



Designation: ~~D8030/D8030M—19~~ D8030/D8030M – 23

## Standard Practice for Sample Preparation for GCCM<sup>1</sup>

This standard is issued under the fixed designation D8030/D8030M; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This standard practice specifies a set of instructions for preparing samples of geosynthetic cementitious composite mat (GCCM) for index property testing.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system ~~are not necessarily~~ may not be exact equivalents; therefore, ~~to ensure conformance with the standard, each system shall be used independently of the other, and~~ Combining values from the two systems shall not be combined. may result in nonconformance with the 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 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.

1.3.2 The procedures used to specify how data are collected/recorded or calculated in this practice 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 user's 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 practice to consider significant digits used in the analytical methods for engineering design.

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.* Some specific hazards statements are given in Section 7 on Hazards.

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:*<sup>2</sup>

[C191 Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle](#)

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee [D35](#) on Geosynthetics and is the direct responsibility of Subcommittee [D35.05](#) on Geosynthetic Erosion Control.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.



- [D4354 Practice for Sampling of Geosynthetics and Rolled Erosion Control Products \(RECPs\) for Testing](#)
- [D4439 Terminology for Geosynthetics](#)
- [D6026 Practice for Using Significant Digits and Data Records in Geotechnical Data](#)

### 3. Terminology

3.1 *Definitions*—For definitions of common technical terms used in this standard, refer to Terminology [D4439](#).

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *cured, adj*—a description of the state of a GCCM after hydration for a specified period of time under specified conditions, followed by a period of time where the GCCM is kept under a specified environmental condition during which the cementitious ~~matrix~~material continues to ~~crystallize~~cure and develop compressive strength.

3.2.2 *curing time, n*—the time subsequent to initial hydration of the GCCM and immediately prior to the testing of the material during which the cementitious material is allowed to harden and form its final structure. The specific process for curing is specified in [9.3.10.3](#).

~~3.2.3 *dry, adj*—a description of the state of a GCCM before it has been exposed to a hydration source. Typically describes the “as-received” dry product after conditioning in prescribed manner.~~

3.2.3 *hydration, n*—exposure of the GCCM, in this case, to water in prescribed conditions for a prescribed time.

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

3.2.5 *initial setting time, n*—the time subsequent to initial hydration of the GCCM at which the cementitious ~~gel~~material begins to ~~interlock~~cure and form an extended structure. The measurement of initial setting time is prescribed, for instance, in Test Methods [C191](#).

3.2.6 *uncured, adj*—a description of the state of a GCCM before it has been exposed to a hydration source. Typically describes the “as-received” dry product after conditioning in prescribed manner.

~~3.2.7 *wet, adj*—a description of the state of a GCCM after it has been exposed to a hydration source for a period of time less than the initial setting time of the cementitious ~~mixture~~material.~~

### 4. Summary of Practice

4.1 A representative sample of ~~dry-uncured (dry)~~ GCCM is either (1) cut into ~~dry-uncured~~ specimens, or (2) exposed to water under controlled conditions and for a prescribed time, allowed to cure (harden), and then cut into specimens for index testing.

### 5. Significance and Use

5.1 This practice is intended to create specimens of GCCM products appropriate for testing for the determination of index properties. Cured (hardened) samples are not necessarily intended to represent a field application of GCCM products, but would be representative of the correct amount of water applied to a known style of product and provide a basis for consistent and repeatable index property testing.

### 6. Apparatus

6.1 *Balances*—A balance with ~~0.01 lb~~ 0.01 lb readability is required (excluding the mass of the sample container).

6.2 *Sample Containers*—Suitable containers which are resistant to corrosion and change in mass upon repeated exposure to moisture, materials of varying pH, and cleaning.

6.3 *Die*, of known dimensions.

6.4 *File-Saw*, such as a tile saw or wall chaser cutter with diamond-tipped blades, used for cutting cured sample to predetermined dimension using pattern marked on cured specimen with template and markers; test specimens to predetermined dimensions.

6.5 *Hydration Tank*—A watertight container with dimensions sufficient to fit the forms, square support bars, and GCCM coupons.

6.6 *Forms*, typically 300 mm [12 in.] square, positioned either side of the GCCM coupons in the hydration tank. Forms must be aluminum or stainless steel, at least 0.2 in. [5 mm] thick, and flat.

6.7 *Square Support Bars*, with a square cross section of 12 mm [ $\frac{1}{2}$  in.]. Four bars are required per coupon (see [Appendix X1](#)) and are typically 250 mm [10 in.] long for a 300 mm [12 in.] coupon.

