



Standard Test Method for Determination of Residue Composition in Liquefied Petroleum Gas (LPG) Using Automated Thermal Desorption/ Gas Chromatography (ATD/GC)¹

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1. Scope

1.1 This test method covers the determination of residue in LPG by automated thermal desorption/gas chromatography (ATD/GC) using flame ionization detection (FID).

1.2 The quantitation of residue covers a component boiling point range from 69°C to 522°C, equivalent to the boiling points of C₆ through C₄₀ n-paraffins.

1.2.1 The boiling range covers possible LPG contaminants such as gasoline, diesel fuel, phthalates and compressor oil. Qualitative information on the nature of the residue can be obtained from this test method.

1.2.2 Materials insoluble in LPG and components which do not elute from the gas chromatograph or which have no response in a flame ionization detector are not determined.

1.2.3 The reporting limit (or limit of quantitation) for total residue is 6.7 µg/g.

1.2.4 The dynamic range of residue quantitation is 6.7 to 3300 µg/g.

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

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.*

2. Referenced Documents

2.1 ASTM Standards:²

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

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.

D1835 Specification for Liquefied Petroleum (LP) Gases

D2158 Test Method for Residues in Liquefied Petroleum (LP) Gases

D3700 Practice for Obtaining LPG Samples Using a Floating Piston Cylinder

D6299 Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical Measurement System Performance

E355 Practice for Gas Chromatography Terms and Relationships

2.2 *Environmental Protection Agency*:³

EPA Method TO-17 Determination of Volatile Organic Compounds in Ambient Air using Active Sampling onto Sorbent Tubes

3. Terminology

3.1 Definitions:

3.1.1 For the definitions of common chromatographic terms, refer to Practice **E355**.

3.1.2 *quality control sample, QC sample, n*—for use in quality assurance program to determine and monitor the precision and stability of a measurement system; a stable and homogenous material having physical or chemical properties, or both, similar to those of typical samples tested by the analytical measurement system. The material is properly stored to ensure sample integrity, and is available in sufficient quantity for repeated long-term testing. **D6299**

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *residue, n*—soluble contaminants in LPG with boiling points from 69°C to 522°C, covering the boiling point range of C₆ to C₄₀ n-paraffins.

3.2.2 *sorbent tube, n*—a tube that contains commercially available adsorbents whose composition is specific to retain the components of interest (residues).

3.2.3 *thermal desorber, n*—a sample introduction technique used in gas chromatography in which residue adsorbed on an adsorbent material is desorbed into a gas chromatograph.

³ Available from United States Environmental Protection Agency (EPA), Ariel Rios Bldg., 1200 Pennsylvania Ave., NW, Washington, DC 20460, <http://www.epa.gov>.