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Standard Test Method for Hydrogen Sulfide In Liquefied Petroleum (LP) Gases (Lead Acetate Method)[1]

This standard is issued under the fixed designation D 2420; 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.

ε[1] NOTE—Editorial corrections were made to paragraph 5.2 in November 1996.

1. Scope

1.1 This test method[2] covers the detection of hydrogen sulfide in liquefied petroleum (LP) gases. The sensitivity of the test is about 4 mg/m^3(0.15 to 0.2 grain of hydrogen sulfide per 100 ft^3) of gas. Methyl mercaptan, if present, produces a transitory yellow stain on the lead acetate paper which, however, fades completely in less than 5 min. Other sulfur compounds present in liquefied petroleum gas do not interfere with the test.

1.2 The values stated in SI units are to be regarded as the standard.

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:*

D 1835 Specification for Liquefied Petroleum (LP) Gases[3]

2.2 *Other Document:*

GPA Standard 2140[4]

3. Summary of Test Method

3.1 The vaporized gas is passed over moist lead acetate paper under controlled conditions. Hydrogen sulfide reacts with lead acetate to form lead sulfide and thus produces a coloration on the paper which will vary from yellow to black, depending upon the amount of hydrogen sulfide present.

4. Significance and Use

4.1 Liquefied petroleum gases and the products of combustion must not be unduly corrosive to the materials with which they come in contact and the measurement of hydrogen sulfide is important. In addition, in some cases the odor of the gases must not be objectionable. (See ASTM Specification D 1835 and GPA Standard 2140)

5. Apparatus and Materials

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

5.2 *Lead Acetate Test Paper*—Commercially available test paper is satisfactory. Alternatively, the test paper can be prepared by dipping strips of *smooth* filter paper in 5 % 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.

5.3 *Flow Indicator*—A wet test meter or a rotameter, which measures flow rates in the range of 2 to 3 L of gas per minute.

6. Sampling

6.1 **Caution**—Because of the chemical activity and physical adsorptive properties of hydrogen sulfide, it is highly desirable to connect the test apparatus directly to the sample source and perform the test on the spot, rather than transferring sample into a sample cylinder for testing in the laboratory. Experience has demonstrated that the hydrogen sulfide concentration in liquefied petroleum gas by use of scrupulously clean sample cylinders is depleted even though the cylinder is made of stainless steel. The exact opposite, an increase in sulfide concentration, has been found to occur when samples of liquefied petroleum gas containing no hydrogen sulfide are transferred into sample cylinders that have not been properly cleaned and which have been in use with samples containing hydrogen sulfide. This points out the fact that data obtained on samples tested for hydrogen sulfide in the laboratory are unreliable.

7. Procedure

7.1 Connect the test apparatus to the sample source by use of a minimum length of clean stainless steel tubing. Moderately flush the line and apparatus for about 1 min. Fill the water reservoir with warm water (50 to 70°C). By use of the needle valve, adjust the rate of gas flow to 2.3 ± 0.2 L/min.

[1] This test method is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricantsand is the direct responsibility of Subcommittee D02.H on Liquefied Petroleum Gas.

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[2] This 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, August 9, 1914.

[3] *Annual Book of ASTM Standards*, Vol 05.01.

[4] Available from Gas Processors Assn., 6526 E. 60th Street, Tulsa, OK 74145.