



Designation: ~~D4439~~ – ~~14~~ D4439 – 15

Standard Terminology for Geosynthetics¹

This standard is issued under the fixed designation D4439; 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. Referenced Documents

1.1 *ASTM Standards:*²

[C125 Terminology Relating to Concrete and Concrete Aggregates](#)

[D1987 Test Method for Biological Clogging of Geotextile or Soil/Geotextile Filters](#)

[D4354 Practice for Sampling of Geosynthetics and Rolled Erosion Control Products\(RECPs\) for Testing](#)

[D4439 Terminology for Geosynthetics](#)

[D4491 Test Methods for Water Permeability of Geotextiles by Permittivity](#)

~~D4533~~[D4533/D4533M Test Method for Trapezoid Tearing Strength of Geotextiles](#)

~~D4594~~[D4594/D4594M Test Method for Effects of Temperature on Stability of Geotextiles](#)

[D4595 Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method](#)

~~D4632~~[D4632/D4632M Test Method for Grab Breaking Load and Elongation of Geotextiles](#)

~~D4716~~[D4716/D4716M Test Method for Determining the \(In-plane\) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head](#)

[D4751 Test Method for Determining Apparent Opening Size of a Geotextile](#)

[D4759 Practice for Determining the Specification Conformance of Geosynthetics](#)

~~D4833~~[D4833/D4833M Test Method for Index Puncture Resistance of Geomembranes and Related Products](#)

[D4873 Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples](#)

~~D4884~~[D4884/D4884M Test Method for Strength of Sewn or Bonded Seams of Geotextiles](#)

[D4885 Test Method for Determining Performance Strength of Geomembranes by the Wide Strip Tensile Method](#)

[D5101 Test Method for Measuring the Filtration Compatibility of Soil-Geotextile Systems](#)

[D5141 Test Method for Determining Filtering Efficiency and Flow Rate of the Filtration Component of a Sediment Retention Device](#)

[D5262 Test Method for Evaluating the Unconfined Tension Creep and Creep Rupture Behavior of Geosynthetics](#)

[D5322 Practice for Laboratory Immersion Procedures for Evaluating the Chemical Resistance of Geosynthetics to Liquids](#)

[D5323 Practice for Determination of 2 % Secant Modulus for Polyethylene Geomembranes](#)

[D5397 Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test](#)

[D5494 Test Method for the Determination of Pyramid Puncture Resistance of Unprotected and Protected Geomembranes](#)

[D5496 Practice for In Field Immersion Testing of Geosynthetics](#)

~~D5514~~[D5514/D5514M Test Method for Large Scale Hydrostatic Puncture Testing of Geosynthetics](#)

[D5567 Test Method for Hydraulic Conductivity Ratio \(HCR\) Testing of Soil/Geotextile Systems](#)

[D5594 Test Method for Determination of the Vinyl Acetate Content of Ethylene-Vinyl Acetate \(EVA\) Copolymers by Fourier Transform Infrared Spectroscopy \(FT-IR\)](#)

[D5617 Test Method for Multi-Axial Tension Test for Geosynthetics](#)

[D5641 Practice for Geomembrane Seam Evaluation by Vacuum Chamber](#)

~~D5747~~[D5747/D5747M Practice for Tests to Evaluate the Chemical Resistance of Geomembranes to Liquids](#)

[D5818 Practice for Exposure and Retrieval of Samples to Evaluate Installation Damage of Geosynthetics](#)

[D5820 Practice for Pressurized Air Channel Evaluation of Dual Seamed Geomembranes](#)

~~D5994~~[D5994/D5994M Test Method for Measuring Core Thickness of Textured Geomembranes](#)

¹ This terminology is under the jurisdiction of [D35](#) on Geosynthetics and is the direct responsibility of [D35.93](#) on Editorial and Terminology.

