



Designation: D975 – 23a

Standard Specification for Diesel Fuel¹

This standard is issued under the fixed designation D975; 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 seven grades of diesel fuel suitable for various types of diesel engines. These grades are described as follows:

1.1.1 *Grade No. 1-D S15*—A special-purpose, light middle distillate fuel for use in diesel engine applications requiring a fuel with 15 ppm sulfur (maximum) and higher volatility than that provided by Grade No. 2-D S15 fuel.²

1.1.2 *Grade No. 1-D S500*—A special-purpose, light middle distillate fuel for use in diesel engine applications requiring a fuel with 500 ppm sulfur (maximum) and higher volatility than that provided by Grade No. 2-D S500 fuel.²

1.1.3 *Grade No. 1-D S5000*—A special-purpose, light middle distillate fuel for use in diesel engine applications requiring a fuel with 5000 ppm sulfur (maximum) and higher volatility than that provided by Grade No. 2-D S5000 fuels.

1.1.4 *Grade No. 2-D S15*—A general purpose, middle distillate fuel for use in diesel engine applications requiring a fuel with 15 ppm sulfur (maximum). It is especially suitable for use in applications with conditions of varying speed and load.²

1.1.5 *Grade No. 2-D S500*—A general-purpose, middle distillate fuel for use in diesel engine applications requiring a fuel with 500 ppm sulfur (maximum). It is especially suitable for use in applications with conditions of varying speed and load.²

1.1.6 *Grade No. 2-D S5000*—A general-purpose, middle distillate fuel for use in diesel engine applications requiring a fuel with 5000 ppm sulfur (maximum), especially in conditions of varying speed and load.

1.1.7 *Grade No. 4-D*—A heavy distillate fuel, or a blend of distillate and residual oil, for use in low- and medium-speed diesel engines in applications involving predominantly constant speed and load.

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.E0 on Burner, Diesel and Non-Aviation Gas Turbine Fuels.

Current edition approved Dec. 15, 2023. Published December 2023. Originally approved in 1948. Last previous edition approved in 2023 as D975 – 23. DOI: 10.1520/D0975-23A.

² This fuel complies with 40 CFR Part 1090 – Regulation of Fuels, Fuel Additives, and Regulated Blendstocks; effective January 1, 2021.

NOTE 1—A more detailed description of the grades of diesel fuels is given in X1.2.

NOTE 2—The Sxxx designation has been adopted to distinguish grades by sulfur rather than using words such as “Low Sulfur” as previously because the number of sulfur grades is growing and the word descriptions were thought to be not precise. S5000 grades correspond to the so-called “regular” sulfur grades, the previous No. 1-D and No. 2-D. S500 grades correspond to the previous “Low Sulfur” grades. S15 grades were not in the previous grade system and are commonly referred to as “Ultra-Low Sulfur” grades or ULSD.

1.2 This specification, unless otherwise provided by agreement between the purchaser and the supplier, prescribes the required properties of diesel fuels at the time and place of delivery.

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

NOTE 3—The generation and dissipation of static electricity can create problems in the handling of distillate diesel fuels. For more information on the subject, see Guide D4865.

