrophotometer used must be clean and in first-class operating condition. The instrument should be calibrated in accordance with the instructions given in the Standards for Checking the Calibration of Spectrophotometers (200 to 1000 nm).<sup>5</sup>

4.2 *Spectrophotometer Cells*, matched having a 10-mm light path.

4.3 *Color Comparison Tubes*—Matched 100-mL, tall-form Nessler tubes, provided with ground-on, optically clear, glass caps. Tubes should be selected so that the height of the 100-mL graduation mark is 275 to 295 mm above the bottom of the tube.

4.4 *Color Comparator*—A color comparator constructed to permit visual comparison of light transmitted through tall-form, 100-mL Nessler tubes in the direction of their longitudinal axes. The comparator should be constructed so that white light is passed through or reflected off a white glass plate and directed with equal intensity through the tubes, and should be shielded so that no light enters the tubes from the side.<sup>6</sup>

## 5. Reagents

5.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 06.02: Standard Methods for the Examination of Water and Waste Water, M. Franson, Ed., American Public Health Assoc., 14th ed., 1975, p. 65.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 11.01.

<sup>4</sup> Hazen, A., “New Color Standard for Natural Waters,” *American Chemical Journal*, Vol XIV, 1892, p. 300–310.

<sup>5</sup> *Annual Book of ASTM Standards*, Vol 06.04.

<sup>5</sup> See NIST Letter Circular LC-1017.

<sup>6</sup> *Annual Book of ASTM Standards*, Vol 15.05.

<sup>6</sup> The sole source of supply of the unit known to the committee at this time is Scientific Glass and Instruments, Inc., P.O. Box 6, Houston, TX 77001. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,<sup>1</sup> which you may attend.

**TABLE 1 Absorbance Tolerance Limits For No. 500 Platinum-Cobalt Stock Solution**

Wavelength, nm	Absorbance
430	0.110 to 0.120
455	0.130 to 0.145
480	0.105 to 0.120
510	0.055 to 0.065