

Australian Standard™

Geosynthetics—Glossary of terms

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PREFACE

This Standard was prepared by the Standards Australia Committee CE-020, Geosynthetics, to supersede AS 3704—1990.

The objective of this Standard is to provide all users of geosynthetics with a comprehensive glossary of terms specifically relating to the subject.

In the preparation of the Standard, reference was made to ASTM and draft ISO test procedures and to glossaries published by CEN and the IGS. These include the terms used in the AS 3706 series, *Geotextiles—Methods of test*, and HB 154, *Geosynthetics—Guidelines on durability*.

The Standard lists alphabetically the terms used in the geosynthetics industry, but it is not exhaustive. The format of the glossary is as follows:

- (a) Preferred terms accompanied by definitions are printed in bold type.
- (b) Where the meanings of terms relating to a common subject are under an appropriate headword, the individual words are cross-referenced to that headword. For example, ‘chemical bonding’ is cross-referenced to ‘bonding’ under which headword the definition appears.
- (c) Non-preferred terms are printed in light type, and are cross-referred to the appropriate preferred words.

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STANDARDS AUSTRALIA

Australian Standard

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1 DEFINITIONS

Term	Definition
abnormal test result	A result that lies more than three standard deviations from the mean.
abrasion	The wearing away of any part of a material by the action of friction or rubbing.
abrasion resistance	The ability of a material to resist wear due to friction or rubbing.
absorption	A mechanism by which a fluid is assimilated by or taken up into a material or its constituents or both.
anisotropic	Having directionally variable physical properties.
antioxidant	A substance designed to retard or prevent oxidative degradation of a material.
apparent opening size	<i>See</i> opening size.
basecloth	A textile fabric, normally woven, which may be included in a needle felt to provide dimensional stability and strength and in some cases to facilitate the needle-punching operation.
batch	A defined quantity of a geosynthetic manufactured, produced, or stored under conditions presumed to be uniform, or a quantity purchased or offered for sale or for sampling at the one time. (<i>See also</i> order and sample.)
batt	Single or multiple sheets of fibre used in non-woven fabric production.
binder	An additive used to bind fibres together. A binder may be of a chemical, adhesive, resinous, or fibrous nature.
binder content	The mass of binder added as a percentage of the total mass of the geotextile.
bonding	The process by means of which one or more sheets, webs, or batts of fibre are held together. Bonding may be accomplished by mechanical, chemical, thermal, or solvent means, or combinations thereof.
chemical bonding	A process that uses suitable chemical products to achieve bonding.
mechanical bonding	A process that uses suitable mechanical methods to achieve bonding.
needle bonding	A mechanical process that uses barbed needles mounted in a needle loom to entangle the fibres of a web or batt by reorientation of some of the fibres within its structure.
needle felting	
needle punching	
needling	

