



Standard Test Method for Color of Petroleum Products by the Automatic Tristimulus Method¹

This standard is issued under the fixed designation D6045; 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 test method covers the automatic determination of color of a wide variety of petroleum products such as undyed motor and aviation gasoline, aviation turbine fuels, naphthas, kerosine, pharmaceutical white oils, diesel fuel oils, heating oils, and lubricating oils by the automatic tristimulus method. This test method correlates to Test Method **D156** and Test Method **D1500** as calculated by the instrumentation.

NOTE 1—With the appropriate sample handling, this test method would apply to petroleum waxes, but they were not used in the round robin, and the precision of this test method with regard to waxes is unknown.

1.2 This test method reports results in terms of Test Method **D156** or Test Method **D1500**.

1.3 This test method has a one-to-one correlation for the entire range of Test Method **D1500** ASTM Color and for the range from 0 to +30 for Test Method **D156** Saybolt color.

1.4 This test method does not apply to solid samples, petroleum products containing dye, and petroleum products having extreme fluorescence.

1.5 This test method does not apply to cloudy samples. Such samples shall be filtered so they are clear before measuring.

1.6 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*²

D156 Test Method for Saybolt Color of Petroleum Products (Saybolt Chromometer Method)

D1500 Test Method for ASTM Color of Petroleum Products (ASTM Color Scale)

¹ This practice is under the jurisdiction of ASTM Committee **D02** on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee **D02.05** on Properties of Fuels, Petroleum Coke and Carbon Material.

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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.

D2500 Test Method for Cloud Point of Petroleum Products
D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

E284 Terminology of Appearance

E308 Practice for Computing the Colors of Objects by Using the CIE System

2.2 *Energy Institute Standard:*

IP 17 Determination of Colour—Lovibond Tintometer³

3. Terminology

3.1 *Definitions:*

3.1.1 *ASTM color*—the name of an empirical scale of expressing the color of a petroleum liquid darker than Saybolt color based on a scale of 0.5 (lightest) to 8.0 Dil (darkest) and determined by Test Method **D1500**.

3.1.2 *CIE*—the abbreviation for the French title of the International Commission on Illumination, or Commission Internationale de l'Eclairage. **E284**

3.1.3 *CIE Standard Illuminant C*—Colorimetric illuminant, representing daylight with a correlated color temperature of 6774 K, defined by the CIE in terms of a relative spectral power distribution. **E284**

3.1.4 *CIE 1931 standard observer*—ideal colorimetric observer with color matching functions $x(\lambda)$, $y(\lambda)$, $z(\lambda)$ corresponding to a field of view subtending a 2° angle on the retina; commonly called the “2° Standard Observer.” **E284**

3.1.5 *Saybolt color*—the name of an empirical scale for expressing of the color of a clear petroleum liquid based on a scale of –16 (darkest) to +30 (lightest) and determined by Test Method **D156**.

3.1.6 *tristimulus values*—The amounts of three specified stimuli required to match a color.

3.1.6.1 *Discussion*—In the CIE system, they are assigned the symbols X, Y, and Z. **E284**

4. Summary of Test Method

4.1 The sample is poured into the glass sample container, and the container is placed into the light path of the automatic instrument. A transmittance measurement is performed in order to determine the CIE tristimulus values (under CIE Standard

³ *Methods for Analysis Testing*, available from Energy Institute, 61 New Cavendish St., London, WIG 7AR, U.K.

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