



Designation: D6021 – 22

Standard Test Method for Measurement of Total Hydrogen Sulfide in Residual Fuels by Multiple Headspace Extraction and Sulfur Specific Detection¹

This standard is issued under the fixed designation D6021; 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 covers a method suitable for measuring the total amount of hydrogen sulfide (H₂S) in heavy distillates, heavy distillate/residual fuel blends, or residual fuels as defined in Specification [D396](#) Grade 4, 5 (Light), 5 (Heavy), and 6, when the H₂S concentration in the fuel is in the 0.01 µg/g (ppmw) to 100 µg/g (ppmw) range.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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.* For specific warning statements, see [7.5](#), [8.2](#), [9.2](#), [10.1.4](#), and [11.1](#).

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

[D396](#) Specification for Fuel Oils

[D1193](#) Specification for Reagent Water

[D2420](#) Test Method for Hydrogen Sulfide in Liquefied Petroleum (LP) Gases (Lead Acetate Method)

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 [D02.14](#) on Stability, Cleanliness and Compatibility of Liquid 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.

[D3609](#) Practice for Calibration Techniques Using Permeation Tubes

[D4057](#) Practice for Manual Sampling of Petroleum and Petroleum Products

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

[D4175](#) Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants

[D4323](#) Test Method for Hydrogen Sulfide in the Atmosphere by Rate of Change of Reflectance

[D5504](#) Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence

[D5705](#) Test Method for Measurement of Hydrogen Sulfide in the Vapor Phase Above Residual Fuel Oils

[D7621](#) Test Method for Determination of Hydrogen Sulfide in Fuel Oils by Rapid Liquid Phase Extraction

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this test method, refer to Terminology [D4175](#).

3.1.2 *heavy distillate, n*—a fuel produced from the distillation of crude oil which has a kinematic viscosity at 40 °C between 5.5 mm²/s and 24.0 mm²/s, inclusive.

3.1.3 *heavy distillate/residual fuel blend, n*—a blend of heavy distillate and residual fuel oil having a viscosity at 40 °C between 5.5 mm²/s and 24.0 mm²/s, inclusive.

3.1.4 *multiple headspace extraction, n*—a technique to determine the total concentration of a gas trapped in a liquid by analysis of successive gas extractions from the vapor space of a closed vessel containing a known amount of the sample.

3.1.5 *residual fuel oil, n*—any liquid or liquefiable petroleum product having a kinematic viscosity at 100 °C between 5.0 mm²/s and 50.0 mm²/s, inclusive, burned for the generation of heat in a furnace or firebox or for the generation of power in an engine.

4. Summary of Test Method

4.1 A representative sample of residual fuel oil is obtained in sufficient quantity to completely fill the sample container.

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