



Designation: D7566 – 22a

Standard Specification for Aviation Turbine Fuel Containing Synthesized Hydrocarbons¹

This standard is issued under the fixed designation D7566; 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 U.S. Department of Defense.

1. Scope*

1.1 This specification covers the manufacture of aviation turbine fuel that consists of conventional and synthetic blending components.

1.2 See **Appendix X2** for an expanded description of the procedure for the production and blending of synthetic blend components.

1.3 This specification applies only at the point of batch origination, as follows:

1.3.1 Aviation turbine fuel manufactured, certified, and released to all the requirements of Table 1 of this specification (D7566), meets the requirements of Specification **D1655** and shall be regarded as Specification **D1655** turbine fuel. Duplicate testing is not necessary; the same data may be used for both D7566 and **D1655** compliance. Once the fuel is released to this specification (D7566) the unique requirements of this specification are no longer applicable: any recertification shall be done in accordance with Table 1 of Specification **D1655**.

1.3.2 Any location at which blending of synthetic blending components specified in **Annex A1** (FT SPK), **Annex A2** (HEFA SPK), **Annex A3** (SIP), **Annex A4** synthesized paraffinic kerosine plus aromatics (SPK/A), **Annex A5** (ATJ), **Annex A6** catalytic hydrothermolysis jet (CHJ), or **Annex A7** (HC-HEFA SPK) with **D1655** fuel (which may on the whole or in part have originated as D7566 fuel) or with conventional blending components takes place shall be considered batch origination in which case all of the requirements of Table 1 of this specification (D7566) apply and shall be evaluated. Short form conformance test programs commonly used to ensure transportation quality are not sufficient. The fuel shall be regarded as **D1655** turbine fuel after certification and release as described in **1.3.1**.

¹ This specification is under the jurisdiction of ASTM Committee **D02** on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee **D02.J0.06** on Synthetic Aviation Turbine Fuels.

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1.3.3 Once a fuel is redesignated as **D1655** aviation turbine fuel, it can be handled in the same fashion as the equivalent refined **D1655** aviation turbine fuel.

1.4 This specification defines the minimum property requirements for aviation turbine fuel that contain synthesized hydrocarbons and lists acceptable additives for use in civil operated engines and aircrafts. Specification D7566 is directed at civil applications, and maintained as such, but may be adopted for military, government, or other specialized uses.

1.5 This specification can be used as a standard in describing the quality of aviation turbine fuel from production to the aircraft. However, this specification does not define the quality assurance testing and procedures necessary to ensure that fuel in the distribution system continues to comply with this specification after batch certification. Such procedures are defined elsewhere, for example in ICAO 9977, EI/JIG Standard 1530, JIG 1, JIG 2, API 1543, API 1595, and ATA-103, and IATA Guidance Material for Sustainable Aviation Fuel Management.

1.6 This specification does not include all fuels satisfactory for aviation turbine engines. Certain equipment or conditions of use may permit a wider, or require a narrower, range of characteristics than is shown by this specification.

1.7 While aviation turbine fuels defined by Table 1 of this specification can be used in applications other than aviation turbine engines, requirements for such other applications have not been considered in the development of this specification.

1.8 Synthetic blending components and blends of synthetic blending components with conventional petroleum-derived fuels in this specification have been evaluated and approved in accordance with the principles established in Practice **D4054**.

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

1.10 *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.*

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

1.11 *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

D56 Test Method for Flash Point by Tag Closed Cup Tester

D86 Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure

D93 Test Methods for Flash Point by Pensky-Martens Closed Cup Tester

D129 Test Method for Sulfur in Petroleum Products (General High Pressure Decomposition Device Method)

D130 Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test

D156 Test Method for Saybolt Color of Petroleum Products (Saybolt Chromometer Method)

D240 Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter

D323 Test Method for Vapor Pressure of Petroleum Products (Reid Method)

D381 Test Method for Gum Content in Fuels by Jet Evaporation

D445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)