Current edition approved ~~March 1, 2014~~ [July 1, 2015](#). Published ~~March 2014~~ [July 2015](#). Originally approved in 1984. Last previous edition approved in ~~2014~~ [2014](#) as ~~D4439 – 14~~ [D4439 – 14](#). DOI: ~~10.1520/D4439-14~~ [10.1520/D4439-15](#).

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.

1.2 *Federal Standard*:³
Federal Standard 751a Stitches, Seams, and Stitchings
2. Terminology

- absorption**, *n*—the process by which a liquid is drawn into and tends to fill permeable pores in a porous solid body, also, the increase in mass of a porous solid body resulting from penetration of a liquid into its permeable pores. **C125**
- aerobic**, *n*—a condition in which a measurable volume of air is present in the incubation chamber or system. **D1987**
- anaerobic**, *n*—a condition in which no measurable volume of air is present in the incubation chamber or system. **D1987**
- apparent opening size (AOS), O_{95}** , *n*—*for a geotextile*, a property which indicates the approximate largest particle that would effectively pass through the geotextile. **D4751**
- atmosphere for testing geosynthetics**, *n*—air maintained at a relative humidity between 50 to 70 % and a temperature of $21 \pm 2^\circ\text{C}$ ($70^\circ \pm 4^\circ\text{F}$). **D4439, D4751, D5494**
- back flushing**, *n*—a process by which liquid is forced in the reverse direction to the flow direction. **D1987**
- basis weight**—deprecated term (do not use in the sense of mass per unit area). **D4439**
- bend**, *vt*—*in mechanics*, to force an object from its natural or manufactured shape into a curve or into increased curvature. **D4439**
- biocide**, *n*—a chemical used to kill bacteria and other microorganisms. **D1987**
- blinding**, *n*—*for geotextiles*, the condition where soil particles block the surface openings of the fabric, thereby reducing the hydraulic conductivity of the system. **D4439**
- breaking force**, (*F*), *J*, *n*—the force at failure. **D4885**
- breaking load**, *n*—the maximum force applied to a specimen in a tensile test carried to rupture. **D4632D4632/D4632M**
- breaking toughness**, *T*, (FL^{-1}), Jm^{-2} , *n*—*for geotextiles*, the actual work-to-break per unit surface area of material. **D4595, D4885**
- chemical resistance**, *n*—the ability to resist chemical attack. **D5322**
- clogging**, *n*—*for geotextiles*, the condition where soil particles move into and are retained in the openings of the fabric, thereby reducing the hydraulic conductivity. **D4439**
- clogging potential**, *n*—*in geotextiles*, the tendency for a given geotextile to decrease permeability due to soil particles that have either lodged in the geotextile openings or have built up a restrictive layer on the surface of the geotextile. **D5101**
- compressed thickness** (*t*, (*L*), *mm*), *n*—thickness under a specified stress applied normal to the material. **D4439**
- constant-rate-of-load tensile testing machine (CRL)**, *n*—a testing machine in which the rate of increase of the load being applied to the specimen is uniform with time after the first 3 s. **D4439**
- corresponding force**, *n*—synonym for force at specified elongation. **D4885**
- coupon**, *n*—a portion of a material or laboratory sample from which multiple specimens can be taken for testing. **D5747D5747/D5747M**
- creep**, *n*—the time-dependent increase in accumulative strain in a material resulting from an applied constant force. **D5262**
- critical height** (*ch*), *n*—the maximum exposed height of a cone or pyramid that will not cause a puncture failure of a geosynthetic at a specified hydrostatic pressure for a given period of time. **D5514D5514/D5514M**
- cross-machine direction**, *n*—the direction in the plane of the fabric perpendicular to the direction of manufacture. **D4632D4632/D4632M**
- density** (ρ , (ML^{-3}), kg/m^3), *n*—mass per unit volume. **D4439**
- design load**—the load at which the geosynthetic is required to operate in order to perform its intended function. **D5262**
- elastic limit**, *n*—*in mechanics*, the stress intensity at which stress and deformation of a material subjected to an increasing force cease to be proportional; the limit of stress within which a material will return to its original size and shape when the force is removed, and hence, not a permanent set. **D4885**

