



# Standard Test Method for Measuring Nominal Thickness of Permanent Rolled Erosion Control Products<sup>1</sup>

This standard is issued under the fixed designation D 6525; 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 test method is used to measure the nominal thickness of permanent rolled erosion control products.

1.2 The values stated in SI units are to be considered as the standard. The values are provided in inch-pound units for information only.

1.3 This test method does not provide thickness values for permanent rolled erosion control products under variable compressive stresses. This test method determines nominal thickness, not necessarily minimum thickness.

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:

D 1777 Test Method for Thickness of Textile Materials<sup>2</sup>

D 4354 Practice for Sampling of Geosynthetics for Testing<sup>3</sup>

D 4439 Terminology for Geotextiles<sup>3</sup>

D 5199 Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes<sup>3</sup>

## 3. Terminology

### 3.1 Definitions:

3.1.1 *pressure, n*—the force or load per unit area.

3.1.2 *thickness*—(1) the distance between one planar surface and its opposite parallel and planar surface; (2) *in permanent rolled erosion control products*, the distance between the upper and lower surfaces of the material, measured under a specified pressure and time.

## 4. Summary of Test Method

4.1 The nominal thickness of permanent rolled erosion control products is determined by observing the perpendicular distance that a movable plane is displaced from a parallel surface by the permanent rolled erosion control product while

under a specified pressure of 0.2 kPa (0.029 psi) for 5 s.

## 5. Significance and Use

5.1 Thickness is one of the basic physical properties used to control the quality of permanent rolled erosion control products. Thickness values may aid in the calculation of other permanent rolled erosion control product parameters. Thickness however is not generally an indication of field performance and generally should not be used in specifications. This test method is developed to aid manufacturers, designers, and end users in comparing the thickness of permanent rolled erosion control products through the use of an accepted ASTM standard.

5.2 The thickness of permanent rolled erosion control products may vary considerably depending on the pressure applied to the specimen during measurement. Where observed changes occur, thickness decreases when applied pressure is increased. To minimize variation, specific sample size and applied pressure are indicated in this test method to ensure all results are comparable.

5.3 This test method may be used for acceptance testing of commercial shipments of permanent rolled erosion control products, but caution is advised since information on between-laboratory precision is incomplete. Comparative tests in accordance with 5.3.1 may be advised.

5.3.1 In case of a dispute arising from differences in reported test results when using this test method for acceptance testing of commercial shipments, the purchaser and the supplier should conduct comparative tests to determine if there is a statistical bias between their laboratories. Competent statistical assistance is recommended for the investigation of bias. As a minimum, the two parties should take a group of test specimens that are as homogeneous as possible and that are formed from a lot of material of the type in question. The test specimens should be randomly assigned in equal numbers to each laboratory for testing. The average results from the two laboratories should be compared using Students *t*-test for unpaired data and an acceptable probability level chosen by the two parties before the testing is begun. If bias is found, either its cause must be found and corrected or the purchaser and supplier must agree to interpret future tests in light of the known bias.

NOTE 1—The user should be aware that the compressibility of the materials, their rebound characteristics, and the like will also affect the

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D-35 on Geosynthetics and is the direct responsibility of Subcommittee D35.05 on Geosynthetic Erosion Control.

Current edition approved Feb 10, 2000. Published April 2000.

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

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 04.09.

thickness of the permanent rolled erosion control products following the time they are rolled up on rolls, shipped, and stored.

## 6. Apparatus

6.1 *Thickness Testing Instrument*—The thickness gage shall have a base (or anvil) and a free-moving presser foot plate whose planar faces are parallel to each other to <0.1 mm. A gage with a 150-mm (6-in.) diameter presser foot, the base shall extend at least 10 mm in all directions further than the edge of the approximately 17 500-mm<sup>2</sup> circular presser foot, shall be used for measurements of permanent rolled erosion control products. The instruments must be capable of measuring a maximum thickness of at least 25 mm (1 in.) to an accuracy of ±0.2 mm. The gages shall be constructed to permit gradual application of pressure to a specific force of 0.2 ± 0.02 kPa (0.029 ± 0.003 psi) for permanent rolled erosion control products. Dead weight loading may be used.

6.2 *Cutting Dies*—Dies to cut specimens should have dimensions at least as large as a circle 200 mm (8 in.) in diameter.

