



Designation: D1555M – 22

Standard Test Method for Calculation of Volume and Weight of Industrial Aromatic Hydrocarbons and Cyclohexane [Metric]¹

This standard is issued under the fixed designation D1555M; 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 standard is for use in calculating the weight and volume of benzene, toluene, mixed xylenes, styrene, ortho-xylene, meta-xylene, para-xylene, cumene, ethylbenzene, 148.9 to 176.7 °C and 176.7 to 204.4 °C aromatic hydrocarbons, and cyclohexane. A method is given for calculating the volume at a given temperature from an observed volume at an observed temperature, t °C. Table 1 lists the density *in Vacuo* at 15 °F and 20 °C for chemicals used to develop the relationship. Densities (or weights) “*in vacuo*” represent the true density (or weight) if measured in a vacuum without the buoyancy effect of air acting on the liquid. It is representative of the actual amount of product present. Densities (or weights) “*in air*” represent what would be measured on a scale. The difference is on the order of 0.13 %. Modern densitometers measure density *in vacuo* and the ASTM recommends the use of *in vacuo* densities (or weights).

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

1.2.1 A complete inch-pound unit companion standard has been developed in Test Method D1555.

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.*

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.*

¹ This test method is under the jurisdiction of ASTM Committee D16 on Aromatic, Industrial, Specialty and Related Chemicals and is the direct responsibility of Subcommittee D16.01 on Benzene, Toluene, Xylenes, Cyclohexane and Their Derivatives.

Current edition approved Sept. 1, 2022. Published September 2022. Originally approved in 1993. Last previous edition approved in 2016 as D1555M– 16. DOI: 10.1520/D1555M-22.

2. Referenced Documents

2.1 ASTM Standards:²

D1217 Test Method for Density and Relative Density (Specific Gravity) of Liquids by Bingham Pycnometer

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

D3505 Test Method for Density or Relative Density of Pure Liquid Chemicals

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

2.2 Other Documents:

American Petroleum Society Research Project 44³

Patterson, J. B., and Morris, E. C., *Metrologia*, 31, 1994, pp. 277-288

TRC Thermodynamic Tables—Hydrocarbons, NSRDS-NIST 75-121, Supplement No. 121, April 30, 2001⁴

3. Significance and Use

3.1 This test method is suitable for use in calculating weights and volumes of the products outlined in Section 1. The information presented in this method can be used for determining quantities of the above-stated aromatic hydrocarbons in tanks, shipping containers, etc.

4. Basic Data

4.1 Densities of materials should be determined by measurement (see Section 7). Densities of pure materials at 60 °F may be estimated from densities furnished by NSRDS-NIST 75-121 (National Standard Reference Data Series—National Institute of Standards and Technology).

4.2 The VCF (Volume Correction Factor) equations provided below are derived from the Volume Correction implementation procedures presented in Method D1555.

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 “Selected Values of Properties of Hydrocarbons and Related Compounds,” prepared by American Petroleum Institute Research Project 44 at the Chemical Thermodynamics Center, Department of Chemistry, Texas A&M, College Station, TX.

⁴ Available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 1070, Gaithersburg, MD 20899-1070, <http://www.nist.gov>.

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