



Designation: D3240 – 22a

Standard Test Method for Undissolved Water In Aviation Turbine Fuels¹

This standard is issued under the fixed designation D3240; 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 test method covers the measurement of undissolved water in aviation turbine fuels in flowing fuel streams without exposing the fuel sample to the atmosphere or to a sample container. The usual range of test readings covers from 1 ppm to 60 ppm of free water. This test method does not detect water dissolved in the fuel, and thus test results for comparable fuel streams can vary with fuel temperature and the degree of water solubility in the fuel.

1.2 *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.*

1.3 *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

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

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this test method, refer to Terminology **D4175**.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *free water; n*—water not dissolved in the fuel.

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.J0.05** on Fuel Cleanliness.

Current edition approved July 1, 2022. Published September 2022. Originally approved in 1973. Last previous edition approved in 2022 as D3240 – 22. DOI: 10.1520/D3240-22A.

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.

3.2.2 *Free Water Independent of Pad Reader (FWIPR), n*—a calculated result which provides free water independent of test pad reader used for measurement. FWIPR equations were developed from the 2011 ILS data.³

4. Summary of Test Method

4.1 A measured sample of fuel is passed through as uranine dye-treated filter pad. Undissolved (free) water in the fuel will react with the uranine dye. When the pad is subsequently illuminated by ultraviolet (UV) light, the dye previously contacted by free water will fluoresce a bright yellow with the brightness increasing for increasing amounts of free water in the fuel. The light-illuminated pad is compared to a known standard using a photocell comparator, and the free water in the fuel sample is read out in parts per million by volume. By varying the fuel sample size, the range of the test method can be increased.

5. Significance and Use

5.1 Undissolved (free) water in aviation fuel can encourage the growth of microorganisms and subsequent corrosion in the tanks of aircraft and can also lead to icing of filters in the fuel system. Control of free water is exercised in ground fueling equipment by use of filter-coalescers and water separators.

6. Apparatus

6.1 *Test Pad Rater (UV Source Device)*—A device^{4,5,6,7} for comparing the fluorescence of the test pad to a known standard, while both are illuminated by the same source of UV light, shall be used. The amount of UV light striking the standard shall be modulated until the total fluorescence of the test pad

³ Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:D02-1804. Contact ASTM Customer Service at service@astm.org.

⁴ The Aqua-Glo Series II instrument manufactured by Gammon Technical Products, Inc., P.O. Box 400, Manasquan, NJ 08736-0400 was used in the original precision test program (RR:D02-1195). The unit is currently available in a Series V configuration, which is changed only in the power supply. All water content measuring components remain of the same configuration as the Series II instrument. Manufacturers who wish to offer similar products are referred to Committee D02 Equipment Replacement Guidelines.

⁵ The sole source of supply of the apparatus known to the committee at this time is Gammon Technical Products Inc., P.O. Box 400, Manasquan, NJ 08736-0400.

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