Designation: D7986 – 17a

Standard Practice for Preparing Specimens of Hydraulic Erosion Control Products for Index Property Testing[1]

This standard is issued under the fixed designation D7986; 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 practice specifies a set of instructions for preparing samples of hydraulic erosion control products (HECPs) for index property testing.

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

1.2.1 For purposes of comparing measured or calculated value(s) with specified limits, the measured or calculated value(s) shall be rounded to the nearest decimal or significant digits in the specified limits.

1.2.2 The procedures used to specify how data are collected/recorded or calculated, in this standard are regarded as the industry standard. In addition, they are representative of the significant digits that generally should be measured. The procedures used do not consider material variation, purpose for obtaining the data, special purpose studies, or any considerations for the users objectives; and it is common practice to increase or reduce the 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 the analytical methods for engineering design.

1.3 *Units*—The values stated in SI units are being regarded as standard. No other units of measurement are included in the practice.

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.*

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:*[2]

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

E145 Specification for Gravity-Convection and Forced-Ventilation Ovens

3. Terminology

3.1 *Definitions:*

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

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *Hydraulic Erosion Control Product (HECP), n—in erosion control*, a manufactured, temporary, degradable, prepackaged fibrous material that is mixed with water and hydraulicallyapplied as a slurry to reduce soil erosion and assist in the establishment and growth of vegetation.

3.2.2 *index property test, n—in erosion control*, a standard test that may be used to compare the relative material properties of erosion control products.

4. Summary of Practice

4.1 A representative sample of dry HECP is mixed with water in an amount corresponding to the desired mixing rate. The resulting slurry is spread evenly on a metal sheet pan in an amount corresponding to the desired field application rate. The material is dried and the resulting sample is removed and cut to sizes appropriate for index property tests.

[1] This test method is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.25.01 on Mulches.

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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.

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

5. Significance and Use

5.1 This practice is intended to simulate mixing of HECP products as would be mixed on a job or project site but in a laboratory environment on a smaller scale. Dried samples are not necessarily intended to represent a field application of HECP products but would be representative of the correct amount of material applied to a known area and provide a basis for consistent and repeatable index property testing.

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 *Baking Pan*—Fabricate a stainless steel straight-sided (not tapered), metal baking pan having dimensions of 280 ± 5 mm by 380 ± 5 mm by 6.5 ± 0.5 mm tall. Retain fabricated pan for future testing.

6.2 *Stand Mixer*—A device capable of maintaining a speed between 60 and 90 rpm on the low setting and equipped with a 4 L stainless steel mixing bowl with a coated flat beater attachment.

6.3 *Drying Oven*—Thermostatically-controlled, preferably of the forced-draft type, meeting the requirements of Specification E145 and capable of maintaining a uniform temperature of 93 ± 5°C.

6.4 *Balance*—Balances shall conform to the requirements of Specification D4753.

6.4.1 To determine the mass of the specimen, the balance shall have readability without estimation of 0.01 g. The capacity of this balance will need to exceed the mass of the container plus a specimen. In general, a balance with minimum capacity of 600 g is sufficient.

6.5 *Graduated Cylinders*—Two cylinders, one graduated for 1000 mL and one graduated for 10 mL.

6.6 *Timing Device*—A clock, stopwatch, digital timer, or device readable to one second or better.

6.7 *Test Fluid*—Distilled or demineralized water is the only permissible test fluid. The use of tap water is not permitted.

6.8 *Metal Pipe*—A galvanized pipe having a minimum length of 600 mm and a 25 mm outside diameter.

6.9 *Miscellaneous Items*—Items such as a large flat solid plastic spatula, scissors or cutting dies, 4 L zip top bags, and non-stick cooking spray.

7. Hazards

7.1 *Safety Hazards*—HECP products can be dusty. Eye protection and a dust mask are recommended to be worn during the procedure.

8. Procedure

8.1 Obtain a 500 g or sufficient amount of representative sample of the HECP from the middle of the bag or bale to satisfy 8.2. For those products with uneven bag distribution of proper chemistry, the manufacturer is required to supply the correct amounts of fiber and chemicals needed to produce the necessary quantity.

