Designation: D7367 – 14

Standard Test Method for Determining Water Holding Capacity of Fiber Mulches for Hydraulic Planting[1]

This standard is issued under the fixed designation D7367; 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 quantitative test method determines water holding capacity of fiber mulches, including wood, paper, and agriculturally derived and blended fiber mulches used for hydraulic planting.

1.2 The purpose of this test method is to provide a means of evaluating water holding capacity in fiber mulches. Product specimen is conditioned and weighed, saturated and re-weighed to determine water holding capacity. The water holding capacity is expressed as a percentage of increased weight after saturation. There are no known limitations to this test method. No range of concentrations/values have been determined. This test method is preferably performed in a laboratory.

1.3 *Units*—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:*[2]

D653 Terminology Relating to Soil, Rock, and Contained Fluids

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

3. Terminology

3.1 *Definitions*—For common definitions of terms in this standard refer to Terminology D653.

4. Summary of Test Method

4.1 Product specimen is conditioned and weighed, saturated and re-weighed to determine water holding capacity. The water holding capacity is expressed as a percentage of increased weight after saturation.

5. Significance and Use

5.1 The meaning of the test is related to the manufacturing and end use of the material, to determine characteristics of products. The water holding capacity of hydraulically applied mulches for hydraulic planting correlates directly with enhanced slurry and spray patterns by providing better soil/slurry binding ability and rate of seed germination.

6. Apparatus

6.1 203.2 mm diameter 2.36 mm sieve.

6.2 203.2 mm diameter sieve pan.

6.3 Large mixing bowl 5.5 L ± (10 Pt ±) capacity.

6.4 Electronic gram scale or balance scale with a minimum of 0.1 g resolution.

6.5 457 mm × 279 mm baking pan or tray for draining.

6.6 Mixer with dough kneader attachment capable of 60 to 90 rpm on low setting (low rpms minimize damage to fibers).

7. Sampling and Testing Specimens

7.1 Prepare specimen by separating 90 g of fiber from an undamaged bag or bale taking ⅓ from the top of the bag, ⅓ from the middle of the bag and ⅓ from the bottom of the bag (heterogeneous blends should be mixed at the same ratio by weight, as manufacturer's specifications to equal 30 g).

7.2 Break the compressed fiber apart and allow to condition at room temperature 23°C ± 2°C and at a humidity level of 50 % RH ±10 % for 24 h.

8. Procedure

8.1 Weigh mixing bowl and place 15 g of conditioned fiber in mixing bowl. Add 300 mL of distilled water at room temperature (23°C ± 2°C) to the bowl. Blend for 5 min with kitchen mixer at low setting.

[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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[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.

8.2 Weigh sieve and sieve pan.

8.3 Place mixed fiber in sieve with pan underneath.

8.4 Detach dough kneader attachment and rinse over mixing bowl using 100 mL of distilled water.

8.5 Empty mixing bowl contents in sieve pan.

8.6 Rinse mixing bowl with 300 mL of distilled water to remove any remaining fibers.

8.7 Empty mixing bowl contents in sieve pan.

8.8 Using a spoon, distribute fibers evenly across the sieve screen surface.

8.9 Place sieve in the large bowl containing enough distilled water to saturate specimen without overflowing the sieve. Pour the fiber and water mixture that collected in the pan into the sieve.

8.9.1 Leave specimen in sieve and sieve pan to remain saturated for 30 min.

8.10 Slowly remove sieve of saturated fiber and transfer it to the large tray making sure pan remains parallel so the surface tension is not broken.

8.11 Place the edge of the sieve on the top of the sieve pan at an angle that does not allow water to escape into the pan (creating enough of an angle to break the surface tension of the water).

8.11.1 Allow the sample to drain for 3 min.

8.12 Dry the sieve pan with a paper towel.

8.13 Record to the nearest 0.01 g the total weight of the sieve and sieve pan and saturated mulch.

8.14 Calculate the water holding capacity as follows:

$$\textit{Water Holding Capacity}\,\% = (K - X)/(X - Y) \times 100$$

where:

K = weight of 203.2 mm sieve and pan and saturated mulch,
X = weight of 203.2 mm sieve and pan and 15 g of dry mulch,
Y = weight of 203.2 mm sieve and pan.

8.15 Perform three replications for each mulch type tested.

9. Report

9.1 Report the water holding capacity as a percentage.

9.1.1 Report average and standard deviation.

10. Precision and Bias

10.1 *Precision*—The precision of the procedure of this test method is being evaluated.

10.2 *Bias*—The true value of erosion control performance of hydraulically applied fibers mulches can be defined only in terms of a test method. Within this limitation, the procedure described herein has no known bias and, since there is not an accepted referee test method, the procedures of this test method have not inherent bias.

11. Keywords

11.1 fiber mulch