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An American National Standard

Standard Test Method for Determining Filterability of Aviation Turbine Fuel[1]

This standard is issued under the fixed designation D6824; 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.

1. Scope*

1.1 This test method covers a procedure for determining the filterability of aviation turbine fuels.

NOTE 1—ASTM specification fuels falling within the scope of this test method are Specifications D1655 and D6615 and the military fuels covered in the military specifications listed in 2.2.

1.2 This test method is not applicable to fuels that contain undissolved water.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *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:*[2]

D1655 Specification for Aviation Turbine Fuels
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
D4860 Test Method for Free Water and Particulate Contamination in Middle Distillate Fuels (Clear and Bright Numerical Rating)
D5452 Test Method for Particulate Contamination in Aviation Fuels by Laboratory Filtration
D6300 Practice for Determination of Precision and Bias Data for Use in Test Methods for Petroleum Products and Lubricants
D6426 Test Method for Determining Filterability of Middle Distillate Fuel Oils
D6615 Specification for Jet B Wide-Cut Aviation Turbine Fuel
~~E1 Specification for ASTM Liquid-in-Glass Thermometers~~

2.2 *Military Standards:*[3]

MIL-DTL-5624 Turbine Fuel, Aviation, Grades JP-4, JP-5, and JP-5/JP-8 ST
MIL-DTL-25524 Turbine Fuel, Aviation, Thermally Stable
MIL-DTL-38219 Turbine Fuels, Low Volatility, JP-7
MIL-DTL-83133 Turbine Fuels, Aviation, Kerosine Types, NATO F-34 (JP-8), NATO F-35, and JP-8+100

~~2.3 *ASTM Adjuncts:*~~

~~ADJD6300—D2PP, Version 4.43, Determination of Precision and Bias Data for Use in Test Methods for Petroleum Products[4]~~

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 ~~*filterability*—~~*filterability, n*—a measure of the rapidity with which a standard filter medium is plugged by insoluble matter in fuel and ~~can be described in the following ways:~~may be described as a function of pressure or volume:

3.1.1.1 *filterability (by ~~pressure)~~—pressure), n*—the pressure drop across a filter medium when 300 mL of fuel is passed at a rate of 20 mL/min.

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[1] This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricantsand is the direct responsibility of Subcommittee D02.J0.01 on Jet Fuel Specifications.

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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 Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098.

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

3.1.1.2 *filterability (by ~~volume)—~~volume), n—*the volume of fuel passed when a pressure of 104 kPa (15 ~~psi) is reached. This method of report is used when less than 300 mL passes at that pressure, 104 kPa (15 psi).~~psig) is reached.

3.1.1.3 *Discussion—*

Filterability by volume is used when less than 300 mL passes the filter at a pressure up to 104 kPa (15 psig).

3.1.1.4 *filterability quality factor ~~(F-QF)—~~(F-QF), n—*a value that defines the filter plugging tendency of a fuel caused by ~~particulate. The value is calculated using the volume and pressure attained at the end of the test cycle. Depending on the outcome of the test, two different equations are applied.~~particulates.

3.1.1.5 *Discussion—*

~~Eq 1 is applied if the total sample was discharged prior to reaching the maximum pressure or Eq 2 if the maximum pressure was reached prior to discharging the entire sample. The equations proportion the results so that a continuous range of 0 to 100 is attained.~~The F-QF value is calculated ~~Eq 1 yields values from 50 to 100, whereas~~using the volume and pressure attained at the end of the test cycle, according to one of ~~Eq 2 yields values from 0 to 50. Higher values signify less~~two equations, depending on the outcome of the test. (See Section 10~~particulate that can plug a filter of a given pore size and porosity.~~, Calculations.)

~~*(1)* If the total sample, 300 mL, is discharged prior to reaching the maximum pressure, 104 kPa (15 psi), the F-QF is calculated by the following equation:~~

$$F - QF_{(300\ mL\ at\ P(F))} = [(15\ psi - P_{(F)})/15\ psi][50] + [50] \quad (1)$$

~~where:~~

~~$P_{(F)}$ = final pressure when the total sample, 300 mL, was discharged.~~

~~*(2)* If the total sample is not discharged prior to reaching the maximum pressure, 104 kPa (15 psi), the F-QF is calculated by the following equation:~~

$$F - QF_{(V(F))}\ at\ 15\ psi) = V_{(F)}/6 \quad (2)$$

~~where:~~

~~$V_{(F)}$ = final volume when the maximum pressure was reached.~~

~~3.1.1.5 *Discussion—*~~

~~The final volume ($V_{(F)}$) is divided by 6, since the maximum possible volume is 300 mL. By dividing by 6, the values for that test result are proportioned to fit the range from 0 to 50.~~

4. Summary of Test Method

4.1 A sample is passed at a constant rate (20 mL/min) through a standard porosity filter medium. The pressure drop across the filter and the volume of filtrate are monitored. The test is concluded either when the pressure drop across the filter exceeds 104 kPa (15 ~~psi)~~psig) or when 300 mL have passed through the filter.

4.2 Results are reported as either the volume that has passed through the filter when a pressure of 104 kPa (15 ~~psi)~~psig) has been reached or the pressure drop when 300 mL have passed through the filter.

4.3 Verification of the apparatus is required when there is a doubt of a test result, or when the apparatus has not been used for three months or more. It is not necessary to verify apparatus performance prior to each test.

5. Significance and Use

5.1 This test method is intended for use in the laboratory or field in evaluating aviation turbine fuel cleanliness.

5.2 A change in filtration performance after storage, pretreatment, or commingling can be indicative of changes in fuel condition.

5.3 Relative filterability of fuels may vary, depending on filter porosity and structure, and may not always correlate with results from this test method.

5.4 Causes of poor filterability in industrial/refinery filters include fuel degradation products, contaminants picked up during storage or transfer, incompatibility of commingled fuels, or interaction of the fuel with the filter media. Any of these could correlate with orifice or filter system plugging, or both.