6.8 *Miscellaneous Knives, Templates, Markers*, as required for marking and cutting samples, coupons, and specimens to fixed dimensions before measurement of weight; dimensions. A knife with a “snap off” type blade is recommended for cutting uncured GCCMs, which can dull blade tips rapidly.

## **7. Hazards**

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

## **8. Sampling, Test Specimens, and Test Units**

8.1 *Lot Sample*—For the lot sample, refer to Practice [D4354](#) for discussion of recommended practice for breaking up shipments of GCCM into lots for testing.

8.2 *Laboratory Samples*—Cut a full-width sample from the lot sample that must be large enough to enable the required number of coupons and test specimens to be cut from it. The laboratory sample must be cut at least 300 mm [1 ft] from the ends of the lot sample. It is essential that the cementitious material is not damaged and has not fallen out of the GCCM. In cases of dispute, take a laboratory sample that will exclude material from the outer wrap of the roll or the inner wrap around the core, of at least 900 mm [3 ft] from the interior end of the roll (wrapped around the core) or exterior end of the material roll, measured from the edge of the cementitious portion of the material.

8.3 *Test Specimens*—Take specimens at random but equally spaced from the laboratory sample. The number of test specimens shall be specified in each test method. Uncured test specimens must be taken a minimum of 100 mm [4 in.] from the edge of the laboratory sample, measured from the edge of the cementitious portion of the material.

8.4 *Coupons*—For preparation of wetted or cured GCCM test specimen(s). The coupon is cut from the uncured laboratory sample and is oversized compared to the test specimen(s) by at least 25 mm [1 in.] along the perimeter of the test specimen(s). A coupon may include one or more specimens and is often 300 mm [12 in.] square; see [Fig. 1](#).

## **9. Procedure A – Dry (Unhydrated)Uncured (Dry) Specimens**

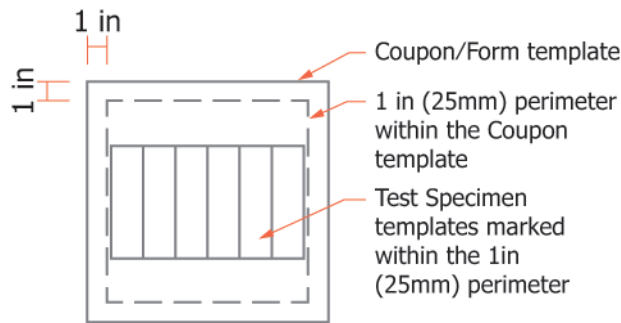
9.1 Obtain a sufficient amount of representative laboratory sample of the GCCM to satisfy [8:29.2](#).

8.1.1 The laboratory sample should be in satisfactory condition and representative of the bulk of the product delivered to the facility.

9.1.1 All sample and specimen cutting should be carried out in a clean area free of debris and preferentially with a surface covering to collect any loose powder which may come from material during cutting.

8.1.3 The number of test specimens shall be specified in each test method. These specimens shall be cut such that they are representative of the roll width.

9.2 *Preparation of DryUncured Specimens*:



**FIG. X1.11 Sand Placed in Base Test Specimen Templates Marked Within the 1 in. of Tub Perimeter of the Coupon Template**

**FIG. X1.2 Porous Stones 300 by 300 mm [12 by 12 in.] Placed on Leveling Sand**

**FIG. X1.3 Coupons 300 by 300 mm [12 by 12 in.] Are Cut from Roll**

**FIG. X1.4 Coupons Are Placed on Top of Porous Stones**

**FIG. X1.5 Additional Porous Stones Are Used as Confining Pressure**

**FIG. X1.6 Tub is Flooded and Allowed to Cure for 24 h**

**FIG. X1.7 With Large, Flat Knife Cured Sample is Stripped Away from Porous Stone**

**FIG. X1.8 Separate Coupon from Porous Stone, GM Side Does Not Stick, GT Side Does**

9.2.1 Using a die, or template and knife, carefully cut the required number of specimens randomly from the sample, but in a manner that is distributed across the width of the sample. test specimens.

9.2.2 All samples and specimens shall be cut, whether using a die, saw, or knives, to the specific dimensions required for the test being performed.

9.2.3 The loss of cement powder from edges of the specimen during the cutting process may have a significant impact on the accuracy of a given test method. This can be a more significant issue for ~~dry or wet uncured~~ samples, as defined under this method. The technician performing this test method should practice cutting specimens from the sample to gain confidence in preparing the sample without significant loss of cement powder.

9.2.4 If using a die to cut the specimen, loss of powder can be minimized by leaving the die in place and removing any remaining sample, including loose powder, from the outside of the die before moving the die. If a base material like cardstock is used with the die when cutting the specimen, the cardstock and die can be used as a temporary container. Transfer the specimen to a sample container with minimal loss of powder.

