



Standard Test Method for Evaluation of White Mineral Oils by Ultraviolet Absorption¹

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1. Scope

1.1 This test method describes a procedure for the examination and evaluation of NF and USP grade white mineral oils.

1.2 This test method is not applicable to oils containing additives soluble in dimethyl sulfoxide (DMSO) that exhibit fluorescence or fluorescence quenching properties.

1.3 The values in SI units are regarded as the standard. The values stated in mesh are for information only.

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 precautionary statements, see 7.1.1-7.1.3.

2. Referenced Documents

2.1 ASTM Standards:

D 1840 Test Method for Naphthalene Hydrocarbons in Aviation Turbine Fuels by Ultraviolet Spectrophotometry²

E 131 Terminology Relating to Molecular Spectroscopy³

E 275 Practice for Describing and Measuring Performance of Ultraviolet, Visible, and Near Infrared Spectrophotometers³

2.2 Other Standard:

U.S. Pharmacopeia USP XIII/National Formulary (NF XVIII)⁴

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms and symbols relating to absorption spectroscopy see Terminology E 131. 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*—the 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 logarithm to the base 10 of the reciprocal of the transmittance, T. In symbols:

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

where T is the transmittance as defined in 3.2.5.

3.2.2 *absorptivity, a, n*—the absorbance divided by the product of sample pathlength and concentration. In symbols:

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

where A is the absorbance as defined in 3.2.1, b is the sample pathlength as defined in 3.2.4, and c is the concentration as defined in 3.2.3.

3.2.3 *concentration, c, n*—the quantity of sample expressed in grams per litre.

3.2.4 *sample pathlength, b, n*—the distance in centimetres, measured in the direction of propagation of the beam of radiant energy, between the surfaces of the specimen on which the radiant energy is incident and the surface of the specimen from which it is emergent.

3.2.5 *transmittance, T, n*—the ratio of the radiant power transmitted by the mineral oil extract in its cell to the radiant power transmitted by the solvent control in its cell. Expressed by,

$$T = P_e/P_c \quad (3)$$

where P_e is the radiant power transmitted by the mineral oil extract and P_c is the radiant power transmitted by the solvent control.

4. Summary of Test Method

4.1 A sample of oil is extracted with dimethyl sulfoxide and the ultraviolet absorbance of the extract is determined in the range from 260 to 350 nm. The absorbance is compared with that of a naphthalene standard.

5. Significance and Use

5.1 The ultraviolet absorption of white mineral oils is used to determine their suitability for use in food, drug, and cosmetic applications.

¹ This test method is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.04 on Hydrocarbon Analysis.

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² *Annual Book of ASTM Standards*, Vol 05.01.

³ *Annual Book of ASTM Standards*, Vol 03.06.

⁴ © 1996–1998 The United States Pharmacopeial Convention, Inc., 12601 Twinbrook Parkway, Rockville, MD 20852. Library of Congress Catalog Card Number 83-640088.