



Designation: D5504 – 20

Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence¹

This standard is issued under the fixed designation D5504; 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 is primarily for the determination of speciated volatile sulfur-containing compounds in high methane content gaseous fuels such as natural gas. It has been successfully applied to other types of gaseous samples, including air, digester, landfill, and refinery fuel gas. The detection range for sulfur compounds, reported as picograms sulfur, is 0.01 to 1000. This is equivalent to 0.01 to 1000 mg/m³, based upon the analysis of a 1 cc sample.

1.2 The range of this test method may be extended to higher concentration by dilution or by selection of a smaller sample loop.

NOTE 1— Dilution will reduce method precision.

1.3 This test method does not purport to identify all sulfur species in a sample. Only compounds that are eluted through the selected column under the chromatographic conditions chosen are determined. The detector response to sulfur is equimolar for all sulfur compounds within the scope (1.1) of this test method. Thus, unidentified compounds are determined with equal precision to that of identified substances. Total sulfur content is determined from the total of individually quantified components.

1.4 *Units*—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.

1.5 *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.*

1.6 *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 ASTM Standards:²

- D1072 Test Method for Total Sulfur in Fuel Gases by Combustion and Barium Chloride Titration
- D1945 Test Method for Analysis of Natural Gas by Gas Chromatography
- D3609 Practice for Calibration Techniques Using Permeation Tubes
- D4010 Specification for Waterless Hand Cleaner (Withdrawn 2000)³
- D4150 Terminology Relating to Gaseous Fuels
- D4468 Test Method for Total Sulfur in Gaseous Fuels by Hydrogenolysis and Rateometric Colorimetry
- D4884 Test Method for Strength of Sewn or Bonded Seams of Geotextiles
- E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods
- E594 Practice for Testing Flame Ionization Detectors Used in Gas or Supercritical Fluid Chromatography
- E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

3. Terminology

3.1 For definitions of general terms used in D03 Gaseous Fuels standards, refer to Terminology D4150.

4. Summary of Test Method

4.1 The analysis of gaseous sulfur compounds is challenging due to the reactivity of these substances. They are difficult to sample and analyze. Ideally, analysis is performed on-site to eliminate sample deterioration as a factor in analysis. Sampling

¹ This test method is under the jurisdiction of ASTM Committee D03 on Gaseous Fuels and is the direct responsibility of Subcommittee D03.05 on Determination of Special Constituents of Gaseous Fuels.

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.