9.2.5 If using a template and knife to cut the specimen, mark the ~~test-specific~~ template on the sample. After cutting the specimen, place the cut specimen into the sample container. Collect any loose powder from the cutting area. Place half of the loose powder into the sample container and discard the remaining half.

9.2.6 The specimen in the sample container, as prepared above, is now conditioned by bringing the specimens to moisture equilibrium in an atmosphere of  $21 \pm 2$  °C and  $65 \pm 5$  % relative humidity. Equilibrium is considered to have been reached when the change in mass of the test specimen in successive weighing, made at intervals of not less than 2 h, does not exceed 0.1 % of the previous mass of the test specimen. After conditioning, the specimens are ready for testing.

## 10. Procedure B – ~~Wetted (Hydrated Only or Hydrated-Only)~~ or Cured (Hydrated and Hardened) Specimens

9.1 Obtain a sufficient amount of representative sample of the ~~GCCM~~ to satisfy 9.2.

9.1.1 The laboratory sample should be in satisfactory condition and representative of the bulk of the product delivered to the facility.

9.1.2 All sample and specimen cutting should be carried out in a clean area free of debris and preferentially with a surface covering to collect any loose powder which may come from material during cutting.

9.1.3 The number of test specimens shall be specified in each test method. These specimens shall be cut such that they are representative of the roll width.



10.1 Preparation of Wet Specimens: Obtain a sufficient amount of representative laboratory sample of the GCCM to satisfy [10.2](#) or [10.3](#).

10.1.1 All laboratory sample and coupon cutting should be carried out in a clean area free of debris and preferentially with a surface covering to collect any loose powder which may come from material during cutting.

10.1.2 Mark on the ~~dry GCCM lab~~ uncured GCCM laboratory sample a template of the forms (and therefore maximum possible coupon size). Mark the perimeter 25 mm [1 in.] inside the form template. Mark within this perimeter a template that represents the size of the ~~specimens~~ test specimen(s) required for the specific test to be carried out; [Fig. 1](#) This is carried out for each specimen or set of specimens required to be cut. Multiple coupons may be required to produce the number of test specimens required for the specific test. Mark the machine direction on the coupon.

10.1.3 Cut using a die or a knife the required number of ~~specimens~~ coupons of the GCCM sample to be tested, but initially cut beyond the marked template, creating a “coupon” which is oversized compared to the tested specimen by at least an inch along the perimeter of the specimen. A coupon may include one or more for preparation of wetted or cured specimens.

10.1.4 The loss of cement powder from edges of the coupon during the cutting process may have a significant impact on the accuracy of a given test method. This can be a more significant issue for specimens tested dry or wet, rather than cured, as defined under this method. The technician performing this test method should practice cutting coupons from the sample to gain confidence in preparing them without significant loss of cement powder.

9.2.4 Prepare a “hydration” tank of water equilibrated to standard temperature of  $21 \pm 2$  °C.

9.2.5 Entirely immerse the coupon(s) in the tank for a period of 20 min.

9.2.6 Remove each coupon from the tank and cut the actual test specimens to the required test dimensions from the oversized coupons using die or template and knife, using same procedure as for dry samples (see [8.2.1](#)) to collect any material that spills from the sides.

9.2.7 Place the specimen and any collected spill into a sample container.

9.2.8 If wet specimens are to be tested, there is no additional conditioning and testing is to proceed within 20 min of being removed from the hydration tank.

10.2 Preparation of Wet Specimens:

10.2.1 Prepare the hydration tank with potable water equilibrated to standard temperature of  $21 \pm 2$  °C.

10.2.2 Entirely immerse the coupon(s) in the tank for a period of 20 min.

10.2.3 Remove each coupon from the tank and cut the actual test specimens to the required test dimensions from the oversized coupons using die or template and knife, using the same procedure as for uncured samples (see [9.2](#)) to collect any material that spills from the sides.

10.2.4 Place the specimen and any collected spill into a sample container.

10.2.5 If wet specimens are to be tested, there is no additional conditioning and testing is to proceed within 20 min of being removed from the hydration tank.

10.3 Preparation of Cured Specimens:

9.3.1 For cured specimens, a determination for each set of specimens must be made before testing of the desired curing time.

9.3.2 A laboratory sample of the GCCM sufficient to cut the required number of specimens is prepared for hydration. This sample may involve multiple coupons cut from the product to facilitate the process of hydration. All coupons shall be larger than the required test specimens to allow for post curing cutting.