



Standard Test Method for Determination of Ethyl Mercaptan in LP-Gas Vapor¹

This standard is issued under the fixed designation D 5305; 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 a rapid and simple procedure using length of stain tubes for field measurement of ethyl mercaptan in the vapor phase of LP-gas systems. Although length-of-stain tubes are available to detect ethyl mercaptan concentrations in the range of 0.5 to 120 parts per million volume (ppmv), this test method is specifically applicable to systems containing 5 ppmv or more of ethyl mercaptan in LP-gas vapors.

NOTE 1—A chromatographic technique can be used for more precise, quantitative determination of ethyl mercaptan in LP-gas.

1.2 The values stated in SI (metric) 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 NFPA Standard:

NFPA 58 Standard for the Storage and Handling of Liquefied Petroleum Gases²

3. Summary of Test Method

3.1 Using a manually-operated vacuum pump, a sample of LP-gas is drawn through a detector tube made specifically for detection of mercaptans. The length of stain (color change) produced in the detector tube when exposed to a measured volume of sample is directly proportional to the amount of ethyl mercaptan present in the sample being tested. The length of stain produced in the detector tube is converted to concentration, in parts per million volume (ppmv), by comparison with a calibration scale provided by the manufacturer of the stain tubes.

4. Significance and Use

4.1 LP-gas is colorless and odorless, and not detectable by normal human senses. To provide an olfactory warning in the event of a leak, LP-gas intended for domestic or commercial use is intentionally odorized so as to be readily detectable well below flammable or suffocating concentration levels of LP-gas in air. (See Appendix X1.) The most common odorant for LP-gas is ethyl mercaptan. The field use of this test method will rapidly determine the presence and concentration of ethyl mercaptan in LP-gas vapor without the necessity for complex laboratory equipment.

5. Interferences

5.1 Detector tubes can be subject to interferences from materials other than the target substance. Methyl mercaptan will likely interfere with tubes designed to measure ethyl mercaptan. Because of different detection chemistry by different manufacturers, interferences can vary. Consult the manufacturer's instructions for specific interference information and observe any instructions given.

5.2 Propylene (propene) will cause an interfering (gray) discoloration with some tubes designed for ethyl mercaptan. LP-gas from natural gas sources usually does not contain propylene (propene). However, LP-gas produced in refinery operations often does contain propylene (propene). Detector tubes calibrated for *t*-butyl mercaptan eliminate this interference, and should be used if the presence of propylene (propene) is suspected. Some tubes designed for measurement of *t*-butyl mercaptan are calibrated in milligrams per cubic metre (mg/m^3) and should be converted to ppmv ethyl mercaptan as shown in Annex A1.

6. Apparatus

6.1 *Pump*—A manually-operated vacuum pump, capable of drawing 100 mL per stroke of sample through the detector tube with an accuracy of ± 2.0 mL.

6.2 *Detector Tubes*—Sealed tubes, made of glass with break-off tips sized to fit the orifice of the pump used (tubes and pumps from different manufacturers should not be interchanged). The tube used must be appropriate for the determination of ethyl mercaptan and must produce a distinct color change when exposed to a sample of LP-gas containing ethyl mercaptan. Any substance known to interfere must be listed in instructions accompanying the tubes (see 5.2). A calibration

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

Current edition approved Nov. 10, 1997. Published June 1998. Originally published as D 5305 - 92. Last previous edition D 5305 - 92.

² Available from National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269.