8.2 Determine and record the required amount of HECP using an application rate of kg/hectare. If the application rate is given in lb/acre, then multiply that value by 1.12 to get kg/hectare.

Then, use the following equation to determine the required amount of HECP, F, in grams for use in this procedure.

$$F = (\text{kg/hectare} \times 0.1) \times A \quad (1)$$

where:

F = required amount of HECP, nearest 0.01 g and
A = area of the baking pan, nearest 0.001 m^2.

8.3 Determine and record the quantity of distilled water based on a mixing rate in liters per kilogram (L/kg). If necessary, convert the mixing rate of gallons per pound by multiplying that value by 8.345 to get L/kg. Then, use the following equation to determine the required quantity of distilled water, Q_{Dw}, in mL.

$$Q_{Dw} = M \times F \quad (2)$$

where:

Q_{Dw} = quantity of distilled water, nearest 0.1 mL and
M = mixing rate, nearest 1 L/kg.

8.4 Add the quantity of distilled water (Q_{Dw}) from 8.3 to the mixing bowl. Use both the 10 mL and 1000 mL graduated cylinders to obtain accurate quantities. Place the required amount of HECP (F) in the mixing bowl.

8.5 Blend the mixture of HECP and distilled water for five minutes with the mixer on the low setting to create a slurry. While waiting for the mixture to blend, spray 5 g of non-stick cooking spray evenly into the metal baking pan and then determine the weight of the pan.

8.6 After blending for five minutes, remove the bowl from the mixer and place the slurry into the metal baking pan. Use the spatula to make sure that all of the slurry is transferred from the bowl to the metal baking pan. Record the pan's identification number on the data sheet.

8.7 As an initial step to spread material, using the 600 mm long metal pipe, roll out the material in the pan. Start in the middle of the pan and roll each direction two times.

8.8 Use the plastic spatula to smooth out the slurry in the pan to a final uniform thickness. Make sure there are no lumps and that the HECP is evenly spread in the pan. Determine and record the mass of the pan plus the slurry to the nearest 0.01 g.

8.9 Place the pan with the slurry in the oven for approximately four hours. Since the drying time may vary and to make sure the material is dried, check the mass of the pan and slurry periodically throughout the four hours until the change in mass of the pan and slurry is less than 1 gram per hour.

8.10 Once the water content is in the acceptable range, remove the pan and slurry from the oven and allow it to cool. Then, determine and record the mass of the pan and slurry to the nearest 0.01 g.

8.11 Carefully remove the dried material from the pan using the spatula. Then trim the sides of the material with scissors or a cutting die. Six specimens each measuring 130 mm long and 100 mm wide can be created from the sample for index property testing. Other dimensions and quantities may be needed based on the requirements of subsequent index property testing.

8.12 Place the specimens in the zip top bags and properly label individual specimens with target field application rate (that is, 2000 - 6000 kg/hectare), mixing rate, supplier name and product name.

8.13 Repeat steps 8.2 through 8.12 until sufficient material has been produced in order to obtain the necessary number of test specimens for subsequent index property testing.

9. Report: Test Data Sheet(s)/Form(s)

9.1 The methodology used to specify how data are recorded on the test data sheet(s)/form(s), as given below, is covered in 1.2 and in Practice D6026.

9.2 Record as a minimum the following information (data):

9.2.1 Identification of the material being made into specimens, such as the product name(s), supplier name, and sample number(s). If available, record lot number and manufacturing date of material.

9.2.2 Date prepared and initials of person performing the preparation.

9.3 Record as a minimum the following sample information:

9.3.1 The information associated with determining the water content and the water content of the material.

9.3.2 The amount of HECP, F.

9.3.3 The amount of distilled water, Q_{Dw}.

9.3.4 Water to HECP mixing ratio.

9.3.5 Field application rate used to create the specimens.

10. Keywords

10.1 erosion control; HECP; hydraulic; index property testing; preparation; sampling

SUMMARY OF CHANGES

Committee D18 has identified the location of selected changes to this standard since the last issue (D7986–17) that may impact the use of this standard. (July 15, 2017)

(1) Revised 8.9.

(2) Deleted Note 2.