



Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials in Soil¹

This standard is issued under the fixed designation D5988; 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 determination under laboratory conditions of the degree and rate of aerobic biodegradation of plastic materials, including formulation additives, in contact with soil.

1.2 This test method is designed to measure the biodegradability of plastic materials relative to a reference material in an aerobic environment.

1.3 This test method is designed to be applicable to all plastic materials that are not inhibitory to the bacteria and fungi present in soil.

1.4 Claims of performance shall be limited to the numerical result obtained in the test and not be used for unqualified “biodegradable” claims. Reports shall clearly state the percentage of net gaseous carbon generation for both the test and reference samples at the completion of the test. Results shall not be extrapolated beyond the actual duration of the test.

1.5 The values stated in SI units are to be regarded as the standard.

1.6 *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.* A specific hazard statement is given in Section 8.

1.7 This ASTM test method is equivalent to ISO 17556.

2. Referenced Documents

2.1 ASTM Standards:²

D425 Test Method for Centrifuge Moisture Equivalent of Soils

¹ This test method is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.96 on Environmentally Degradable Plastics and Biobased Products.

Current edition approved May 1, 2012. Published June 2012. Originally approved in 1996. Last previous edition approved in 2003 as D5988 - 03. DOI: 10.1520/D5988-12.

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.

D618 Practice for Conditioning Plastics for Testing

D883 Terminology Relating to Plastics

D1193 Specification for Reagent Water

D1293 Test Methods for pH of Water

D2980 Test Method for Volume Mass, Moisture-Holding Capacity, and Porosity of Saturated Peat Materials

D2989 Test Method for Acidity-Alkalinity of Halogenated Organic Solvents and Their Admixtures

D4129 Test Method for Total and Organic Carbon in Water by High Temperature Oxidation and by Coulometric Detection

D4972 Test Method for pH of Soils

D5338 Test Method for Determining Aerobic Biodegradation of Plastic Materials Under Controlled Composting Conditions, Incorporating Thermophilic Temperatures

D5511 Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under High-Solids Anaerobic-Digestion Conditions

2.2 APHA-AWWA-WPCF Standards:³

2540 D Total Suspended Solids Dried at 103°–105°C

2540 G Total, Fixed, and Volatile Solids in Solids and Semi-Solid Samples

2.3 ISO Standard:

ISO 17556 Plastics—Determination of the Ultimate Aerobic Biodegradability of Plastic Materials in Soil by Measuring the Oxygen Demand in a Respirometer or the Amount of Carbon Dioxide Evolved

3. Terminology

3.1 *Definitions*—Definitions of terms applicable to this test method appear in Terminology **D883**.

4. Summary of Test Method

4.1 The test method described consists of the selection of plastic material for the determination of aerobic biodegradability, obtaining soil as a matrix and source of inoculum, exposing the plastic material to the soil, measuring

³ Standard Methods for the Examination of Water and Wastewater, 17th Edition, 1989, American Public Health Association (APHA), 1015 Fifteenth Street NW, Washington, DC 20005.

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