



Standard Test Method for Ultraviolet Absorbance and Absorptivity of Petroleum Products¹

This standard is issued under the fixed designation D2008; 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 measurement of the ultraviolet absorption of a variety of petroleum products. It covers the absorbance of liquids or the absorptivity of liquids and solids, or both, at wavelengths in the region from 220 to 400 nm of the spectrum.

1.2 The use of this test method implies that the conditions of measurement—wavelength, solvent (if any), sample path length, and sample concentration—are specified by reference to one of the examples of the application of this test method in the annexes or by a statement of other conditions of measurement.

1.3 Examples of the application of this test method are the determination of the absorbance of white mineral oil, the absorptivity of refined petroleum wax, and the absorptivity of USP petrolatum.

1.4 The values stated in SI units are to be regarded as the standard. The values stated in Fahrenheit, feet, and inches, indicated in parentheses, are for information only.

1.5 **Warning**—Mercury has been designated by EPA and many state agencies as a hazardous material that can cause central nervous system, kidney, and liver damage. Mercury, or its vapor, may be hazardous to health and corrosive to materials. Caution should be taken when handling mercury and mercury-containing products. See the applicable product Material Safety Data Sheet (MSDS) for details and EPA's website (<http://www.epa.gov/mercury/faq.htm>) for additional information. Users should be aware that selling mercury or mercury-containing products, or both, in your state may be prohibited by state law.

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. For specific warning statements, see 7.3.1, 7.3.3, and 13.4.*

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.04.0F on Absorption Spectroscopic Methods.

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2. Referenced Documents

2.1 ASTM Standards:²

D1193 Specification for Reagent Water

E131 Terminology Relating to Molecular Spectroscopy

E169 Practices for General Techniques of Ultraviolet-Visible Quantitative Analysis

E275 Practice for Describing and Measuring Performance of Ultraviolet and Visible Spectrophotometers

3. Terminology

3.1 Definitions of terms and symbols relating to absorption spectroscopy in this test method shall conform to Terminology E131. Terms of particular significance are the following:

3.2 Definitions:

3.2.1 *radiant energy, n*—energy transmitted as electromagnetic waves.

3.2.2 *radiant power, P, n*—the rate at which energy is transported in a beam of radiant energy.

3.2.3 *transmittance, T, n*—the molecular property of a substance that determines its transportability of radiant power, expressed by:

$$T = \frac{P}{P_o} \quad (1)$$

where:

P = the radiant power passing through the sample and

P_o = the radiant power incident upon the sample.

3.2.4 *absorbance, A, n*—the molecular property of a substance that determines its ability to take up radiant power, expressed by:

$$A = \log_{10}(1/T) = -\log_{10}T \quad (2)$$

where T is the transmittance as defined in 3.2.3.

3.2.4.1 *Discussion*—Absorbance expresses the excess absorption over that of a specified reference or standard. It is implied that compensation has been affected for reflectance losses, solvent absorption losses, and refractive effects, if present, and that attenuation by scattering is small compared with attenuation by absorption.

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.

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