NOTE 2—Due to compressibility of many permanent rolled erosion control products, the cutting and handling preparation may change the thickness. Care should be exercised to minimize these effects.

## 7. Sampling

7.1 *Lot Sample*—In the absence of other guidelines, divide the product into lots and take lot samples in accordance with Practice D 4354.

7.2 *Laboratory Sample*—Consider the units in the lot sample as the units in the laboratory sample. For the laboratory sample, take a full-width sample of sufficient length along the center section of the rolls. Exclude the inner and outer layers or wraps of the roll or any material containing folds, crushed areas, or other distortions not representative of the sampled lot.

7.3 Remove test specimens from the laboratory sample in a randomly distributed pattern across the width with no specimen taken nearer than 100 mm (4 in.) from the roll sides or ends, unless otherwise specified.

7.4 *Test Specimens*—From each unit in the laboratory sample, remove the specimens so that the edge of the specimen will extend beyond the edge of the presser foot by 10 mm (0.39 in.) in all directions (that is at least a circle of 200 mm (8 in.) in diameter).

7.5 *Number of Specimens*—Unless otherwise agreed upon, as when provided in an applicable material specification, take a number of test specimens per laboratory sample such that the user may expect at the 95 % probability level that the test result is not more than 6.0 % of the average above or below the average of the sample. Determine the number of specimens per sample as follows:

7.5.1 *Reliable Estimate of  $v$* —When there is a reliable estimate of  $v$  based upon extensive part records for similar materials tested in the user's laboratory as directed in this test method, calculate the required number of specimens as follows:

$$n = (tv/A)^2 \quad (1)$$

where:

- $n$  = number of test specimens (rounded upward to a whole number),
- $v$  = reliable estimate of the coefficient of variation of individual observations on similar materials in the user's laboratory under conditions of single operation precision, %,
- $t$  = value of Student's  $t$  for one-sided limits (see Table 1 of Test Method D 5199), a 95 % probability level, and the degrees of freedom associated with the estimate of, and
- $A$  = 5.0 % of the average, the value of the allowable variation.

7.5.2 *No Reliable Estimate of  $v$* —When there is no reliable estimate of  $v$  for the user's laboratory, this equation should not be used directly. Instead, specify the fixed number (10) of specimens. The number of specimens is calculated using  $v = 9.5$  % of the average. These values for  $v$  are somewhat larger than usually found in practice. When a reliable estimate of  $v$  for the user's laboratory becomes available, this equation will usually require fewer than the fixed number of specimens.

## 8. Conditioning

8.1 Bring the specimens to the moisture and temperature equilibrium in the atmosphere for testing permanent rolled erosion control products, that is a temperature of 21 ± 2°C (70 ± 4°F) and a relative humidity of 60 ± 10 %.

## 9. Procedure

9.1 Test the conditioned specimens in the standard atmosphere specified in 8.1.

9.2 Handle the test specimens carefully to avoid altering the natural state of the material.

9.3 With force applied to the presser foot on the base (no test specimen present), zero the measuring scale or record the base reading. Lift the presser foot, center the test specimen on the base under the presser foot, and bring the presser foot into the contact with the material. Gradually increase the pressure to 0.2 kPa (0.029 psi). After the full force has been applied to the presser foot for 5 s against the specimen, record the thickness to the nearest 0.2 mm and remove the specimen from the test device.

9.4 Repeat the method for each of the remaining specimens.

## 10. Calculation

10.1 Calculate the average of the thickness for all test results as read directly from the test instrument.

## 11. Report

11.1 Report the following information for the nominal thickness:

11.1.1 Project, type of permanent rolled erosion control product tested, and method of sampling,

11.1.2 Name or description of thickness apparatus used for testing,

11.1.3 Dimensions of the presser foot and of the specimen,

11.1.4 Loading time interval,

11.1.5 Number of tests,

11.1.6 Average nominal thickness,  
11.1.7 Coefficient of variation of thickness in the sample, in  
percent (optional), and

11.1.8 Any unusual or out-of-standard conditions or obser-  
vations made during the tests.

*The American Society for Testing and Materials takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.*

*This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.*

*This standard is copyrighted by ASTM, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or [service@astm.org](mailto:service@astm.org) (e-mail); or through the ASTM website ([www.astm.org](http://www.astm.org)).*