



Standard Specification for Kerosine¹

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

1. Scope*

1.1 This specification covers two grades of kerosine suitable for use in critical kerosine burner applications:

1.1.1 *No. 1-K*—A special low-sulfur grade kerosine suitable for use in nonflue-connected kerosine burner appliances and for use in wick-fed illuminating lamps.

1.1.2 *No. 2-K*—A regular grade kerosine suitable for use in flue-connected burner appliances and for use in wick-fed illuminating lamps.

1.2 This specification is intended for use in purchasing, as a reference for industry and governmental standardization, and as a source of technical information.

1.3 This specification, unless otherwise provided by agreement between the purchaser and the supplier, prescribes the required properties of kerosine at the time and place of custody transfer.

1.4 Nothing in this specification shall preclude observance of federal, state, or local regulations which can be more restrictive.

1.5 All values are stated in SI units and are regarded as the standard.

NOTE 1—The generation and dissipation of static electricity can create problems in the handling of kerosines. For more information on the subject, see Guide D 4865.

2. Referenced Documents

2.1 ASTM Standards:²

D 56 Test Method for Flash Point by Tag Closed Cup Tester

D 86 Test Method for Distillation of Petroleum Products at Atmospheric Pressure

D 130 Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test

D 156 Test Method for Saybolt Color of Petroleum Products (Saybolt Chromometer Method)

D 187 Test Method for Burning Quality of Kerosine

D 445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)

D 1266 Test Method for Sulfur in Petroleum Products (Lamp Method)

D 2386 Test Method for Freezing Point of Aviation Fuels

D 2622 Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry

D 2887 Test Method for Boiling Range Distribution of Petroleum Fractions by Gas Chromatography

D 3227 Test Method for (Thiol Mercaptan) Sulfur in Gasoline, Kerosine, Aviation Turbine, and Distillate Fuels (Potentiometric Method)

D 3828 Test Methods for Flash Point by Small Scale Closed Cup Tester

D 4294 Test Method for Sulfur in Petroleum and Petroleum Products by Energy-Dispersive X-Ray Fluorescence Spectrometry

D 4865 Guide for Generation and Dissipation of Static Electricity in Petroleum Fuel Systems

D 4952 Test Method for Qualitative Analysis for Active Sulfur Species in Fuels and Solvents (Doctor Test)

D 5453 Test Method for Determination of Total Sulfur in Light Hydrocarbons, Motor Fuels and Oils by Ultraviolet Fluorescence

D 5901 Test Method for Freezing Point of Aviation Fuels (Automatic Optical Method)

D 5972 Test Method for Freezing Point of Aviation Fuels (Automatic Phase Transition Method)

D 6469 Guide for Microbial Contamination in Fuels and Fuel Systems

2.2 Energy Institute Standard:

IP 10 Burning Test—24 Hour, Standard Methods for Analysis and Testing of Petroleum and Related Products, Vol 1³

2.3 Other Documents:

26 CFR, Part 48 Diesel Fuel Excise Tax; Dye, Color, and Concentration⁴

¹ This specification is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.E0 on Burner, Diesel, Non-Aviation Gas Turbine, and Marine 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.

³ Available from Energy Institute, 61 New Cavendish St., London, WIG 7AR, U.K.

⁴ Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

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

TABLE 1 Detailed Requirements for Kerosine

Property	ASTM Test Method	Limit ^A
Flash Point °C, min	D 56	38
Distillation (one of the following requirements shall be met):		
1. Physical Distillation	D 86	
Distillation temperature, °C		
10 % volume recovered, max		205
Final boiling point, max		300
2. Simulated Distillation ^B	D 2887	
Distillation temperature, °C		
10 % volume recovered, max		185
Final boiling point, max		340
Kinematic viscosity at 40°C, mm ² /s	D 445	
min		1.0
max		1.9
Sulfur, % mass	D 1266	
No. 1-K, max		0.04
No. 2-K, max		0.30
Mercaptan sulfur, % mass, max ^C	D 3227	0.003
Copper strip corrosion rating max, 3 h at 100°C	D 130	No. 3
Freezing point, °C, max	D 2386	- 30
Burning quality, min	D 187	pass (see 4.2)
Saybolt color, min	D 156	+ 16 ^D

^A To meet special operating conditions, modifications of individual limiting requirements, except sulfur, can be agreed upon among purchaser, seller and manufacturer.

^B Test Method **D 2887**, Simulated Distillation, was determined to be an acceptable alternative test method to Test Method **D 86**, Physical Distillation, based on RR:D02-1553. This report has been filed at ASTM International Headquarters and may be obtained by request.

^C The Mercaptan sulfur determination can be waived if the fuel is considered sweet by Test Method **D 4952**.

^D Appendixes **X1.1** and **X1.12** contain additional information on color, red dye, and potential application problems.

3. General Requirements

3.1 Kerosine shall be a refined petroleum distillate consisting of a homogeneous mixture of hydrocarbons essentially free of water, inorganic acidic or basic compounds, and excessive amounts of particulate contaminants. Additive usage can be established by mutual agreement of the supplier and the purchaser.

4. Detailed Requirements

4.1 The kerosine shall conform to the detailed requirements prescribed in **Table 1**.

4.2 The kerosine shall conform to the following requirements when tested for burning quality as specified:

4.2.1 *Time of Burning*—A minimum of 16 h continuous burning after the first weighing shall be required.

4.2.2 *Rate of Burning*—After the first weighing, the rate of burning shall be 18 to 26 g/h with the Institute of Petroleum (IP) Test Method, IP 10.

4.2.3 *Appearance of Chimney at End of Tests*—The chimney shall have no more than a light, white deposit.

4.2.4 *Flame Characteristics at End of Test*—At the end of test, the width of the flame shall not vary by more than 6 mm, and the height of the flame shall not have lowered by more than 5 mm from the respective measurements recorded at the start of the test.

NOTE 2—The significance of ASTM specifications for kerosine is discussed in **Appendix X1**.

5. Test Methods

5.1 The requirements enumerated in this specification shall be determined in accordance with the following ASTM methods except as noted.

5.1.1 *Flash Point*—Test Method **D 56**, except where other methods are prescribed by law. Test Method **D 3828** may be used as an alternate with the same limits. In case of a dispute, Test Method **D 56** shall be used as the referee method.

5.1.2 *Distillation*—Distillation shall be determined in accordance with Test Methods **D 86** or **D 2887**. In case of dispute, Test Method **D 86** shall be used as the referee method.⁵

5.1.3 *Viscosity*—Test Method **D 445**.

5.1.4 *Sulfur*—Test Method **D 1266**. Test Methods **D 2622**, **D 4294**, or **D 5453** can also be used. In case of a dispute, Test Method **D 1266** is the referee sulfur test method for this specification.

5.1.5 *Mercaptan Sulfur*—Test Method **D 3227**.

5.1.6 *Copper Strip Corrosion*—Test Method **D 130**, 3 h test at 100°C.

5.1.7 *Freezing Point*—Test Method **D 2386**. Automatic Test Methods **D 5901** and **D 5972** can be used as alternates with the same limits. In case of a dispute, Test Method **D 2386** shall be used as referee.

5.1.8 *Burning Quality*—Test Method **D 187**.

5.1.9 *Saybolt Color*—Test Method **D 156**.

6. Keywords

6.1 fuel oil; kerosine; petroleum and petroleum products

⁵ Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:D02-1553.