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An American National Standard

Standard Specification for Kerosine[1]

This standard is issued under the fixed designation D 3699; 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 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.

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

~~1.5~~

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.

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

1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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 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, Spark Ignition Engine Fuel, Diesel Engine Fuel, and Engine Oil by Ultraviolet Fluorescence

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

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[1] This specification is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.E0.01 on Burner Fuels.

Current edition approved ~~Nov.~~Sept. 1, ~~2007.~~2008. Published ~~December 2007.~~September 2008. Originally approved in 1978. Last previous edition approved in ~~2006~~2007 as D 3699–0~~6~~7.

[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.

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

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:*[3]
IP 10 Burning Test—24 Hour, Standard Methods for Analysis and Testing of Petroleum and Related Products, Vol 1
2.3 *Other Documents:*[4]
26 ~~CFR,~~CFR Part 48 Diesel Fuel Excise Tax; Dye, Color, and Concentration

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 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.

[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.

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):~~		
Distillation temperature, °C		
~~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~~
Mercaptan sulfur, % mass, max[B]	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
Burn Quality		
Time of Burning	D 187	Minimum 16 h continuous after first weighing
Rate of Burning	IP 10	18 to 26 g/h after first weighing
Chimney Appearance	D 187	Maximum light white deposit (at end of test)
Flame Characteristics	D 187	Maximum variance of flame width – 6 mm
(comparison of properties from beginning and end of test)		Maximum variance of flame height lowered – 5 mm
~~Saybolt color, min~~	~~D 156~~	~~+16[D]~~
Saybolt color, min	D 156	+16[C]

[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 D86, 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 D4952.
~~[D]~~ Appendixes X1.1 and X1.12 contain additional information on color, red dye, and potential application problems.