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**Geosynthetics —**

Part 1:  
**Terms and definitions**

**Géosynthétiques —**

Partie 1:  
**Termes et définitions**

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 221, *Geosynthetics*.

This first edition of ISO 10318-1 cancels and replaces ISO 10318:2005, which has been technically revised.

ISO 10318 consists of the following parts, under the general title *Geosynthetics*:

- *Part 1: Terms and definitions*
- *Part 2: Symbols and pictograms*

# Geosynthetics —

## Part 1: Terms and definitions

### 1 Scope

The intent of this part of ISO 10318 is to define terms related to functions, products, properties, and other terms used in EN and ISO geosynthetics International Standards. Definitions of terms not included in this part of ISO 10318 can be found in the International Standards describing appropriate test methods.

NOTE See also the ISO online browsing platform (OBP): [www.iso.org/obp/ui/](http://www.iso.org/obp/ui/)

### 2 Terms and definitions

#### 2.1 Terms related to functions

##### 2.1.1

##### **drainage**

collecting and transporting of precipitation, ground water, and/or other fluids in the plane of a geosynthetic material

##### 2.1.2

##### **filtration**

restraining of uncontrolled passage of soil or other particles subjected to hydrodynamic forces, while allowing the passage of fluids into or across a geosynthetic material

##### 2.1.3

##### **protection**

preventing or limiting of local damage to a given element or material by the use of a geosynthetic material

##### 2.1.4

##### **reinforcement**

use of the stress-strain behaviour of a geosynthetic material to improve the mechanical properties of soil or other construction materials

##### 2.1.5

##### **separation**

prevention from intermixing of adjacent dissimilar soils and/or fill materials by the use of a geosynthetic material

##### 2.1.6

##### **surface erosion control**

use of a geosynthetic materials to prevent or limit soil or other particle movements at the surface of, for example, a slope

##### 2.1.7

##### **barrier**

use of a geosynthetic to prevent or limit the migration of fluids

**2.1.8**

**stress relief**

<for asphalt overlay> use of a geosynthetic to retard the development of cracks by absorbing the stresses that arise from the damaged pavement

**2.2 Terms related to products**

**2.2.1**

**geosynthetic**

**GSY**

generic term describing a product, at least one of whose components is made from a synthetic or natural polymer, in the form of a sheet, a strip, or a three-dimensional structure, used in contact with soil and/or other materials in geotechnical and civil engineering applications

**2.2.1.1**

**geotextile**

**GTX**

planar, permeable, polymeric (synthetic or natural) textile material, which may be nonwoven, knitted, or woven, used in contact with soil and/or other materials in geotechnical and civil engineering applications

**2.2.1.1.1**

**nonwoven geotextile**

**GTX-NW**

geotextile made of directionally or randomly orientated fibres, filaments, or other elements, mechanically and/or thermally and/or chemically bonded

**2.2.1.1.2**

**knitted geotextile**

**GTX-K**

geotextile produced by interlooping one or more yarns, filaments, or other elements

**2.2.1.1.3**

**woven geotextile**

**GTX-W**

geotextile produced by interlacing, usually at right angles, two or more sets of yarns, filaments, tapes, or other elements

**2.2.1.2**

**geotextile-related product**

**GTP**

planar, permeable, polymeric (synthetic or natural) material used in contact with soil and or other materials in geotechnical and civil engineering applications, which does not comply with the definition of a geotextile

Note 1 to entry: See *geotextile* (2.2.1.1).

