Designation: D7687 – 11

Standard Test Method for Measurement of Cellular Adenosine Triphosphate in Fuel, Fuel/Water Mixtures, and Fuel-Associated Water with Sample Concentration by Filtration[1]

This standard is issued under the fixed designation D7687; 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 protocol for capturing, extracting and quantifying the cellular adenosine triphosphate (cellular-ATP) content associated with microorganisms found in fuels, fuel/water mixtures and fuel-associated water.

1.2 The ATP is measured using a bioluminescence enzyme assay, whereby light is generated in amounts proportional to the concentration of cellular-ATP in the samples. The light is produced and measured quantitatively as relative light units (RLU) which are converted by comparison with an ATP standard, computation to pg ATP/mL and optional further transformation to Log_{10}[pg ATP/mL].

1.3 This test method is equally suitable for use as a laboratory or portable method.

1.4 This test method is limited to fuels with a nominal viscosity ≤ 75cSt at test temperature.

1.5 This test method detects ATP concentrations in the range of 5.0 pg ATP/mL (0.699 $\log_{10}$[pg ATP/mL]) to 100 000 pg ATP/mL (5.000 $\log_{10}$[pg ATP/mL]) for 20 mL samples of fuel or fuel/water mixtures, and 20 pg ATP/mL (1.301 $\log_{10}$[pg ATP/mL]) to 400 000 pg ATP/mL (5.602 $\log_{10}$ [pg ATP/mL]) for 5 mL samples of fuel-associated water.

NOTE 1—These ranges were calculated with the formula for calculating sample ATP in pg/mL provided in 12.1 based on the minimum recommended RLU for a 1 ng ATP/mL standard when using the reagents specified in Section 7 and the luminometer specified in 6.4 and corrected with a reagent-method blank as determined in Appendix X5.

1.6 Providing interferences can be overcome, bioluminescence is a reliable and proven method for qualifying and quantifying ATP. This test method does not differentiate between ATP from different sources, for example: from different types of microorganisms, such as bacteria and fungi.

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

1.8 *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]

D396 Specification for Fuel Oils
D975 Specification for Diesel Fuel Oils
D1129 Terminology Relating to Water
D1655 Specification for Aviation Turbine Fuels
D2069 Specification for Marine Fuels (Withdrawn 2003)[3]
D2880 Specification for Gas Turbine Fuel Oils
D3699 Specification for Kerosine
D4012 Test Method for Adenosine Triphosphate (ATP) Content of Microorganisms in Water
D4175 Terminology Relating to Petroleum, Petroleum Products, and Lubricants
D6161 Terminology Used for Microfiltration, Ultrafiltration, Nanofiltration and Reverse Osmosis Membrane Processes
D6300 Practice for Determination of Precision and Bias Data for Use in Test Methods for Petroleum Products and Lubricants
D6751 Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels
D7463 Test Method for Adenosine Triphosphate (ATP) Content of Microorganisms in Fuel, Fuel/Water Mixtures and Fuel Associated Water
D7464 Practice for Manual Sampling of Liquid Fuels, Associated Materials and Fuel System Components for Microbiological Testing
D7467 Specification for Diesel Fuel Oil, Biodiesel Blend (B6 to B20)

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

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