



Designation: D5305 – 18

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

This standard is issued under the fixed designation D5305; 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 describes 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 by volume, this test method is specifically applicable to systems containing 5 ppm by volume 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 units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *NFPA Standard:*²

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

3. Terminology

3.1 *Abbreviations:*

3.1.1 *EM*—ethyl mercaptan

3.1.2 *LP-Gas, LPG*—liquefied petroleum gas

3.1.3 *PTFE*—polytetrafluoroethylene

3.1.4 *TBM*—*t*-butyl mercaptan

4. Summary of Test Method

4.1 Using a manually-operated vacuum pump, a sample of LP-gas from the vapor space of an LP-gas cylinder, storage tank or other closed containment system is drawn through a detector tube made specifically for detection of ethyl mercaptan. 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 by volume, by comparison with a calibration scale provided by the manufacturer of the stain tube.

5. Significance and Use

5.1 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 fuel 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** for important explanations.) 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.

6. Interferences

6.1 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.

6.2 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

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 Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471, <http://www.nfpa.org>.

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