**2.2.1.2.1**

**geogrid**

**GGR**

planar, polymeric structure consisting of a regular open network of integrally connected, tensile elements, which may be linked by extrusion, bonding, or interlooping or interlacing, whose openings are larger than the constituents

**2.2.1.2.2**

**geonet**

**GNT**

geosynthetic consisting of parallel sets of ribs overlying and integrally connected with similar sets at various angles

**2.2.1.2.3****geomat**  
**GMA**

three-dimensional, permeable structure, made of polymeric monofilaments, and/or other elements (synthetic or natural), mechanically and/or thermally and/or chemically and/or otherwise bonded

**2.2.1.2.4****geocell**  
**GCE**

three-dimensional, permeable, polymeric (synthetic or natural) honeycomb, or similar cellular structure, made of linked strips of geosynthetics

**2.2.1.2.5****geostrip**  
**GST**

polymeric material in the form of a strip of width not more than 200 mm, used in contact with soil and/or other materials in geo-technical and civil engineering applications

**2.2.1.2.6****geospacer**  
**GSP**

three-dimensional polymeric structure with an interconnected air space in between, used in contact with soil and/or other materials in geotechnical and civil engineering applications

**2.2.1.3****geosynthetic barrier**  
**GBR**

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

**2.2.1.3.1****polymeric geosynthetic barrier**  
**GBR-P****geomembrane**

factory-assembled structure of geosynthetic materials in the form of a sheet in which the barrier function is essentially fulfilled by polymers

**2.2.1.3.2****clay geosynthetic barrier**  
**GBR-C****geosynthetic clay liner**

factory-assembled structure of geosynthetic materials in the form of a sheet in which the barrier function is essentially fulfilled by clay

**2.2.1.3.3****bituminous geosynthetic barrier**  
**GBR-B****bituminous geomembrane**

factory-assembled structure of geosynthetic materials in the form of a sheet in which the barrier function is essentially fulfilled by bitumen

**2.2.1.4****geocomposite**  
**GCO**

manufactured, assembled material using at least one geo-synthetic product among the components

## 2.3 Terms related to properties

### 2.3.1 General properties

#### 2.3.1.1 nominal value

**NV**  
value of a material property as declared, rather than measured, by the producer/supplier of the material

### 2.3.2 Terms related to physical properties

#### 2.3.2.1 thickness

*d*  
distance between the upper and lower surfaces of a geosynthetic, measured normal to the surfaces and under a specified pressure

Note 1 to entry: Unit is expressed in mm.

#### 2.3.2.2 mass per unit area

$\rho_A$   
ratio of the mass of a specimen of specified dimensions to its area

Note 1 to entry: Unit is expressed in grams per square metre (g/m<sup>2</sup>).

### 2.3.3 Terms related to hydraulic properties

#### 2.3.3.1 characteristic opening size

$O_{90}$   
size of opening which corresponds to the maximum particle size of 90 % by weight of the soil passing through the geotextile

Note 1 to entry: Unit is expressed in  $\mu\text{m}$ .

#### 2.3.3.2 permeability

rate of fluid transmission through a geosynthetic

#### 2.3.3.3 coefficient of permeability normal to the plane

$k_n$   
ratio between flow velocity  $v$  and hydraulic gradient  $i$  normal to plane

Note 1 to entry: Unit is expressed in m/s.

#### 2.3.3.4 flux

$q_n$   
volumetric flow rate per unit area normal to the plane of the product at a defined head

Note 1 to entry: Unit is expressed in l/(m<sup>2</sup>·s).

#### 2.3.3.5 velocity index

*v*-index  
velocity corresponding to a head loss of 50 mm across a specimen, in a water permeability test

Note 1 to entry: Unit is expressed in mm/s.



**2.3.3.6****permittivity** $\psi$ 

volumetric flow rate of water and/or other liquids per unit area per unit head loss, under laminar flow conditions, normal to the plane of a product

Note 1 to entry: Unit is expressed in s<sup>-1</sup>.

**2.3.3.7****in-plane flow capacity** $q_p$ 

volumetric flow rate of water and/or other liquids per unit width of specimen, at defined gradients in the plane of a product

Note 1 to entry: Unit is expressed in l/(m·s).

**2.3.3.8****transmissivity** $\theta$ 

volumetric flow rate per unit width of specimen and per unit gradient in the plane of a product

Note 1 to entry: Unit is expressed in l/(m·s).

