



Standard Test Method for Hydrogen In Petroleum Fractions¹

This standard is issued under the fixed designation D1018; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers the determination of hydrogen in petroleum fractions that can be burned completely without smoking in a wick lamp.

1.2 The values stated in SI units are to be regarded as 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

D1266 Test Method for Sulfur in Petroleum Products (Lamp Method)

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

D4177 Practice for Automatic Sampling of Petroleum and Petroleum Products

D6299 Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical Measurement System Performance

3. Summary of Test Method

3.1 The test specimen is burned from a cotton wick in an atmosphere of purified air. The water formed is collected from the combustion gases by a desiccant and weighed.

4. Significance and Use

4.1 Knowledge of the hydrogen content of petroleum products, particularly fuels, can be helpful in assessing performance characteristics.

4.2 This test method is suitable for most laboratory applications requiring the determination of hydrogen in liquid petroleum lubricants and products.

5. Apparatus

5.1 *Lamp*—A lamp (see **Note 1**) consisting of a 25-mL Erlenmeyer flask, a burner, and a burner cap conforming to the dimensions shown in **Fig. 1**. The burner consists of two concentric glass tubes, the external one having an arm, provided with standard-taper glass joints for connection with the flask, chimney, and burner cap. The burner has a small opening near its base to allow equalization of the pressure between the chimney and flask.

NOTE 1—The lamp and burner are constructed in accordance with Appendix A3 of Test Method D1266.

5.2 *Chimney*—A chimney (see **Note 2**) conforming to the dimensions shown in **Fig. 1**.

NOTE 2—The chimney is constructed in accordance with Appendix A3 of Test Method D1266, except that the delivery tube is cut off and a short length of glass tubing is sealed on at right angles to the chimney. The secondary air inlet is not used and is sealed off.

5.3 *Absorbers*—Two absorption bulbs³ suitable for collecting and weighing the water formed during combustion of the sample. The bulbs shall be filled in the following manner: a 1- to 2-cm layer of glass wool, a 5-cm layer of 6- to 10-mesh cp anhydrous calcium chloride, a 1-cm layer of glass wool, a 2-cm layer of phosphorus pentoxide, and glass wool to the top of the absorbers. One filling is sufficient for approximately 10 g of water.

5.4 *Cotton Wicking*—Clean, unused, uniform, two-strand twisted cotton wicking of good quality, weighing 0.5 to 0.6 g/m per strand.

5.5 *Air Purifying System*—The compressed air (**Warning**—Compressed gas under higher pressure) for the combustion shall be purified by passage through a scrubber containing sulfuric acid (relative density 1.84), a surge chamber packed with glass wool, and a drying tower filled with 10 to 20-mesh

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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 Turner-type absorption bulbs are satisfactory for this test method.