



Designation: D7463 – 18

Standard Test Method for Adenosine Triphosphate (ATP) Content of Microorganisms in Fuel, Fuel/Water Mixtures, and Fuel Associated Water¹

This standard is issued under the fixed designation D7463; 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 provides a protocol for capturing, concentrating, and testing the adenosine triphosphate (ATP) present in a fuel system sub-sample (that is, test specimen) associated with:

1.1.1 Microorganisms and hydrophilic particles found in liquid fuels as described in [Table X6.1](#), or

1.1.2 Microorganisms and hydrophilic particles found in mixture of fuel and associated bottom water or just associated bottom water.

1.1.3 ATP detected by this bioluminescence test can be derived from cellular ATP, extra-cellular ATP, or some combination of both.

1.1.4 Cellular and extra-cellular ATP utilized to perform ATP bioluminescence are captured and concentrated from a fuel system sample into an aqueous test specimen (that is, sub-sample) for testing. For example, for a fuel system sample that does not contain any visible fuel associated bottom water, the aqueous test specimen is the capture solution itself described in [8.2.1.1](#). For fuel system samples that are a mixture of fuel and associated bottom water (that is, free water), the test specimen is an aliquant of the capture solution and associated bottom water.

1.2 The ATP is measured using a patented bioluminescence enzyme assay, whereby light is generated in amounts proportional to the concentration of ATP in the sample. The light is produced and measured quantitatively using dedicated ATP test pens² and a dedicated luminometer² and reported in (instrument specific) Relative Light Units.

1.3 This test method is equally suitable for use in the laboratory or field.

1.4 Although bioluminescence is a reliable and proven technology, this method does not differentiate ATP from bacteria or fungi.

1.5 For water or capture solution samples, the concentration range of ATP detectable by this test method is 1×10^{-11} M to 3×10^{-8} M which is equivalent to 1×10^{-14} moles/mL to 3×10^{-11} moles/mL for water samples or capture solution. Assuming testing on fuel phase is performed on a 500 mL volume of fuel the equivalent concentrations is fuel would be: 6×10^{-11} M to 2×10^{-14} M.

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

1.6.1 There is one exception—Relative Light Unit (RLU) as defined in [3.1.19](#).

1.7 *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.*

1.8 *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:³

[D396 Specification for Fuel Oils](#)

[D975 Specification for Diesel Fuel Oils](#)

[D1655 Specification for Aviation Turbine Fuels](#)

[D2880 Specification for Gas Turbine Fuel Oils](#)

[D4012 Test Method for Adenosine Triphosphate \(ATP\) Content of Microorganisms in Water](#)

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 The sole source of supply, repair, recertification, and technical support of the apparatus or test pen known to the committee at this time is Merck KGaA, 64271 Darmstadt, Germany (Worldwide) or Fuel Quality Services, Inc., 4584 Cantrell Rd., Flowery Branch, GA 30542 (USA). If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,¹ which you may attend.

³ 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.

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