Term	Definition
resin bonding	A process that uses suitable resins or adhesives to achieve bonding.
spray bonding	A process that uses droplets of an adhesive sprayed on to the fibre web or batt to achieve bonding.
spun bonding spun laid	A continuous method of making non-woven fabrics in which filaments are extruded and laid down in the form of a web and bonded.
stitch bonding	A process that uses suitable stitching techniques to achieve bonding. A stitch-bonded fabric is usually a multicomponent one in which one component is a series of interlooped stitches running along the fabric length, e.g., a fibre web bonded by stitching yarns.
heat bonding thermal bonding	A process in which a web or batt of fibres containing heat-sensitive material is bonded by the application of heat with or without the application of pressure. The heat sensitive material may be in the form of fibres, bicomponent fibres, or powders.
breaking stress	The maximum stress developed in a test specimen at the point of rupture. The force applied is usually related to the cross-sectional area of the unstrained specimen.
breaking tensile strength	<i>See</i> strength.
bulk sample	<i>See</i> sample.
bursting strength	<i>See</i> strength.
calender	A machine in which heavy rollers rotate under mechanical or hydraulic pressure. The rollers may be unheated, or one may be a thick-walled steel shell heated internally. All rollers may rotate at the same speed or one highly polished and heated roller may rotate at a higher surface speed than the rest.
calendering	A method of making a thermal bond in which calender rollers are used to apply heat and pressure, thus causing bonding by the softening or melting of the heat-sensitive material.
characteristic value	The value of a material property which generally corresponds to a fractile of the assumed statistical distribution of the particular property of the material specified by relevant Standards and tested under specific conditions.
chemical bonding	<i>See</i> bonding.
coefficient of permeability	<i>See</i> permeability.
coefficient of variation	The standard deviation expressed as a percentage of the mean value.
composite geotextile	<i>See</i> geotextile.
conditioning	The process by which geotextile materials are permitted to come to hygroscopic and thermal equilibrium with the surrounding atmosphere or with the standard atmosphere for testing. (<i>See also</i> standard atmosphere for testing.)
constant-rate-of-extension (CRE) tensile testing machine	A testing machine in which the rate of extension of the specimen is constant with respect to time.

Term	Definition
continuous filament	A fibre of indefinite length.
continuous filament yarn	A yarn of one or more filaments that run essentially the whole length of the yarn. (<i>See also</i> filament.) NOTE: Yarns of one or more filaments are usually referred to as monofilaments or multifilaments respectively.
course	A term applied to knitted fabrics describing a succession or row of knitted loops or stitches across the width of the fabric, usually perpendicular to the wales. (<i>See also</i> wales.)
creep	The time-dependent deformation of a material due to the application of a continuing and constant force.
cross-machine direction	<i>See</i> direction.
CRE testing machine	<i>See</i> constant-rate-of-extension tensile testing machine.
degradation	The reduction, over a period of time, in one or more physical properties of a geotextile due to external agencies. Such agencies may include abrasion, weathering, sunlight, ultraviolet light, chemicals, pollutants, soil burial, and various combinations thereof.
accelerated degradation	Degradation induced for testing purposes at a rate faster than that applying in normal in-service conditions.
actinic degradation	Degradation of fibres or fabrics due to exposure to solar radiation.
ultraviolet degradation	Degradation of fibres or fabrics due to exposure to ultraviolet radiation.
denier	A unit of linear density, equal to the mass, in grams, of 9000 m of a filament or yarn. (<i>See also</i> linear density and text.)
direction	
cross-machine direction	The direction in a machine-made fabric, perpendicular to the direction of motion of the material through the processing machine.
machine direction	The direction in a machine-made fabric, parallel to the direction of motion of the material through the processing machine.
normal direction	The direction perpendicular to the plane of the geotextile.
planar direction	Any direction in the plane of the geotextile.
drainage	The collecting and transporting of precipitation, ground water and/or other fluids.
durability	The ability of a geotextile to retain its original properties over a period of time. (<i>See also</i> degradation.)
electrokinetic geosynthetic	A composite material that may provide filtration, drainage and reinforcement, in addition to electrical conduction.
elongation	Extension expressed as a percentage of the original gauge length.
elongation at break	The elongation at the breaking point.
elongation at ultimate force	The elongation at the maximum applied force.
equivalent opening size	<i>See</i> opening size.

