



Designation: D8166 – 21a

Standard Test Method for Sizing and Counting Particulates in Middle Distillate Fuels and Biodiesel Blend (B6 to B20) Using Continuous Flow and Bottle Sampler Automatic Particle Condition Monitors¹

This standard is issued under the fixed designation D8166; 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 uses specific automatic particle condition monitors (PCMs) to count and measure the size of dispersed dirt particles, water droplets and other particulates, in middle distillate fuel, in the overall range from 4 μm to 70 μm and in the size bands $\geq 4 \mu\text{m}$, $\geq 6 \mu\text{m}$, $\geq 14 \mu\text{m}$, and $\geq 30 \mu\text{m}$.

1.2 This test method has interim repeatability precision only, see Section 14 for more information.

NOTE 1—ASTM specification fuels falling within the scope of this test method include Specifications: D975, D1655, D3699, D7467, MIL-DTL-83133, MIL-DTL-5624, and distillate grades of D396 and D2880.

NOTE 2—For the purposes of this test method, water droplets are counted as particles, and agglomerated particles are detected and counted as a single larger particle. Dirt includes microbial particulates. Although the projected area of a particle is measured, this is expressed as the diameter of a circle for the purposes of this test method. The detector is unable to distinguish between dirt and water particles.

NOTE 3—This test method may be used for particle sizes bands up to 70 μm , however the interim repeatability has only been determined for the size bands $\geq 4 \mu\text{m}$, $\geq 6 \mu\text{m}$, and $\geq 14 \mu\text{m}$. All measurements are counts per millilitre.

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 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.*

1.5 *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

- D396 Specification for Fuel Oils
- D975 Specification for Diesel Fuel
- D1655 Specification for Aviation Turbine Fuels
- D2880 Specification for Gas Turbine Fuel Oils
- D3699 Specification for Kerosene
- D4057 Practice for Manual Sampling of Petroleum and Petroleum Products
- D4175 Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants
- D4177 Practice for Automatic Sampling of Petroleum and Petroleum Products
- D4306 Practice for Aviation Fuel Sample Containers for Tests Affected by Trace Contamination
- D5854 Practice for Mixing and Handling of Liquid Samples of Petroleum and Petroleum Products
- D6300 Practice for Determination of Precision and Bias Data for Use in Test Methods for Petroleum Products, Liquid Fuels, and Lubricants
- D7467 Specification for Diesel Fuel Oil, Biodiesel Blend (B6 to B20)
- D7619 Test Method for Sizing and Counting Particles in Light and Middle Distillate Fuels, by Automatic Particle Counter

2.2 U.S. Dept. of Defense Specifications:³

- MIL-DTL-5624 Specification: Turbine Fuel, Aviation, Grades JP-4 (NATO F-40 and JP-5 (NATO F-44)
- MIL-DTL-83133 Specification: Turbine Fuel, Aviation, Kerosene Type, JP-8 (NATO F-34), NATO F-35, and JP-8+100 (NATO F-37)

2.3 ISO Standards:⁴

- ISO 12103 Road vehicles—Test contaminants for filter evaluation—Part 1: Arizona test dust

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.14 on Stability, Cleanliness and Compatibility of Liquid 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 online at ASSIST Quick Search (<http://quicksearch.dla.mil>).

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

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