INTERNATIONAL STANDARD

ISO 13437

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Geotextiles and geotextile-related products — Method for installing and extracting samples in soil, and testing specimens in laboratory

Géotextiles et produits apparentés — Méthode pour l'installation et l'extraction d'échantillons dans le sol et pour la réalisation d'essais en laboratoire sur les éprouvettes

Reference number
ISO 13437:1998(E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 13437 was prepared by the European Committee for Standardization (CEN) in collaboration with ISO Technical Committee TC 38, *Textiles*, Subcommittee SC 21, *Geotextiles*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Annexes A and ZZ of this International Standard are for information only.

Annex ZZ provides a list of corresponding International and European Standards for which equivalents are not given in the text.

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet iso@iso.ch

Printed in Switzerland

Foreword

The text of EN ISO 13437:1998 has been prepared by Technical Committee CEN/TC 189 "Geotextiles and geotextile-related products", the secretariat of which is held by IBN, in collaboration with Technical Committee ISO/TC 38 "Textiles".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 1999, and conflicting national standards shall be withdrawn at the latest by February 1999.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This standard is part of a series of standards and prestandards on the durability of geotextiles and geotextile-related products.
The use and applicability of this standard will be further described in a guide to durability (currently in course of preparation).

1 Scope

This standard specifies a method for the on-site installation, retrieval and testing of geotextile samples, irrespective of the particular degradation mechanisms to which they are exposed.

The method is also appropriate to test for mechanical damage, much of which occurs during installation, and to provide an owner with information about the state of the geotextile or geotextile-related product in his structure.

> NOTE : The durability of geotextiles or geotextile-related products is assessed by short-term accelerated tests under conditions more extreme than those experienced in service. In order to establish the validity of these tests it is essential to compare their predictions with tests made on material extracted from site.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 963	Geotextiles and geotextile-related products - Sampling and preparation of test specimens
EN 965	Geotextiles and geotextile-related products - Determination of mass per unit area
EN ISO 10319	Geotextiles - Wide-width tensile test (ISO 10319 : 1993)
prEN ISO 10320	Geotextiles and geotextile-related products - Identification on site (ISO/DIS 10320 : 1995)
ISO 307:1994	Plastics - Polyamides - Determination of viscosity number
ISO 1628-3:1998	Plastics - Determination of viscosity number and limiting viscosity number - Part 3 : Polyethylenes and polypropylenes (Revision of ISO 1628-3:1991)

ISO/DIS 1628-5:1997	Plastics - Determination of viscosity of polymers in dilute solution using capillary viscometers - Part 5 : Thermoplastic polyester (TP) homopolymers and copolymers (Revision of ISO 1623-5:1986)
ISO 10318	Geotextiles - Vocabulary

3 Definitions

For the purposes of this standard, the following definitions apply :

3.1 **geotextile**: A geotextile or geotextile - related product.

3.2 **control specimen**: Test specimen taken from a sample of the material delivered on site before its installation in the structure.

3.3 **durability testing sample**: Test sample installed during construction for the purpose of degradation assessment.

3.4 **retrieval sample**: Either durability testing sample or sample of in service materials retrieved after a predetermined time.

4 Principle

The properties of the geotextile after a certain period in service (used material) are compared to the same properties determined on control specimens (control material).

5 Test method

5.1 Identification of the initial conditions

The following information shall be indicated:

- identification and description of the structure;
- description of the geotextile environment;
- identification and characteristics of the geotextile, with testing standard references.

NOTE : For each of the above, examples of suitable forms are given in annex A. Where possible, variation about the mean values can be given.

5.2 Installation of durability testing samples

The following general guidelines shall be followed unless otherwise agreed by the parties concerned :

5.2.1 The number of samples is determined by the dimensions of the structure, the physical and chemical variations in the environment in which the geotextile is installed, and the repercussions that a failure of the geotextile function would cause.

5.2.2 The number of retrievals depends on the expected service life of the geotextile.

The following schedule shall be observed unless otherwise agreed :

- prepare durability testing samples and take control samples on delivery of material;
- make a first retrieval directly following construction;
- make a second retrieval after 10 years;
- then every 20 years or less if the results obtained command an earlier retrieval, or if major environmental factors are known to have changed;
- make a final retrieval on completion of service life.

Thus three retrievals are needed for a 30-year expected service life, and eight retrievals for a 120-year expected service life.

5.2.3 The samples shall be subjected to the same physical and chemical environments to which the geotextile is exposed in the structure. As far as possible, this includes also mechanical stresses and hydraulic features.

