

This document is not an ASTM standard and is intended only to provide the user of an ASTM standard an indication of what changes have been made to the previous version. Because it may not be technically possible to adequately depict all changes accurately, ASTM recommends that users consult prior editions as appropriate. In all cases only the current version of the standard as published by ASTM is to be considered the official document.



---

**Designation: D 4759 – 88 (Reapproved 1996)**



**Designation: D 4759 – 02**

## Standard Practice for Determining the Specification Conformance of Geosynthetics<sup>1</sup>

This standard is issued under the fixed designation D 4759; 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 reappraisal. A superscript epsilon (ε) indicates an editorial change since the last revision or reappraisal.

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D-35 on Geotextiles, Geomembranes, and Related Products and is the direct responsibility of Subcommittee D35.01 on Mechanical Properties.

Current edition approved Feb. 11, 1988; Oct. 10, 2002. Published April 1988; November 2002. Originally published as D 4759–88. Last previous edition D 4759–88(1996).

### 1. Scope

1.1 This practice covers a procedure for determining the conformance of geosynthetic properties to standard specifications.

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.*

### 2. Referenced Documents

2.1 *ASTM Standards:*

D 4354 Practice for Sampling of Geosynthetics for Testing<sup>2</sup>

D 4439 Terminology for Geosynthetics<sup>2</sup>

D 4533 Test Method for Trapezoid Tearing Strength of Geotextiles<sup>2</sup>

### 3. Terminology

3.1 *Definitions:*

3.1.1 *geotextile, n*—any permeable textile used with foundation soil, rock, earth, or any other geotechnical engineering related material as an integral part of a man-made project, structure, or system.

3.1.2 *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.

3.1.3 *specification, n*—a precise statement of a set of requirements to be satisfied by a material, product, system or service that indicates the procedures for determining whether each of the requirements is satisfied.

3.1.4 *test result, n*—a value obtained by a given test method, expressed as a single determination or a specified combination of a number of determinations.

3.1.5 For definition of terms relating to geotextiles, refer to Terminology D 4439.

### 4. Significance and Use

4.1 This practice provides a means by which the purchaser can determine the conformance of geosynthetic properties as applied to the acceptance or rejection of a material in regards to a material specification.

4.2 This practice has been developed with strong emphasis on practicality and the realization that all geosynthetics are subjected to a vigorous quality control program prior to shipping.

NOTE 1—It is suggested that the user obtain the mean, standard deviation, and/or the coefficient of variation for given physical/mechanical properties of a product directly from the manufacturer. If this data is unavailable, it is suggested that users of this practice begin to accumulate data that can be used to estimate product averages and standard deviations for each product.

NOTE 2—The risk to the purchaser of buying out of specification materials is minimal when conformance requirements are detailed in the purchase specification and adequate conformance testing is performed. It is the producer's responsibility to perform thorough quality control testing for all properties requiring certification. The producer's risk of rejection is minimal with the performance of this thorough quality control testing.

### 5. Procedure

5.1 Divide into lots and select lot and laboratory samples as directed in Practice D 4354.

<sup>2</sup> *Annual Book of ASTM Standards*, Vol 04.13.

- 5.2 Test the number of specimens as directed in the applicable testing method.
  - 5.3 If the average test values for the individual lot sampling unit meet all the acceptable specification values, the lot passes.
  - 5.4 If the average test value for any individual lot sampling unit does not meet one or more of the acceptable specification values, the lot shall be resampled and tested, except as noted in 5.4.3.
    - 5.4.1 Any individual lot sampling unit which fails initial testing shall not be included in the lot for resampling.
    - 5.4.2 Disposition of individual lot sampling units which fail initial testing shall be agreed upon by purchaser and seller.
    - 5.4.3 If all lot sampling units fail initial testing, reject the entire lot without further sampling and testing.
    - 5.4.4 The resample size shall be at least that determined in 5.1.
- NOTE 3—The larger the number of samples in a resample, the smaller will be the consumer’s risk of accepting an undesirable product.
- 5.5 Pass the lot if the average test values for the individual lot sampling unit from the resample meet the acceptable specification values.
  - 5.6 Fail the lot if the average test values for any individual lot sampling unit from the resample do not meet one or more of the acceptable specification values.
  - 5.7 Reject any failing lot.
  - 5.8 A numerical example of this practice is included in Appendix X1.