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

1.4 *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:*³

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

³ 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

- D129** Test Method for Sulfur in Petroleum Products (General High Pressure Decomposition Device Method) (Withdrawn 2023)⁴
- D130** Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test
- D445** Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)
- D482** Test Method for Ash from Petroleum Products
- D524** Test Method for Ramsbottom Carbon Residue of Petroleum Products
- D613** Test Method for Cetane Number of Diesel Fuel Oil
- D1266** Test Method for Sulfur in Petroleum Products (Lamp Method)
- D1319** Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption
- D1552** Test Method for Sulfur in Petroleum Products by High Temperature Combustion and Infrared (IR) Detection or Thermal Conductivity Detection (TCD)
- D1796** Test Method for Water and Sediment in Fuel Oils by the Centrifuge Method (Laboratory Procedure)
- D2274** Test Method for Oxidation Stability of Distillate Fuel Oil (Accelerated Method)
- D2500** Test Method for Cloud Point of Petroleum Products and Liquid Fuels
- 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
- D2709** Test Method for Water and Sediment in Middle Distillate Fuels by Centrifuge
- D2880** Specification for Gas Turbine Fuel Oils
- D2887** Test Method for Boiling Range Distribution of Petroleum Fractions by Gas Chromatography
- D3120** Test Method for Trace Quantities of Sulfur in Light Liquid Petroleum Hydrocarbons by Oxidative Microcoulometry
- D3828** Test Methods for Flash Point by Small Scale Closed Cup Tester
- D4057** Practice for Manual Sampling of Petroleum and Petroleum Products
- D4176** Test Method for Free Water and Particulate Contamination in Distillate Fuels (Visual Inspection Procedures)
- D4177** Practice for Automatic Sampling of Petroleum and Petroleum Products
- 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
- D4308** Test Method for Electrical Conductivity of Liquid Hydrocarbons by Precision Meter
- D4539** Test Method for Filterability of Diesel Fuels by Low-Temperature Flow Test (LTFT)
- D4737** Test Method for Calculated Cetane Index by Four Variable Equation
- D4865** Guide for Generation and Dissipation of Static Electricity in Petroleum Fuel Systems
- D5186** Test Method for Determination of the Aromatic Content and Polynuclear Aromatic Content of Diesel Fuels By Supercritical Fluid Chromatography
- D5304** Test Method for Assessing Middle Distillate Fuel Storage Stability by Oxygen Overpressure
- D5453** Test Method for Determination of Total Sulfur in Light Hydrocarbons, Spark Ignition Engine Fuel, Diesel Engine Fuel, and Engine Oil by Ultraviolet Fluorescence
- D5771** Test Method for Cloud Point of Petroleum Products and Liquid Fuels (Optical Detection Stepped Cooling Method)
- D5772** Test Method for Cloud Point of Petroleum Products and Liquid Fuels (Linear Cooling Rate Method)
- D5773** Test Method for Cloud Point of Petroleum Products and Liquid Fuels (Constant Cooling Rate Method)
- D5842** Practice for Sampling and Handling of Fuels for Volatility Measurement
- D5854** Practice for Mixing and Handling of Liquid Samples of Petroleum and Petroleum Products
- D6078** Test Method for Evaluating Lubricity of Diesel Fuels by the Scuffing Load Ball-on-Cylinder Lubricity Evaluator (SLBOCLE) (Withdrawn 2021)⁴
- D6079** Test Method for Evaluating Lubricity of Diesel Fuels by the High-Frequency Reciprocating Rig (HFRR)
- D6217** Test Method for Particulate Contamination in Middle Distillate Fuels by Laboratory Filtration
- D6304** Test Method for Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer Titration
- D6371** Test Method for Cold Filter Plugging Point of Diesel and Heating Fuels
- D6468** Test Method for High Temperature Stability of Middle Distillate Fuels
- D6469** Guide for Microbial Contamination in Fuels and Fuel Systems
- D6751** Specification for Biodiesel Fuel Blendstock (B100) for Middle Distillate Fuels
- D6890** Test Method for Determination of Ignition Delay and Derived Cetane Number (DCN) of Diesel Fuel Oils by Combustion in a Constant Volume Chamber
- D6898** Test Method for Evaluating Diesel Fuel Lubricity by an Injection Pump Rig (Withdrawn 2021)⁴
- D7039** Test Method for Sulfur in Gasoline, Diesel Fuel, Jet Fuel, Kerosine, Biodiesel, Biodiesel Blends, and Gasoline-Ethanol Blends by Monochromatic Wavelength Dispersive X-ray Fluorescence Spectrometry
- D7042** Test Method for Dynamic Viscosity and Density of Liquids by Stabinger Viscometer (and the Calculation of Kinematic Viscosity)
- D7094** Test Method for Flash Point by Modified Continuously Closed Cup (MCCCFP) Tester
- D7220** Test Method for Sulfur in Automotive, Heating, and Jet Fuels by Monochromatic Energy Dispersive X-ray Fluorescence Spectrometry

⁴ The last approved version of this historical standard is referenced on www.astm.org.