Designation: D7978 – 14

Standard Test Method for Determination of the Viable Aerobic Microbial Content of Fuels and Associated Water—Thixotropic Gel Culture Method[1]

This standard is issued under the fixed designation D7978; 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 describes a procedure that can be used in the field or in a laboratory to quantify culturable, viable aerobic microorganisms present as contaminants in liquid fuels, including those blended with synthesized hydrocarbons or biofuels, with kinematic viscosities (at 40 °C) of ≤24 mm^2 s^{-1} and heavy and residual fuels with kinematic viscosities (at 40 °C) of ≤700 mm^2 s^{-1} and in fuel-associated water.

1.1.1 This test method has been validated by an ILS for a range of middle distillate fuels meeting Specifications D975, D1655, ISO 8217 DMA, and NATO F-76.[2]

1.2 This test method quantitatively assesses culturable, viable aerobic microbial content present in the form of bacteria, fungi, and fungal spores. Results are expressed as the total number of microbial colony forming units (CFU)/L of fuel or total number of CFU/mL of associated water. The number of CFU should not be interpreted as absolute values but should be used as part of a diagnostic or condition monitoring effort; for example, these values can be used to assess contamination as absent, light, moderate, or heavy.

NOTE 1—This test method is technically equivalent to IP 613, although the two methods are not currently jointed.

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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[3]

D975 Specification for Diesel Fuel Oils
D1129 Terminology Relating to Water
D1655 Specification for Aviation Turbine Fuels
D4175 Terminology Relating to Petroleum, Petroleum Products, and Lubricants
D4176 Test Method for Free Water and Particulate Contamination in Distillate Fuels (Visual Inspection Procedures)
D6469 Guide for Microbial Contamination in Fuels and Fuel Systems
D6974 Practice for Enumeration of Viable Bacteria and Fungi in Liquid Fuels—Filtration and Culture Procedures
D7464 Practice for Manual Sampling of Liquid Fuels, Associated Materials and Fuel System Components for Microbiological Testing
D7847 Guide for Interlaboratory Studies for Microbiological Test Methods
E2756 Terminology Relating to Antimicrobial and Antiviral Agents

2.2 *Energy Institute Standards:*[4]

IP 385 Determination of the Viable Aerobic Microbial Content of Fuels and Fuel Components Boiling Below 390 °C—Filtration and Culture Method
IP 613 Determination of the Viable Aerobic Microbial Content of Fuels and Associated Water—Thixotropic Gel Culture Method
Guidelines for the Investigation of the Microbial Content of Petroleum Fuels and for the Implementation of Avoidance and Remedial Strategies, 2nd Edition, 2008, Energy Institute, London, ISBN 978 0 85293 524 8

2.3 *Other Standards:*

ISO 8217 DMA Petroleum Products, Fuels (Class F), Specifications of Marine Fuels, 4th Edition 2010, ISO Switzerland

[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 and Cleanliness of Liquid Fuels.

Current edition approved Dec. 15, 2014. Published February 2015. DOI: 10.1520/D7978-14.

[2] Defense Standard 91-4, Fuel, Naval, Distillate (NATO Code: F-76, Joint Service designation DIESO F-76), Issue 9, 3 May 2013, UK Defense Standardization

[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.

[4] Available from Energy Institute, 61 New Cavendish St., London, WIG 7AR, U.K., http://www.energyinst.org.

Copyright © ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. United States