



Designation: D2158 – 16a



Designation: 317/95(02)

Standard Test Method for Residues in Liquefied Petroleum (LP) Gases¹

This standard is issued under the fixed designation D2158; 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 extraneous materials weathering above 38 °C that are present in liquefied petroleum gases. The extraneous materials will generally be dissolved in the LPG, but may have phase-separated in some instances.

1.2 Liquefied petroleum gases that contain certain anti-icing additives can give erroneous results by this test method.

1.3 Although this test method has been used to verify cleanliness and lack of heavy contaminants in propane for many years, it might not be sensitive enough to protect some equipment from operational problems or increased maintenance. A more sensitive test, able to detect lower levels of dissolved contaminants, could be required for some applications.

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 applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[D96 Test Method for Water and Sediment in Crude Oil by Centrifuge Method \(Field Procedure\) \(Withdrawn 2000\)](#)³

[D1796 Test Method for Water and Sediment in Fuel Oils by](#)

[the Centrifuge Method \(Laboratory Procedure\)](#)

[D1835 Specification for Liquefied Petroleum \(LP\) Gases](#)

[E1137 Specification for Industrial Platinum Resistance Thermometers](#)

[E2251 Specification for Liquid-in-Glass ASTM Thermometers with Low-Hazard Precision Liquids](#)

[E2877 Guide for Digital Contact Thermometers](#)

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *oil stain observation, n*—the volume of solvent-residue mixture required to yield an oil stain or ring that persists for 2 min under specified conditions on absorbent paper.

3.1.2 *residue, n*—the volume, measured to the nearest 0.05 mL, of the residual material boiling above 38 °C resulting from the evaporation of 100 mL of sample under the specified conditions of this test method.

3.1.3 *solvent-residue mixture, n*—a mixture (solution) of 10 mL of solvent with any residue remaining in the centrifuge tube at the conclusion of the first step in this test method.

4. Summary of Test Method

4.1 A 100 mL sample of liquefied petroleum gas is weathered in a 100 mL centrifuge tube. The volume of residue remaining after heating the tube to 38 °C is measured and recorded.

4.2 To dissolve any residue, 10 mL of solvent is added to the centrifuge tube. Small, measured volumes of solvent-residue mixture are deposited on an absorbent paper in a specified manner. The appearance of the absorbent paper to which the residue solution has been added in measured increments is observed and recorded.

5. Significance and Use

5.1 Control over the residue content (required by Specification [D1835](#)) is of considerable importance in end-use applications of LPG. In liquid feed systems, residues can lead to troublesome deposits and, in vapor withdrawal systems, residues that are carried over can foul regulating equipment. Residues that remain in vapor-withdrawal systems will

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.H0](#) on Liquefied Petroleum Gas.

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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.

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

accumulate, can be corrosive, and will contaminate subsequent product. Water, particularly if alkaline, can cause failure of regulating equipment and corrosion of metals.

6. Interferences

6.1 Solid contaminants such as rust, scale or dirt can interfere with this test method, which is not intended for representative measurement of solid, undissolved contaminants. However, the presence of solids in the centrifuge tube should be reported.

7. Apparatus

7.1 *Centrifuge Tube*, 100 mL graduated, conforming to dimensions given in Fig. 1. The first 0.5 mL shall be graduated in 0.05 mL increments. The shape of the lower tip of the tube

is especially important. The taper shall be uniform and the bottom shall be rounded as shown in Fig. 1. Tubes shall be made of thoroughly annealed heat-resistant glass. Volumetric graduation tolerances, based on air-free water at 20 °C, are given in Table 1. Detailed requirements for centrifuge tubes appear in Test Methods D96 and D1796.

7.2 *Cooling Coil and Cooling Bath*, a minimum length of 6 m of 5 mm to 7 mm outside diameter copper tubing wound to a diameter of 63.5 mm ± 1.5 mm outside diameter, and assembled in a suitable cooling bath. (See Fig. 2 as an example.)

7.2.1 Mechanical refrigeration is permitted provided that the coolant temperature is below -43 °C. If dry ice is used, a non-glass dewar or vessel is recommended.

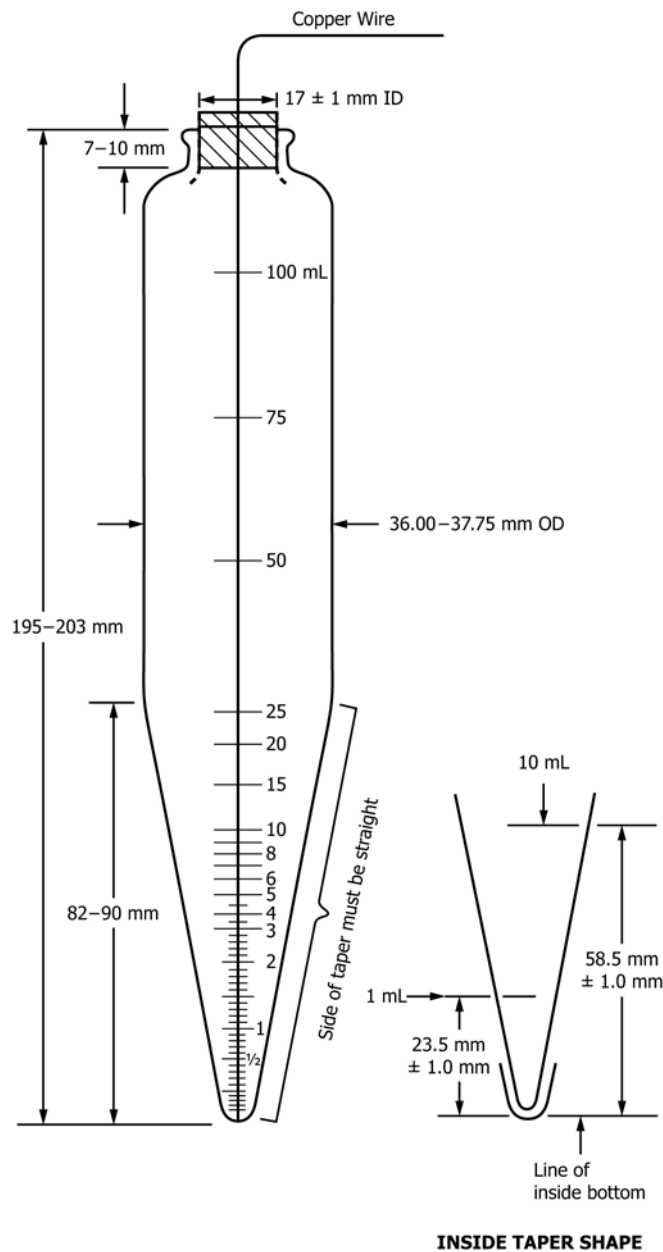


FIG. 1 Cone-Shaped Centrifuge Tube, 203 mm