**2.3.3.9****liquid tightness**

ability of a geosynthetic to retain liquid

**2.3.4 Terms related to mechanical properties****2.3.4.1****tensile stress, related to the cross-sectional area of the specimen** $\sigma$ 

tensile force per cross-sectional area of the specimen prior to loading, carried by a specimen at any given time in a short-term test

Note 1 to entry: Tensile stress, related to the cross-sectional area of the specimen, is expressed in MPa.

**2.3.4.1.1****yield point**

point on the stress-strain curve, other than the failure point, at which an increase in strain occurs without an increase in stress

**2.3.4.1.2****tensile stress at yield point** $\sigma_y$ 

first stress at which an increase in strain occurs without an increase in stress

Note 1 to entry: It may be less than the maximum attainable stress.

**2.3.4.1.3****tensile stress at failure** $\sigma_f$ 

tensile stress at which the test specimen ruptures

**2.3.4.1.4****maximum tensile stress** $\sigma_{max}$ 

maximum tensile stress sustained by the test specimen during a tensile test

**2.3.4.2**

**tensile strength (related to specimen width)**

$T$   
tensile force per unit width carried by a specimen at any given time in a short-term test

Note 1 to entry: Unit is expressed in kN/m.

**2.3.4.2.1**

**tensile strength (related to specimen width) at failure**

$T_f$   
tensile strength at which the test specimen ruptures

**2.3.4.2.2**

**maximum tensile strength (related to specimen width)**

$T_{\max}$   
maximum tensile strength sustained by the test specimen during a tensile test

**2.3.4.2.3**

**tensile modulus**

$J$   
ratio of the change in tensile stress or strength of a geosynthetic to the corresponding change in elongation

Note 1 to entry: Tensile modulus is expressed in MPa or kN/m.

**2.3.4.3**

**preload**

small load equal to 1 % of the expected maximum load, enabling initial gauge length and strain zero to be determined under re-producible conditions

**2.3.5 Seaming or attaching of GTX or GTP**

**2.3.5.1**

**connection**

local or linear attachment of dissimilar geosynthetics or of a geosynthetic and another material

**2.3.5.2**

**joint**

local or linear attachment of adjacent rolls of similar geosynthetic

**2.3.5.3**

**bond**

areal attachment of the elements of a geocomposite to each other

**2.3.5.4**

**maximum joint or seam strength**

$T_{j\max}$   
maximum tensile strength of the seam formed by joining two or more sheets

Note 1 to entry: Unit is expressed in kN/m.

**2.3.5.5**

**joint or seam efficiency**

$\xi_s$   
ratio of the joint or seam strength to the tensile strength of the material measured in the same direction

Note 1 to entry: Unit is expressed in %.

## 2.3.6 Interface properties

### 2.3.6.1

#### friction angle

$\phi$

angle, the tangent of which is equal to the ratio of the friction force per unit area to the normal stress along the interface between two parts of the same material or between two materials

Note 1 to entry: Soil and GSY are examples of two materials.

### 2.3.6.2

#### friction interaction (efficiency) coefficient

$f_{s,GSY}$

ratio between the tangent of the friction angle between soil and GSY, and the tangent of the friction angle of the soil

## 2.4 Other terms

### 2.4.1

#### machine direction

MD

direction of manufacture of a geosynthetic product (the warp direction for woven geotextiles)

### 2.4.2

#### cross-machine direction

CMD

direction perpendicular to the direction of manufacture of a geo-synthetic product (the weft direction for woven geotextiles)

### 2.4.3

#### design life

period of time from the start of installation to the point where the material no longer fulfils its required design properties in order to perform its function within defined limits

### 2.4.4

#### peel test

tensile test of a bond, join, or connection in which two components are separately clamped and one component is peeled away from the other in order to determine peel strength

### 2.4.5

#### tensile shear test

tensile test of a bond, joint, or connection in which two components are separately clamped and load is applied in the plane of the product in order to determine tensile shear strength

## Bibliography

- [1] ISO 9863-1:2005, *Geosynthetics — Determination of thickness at specified pressures — Part 1: Single layers*

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