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An American National Standard



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Standard Test Method for Smoke Point of Kerosine and Aviation Turbine Fuel¹

This standard is issued under the fixed designation D 1322; 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 a procedure for determination of the smoke point of kerosine and aviation turbine fuel.

NOTE 1—There is good correlation between Luminometer number (Test Method D 1740) and smoke point which is represented in Appendix X1.

1.2 *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:

D 1740 Test Method for Luminometer Number of Aviation Turbine Fuels²

D 4057 Practice for Manual Sampling of Petroleum and Petroleum Products³

2.2 IP Standard:

IP 57/95 Smoke Point⁴

NOTE 2—Only IP 57/95 published in 1995⁴ is equivalent to D1322; earlier versions of IP 57 were not equivalent.

2.3 ISO Standard:⁵

ISO 3014:1993(E) Petroleum Products—Determination of the Smoke Point of Kerosine

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

¹ This test method is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.J0.07 on Combustion Characteristics.

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² *Annual Book of ASTM Standards*, Vol 05.01.

³ *Annual Book of ASTM Standards*, Vol 05.02.

⁴ Standard Methods for Analysis and Testing of Petroleum and Related Products, 1995, Institute of Petroleum, 61 New Cavendish St., London W1M 8AR, England.

⁵ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

3.1.1 *aviation turbine fuel*—refined petroleum distillate, generally used as a fuel for aviation gas turbines.

3.1.1.1 *Discussion*—Different grades are characterized by volatility ranges, freeze point, and by flash point.

3.1.2 *kerosine*—refined petroleum distillate, boiling between 140 and 300°C, generally used in lighting and heating applications.

3.1.3 *smoke point*—the maximum height, in millimetres, of a smokeless flame of fuel burned in a wick-fed lamp of specified design.

4. Summary of Test Method

4.1 The sample is burned in an enclosed wick-fed lamp that is calibrated daily against pure hydrocarbon blends of known smoke point. The maximum height of flame that can be achieved with the test fuel without smoking is determined to the nearest 0.5 mm.

5. Significance and Use

5.1 This test method provides an indication of the relative smoke producing properties of kerosines and aviation turbine fuels in a diffusion flame. The smoke point is related to the hydrocarbon type composition of such fuels. Generally the more aromatic the fuel the smokier the flame. A high smoke point indicates a fuel of low smoke producing tendency.

5.2 The smoke point (and Luminometer number with which it can be correlated) is quantitatively related to the potential radiant heat transfer from the combustion products of the fuel. Because radiant heat transfer exerts a strong influence on the metal temperature of combustor liners and other hot section parts of gas turbines, the smoke point provides a basis for correlation of fuel characteristics with the life of these components.

6. Apparatus

6.1 *Smoke Point Lamp*, as shown in Fig. 1 and described in detail in Annex A1.

6.2 *Wick*, of woven solid circular cotton of ordinary quality, having the following characteristics: