



## Standard Test Method for Measuring Mass Per Unit of Geosynthetic Clay Liners<sup>1</sup>

This standard is issued under the fixed designation D 5993; 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 laboratory determination of the mass per unit area of a sample of a geosynthetic clay liner (GCL). The dry mass of the clay can be found by simply subtracting the manufacturer's reported nominal mass of the geosynthetic component(s) from the total mass of the dry GCL. The moisture content of the GCL can also be determined by subtracting the initial total mass of the GCL from the total mass of the dry GCL.

1.2 *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.* See Section 7 for specific precautionary statements.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

- D 123 Terminology Relating to Textiles<sup>2</sup>
- D 2216 Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock<sup>3</sup>
- D 4354 Practice for Sampling of Geosynthetics for Testing<sup>4</sup>
- D 4439 Terminology for Geosynthetics<sup>4</sup>
- D 4643 Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method<sup>3</sup>
- D 4753 Specification for Evaluating, Selecting, and Specifying Balances and Scales for Use in Testing Soil, Rock, and Related Construction Materials<sup>3</sup>
- D 5261 Test Method for Measuring Mass Per Unit Area of Geotextiles<sup>4</sup>
- E 145 Specification for Gravity-Convection and Forced Ventilation Ovens<sup>5</sup>
- E 691 Practice for Conducting an Interlaboratory Study to

Determine the Precision of a Test Method<sup>6</sup>

### 3. Terminology

#### 3.1 Definitions:

3.1.1 *geosynthetic, n*—a planar product manufactured from polymeric material used with soil, rock, earth, or other geotechnical engineering related material as an integral part of a man-made project, structure, or system. **D 4439**

3.1.2 *geosynthetic clay liner, n*—a manufactured hydraulic barrier consisting of clay bonded to a layer or layers of geosynthetic material(s). (Currently being balloted under D-35 Committee on Terminology.)

3.1.3 *moisture content, n*—that part of the mass of a geosynthetic clay liner that is absorbed water, compared to the mass of dry clay.

3.1.4 *oven-dried, adj*—the condition of a material that has been heated under prescribed conditions of temperature and humidity until there is no further significant change in its mass. **D 123**

### 4. Summary of Test Method

4.1 The mass per unit area is determined by weighing (oven-dried) specimens of known initial size after drying in an oven over a sufficient time period to remove the moisture from the GCL.

4.2 The mass per unit area of the clay component of the GCL can be estimated by subtracting the manufacturer's reported nominal mass per unit area of the synthetic component(s) from the total GCL mass per unit area.

NOTE 1—The supplier of the geosynthetic clay liner must be able to verify that the actual mass/unit area of the synthetic component(s) is within  $\pm 10\%$  of the reported nominal value. A more accurate estimation of the actual dry clay mass per unit area could be obtained by using the actual average value for the synthetic component(s) (as obtained from the manufacturer for the actual lots used to make the GCL) rather than the nominal value.

4.3 The moisture content of the GCL can be estimated with this test method.

### 5. Significance and Use

5.1 This test method is used to determine if the GCL

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<sup>2</sup> Annual Book of ASTM Standards, Vol 07.01.

<sup>3</sup> Annual Book of ASTM Standards, Vol 04.08.

<sup>4</sup> Annual Book of ASTM Standards, Vol 04.09.

<sup>5</sup> Annual Book of ASTM Standards, Vol 14.04.

<sup>6</sup> Annual Book of ASTM Standards, Vol 14.02