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

D1298 Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method

D1319 Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption

D1322 Test Method for Smoke Point of Kerosene and Aviation Turbine Fuel

D1405 Test Method for Estimation of Net Heat of Combustion of Aviation Fuels

D1655 Specification for Aviation Turbine Fuels

D1840 Test Method for Naphthalene Hydrocarbons in Aviation Turbine Fuels by Ultraviolet Spectrophotometry

D2276 Test Method for Particulate Contaminant in Aviation Fuel by Line Sampling

D2386 Test Method for Freezing Point of Aviation Fuels

D2425 Test Method for Hydrocarbon Types in Middle Distillates by Mass Spectrometry

D2622 Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry

D2624 Test Methods for Electrical Conductivity of Aviation and Distillate Fuels

D2710 Test Method for Bromine Index of Petroleum Hydrocarbons by Electrometric Titration

D2887 Test Method for Boiling Range Distribution of Petroleum Fractions by Gas Chromatography

D2892 Test Method for Distillation of Crude Petroleum (15-Theoretical Plate Column)

D3227 Test Method for (Thiol Mercaptan) Sulfur in Gasoline, Kerosine, Aviation Turbine, and Distillate Fuels (Potentiometric Method)

D3240 Test Method for Undissolved Water In Aviation Turbine Fuels

D3241 Test Method for Thermal Oxidation Stability of Aviation Turbine Fuels

D3242 Test Method for Acidity in Aviation Turbine Fuel

D3338 Test Method for Estimation of Net Heat of Combustion of Aviation Fuels

D3343 Test Method for Estimation of Hydrogen Content of Aviation Fuels

D3701 Test Method for Hydrogen Content of Aviation Turbine Fuels by Low Resolution Nuclear Magnetic Resonance Spectrometry

D3828 Test Methods for Flash Point by Small Scale Closed Cup Tester

D3948 Test Method for Determining Water Separation Characteristics of Aviation Turbine Fuels by Portable Separator

D4052 Test Method for Density, Relative Density, and API Gravity of Liquids by Digital Density Meter

D4054 Practice for Evaluation of New Aviation Turbine Fuels and Fuel Additives

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

D4171 Specification for Fuel System Icing Inhibitors

D4175 Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants

D4176 Test Method for Free Water and Particulate Contamination in Distillate Fuels (Visual Inspection Procedures)

D4294 Test Method for Sulfur in Petroleum and Petroleum Products by Energy Dispersive X-ray Fluorescence Spectrometry

D4306 Practice for Aviation Fuel Sample Containers for Tests Affected by Trace Contamination

D4529 Test Method for Estimation of Net Heat of Combustion of Aviation Fuels

D4625 Test Method for Middle Distillate Fuel Storage Stability at 43 °C (110 °F)

D4629 Test Method for Trace Nitrogen in Liquid Hydrocarbons by Syringe/Inlet Oxidative Combustion and Chemiluminescence Detection

D4809 Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Precision Method)

D4865 Guide for Generation and Dissipation of Static Electricity in Petroleum Fuel Systems

D4952 Test Method for Qualitative Analysis for Active Sulfur Species in Fuels and Solvents (Doctor Test)

D4953 Test Method for Vapor Pressure of Gasoline and Gasoline-Oxygenate Blends (Dry Method)

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.