Term	Definition
erosion control mat (ECM)	A permeable, biodegradable (synthetic or natural) structure placed over the soil for temporary erosion control applications, usually while vegetation is being established.
extension	The increase of the gauge length with the applied force.
fabric <i>see</i> 'Geotextile'	A manufactured assembly of fibres or yarns or combination of fibres and yarns that has substantial surface area in relation to its thickness and sufficient mechanical strength to give the assembly inherent cohesion.
face surface	The surface of a geotextile fabric, which is normally laid face upwards in the ground, unless designated otherwise. The face surface of a fabric is normally designated by the manufacturer.
fatigue	The phenomenon of change of physical or mechanical properties of a geotextile (usually leading to failure) under the repeated application of a cyclic force.
fibre	A unit of matter characterized by flexibility, fineness, and high ratio of length to thickness.
binder fibre	A fibre that has a relatively low softening point compared with other fibres in the web, and which, on the application of heat or pressure, acts as an adhesive.
man-made fibre	A fibre manufactured by man as distinct from a fibre that occurs naturally.
regenerated fibre	A man-made fibre produced from a naturally occurring fibre-forming polymer by a process that includes regeneration of the original polymer structure.
staple fibre	A man-made fibre of predetermined short length. The fibre is usually prepared by cutting or breaking filaments of the material into lengths suitable for the processing system in question. Lengths normally range from 5 mm to 500 mm.
synthetic fibre	A man-made fibre produced from a polymer built up by man from chemical elements or compounds, in contrast to fibres made from naturally occurring fibre-forming polymers.
fibre blinding	The condition where soil particles or other substances accumulate on the surface of a geotextile, thereby reducing its hydraulic properties. (<i>See also</i> filter clogging.)
filter	A device or material that allows fluid to pass and restrains all or some solid particles from passing.
filter clogging	The condition where soil particles are held within the voids of a geotextile structure, thereby reducing its hydraulic properties to the point where it no longer meets its design requirements.
fifth percentile	The value, calculated from the test results, which is expected to be exceeded by 95 percent of the population values.
filament	<i>See</i> continuous filament.
film	A polymeric material that is homogeneous, non-fibrous, continuous, thin, and flexible.

Term	Definition
filter cake	A layer of soil particles accumulated adjacent to or on the surface of a geotextile.
filtration	The separation of solids from liquids by the passage of the mixture through a suitable permeable material that retains the solid matter on or near its surface and allows the liquid to pass through. NOTE: For geotextiles, the liquid is usually water and the solid matter particles of soil.
fines	The fraction of a soil passing through a 75µm sieve.
flexural modulus	Ratio of the stress difference to the corresponding strain difference during a bending test. Unit: Megapascals (MPa)
flexural strength	Maximum flexural stress sustained by the test specimen during a bending test. Unit: Megapascals (MPa)
flexural stress	Nominal stress of the outer surface of the test specimen at midspan. Unit: Megapascals (MPa)
flow rate	The flow rate per unit area normal to the plane of the product at a defined head. Unit: litres per square metre second (L/m ² .s)
formulation	A specific mixture of components used to create a polymer or a polymer blend used to make a geosynthetic.
force	That which can alter the state of rest or motion of a body. Unit: newton (N), kilonewton (kN) NOTE: 1 N = 1 kg.m/s ² . Thus a mass of 100 kg exerts a force of approximately 980 N.
breaking force	The maximum force applied to a test specimen at the point of rupture.
peak force	The force at which strain first increases with no increase in force. (See point P on Figure A4, Appendix A.)
ultimate force	The maximum force applied to the test piece in a tensile test carried out to failure. (See point U on Figure A4, Appendix A.)
gauge length	In tensile testing, the initial length of a test specimen measured between the specimen clamps.
geocell	A three-dimensional, permeable, polymeric (synthetic or natural) honeycomb or web structure, made of strips of geotextiles, geogrids or geomembranes linked alternatingly and used in contact with soil/rock and/or any other geotechnical material in civil engineering applications.
geocomposite	A manufactured or assembled material using at least one geosynthetic product among the components, used in contact with soil/rock and/or any other geotechnical material in civil engineering applications.

