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Standard Terminology for Geosynthetics[1]

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 ± 2°C (70° ± 4°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 micro-organisms. **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 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

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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 conductivty of the soil/geotextile system, k_{sg}, at any time during the test, to the initial hydraulic conductivity, k_{sgo}, 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**

lot sample, *n*—one or more shipping units taken at random to represent an acceptance sampling lot and used as a source of laboratory samples. **D 4354**

minimum average roll value (MARV), *n*—for geosynthetics, a manufacturing quality control tool used to allow manufacturers to establish published values such that the user/purchaser will have a 97.7% confidence that the property in question will meet published values. For normally distributed data, "MARV" is calculated as the typical value minus two (2) standard deviations from documented quality control