



Standard Test Method for Determination of Elemental Sulfur in Natural Gas¹

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1. Scope

1.1 This test method is primarily for the determination of elemental sulfur in natural gas pipelines, but it may be applied to other gaseous fuel pipelines and applications provided the user has validated its suitability for use. The detection range for elemental sulfur, reported as sulfur, is 0.0018 to 30 mg/L. The results may also be reported in units of mg/kg or ppm.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with 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:²

D1072 Test Method for Total Sulfur in Fuel Gases by Combustion and Barium Chloride Titration

D1145 Test Method for Sampling Natural Gas (Withdrawn 1986)³

D1945 Test Method for Analysis of Natural Gas by Gas Chromatography

D3609 Practice for Calibration Techniques Using Permeation Tubes

D4084 Test Method for Analysis of Hydrogen Sulfide in Gaseous Fuels (Lead Acetate Reaction Rate Method)

D4150 Terminology Relating to Gaseous Fuels

D4468 Test Method for Total Sulfur in Gaseous Fuels by Hydrogenolysis and Rateometric Colorimetry

D4626 Practice for Calculation of Gas Chromatographic Response Factors

D5287 Practice for Automatic Sampling of Gaseous Fuels

D5504 Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence

D6228 Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Flame Photometric Detection

D7165 Practice for Gas Chromatograph Based On-line/At-line Analysis for Sulfur Content of Gaseous Fuels

D7166 Practice for Total Sulfur Analyzer Based On-line/At-line for Sulfur Content of Gaseous Fuels

D7551 Test Method for Determination of Total Volatile Sulfur in Gaseous Hydrocarbons and Liquefied Petroleum Gases and Natural Gas by Ultraviolet Fluorescence

D7607 Test Method for Analysis of Oxygen in Gaseous Fuels (Electrochemical Sensor Method)

E840 Practice for Using Flame Photometric Detectors in Gas Chromatography

2.2 ISO Documents

ISO 14532 Natural Gas—Vocabulary

3. Terminology

3.1 Definitions:

3.1.1 *compressed natural gas (CNG)*, *n*—natural gas that is typically pressurized to 24.8 MPa [3,600 psi]. CNG is primarily used as a vehicular fuel. **D4150-08 with modifications**

3.1.2 *elemental sulfur*, *n*—a pale yellow nonmetallic element occurring in nature and found as a particulate in diesel exhaust, natural gas, and other gaseous fuels. It exists in several free and combined allotropic forms.

3.1.3 *episulfide*, *n*—a class of compound that contains a saturated heterocyclic ring consisting of two carbon atoms and one sulfur atom. It is the sulfur analogue of an epoxide. They are also known as thiiranes, olefin sulfides, thioalkylene oxides, and thiacyclopropanes.

3.1.4 *liquefied natural gas (LNG)*, *n*—natural gas that has been liquefied, after processing, for storage or transportation purposes. **ISO 14532**

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.