



Designation: D 4439 – 02

Standard Terminology for Geosynthetics¹

This standard is issued under the fixed designation D 4439; 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.

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. **C 125**

aerobic, *n*—a condition in which a measurable volume of air is present in the incubation chamber or system. **D 1987**

anaerobic, *n*—a condition in which no measurable volume of air is present in the incubation chamber or system. **D 1987**

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. **D 4751**

atmosphere for testing geosynthetics, *n*—air maintained at a relative humidity between 50 to 70 % and a temperature of $21 \pm 2^\circ\text{C}$ ($70^\circ \pm 4^\circ\text{F}$). **D 4439, D 4751, D 5494**

back flushing, *n*—a process by which liquid is forced in the reverse direction to the flow direction. **D 1987**

basis weight—deprecated term (do not use in the sense of mass per unit area). **D 4439**

bend, *vt*—in *mechanics*, to force an object from its natural or manufactured shape into a curve or into increased curvature. **D 4439**

blinding, *n*—for *geotextiles*, the condition where soil particles block the surface openings of the fabric, thereby reducing the hydraulic conductivity of the system. **D 4439**

biocide, *n*—a chemical used to kill bacteria and other microorganisms. **D 1987**

breaking force, (*F*), *J*, *n*—the force at failure. **D 4885**

breaking load, *n*—the maximum force applied to a specimen in a tensile test carried to rupture. **D 4632**

breaking toughness, *T*, (FL^{-1}), Jm^{-2} , *n*—for *geotextiles*, the actual work-to-break per unit surface area of material. **D 4595, D 4885**

chemical resistance, *n*—the ability to resist chemical attack. **D 5322**

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. **D 4439**

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. **D 5101**

compressed thickness (*t*, (*L*), mm), *n*—thickness under a specified stress applied normal to the material. **D 4439**

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. **D 4439**

corresponding force, *n*—synonym for force at specified elongation. **D 4885**

coupon, *n*—a portion of a material or laboratory sample from which multiple specimens can be taken for testing. **D 5747**

creep, *n*—the time-dependent increase in accumulative strain in a material resulting from an applied constant force. **D 5262**

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. **D 5514**

cross-machine direction, *n*—the direction in the plane of the fabric perpendicular to the direction of manufacture. **D 4632**

density (ρ , (ML^{-3}), kg/m^3), *n*—mass per unit volume. **D 4439**

design load—the load at which the geosynthetic is required to operate in order to perform its intended function. **D 5262**

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. **D 4885**

elongation at break, *n*—the elongation corresponding to the breaking load, that is, the maximum load. **D 4632**

failure, *n*—an arbitrary point beyond which a material ceases to be functionally capable of its intended use. **D 4885, D 5262**

failure, *n*—in *testing geosynthetics*, water or air pressure in the test vessel at failure of the geosynthetic. **D 5514**

flexible polypropylene, *n*—a material having a 2 % secant modulus of less than 300 MPa (40,000 psi) as determined by

¹ This terminology is under the jurisdiction of D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.93 on Editorial and Terminology.

Current edition approved August 10, 2002. Published October 2002. Originally published as D 4439 – 84. Last previous edition D 4439 – 01.

Test Method D 5323 produced by polymerization of propylene with or without other alpha olefin monomers.

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. **D 5496**

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

filling, *n*—yarn running from selvage to selvage at right angles to the warp in a woven fabric. **D 4439**

force at specific elongation, FASE, *n*—the force associated with a specific elongation on the force-elongation curve. **D 4439**

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.) **D 4885**

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. **D 5262**

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. **D 4439**

geomembrane, *n*—an essentially impermeable geosynthetic composed of one or more synthetic sheets. **D 4439, D 4873, D 4885, D 5994, D 5820**

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 4354, D 4759, D 4873, D 5617, D 5818**

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. **D 4439, D 4595**

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. **D 4439, D 4491, D 4595, D 4716, D 4751**

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. **D 1987, D 4439, D 5594**

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. **D 4632**

gradient ratio, *n*—*in geotextiles*, the ratio of the hydraulic

gradient through a soil-geotextile system to the hydraulic gradient through the soil alone. **D 5101**

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. **D 4716**

head, *n*—pressure at a point in a liquid, expressed in terms of the vertical distance of the point below the surface of the liquid. **D 4716**

hydraulic conductivity (*k*), *n*—the rate of discharge of water under laminar flow conditions through a unit cross-sectional area of a porous medium under a unit hydraulic gradient and standard temperature conditions (20°C). **D 5567**

hydraulic conductivity ratio (HCR), *n*—the ratio of the hydraulic conductivity of the soil/geotextile system, k_{sg} , at any time during the test, to the initial hydraulic conductivity, k_{sg0} , measured at the beginning of the test (new).

hydraulic gradient, *i*, *s* (*D*)—the loss of hydraulic head per unit distance of flow, dH/dL. **D 5101**

hydraulic transmissivity, θ ($L^2 T^{-1}$), *n*—*for a geotextile or related product*, the volumetric flow rate of water per unit width of specimen per unit gradient in a direction parallel to the plane of the specimen. **D 4716**

hydrostatic pressure, *n*—a state of stress in which all the principal stresses are equal (and there is no shear stress), as in a liquid at rest; induced artificially by means of a gaged pressure system; the product of the unit weight of the liquid and the difference in elevation between the given point and the free water elevation. **D 5514**

index test, *n*—a test procedure which may contain a known bias but which may be used to establish an order for a set of specimens with respect to the property of interest. **D 4833, D 4885**

inflection point, *n*—the first point of the force-elongation curve at which the second derivative equals zero. **D 4885**

initial tensile modulus, J_p (FL^{-1}), Nm^{-1} , *n*—*for geosynthetics*, the ratio of the change in force per unit width to the change in elongation of the initial portion of a force-elongation curve. **D 4885**

in-plane flow, *n*—fluid flow confined to a direction parallel to the plane of a geotextile or related product. **D 4716**

integral, *adj*—*in geosynthetics*, forming a necessary part of the whole; constituent. **D 4439**

laboratory sample, *n*—a portion of material taken to represent the lot sample, or the original material, and used in the laboratory as a source of test specimens. **D 4354**

laminar flow, *n*—flow in which the head loss is proportional to the first power of the velocity. **D 4716**

linear density, *n*—mass per unit length; the quotient obtained by dividing the mass of a fiber or yarn by its length.

lot, *n*—a unit of production, or a group of other units or packages, taken for sampling or statistical examination, having one or more common properties and being readily separable from other similar units. **D 4354**