



Designation: D8480 – 23

Standard Test Method for Determining the Tensile Strength of GCCM Materials¹

This standard is issued under the fixed designation D8480; 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 The purpose of the proposed test method is to determine the tensile strength of cured/hydrated GCCM materials to include reporting the initial tensile strength (first crack in the cementitious layer) and final tensile strength for GCCMs as supplied and in a weathered state with the geosynthetic top layer(s) removed.

1.2 As a performance test, this method will be used relatively infrequently and to test large lots of material. This test is not intended for routine quality control testing of GCCMs.

1.3 The values in SI units are to be regarded as the standard. Values in inch-pound units are in parentheses for information.

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:²

D76/D76M Specification for Tensile Testing Machines for Textiles

D4354 Practice for Sampling of Geosynthetics and Rolled Erosion Control Products (RECPs) for Testing

D4439 Terminology for Geosynthetics

D8030/D8030M Practice for Sample Preparation for GCCM

D8364/D8364M Specification for Geosynthetic Cementitious Composite Mat (GCCM) Materials

¹ This test method is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.05 on Geosynthetic Erosion Control.

Current edition approved Oct. 1, 2023. Published October 2023. DOI: 10.1520/D8480-23.

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.

3. Terminology

3.1 For definitions of common technical terms used in this standard, refer to Terminology D4439.

3.2 Definitions:

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

3.2.2 *final tensile strength, n*—the tensile strength, expressed in kilonewtons per meter (pound force per inch), is calculated from the maximum breaking load of a GCCM specimen and dividing by the specimen width. The final tensile strength is oriented in either the machine or cross-machine direction.

3.2.3 *initial tensile strength, n*—the tensile strength, expressed in kilonewtons per meter (pound force per inch), is calculated from the initial breaking load of a GCCM specimen (when the cementitious material first cracks, observed as the first reduction in load on a load/extension graph) and dividing by the specimen width. The initial tensile strength is oriented in either the machine or cross-machine direction.

3.2.4 *top layer, n*—the upper layer of the GCCM in contact with the cementitious material that would face away from the subgrade (upwards) in a normal installation. Without this layer, the loose cementitious fill will no longer be constrained.

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

4. Significance and Use

4.1 This test method is applicable for testing GCCMs in the cured state. This determines the initial and final breaking load to determine the initial and final tensile strength of the GCCM. It is used with a constant rate of extension type tensile testing machine.

4.2 GCCMs are composites, and the cured cementitious material typically has a lower tensile strength to the geosynthetic layer(s). When testing the tensile strength of a cured GCCM, multiple cracks will typically form in the cementitious