



Standard Test Method for Density or Relative Density of Pure Liquid Chemicals¹

This standard is issued under the fixed designation D3505; 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.

^{ε1} NOTE—Editorial changes were made in Section 11.4 and Section 12 in April 2013.

1. Scope*

1.1 This test method describes a simplified procedure for the measurement of density or relative density of pure liquid chemicals for which accurate temperature expansion functions are known. It is restricted to liquids having vapor pressures not exceeding 79 993 Pascal (0.800 bar, 600 mm Hg (0.789 atm) at the equilibration temperature, and having viscosities not exceeding 15 cSt at 20°C.

1.2 Means are provided for reporting results in the following units:

Density g/cm³ at 20°C

Density g/mL at 20°C

Relative density 20°C/4°C

Relative density 15.56°C/15.56°C

NOTE 1—This test method is based on the old definition of 1 L = 1.000028 dm³ (1 mL = 1.000028 cm³). In 1964 the General Conference on Weights and Measures withdrew this definition of the litre and declared that the word “litre” was a special name for the cubic decimetre, thus making 1 mL = 1 cm³ exactly.

NOTE 2—An alternative method for determining relative density of pure liquid chemicals is Test Method D4052.

1.3 The following applies to all specified limits in this test method: for purposes of determining conformance with this test method, an observed value or a calculated value 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 E29.

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

1.5 *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 applica-*

bility of regulatory limitations prior to use. Specific hazard statements are given in 7.1.

2. Referenced Documents

2.1 ASTM Standards:²

D1193 Specification for Reagent Water

D1555 Test Method for Calculation of Volume and Weight of Industrial Aromatic Hydrocarbons and Cyclohexane

D3437 Practice for Sampling and Handling Liquid Cyclic Products

D4052 Test Method for Density, Relative Density, and API Gravity of Liquids by Digital Density Meter

D6809 Guide for Quality Control and Quality Assurance Procedures for Aromatic Hydrocarbons and Related Materials

E1 Specification for ASTM Liquid-in-Glass Thermometers

E12 Terminology Relating to Density and Specific Gravity of Solids, Liquids, and Gases (Withdrawn 1996)³

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

2.2 Other Document:

OSHA Regulations, 29 CFR paragraphs 1910.1000 and 1910.1200⁴

3. Terminology

3.1 Definitions:

3.1.1 *density, n*—the mass of material per unit volume at a given temperature called the “reference temperature.” Weight corrected to a standard acceleration of gravity and corrected for the buoyant effect of air is used to measure mass. This method specifies the use of a beam balance to determine weight so that

¹ This test method is under the jurisdiction of ASTM Committee D16 on Aromatic Hydrocarbons and Related Chemicals and is the direct responsibility of Subcommittee D16.04 on Instrumental Analysis.

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.