³ Available from DLA Document Services, Building 4/D, 700 Robbins Ave., Philadelphia, PA 19111-5094, <http://quicksearch.dla.mil>.

elongation at break, *n*—the elongation corresponding to the breaking load, that is, the maximum load. **D4632D4632/D4632M**

failure, *n*—an arbitrary point beyond which a material ceases to be functionally capable of its intended use. **D4885, D5262**

failure, *n*—*in testing geosynthetics*, water or air pressure in the test vessel at failure of the geosynthetic. **D5514D5514/D5514M**

field testing, *n*—testing performed in the field under actual conditions of temperature and exposure to the fluids for which the immersion testing is being performed. **D5496**

fill—deprecated term, see **filling**.

filling, *n*—yarn running from selvage to selvage at right angles to the warp in a woven fabric. **D4439**

flexible polypropylene, *n*—a material having a 2 % secant modulus of less than 300 MPa (40,000 psi) as determined by Practice **D5323** produced by polymerization of propylene with or without other alpha olefin monomers.

force at specific elongation, FASE, *n*—the force associated with a specific elongation on the force-elongation curve. **D4439**

force-elongation curve, *n*—*in a tensile test*, a graphical representation of the relationship between the magnitude of an externally applied force and the change in length of the specimen in the direction of the applied force. (*Synonym* for stress-strain curve.) **D4885**

geocomposite, *n*—a product composed of two or more materials, at least one of which is a geosynthetic.

geofoam, *n*—block or planar rigid cellular foamed polymeric material used in geotechnical engineering applications.

geogrid, *n*—a geosynthetic formed by a regular network of integrally connected elements with apertures greater than 6.35 mm (¼ in.) to allow interlocking with surrounding soil, rock, earth, and other surrounding materials to function primarily as reinforcement. **D5262**

geomembrane, *n*—an essentially impermeable geosynthetic composed of one or more synthetic sheets. **D4439, D4873, D4885, D5994D5994M, D5820**

geonet, *n*—a geosynthetic consisting of integrally connected parallel sets of ribs overlying similar sets at various angles for planar drainage of liquids or gases. **D4439**

geostrip—polymeric material in the form of a strip of width not more than 200 mm (7.87 in.), used in contact with soil or other materials in geotechnical and civil engineering applications, or both.

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. **D4354, D4759, D4873, D5617, D5818**
<https://standards.iteh.ai/catalog/standards/sist/4f454af5-d67e-449b-b29a-d0512d5eab8b/astm-d4439-15>

geosynthetic barrier—low-permeability geosynthetic material, used in geotechnical and civil engineering applications with the purpose of reducing or preventing the flow of fluid through the construction.

geosynthetic clay liner, *n*—a manufactured hydraulic barrier consisting of clay bonded to a layer or layers of geosynthetic materials.

geotechnical engineering, *n*—the engineering application of geotechnics. **D4439, D4595**

geotechnics, *n*—the application of scientific methods and engineering principles to the acquisition, interpretation, and use of knowledge of materials of the earth's crust to the solution of engineering problems. **D4439, D4491, D4595, D4716D4716/D4716M, D4751**

geotextile, *n*—a permeable geosynthetic comprised solely of textiles.

DISCUSSION—

Geotextiles perform several functions in geotechnical engineering applications, including: separation; filtration; drainage; reinforcement; and protection. **D1987, D4439, D5594**

grab test, *n*—*in fabric testing*, a tension test in which only a part of the width of the specimen is gripped in the clamps. **D4632D4632/D4632M**

gradient ratio, *n*—*in geotextiles*, the ratio of the hydraulic gradient through a soil-geotextile system to the hydraulic gradient through the soil alone. **D5101**

gravity flow, *n*—flow in a direction parallel to the plane of a geotextile or related product driven predominately by a difference in elevation between the inlet and outflow points of a specimen. **D4716D4716/D4716M**