



Standard Test Method for Free Water and Particulate Contamination in Mid-Distillate Fuels (Clear and Bright Numerical Rating)¹

This standard is issued under the fixed designation D 4860; 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.

^{ε1} NOTE—Warning notes were placed in the text editorially in November 2000.

1. Scope

1.1 This test method provides a rapid, portable means for field and laboratory use to inspect visually for particulate matter and numerically rate free water in aviation turbine and distillate fuels.

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

1.3 *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.* For specific hazard statements, see 11.2.3.1 and Annex A1.

2. Referenced Documents

2.1 ASTM Standards:

- D 1500 Test Method for ASTM Color of Petroleum Products (ASTM Color Scale)²
- D 1744 Test Method for Water in Liquid Petroleum Products by Karl Fischer Reagent²
- D 2276 Test Method for Particulate Contaminant in Aviation Fuel by Line Sampling²
- D 2709 Test Method for Water and Sediment in Middle Distillate Fuels by Centrifuge²
- D 4057 Practice for Manual Sampling of Petroleum and Petroleum Products³
- D 4176 Test Method for Free Water and Particulate Contamination in Distillate Fuels (Visual Inspection Procedures)³

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.14 on Stability and Cleanliness of Liquid Fuels.

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² Annual Book of ASTM Standards, Vol 05.01.

³ Annual Book of ASTM Standards, Vol 05.02.

3.1.1 *free water*—water in excess of that soluble in the fuel at the temperature of the test and appearing in the fuel as a haze or cloudiness, or as droplets.

3.1.2 *solid particulates*—small solid or semi-solid particles, sometimes referred to as silt or sediment, present in fuel as a result of contamination by air-blown dusts, corrosion by-products, fuel instability, or protective-coating deterioration.

3.1.3 *clear-and-bright* (also termed *clean-and-bright*)—a condition in which the fuel contains no visible water drops or particulates and is free of haze or cloudiness.

3.1.4 *Micro-Separometer clear-and-bright (MSEP-C&B)*—a numerical rating indicating the presence and ease of removal of free water and particulate contamination by filtration.

4. Summary of Test Method

4.1 Visual inspection of the fuel sample for free water and particulate matter is performed immediately when the sample is taken. A glass container is used to view for water haze, and the fuel sample is swirled to create a vortex to detect the presence of particulate matter.

4.2 A numerical rating for free water is obtained by filtering a portion of the fuel sample at a programmed rate (50 mL/45 s) through a standard fiberglass coalescer/filter. A portion of the effluent is used to establish a reference (100) level by a light transmittance measurement. Another portion of the unprocessed (unfiltered) fuel sample is then compared to the 100 reference level. The results are reported on a 50 to 100 scale to the nearest whole number. A test can be performed in 5 to 10 min.

NOTE 1—The standard fiberglass coalescer/filter consists of a precision machined, aluminum housing, containing fiber-glass material that has been selected to specific air flow characteristics. These criteria have a direct bearing on the test results.

5. Significance and Use

5.1 The test provides a field test to evaluate visually a fuel sample for particulate matter and free water similar to Test Method D 4176 plus a numerical rating for free water. High numerical ratings indicate that the fuel is relatively free of free