



Designation: D2420 – 12a

Standard Test Method for Hydrogen Sulfide in Liquefied Petroleum (LP) Gases (Lead Acetate Method)¹

This standard is issued under the fixed designation D2420; 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 method² covers the detection of hydrogen sulfide in liquefied petroleum (LP) gases. The sensitivity of the test is about 4 mg/m³ (0.15 to 0.2 grain of hydrogen sulfide per 100 ft³) of gas.

1.2 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*³

D1193 Specification for Reagent Water

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

D1835 Specification for Liquefied Petroleum (LP) Gases

2.2 *GPA Standard:*⁴

GPA 2140 Liquefied Petroleum Gas Specifications and Test Methods

3. Summary of Test Method

3.1 Vaporized LP gas is passed over moist lead acetate paper under controlled conditions. Hydrogen sulfide reacts with lead acetate to form lead sulfide which produces a coloration on the

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.H0 on Liquefied Petroleum Gas.

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² This test method is based on Edwards, J. D., and McBride, R. S., "Lead Acetate Test for Hydrogen Sulphide in Gas," *Technologic Papers T41*, National Institute for Standards and Technology, Aug. 9, 1914.

³ 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.

⁴ Available from Gas Processors Association (GPA), 6526 E. 60th St., Tulsa, OK 74145, www.gpaglobal.org.

paper varying from yellow to black, depending upon the amount of hydrogen sulfide present.

4. Significance and Use

4.1 Liquefied petroleum gases and their products of combustion must not be unduly corrosive to the materials with which they come in contact. The potential personnel exposure hazards of H₂S also make the detection and measurement of hydrogen sulfide important, even in low concentrations. In addition, in some cases the odor of the gases shall not be objectionable. (See Specification D1835 and GPA 2140.)

5. Interferences

5.1 Methyl mercaptan, if present, produces a transitory yellow stain on the lead acetate paper that will fade completely in less than 5 min.

5.2 Other sulfur compounds present in liquefied petroleum gas do not interfere with the test.

6. Apparatus and Materials

6.1 *Apparatus for Detecting Hydrogen Sulfide in Liquefied Petroleum Gas*, as shown in Fig. 1 or commercially available apparatus.

6.2 *Lead Acetate Test Paper*—Commercially available test paper is satisfactory. Alternatively, the test paper may be prepared by dipping strips of *smooth* filter paper in 5 % aqueous lead acetate solution and removing the excess solution with a clean blotter. The strips of paper shall be approximately 50 mm long and 10 mm wide and contain a 3 mm hole near one end so they will hang freely vertical in the test apparatus.

6.3 *Gas Flow Indicator*—Capable of measuring flow rates in the range of 2 to 3 L of gas per minute. A wet test meter rotameter and mass flow controller have been found to be suitable.

6.4 *Water*—Unless otherwise indicated, reference to water shall be understood to mean reagent water that meets the requirements of Type II or III of Specification D1193, or better.

6.5 *Tubing*—High-pressure connecting tubing to connect the test apparatus to the sample collection point. Internally clean, non-reactive and non-absorptive stainless steel material is recommended, but other materials that safely contain the

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