Designation: D586 – 19

Standard Test Method for Ash and Organic Matter Content of Degradable Erosion Control Products[1]

This standard is issued under the fixed designation D586; 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 the determination of the ash and organic matter contents of degradable Erosion Control Products (ECPs) by ignition at 900°C. This test method is primarily used to determine the ash and organic matter contents of degradable erosion control products (ECPs) to satisfy specifications set forth by various agencies.

1.2 *Units*—The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 All observed and calculated values shall conform to the guidelines for significant digits and rounding established in Practice D6026.

1.3.1 The procedures used to specify how data are collected/recorded and calculated in the standard are regarded as the industry standard. In addition, they are representative of the significant digits that generally should be retained. The procedures used do not consider material variation, purpose for obtaining the data, special purpose studies, or any considerations for the user's objectives; and it is common practice to increase or reduce significant digits of reported data to be commensurate with these considerations. It is beyond the scope of this standard to consider significant digits used in analysis methods for engineering data.

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

1.5 *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:*

D653 Terminology Relating to Soil, Rock, and Contained Fluids

D3740 Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

D4753 Guide for Evaluating, Selecting, and Specifying Balances and Standard Masses for Use in Soil, Rock, and Construction Materials Testing

D6026 Practice for Using Significant Digits in Geotechnical Data

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of common technical terms used in this standard, refer to Terminology D653.

4. Summary of Test Method

4.1 This test method is used to determine the average percent ash and organic matter content of a degradable ECP. At least three test specimens are obtained from a representative sample. One specimen is used to determine the water content which is used in calculating the moisture-free mass. Two or more specimens are used to determine the average ash content.

4.2 A test specimen of known mass used to determine the ash content is placed inside a muffle furnace at 900 ± 25°C for a period of time until it is completely combusted. The remaining material after combustion is ash. This process is repeated at least twice, such that the average ash content and a calculation for organic material for the degradable ECP is determined.

5. Significance and Use

5.1 The ash content of the degradable ECP may consist of various residues from chemicals used in its manufacture, metallic matter from piping and machinery, mineral matter in the ECP fibers from which the degradable ECP was made, and filling, coating, pigmenting or other added materials. The amount and composition of the ash is a function of the presence or absence of any of these materials or others singly or in

[1] This test method is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.25 on Erosion and Sediment Control Technology.

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

combination. No specific qualitative meaning is attached to the term "ash" as used in this test method.

5.2 In most cases, the ash content of ECPs will contain inorganic residues from the ECP fibers, inorganic residues from any added chemicals, and loading or filling materials deliberately added.

5.3 For ECP fibers containing cellulose and clays, or materials having variable chemical composition, variable thermal decomposition behavior, or both, the ash level may necessitate significant confirmation regarding the materials added.

NOTE 1—The quality of the result produced by this standard is dependent on the competence of the personnel performing it, and the suitability of the equipment and facilities used. Agencies that meet the criteria of Practice D3740 are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with Practice D3740 does not in itself assure reliable results. Reliable results depend on many factors; Practice D3740 provides a means of evaluating some of those factors

6. Apparatus

6.1 *Crucible*—A platinum container or dish with a lid or cover is recommended; however, porcelain or silica crucibles may be used provided their mass does not change under the ignition condition. The crucible shall have enough capacity to hold the mass of the test specimen in whole. Typically, a crucible with a height and diameter of about 63.5 mm or similar is sufficient.

6.2 *Analytical Balance*—Balances shall conform to the requirements of Guide D4753.

6.2.1 To determine the mass of the specimen, the balance shall have readability without estimation of 0.1 mg or better. The capacity of this balance will need to exceed the mass of the container plus Erosion Control Product. In general, a balance with a minimum capacity of 100 g is sufficient.

6.3 *Muffle Furnace*—A furnace capable of producing and maintaining a constant temperature of 900 ± 25°C and having enough capacity to hold the crucible.

6.4 *Drying Oven*—A vented, thermostatically controlled oven capable of maintaining a uniform temperature of 105 ± 3°C throughout the drying chamber. A forced-draft oven usually meets these requirements.

6.5 *Thermometric Device*—A thermometric device(s) capable of measuring the temperature of the drying oven and the muffle furnace, readable to the nearest 1°C or better and having an accuracy of at least ±0.5°C.

6.6 *Water Content Container*—A metal, glass, or porcelain container having a tight fitting lid with enough capacity to hold 2 to 5 g of degradable ECP.

6.7 *Desiccator*—A desiccant containing device of suitable size used to prevent moisture gain during cooling of the oven-dried specimen, crucible, and containers. The desiccant shall be indicating-grade anhydrous alumina.

6.8 *Miscellaneous Items*—A mixing bowl with a tight fitting lid, Bunsen burner, tongs, and rubber or latex gloves are useful.

7. Sampling and Test Specimens

7.1 The representative sample to be used for determining ash content shall be obtained from a processed and packaged bale or roll of degradable ECP that has no visible signs of tears, rips, holes, or openings in the packaging. If the packaging is damaged, do not use it for testing, as the moisture content will be affected.

7.2 Working quickly, cut open the bale and select 20 g from each the top, middle, and bottom ⅓ of the bale for a total of 60 g. If the degradable ECP is in rolled form, obtain a representative sample by cutting a 1 m^2 portion from the middle of roll. Wearing rubber or latex gloves, place the ECP in a mixing bowl and gently break the compressed fibers apart with your thumb and fingers. Mix thoroughly to make sure each of the test specimens are representative of the sample and cover the bowl with a tight fitting lid to prevent changes in moisture content.

7.3 From the representative sample, select at least three test specimens: one for the water content determination (9.1) and at least two for determining the ash content (9.2).

8. Preparation of Apparatus

8.1 *Water Content Container*—Place the water content container with its lid on in the 105 ± 3°C oven for 1 h. Then remove it from the oven and cool it for 1 h in the desiccator. Wearing rubber or latex gloves, remove the container from the desiccator, quickly open and close the lid to allow pressure equalization. Zero the analytical balance and place the container and lid on the balance. Record the mass of the container plus lid, M_t, to the nearest 1 mg. Immediately proceed to 9.1.

8.2 *Crucible*—Thoroughly clean an empty crucible and place it in the 900 ± 25°C muffle furnace for 30 to 60 min. Then remove it from the muffle furnace and allow it to cool slightly (~15 to 20 min) before placing it in the desiccator. Allow the crucible to cool to room temperature, then determine and record the mass of the crucible, M_c, to the nearest 0.1 mg using the analytical balance. Immediately proceed to 9.2.

9. Procedure

9.1 *Water Content Determination*—Handle the specimen and the container using tongs or clean, dry rubber/latex gloves. From the representative sample, select a test specimen having a mass of at least 2 g. A mass between 2 and 5 g is recommended. Immediately, within one to two seconds after separation from the representative sample, place the test specimen in the water content container prepared in 8.1 and cover with the tight fitting lid. Determine and record the mass of the container with lid plus specimen, M_m, to the nearest 1 mg.

9.1.1 Remove lid and place the container with lid plus specimen in the 105 ± 3°C oven for 2 h. Then, replace the lid on the container, remove from the oven, place in the desiccator and allow to cool for 1 h.

9.1.2 Quickly open and close lid to allow for pressure equalization, then determine and record the mass of the container with lid plus oven-dried specimen, M_d, to the nearest 1 mg.

9.1.3 Repeat drying and cooling until the difference in mass between two successive mass determinations are not more than 0.1 % of the mass of the specimen.