Term	Definition
geocomposite drain	A prefabricated subsurface drainage product that consists of a geotextile filter skin supported by a three dimensional core allowing in plane flow.
geocomposite reinforcement	A composite product consisting of at least one geosynthetic material for soil reinforcement in combination with some other product.
geofoam	A polymeric material which has been formed by the application of the polymer in semi-liquid form, through the use of a foaming agent, and results in a lightweight material with high void content, used in contact with soil/rock and/or any other geotechnical material in civil engineering applications.
geoform	A three-dimensional permeable geosynthetic structure filled with soil or other material
geogrid	A planar, polymeric structure consisting of a regular open network of integrally connected tensile elements, which may be linked by extrusion, bonding or interlacing, whose openings are larger than the constituents, used in contact with soil/rock and/or any other geotechnical material in civil engineering applications (primarily for reinforcement applications).
geogrid, bonded	A geogrid manufactured by bonding, usually at right angles, two or more sets of strands or elements.
geogrid, extruded	A geogrid manufactured by extruding polymers and drawing in a sheet form.
geogrid, knitted	A geogrid manufactured by knitting together yarns or elements, usually at right angles to each other.
geogrid, woven	A geogrid manufactured by weaving yarns or elements, usually at right angles to each other.
geomat	<i>See</i> erosion control mat and turf reinforcement mat
geomembrane sheet(s)	A planar, relatively impermeable, polymeric (synthetic or natural) sheet used in contact with soil/rock and/or any other geotechnical material in civil engineering applications.
geomembrane, bituminous	A planar, relatively impermeable sheet manufactured from natural bituminous materials.
geomembrane, elastomeric	A planar, relatively impermeable sheet manufactured from elastomeric polymers.
geomembrane, plastomeric	A planar, relatively impermeable sheet manufactured from plastomeric polymers.
geonet	A planar, polymeric structure consisting of a regular dense network, whose constituent elements are linked by knots or extrusions and whose openings are much larger than the constituents, used in contact with soil/rock and/or any other geotechnical material in civil engineering applications.
geospacer	A geosynthetic consisting of integrally connected parallel sets of ribs overlying similar sets of various grades for planar drainage.

Term	Definition
geosynthetic	A generic term describing a product at least one of whose components is made of a planar, polymeric (synthetic or natural) material used in contact with soil/rock and/or any other geotechnical material in civil engineering applications.
geosynthetic clay liner	An assembled structure of geosynthetic materials and low hydraulic conductivity earth material (clay), in the form of a manufactured sheet, used in contact with soil/rock and/or any other geotechnical material in civil engineering applications.
geotechnical engineering	The engineering applications of geotechnics.
geotechnics	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. NOTE: Geotechnics embraces the fields of soil mechanics and rock mechanics, and many of the engineering aspects of geology, geophysics, hydrology, and related sciences.
geotextile	A planar, permeable, polymeric (synthetic or natural) textile material, which may be non-woven, knitted or woven, used in contact with soil/rock and/or any other geotechnical material in civil engineering applications.
geotextile, knitted	A geotextile produced by interlooping one or more yarns, fibres, filaments or other elements.
geotextile, non-woven	A geotextile in the form of a manufactured sheet, web or batt of directionally or randomly orientated fibres, filaments or other elements, mechanically and/or thermally and/or chemically bonded.
geotextile, woven	A geotextile produced by interlacing, usually at right angles, two or more sets of yarns, fibres, filaments, tapes or other elements.
geotextile unit mass	See mass per unit area.
grab tensile test	See tensile test.
heat bonding	See bonding.
hydraulic gradient	The ratio of the total head loss (Δh) across the specimen to its length (l) in the flow direction.
hydrolysis	The cleavage of chemical bonds in polymers by reaction with water, including moisture or steam. NOTE: Polar linkages in polymers such as ester, amide and urethane bridges are particularly susceptible to hydrolysis. For this reason polyesters, polyamides and polyurethanes are all sensitive to hydrolysis in moist, warm environments. Hydrolysis is generally acid or base catalyzed.
inflection point	1 For geotextile materials exhibiting Hookean behaviour on the application of a force: the first point on the force/ elongation curve at which force becomes proportional to elongation. (See point C in Figure A1, Appendix A.)