



Standard Test Method for Determining the Aerobic, Aquatic Biodegradability of Lubricants or Lubricant Components in a Closed Respirometer¹

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1. Scope

1.1 This test method covers a procedure for determining the degree of biodegradability of lubricants or their components in an aerobic aqueous medium on exposure to an inoculum under controlled laboratory conditions. This test method is an ultimate biodegradation test that measures oxygen demand in a closed respirometer.

1.2 This test method is suitable for evaluating the biodegradation of volatile as well as nonvolatile lubricants or lubricant components.

1.3 This test method is applicable to lubricants and lubricant components which are not toxic and not inhibitory to the test microorganisms at the test concentration.

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

1.5 *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.* Specific hazards are given in Section 10.

2. Referenced Documents

2.1 ASTM Standards:²

D1129 Terminology Relating to Water

D1193 Specification for Reagent Water

D1293 Test Methods for pH of Water

D4175 Terminology Relating to Petroleum, Petroleum Products, and Lubricants

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 D02.12 on Environmental Standards for Lubricants.

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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.

D4447 Guide for Disposal of Laboratory Chemicals and Samples

D6384 Terminology Relating to Biodegradability and Ecotoxicity of Lubricants

E943 Terminology Relating to Biological Effects and Environmental Fate

2.2 ISO Standards:³

ISO 4259:1992(E) Petroleum Products—Determination and Application of Precision Data in Relation to Methods of Test

ISO 6107-2:1997 Water Quality—Vocabulary—Part 2

ISO 8192:1986 Water Quality—Test for Inhibition of Oxygen Consumption by Activated Sludge

ISO 9408:1999 Water Quality—Evaluation of Ultimate Aerobic Biodegradability of Organic Compounds in Aqueous Medium by Determination of Oxygen Demand in a Closed Respirometer

2.3 OECD Standards:⁴

OECD 301F:1992 Ready Biodegradability—Manometric Respirometry

2.4 APHA Standards:⁵

2540B Total Solids Dried at 103–105°C

9215 Heterotrophic Plate Count

3. Terminology

3.1 Definitions:

3.1.1 Definitions of terms applicable to this test method appear in the Compilation of ASTM Standard Definitions and the following terminology standards: D1129, D4175, D6384, E943, and ISO 6107-2:1997.

3.1.2 *activated sludge, n*—the precipitated solid matter, consisting mainly of bacteria and other aquatic microorganisms, that is produced at a domestic wastewater

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁴ Available from Organisation for Economic Cooperation and Development (OECD), 2 rue André Pascal, F-75775, Paris Cedex 16, France, <http://www.oecd.org>.

⁵ From Standard Methods for the Examination of Water and Wastewater, latest edition. Available from the American Public Health Assoc., 1015 18th St., NW, Washington, DC 20036.