



Designation: D7493 – 22

Standard Test Method for Online Measurement of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatograph and Electrochemical Detection¹

This standard is issued under the fixed designation D7493; 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 for on-line measurement of gas phase sulfur-containing compounds in gaseous fuels by gas chromatography (GC) and electrochemical (EC) detection. This test method is applicable to hydrogen sulfide, C1 to C4 mercaptans, sulfides, and tetrahydrothiophene (THT).

1.1.1 Carbonyl sulfide (COS) is not measured according to this test method.

1.1.2 The detection range for sulfur compounds is approximately from 0.1 to 100 ppm(v) (mL/m^3) or 0.1 to 100 mg/m^3 at 25 °C, 101.3 kPa. The detection range will vary depending on the sample injection volume, chromatographic peak separation, and the sensitivity of the specific EC detector.

1.2 This test method describes a GC-EC method using capillary GC columns and a specific detector for natural gas and other gaseous fuels composed of mainly light (C4 and smaller) hydrocarbons. Alternative GC columns including packed columns, detector designs, and instrument parameters may be used, provided that chromatographic separation, quality control, and measurement objectives needed to comply with user or regulator needs, or both, are achieved.

1.3 This test method does not intend to identify and measure all individual sulfur species and is mainly employed for monitoring naturally occurring reduced sulfur compounds commonly found in natural gas and fuel gases or employed as an odorant in these gases.

1.4 This test method is typically employed in repetitive or continuous on-line monitoring of sulfur components in natural gas and fuel gases using a single sulfur calibration standard. Guidance for producing calibration curves specific to particular analytes or enhanced quality control procedures can be found in Test Methods D5504, D5623, D6228, D6968, ISO 19739, or GPA 2199.

1.5 The test method can be used for measuring sulfur compounds listed in Table 1 in air or other gaseous matrices, provided that compounds that can interfere with the GC separation and electrochemical detection are not present.

1.6 This test method is written as a companion to Practices D5287, D7165 and D7166.

1.7 *Units*—The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.8 *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.*

1.9 *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

D3609 Practice for Calibration Techniques Using Permeation Tubes

D4150 Terminology Relating to Gaseous Fuels

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

D5623 Test Method for Sulfur Compounds in Light Petroleum Liquids by Gas Chromatography and Sulfur Selective Detection

¹ This test method is under the jurisdiction of ASTM Committee D03 on Gaseous Fuels and is the direct responsibility of Subcommittee D03.12 on On-Line/At-Line Analysis of Gaseous Fuels.

Current edition approved Nov. 1, 2022. Published April 2023. Originally approved in 2008. Last previous edition approved in 2018 as D7493 – 14 (2018). DOI: 10.1520/D7493-22.

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.