**APPENDIX**

**(Nonmandatory Information)**

**X1. EXAMPLE OF DETERMINING CONFORMANCE TO SPECIFICATION**

X1.1 *Assumptions*—This example assumes the following:

X1.1.1 A geotextile is to be tested against a specification that requires a minimum of trapezoid tear strength of 356 N (80 lbf).

X1.1.2 For this example, the lot consists of ~~100~~ 300 rolls. Practice D 4354, Procedure C requires ~~five~~ two lot sampling units per lot for lots of ~~65~~ 201 to ~~125~~ 500 rolls. The ~~100~~ 300 rolls in the lot were assigned numbers and the five rolls to be used as lot sampling units were selected using a table of random numbers.

**TABLE X1.1 Test Results for Sample Set 1**

Specimen	Lot Sampling Units									
	Machine Direction					Cross-Machine Direction				
	1	2	3	4	5	1	2	3	4	5
1	84	79	92	79	80	84	85	94	8082	
2	84	79	92	79	80	84	85	94	80	
3	83	80	93	78	82	85	86	96	8183	
4	83	80	93	78	82	85	86	96	81	
5	82	84	95	79	84	84	84	92	8381	
6	82	84	95	79	84	84	84	92	83	
7	82	82	94	80	86	83	87	94	8485	
8	82	82	94	80	86	83	87	94	84	
9	83	83	90	81	84	82	88	93	8284	
10	83	83	90	81	84	82	88	93	82	
Average	82.8	81.0	92.8	79.4	82.6	83.8	86.0	93.2	82.0	83.0

X1.1.3 Test Method D 4533 specifies there will be one laboratory sampling unit taken from each lot sampling unit and requires the following number of test specimens per laboratory sampling unit in each direction:

$$n = (tv/A)^2$$

where:

- $n$  = number of test specimens per laboratory sampling unit (rounded upward to the next whole number),
- $v$  = reliable estimate of the coefficient of variation for individual observations based on similar materials in the user’s laboratory under conditions of single-operator precision,
- $t$  = the value of Student’s  $t$  for one side limits, a 95 % probability level, and the degrees of freedom associated with the estimate of  $v$ , and
- $A$  = 5.0 % of the average, the value of the allowable variation.

X1.1.4 Based on a value of  $v = 6.3$  lbf associated with an infinite number of degrees of freedom ( $t = 1.645$ ):

$n = [(1.645) (6.3)/5.0]^2 = 4.3 = 5$  specimens per laboratory sampling unit in each direction

X1.2 *Data for Sample Set 1*—The data are given in Table X1.1. Lot sampling unit 4 2 failed in the machine direction. Since lot sampling unit 4 2 does not meet the specification requirement, the lot was resampled.

X1.3 *Resampling*—The supplier and the purchaser agreed to increase the number of rolls in the second lot sample to ~~six~~ three. The ~~six~~ three rolls in the second sample were selected using a table of random numbers excluding the roll from which lot sampling unit 4 2 was taken.

X1.4 *Data for Sample Set 2*—The data are given in Table X1.2. None of the lots sampling units failed. The lot was accepted.

*ASTM International 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 International 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 International, 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 (e-mail); or through the ASTM website (www.astm.org).*

**TABLE X1.2 Test Results for Sample Set 2**

Specimen	Lot Sampling Units						6
	Machine Direction			Cross-Machine Direction			
	<u>62</u>	<u>74</u>	<u>85</u>	<u>92</u>	<u>404</u>	<u>44</u>	
1	86	92	96	78	84	82	87
2	85	94	95	80	79	84	87
3	83	90	97	82	79	83	86
3	83	90	97	82	79	83	86
4	81	91	94	84	83	85	84
5	82	93	93	83	80	84	83
Average	83.4	92.0	95.0	81.4	80.4	83.0	85.4