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.

Designation: D1657 – 12 (Reapproved 2017)

Manual of Petroleum Measurement Standards (MPMS), Chapter 9.2

Standard Test Method for Density or Relative Density of Light Hydrocarbons by Pressure Hydrometer[1]

This standard is issued under the fixed designation D1657; 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 determination of the density or relative density of light hydrocarbons including liquefied petroleum gases (LPG) having Reid vapor pressures exceeding 101.325 kPa (14.696 psi).

1.2 The prescribed apparatus should not be used for materials having vapor pressures higher than 1.4 MPa (200 psi) at the test temperature. This pressure limit is dictated by the type of equipment. Higher pressures can apply to other equipment designs.

1.3 The initial pressure hydrometer readings obtained are uncorrected hydrometer readings and not density measurements. Readings are measured on a hydrometer at either the reference temperature or at another convenient temperature, and readings are corrected for the meniscus effect, the thermal glass expansion effect, alternate calibration temperature effects and to the reference temperature by means of calculations and Adjunct to D1250 Guide for Petroleum Measurement Tables (API *MPMS* Chapter 11.1) or API *MPMS* Chapter 11.2.4 (GPA TP-27), as applicable.

1.4 Values determined as density or relative density can be converted to equivalent values in the other units or alternative reference temperatures by means of Interconversion Procedures API *MPMS* Chapter 11.5, or Adjunct to D1250 Guide for Petroleum Measurement Tables (API *MPMS* Chapter 11.1) or API *MPMS* Chapter 11.2.4 (GPA TP-27), as applicable.

1.5 The calculations required in Section 11 shall be applied to the initial pressure hydrometer reading with observations and results reported as required by Section 11 prior to use in a subsequent calculation procedure (measurement ticket calculation, meter factor calculation, or base prover volume determination).

1.6 Annex A1 contains a procedure for verifying or certifying the equipment for this test method.

1.7 The values in SI units are to be regarded as the standard. US Customary values shown in adjacent parentheses are for information only and may not be exactly equivalent. Both SI and customary units have been rounded so that they may not be exactly equivalent.

1.8 *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.*

1.9 *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]

D1250 Guide for Use of the Petroleum Measurement Tables

D1265 Practice for Sampling Liquefied Petroleum (LP) Gases, Manual Method

D1298 Test Method for Density, Relative Density, and API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method (API *MPMS* Chapter 9.1)

E1 Specification for ASTM Liquid-in-Glass Thermometers

[1] This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and the API Committee on Petroleum Measurement, and is the direct responsibility of Subcommittee D02.02 /COMQ, the joint ASTM-API Committee on Hydrocarbon Measurement for Custody Transfer (Joint ASTM-API). This test method has been approved by the sponsoring committees and accepted by the Cooperating Societies in accordance with established procedures.

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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.

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