- D5001** Test Method for Measurement of Lubricity of Aviation Turbine Fuels by the Ball-on-Cylinder Lubricity Evaluator (BOCLE)
- D5006** Test Method for Measurement of Fuel System Icing Inhibitors (Ether Type) in Aviation Fuels
- D5190** Test Method for Vapor Pressure of Petroleum Products (Automatic Method) (Withdrawn 2012)³
- D5191** Test Method for Vapor Pressure of Petroleum Products and Liquid Fuels (Mini Method)
- D5291** Test Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Petroleum Products and Lubricants
- D5452** Test Method for Particulate Contamination in Aviation Fuels by Laboratory Filtration
- D5453** Test Method for Determination of Total Sulfur in Light Hydrocarbons, Spark Ignition Engine Fuel, Diesel Engine Fuel, and Engine Oil by Ultraviolet Fluorescence
- D5972** Test Method for Freezing Point of Aviation Fuels (Automatic Phase Transition Method)
- D6045** Test Method for Color of Petroleum Products by the Automatic Tristimulus Method
- D6304** Test Method for Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer Titration
- D6379** Test Method for Determination of Aromatic Hydrocarbon Types in Aviation Fuels and Petroleum Distillates—High Performance Liquid Chromatography Method with Refractive Index Detection
- D6469** Guide for Microbial Contamination in Fuels and Fuel Systems
- D6866** Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis
- D7042** Test Method for Dynamic Viscosity and Density of Liquids by Stabinger Viscometer (and the Calculation of Kinematic Viscosity)
- D7111** Test Method for Determination of Trace Elements in Middle Distillate Fuels by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES)
- D7153** Test Method for Freezing Point of Aviation Fuels (Automatic Laser Method)
- D7154** Test Method for Freezing Point of Aviation Fuels (Automatic Fiber Optical Method)
- D7236** Test Method for Flash Point by Small Scale Closed Cup Tester (Ramp Method)
- D7344** Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure (Mini Method)
- D7345** Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure (Micro Distillation Method)
- D7359** Test Method for Total Fluorine, Chlorine and Sulfur in Aromatic Hydrocarbons and Their Mixtures by Oxidative Pyrohydrolytic Combustion followed by Ion Chromatography Detection (Combustion Ion Chromatography-CIC)
- D7524** Test Method for Determination of Static Dissipater Additives (SDA) in Aviation Turbine Fuel and Middle Distillate Fuels—High Performance Liquid Chromatograph (HPLC) Method
- D7945** Test Method for Determination of Dynamic Viscosity and Derived Kinematic Viscosity of Liquids by Constant Pressure Viscometer
- D7974** Test Method for Determination of Farnesane, Saturated Hydrocarbons, and Hexahydrofarnesol Content of Synthesized Iso-Paraffins (SIP) Fuel for Blending with Jet Fuel by Gas Chromatography
- D8148** Test Method for Spectroscopic Determination of Haze in Fuels
- D8305** Test Method for The Determination of Total Aromatic Hydrocarbons and Total Polynuclear Aromatic Hydrocarbons in Aviation Turbine Fuels and other Kerosene Range Fuels by Supercritical Fluid Chromatography
- E29** Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
- 2.2 *Energy Institute Standards*:⁴
- EI 1550** Handbook on Equipment Used for the Maintenance and Delivery of Clean Aviation Fuel
- EI 1583** Laboratory Tests and Minimum Performance Levels for Aviation Fuel Filter Monitors
- EI/JIG 1530** Quality Assurance Requirements for the Manufacture, Storage and Distribution of Aviation Fuels to Airports
- IP 12** Determination of Specific Energy
- IP 16** Determination of the Freezing Point of Aviation Fuels—Manual Method
- IP 30** Detection of Mercaptans, Hydrogen Sulfide, Elemental Sulfur and Peroxides—Doctor Test Method
- IP 34** Determination of Flash Point—Pensky-Martens Closed Cup Method
- IP 69** Vapour Pressure-Reid Method (St-B-9)
- IP 71, Section 1** Petroleum Products—Transparent and Opaque Liquids—Determination of Kinematic Viscosity and Calculation of Dynamic Viscosity
- IP 123** Petroleum Products—Determination of Distillation Characteristics at Atmospheric Pressure
- IP 154** Petroleum Products—Corrosiveness to Copper—Copper Strip Test
- IP 156** Petroleum Products and Related Materials—Determination of Hydrocarbon Types—Fluorescent Indicator Adsorption Method
- IP 160** Crude Petroleum and Liquid Petroleum Products—Laboratory Determination of Density—Hydrometer Method
- IP 170** Determination of Flash Point—Abel Closed-Cup Method
- IP 216** Particulate Contaminant in Aviation Fuel
- IP 225** Determination of Copper in Light Petroleum Distillates—Spectrophotometric Method
- IP 227** Corrosiveness to Silver of Aviation Turbine Fuels—Silver Strip Method

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from Energy Institute, 61 New Cavendish St., London, WIG 7AR, U.K., <http://www.energyinst.org.uk>.