



Standard Test Method for Determining Weight Loss From Plastic Materials Exposed to Simulated Municipal Solid-Waste (MSW) Aerobic Compost Environment¹

This standard is issued under the fixed designation D 6003; 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 is used to determine the degree and rate of aerobic biodegradation of plastic materials exposed to a controlled composting environment. Aerobic composting takes place in an environment where temperature, aeration, and humidity are closely monitored and controlled.

1.2 The test is designed to determine the biodegradability of plastic materials, relative to that of a standard material, in an aerobic environment. Aeration of the test reactors is maintained at a constant rate throughout the test and reactor vessels of a size no greater than 4-L volume are used to ensure that the temperature of the vessels is approximately the same as that of the controlled environment chamber.

1.3 Biodegradability of the plastic is assessed by determining the amount of weight loss from samples exposed to a biologically active compost relative to the weight loss from samples exposed to a “poisoned” control.

1.4 The test is designed to be applicable to all plastic materials that are not inhibitory to the bacteria and fungi present in the simulated Municipal Solid Waste (MSW).

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.*

NOTE 1—There is no similar or equivalent ISO method.

2. Referenced Documents

2.1 ASTM Standards:

D 618 Practice for Conditioning of Plastics and Electrical Insulating Materials for Testing²

D 883 Terminology Relating to Plastics²

D 1193 Specification for Reagent Water³

¹ This test method is under the jurisdiction of ASTM Committee D-20 on Plastics and is the direct responsibility of Subcommittee D20.96 on Environmentally Degradable Plastics.

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² Annual Book of ASTM Standards, Vol 08.01.

³ Annual Book of ASTM Standards, Vol 11.01.

D 1898 Practice for Sampling of Plastics²

D 2973 Test Method for Total Nitrogen in Peat Materials⁴

D 2974 Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils⁴

D 2976 Test Method for pH of Peat Materials⁴

D 2980 Test Method for Volume Weights, Water-Holding Capacity, and Air Capacity of Water-Saturated Peat Materials⁴

D 3593 Molecular Weight Averages and Molecular Weight Distribution of Certain Polymers by Liquid Size Exclusion Chromatography (Gel Permeation Chromatography)⁵

D 4129 Test Method for Total and Organic Carbon in Water by High-Temperature Oxidation and Coulometric Detection⁶

D 5338 Test Method for Determining Aerobic Biodegradation of Plastic Materials under Controlled Composting Conditions⁷

D 5509 Practice for Exposing Plastics to a Simulated Compost Environment⁷

D 5512 Practice for Exposing Plastics to a Simulated Compost Environment Using an Externally Heated Reactor⁷

2.2 APHA-AWWA-WPCF Standards:

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

3. Terminology

3.1 *Definitions*—Definitions of terms applying to this test method appear in Terminology D 883 and Practice D 5509.

4. Summary of Test Method

4.1 The test method consists of the following:

4.1.1 Selecting plastic materials for exposure in a controlled aerobic composting environment;

4.1.2 Preparing and characterizing a simulated compost with the proper C:N ratio, pH, water holding capacity, porosity, and inoculum to establish and maintain a high biological activity;

⁴ Annual Book of ASTM Standards, Vol 04.08.

⁵ Discontinued, 1993. Replaced by Test Method D 5296.

⁶ Annual Book of ASTM Standards, Vol 11.02.

⁷ Annual Book of ASTM Standards, Vol 08.03.

