



Designation: D1840 – 24

Standard Test Method for Naphthalene Hydrocarbons in Aviation Turbine Fuels by Ultraviolet Spectrophotometry¹

This standard is issued under the fixed designation D1840; 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 This test method covers the determination, by ultraviolet spectrophotometry, of the total concentration of naphthalene, acenaphthene, and alkylated derivatives of these hydrocarbons in jet fuels. This test method is designed to analyze fuels containing not more than 5 % of such components and having end points below 315 °C (600 °F). The range of concentrations used in the interlaboratory test programs which established the precision statements for this test method was 0.08 % to 5.6 % by volume. This test method determines the maximum amount of naphthalenes that could be present.

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 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* For specific warning statements, see 8.1 and 8.2.

1.4 *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.*

2. Referenced Documents

2.1 ASTM Standards:²

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:

3.1.1 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:

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

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

3.2 Definitions of Terms Specific to This Standard:

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

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

where:

T = transmittance as defined in 3.2.5.

3.2.1.1 *Discussion*—It may be necessary to correct the observed transmittance (indicated by the spectrophotometer) by compensating for reflectance losses, solvent absorption losses, or refraction effects.

3.2.2 *absorptivity, a, n*—the specific property of a substance to absorb radiant power per unit sample concentration and path length, expressed by

$$a = A/bc \quad (2)$$

where:

A = absorbance defined in 3.2.1,

b = sample cell path length, and

c = quantity of absorbing substance contained in a unit volume of solvent.

3.2.2.1 *Discussion*—Quantitative ultraviolet analyses are based upon the absorption law, known as Beer's law. The law

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

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. 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