



Designation: D8488 – 22

Standard Test Method for Determination of Hydrogen Sulfide (H₂S) in Natural Gas by Tunable Diode Laser Spectroscopy (TDLAS)¹

This standard is issued under the fixed designation D8488; 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 the online determination of hydrogen sulfide (H₂S) in natural gas using tunable diode laser absorption spectroscopy (TDLAS) analyzers also known as a “TDL analyzers.” The particular wavelength for H₂S measurement varies by manufacturer, typically between 1000 and 10 000 nm with an individual laser having a tunable range of less than 10 nm. The H₂S concentration ranges can be anywhere from 0-5 ppm(v) to 0-90 % by volume.

1.2 *Units*—The values stated in SI units are to be regarded as the standard. No other units of measurement are included in this standard. TDLAS analyzers inherently output concentrations in unitless molar ratios such as ppm(v).

NOTE 1—Weight-per-volume units such as milligrams or grains of H₂S per cubic foot or cubic meter can be derived from ppm(v) at “standard conditions” or standard temperature and pressure.

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 *ASTM Standards:*²

D1945 Test Method for Analysis of Natural Gas by Gas Chromatography
D4150 Terminology Relating to Gaseous Fuels

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.

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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.

D5503 Practice for Natural Gas Sample-Handling and Conditioning Systems for Pipeline Instrumentation (Withdrawn 2017)³

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

D6968 Test Method for Simultaneous Measurement of Sulfur Compounds and Minor Hydrocarbons in Natural Gas and Gaseous Fuels by Gas Chromatography and Atomic Emission Detection

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

D7833 Test Method for Determination of Hydrocarbons and Non-Hydrocarbon Gases in Gaseous Mixtures by Gas Chromatography

3. Terminology

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

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *absorption spectroscopy, n*—refers to spectroscopic techniques that measure the absorption of electromagnetic radiation as a function of frequency or wavelength because of its interaction with a sample.

3.2.2 *adsorption, n*—adhesion of molecules to a solid surface forming a molecular or atomic film.

3.2.3 *chemometrics, n*—field of science relating measurements made on a chemical system or process to the state of the system via application of mathematical or statistical methods.

3.2.4 *desorption, n*—phenomenon whereby a substance is released from a surface (the opposite of adsorption).

3.2.5 *heat trace, n*—ribbon-shaped tape that uses electrical resistance or tubing carrying steam to generate heat.

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