5.2.4 The dimensions of the durability testing samples shall be a minimum of:

- 1 m x 1 m for a sheet product;
- 1 m in length for a linear product.

5.2.5 Report the following :

- description, origin and numbering of the samples;
- date of installation and exact location in the structure (drawing);
- retrieval schedule.

5.3 Preparation of control specimens

Take control specimens of the geotextile from the material before installation. The control specimens shall be taken as close as possible to the material used for the durability testing samples.

The dimension of the control specimens is identical to the dimension of durability testing samples. Their number is equal to the number of scheduled retrievals.

The specimens shall be taken in accordance with EN 963.

Avoid folding or cutting if possible. However, if it is essential, the 1 m x 1 m specimens shall be folded or cut in three folds or parts parallel to the machine direction or to the main tensile strength direction. One specimen of 1 m x 1 m or three specimens of 1 m in length are placed in a black polyethylene bag labelled outside with identification, date and structure reference. A copy of the geotextile identification form (see Annex A) with copy of product delivery reference label is to be placed inside each bag. The three bags shall be placed in another black polyethylene bag, also labelled with date and

structure reference, and kept in a horizontal position in a depository at a temperature between 0 °C and 20 °C and relative humidity of 50% to 65 %, with no condensation.

5.4 Retrieval of samples

There are two possible retrieval situations:

- durability testing samples have been installed during construction, in which case the operation is simply to retrieve the specimens, or
- no such provisions were made and it is necessary to sample a piece of geotextile in service.

In the second case the selection of the location for sampling is dependent on several parameters such as accessibility, disturbance of traffic, and cost. If a choice exists, the most interesting areas are where there is local deformation or differential settlement in the facing of the structure or on the road surface, or indications of water leakage.
A procedure for repair of the hole left in the geotextile shall be defined.

In all cases :

- perform the sampling carefully in order to avoid any damage to the product. The excavation operation may begin with a mechanical digger but shall be stopped 0,3 m before reaching the geotextile. Continue the work manually with shovel and trowel to remove the remaining soil gently over a surface area of 1 m^2;

- take a sample of soil in contact with the geotextile for determination of pH, chemical analysis and determination of mechanical characteristics;

- photograph the site and report the visual appearance of the geotextile, with particular attention to holes, tears, root penetration and presence of water;

- cut the sample along the sides of the square by appropriate means, lift it carefully, place it flat between two sheets of black polyethylene film and seal the film to prevent desiccation;

  NOTE : In particular cases, it may be interesting to take a core sample of geotextile with its surrounding soil medium to analyse further any clogging of the geotextile.

- label the samples with the date, structure reference and reference number and send them to the laboratory.

5.5 Testing and analysis

5.5.1 Testing on retrieval samples :

If necessary, carry out weighing and water permeability measurements before washing.

Wash the samples carefully under running cold tap water and place them horizontally to dry.

Examine the geotextile visually after cleaning, with particular attention to holes (size and number) and tears.

If necessary, reweigh the sample in order to determine the soil mass removed by washing and determine the water permeability a second time.

5.5.2 Testing on retrieval samples and control specimens :

The following tests shall be performed :

- wide-width tensile test (in accordance with EN ISO 10319) ;
- determination of the solution viscosity for each individual material :
    - polyamide (in accordance with ISO 307 : 1984)
    - polyester (in accordance with ISO 1628-5 : 1986)
    - polyethylene, polypropylene (in accordance with ISO 1628-3 : 1991) ;
- examination by scanning electron microscopy to reveal possible chemical or microbiological attack, surface degradation or environmental stress cracking.

NOTE : One or several tests relevant to the function of the geotextile can be added.

Compare the results of these tests with those obtained on control specimens.

6 Test report

The test report shall include :

a) the identification of the initial conditions (see 5.1) ;

b) the retrieval operation (see 5.4) ;

c) the laboratory report (see 5.5).

The organisation in charge of monitoring the structure shall add its comments and conclusions.

Annex A (informative):
Identification forms for structure, environment and geotextile.

XYZ company	Civil engineering structure using a geotextile or geotextile - related product	Form 1/3 STRUCTURE

Structure reference : .....
.....
.....

Exact location of the structure:.....
.....

Description of the structure :
.....
.....

design service life : .....

function (s) of the geotextile
.....
.....
.....

location of the geotextile in the structure (drawing)

Loads

mechanical
.....

hydraulic
.....

Remarks
.....
.....
.....

Date : **Name :**

XYZ company	Civil engineering structure using a geotextile or geotextile - related product	Form 2/3 ENVIRONMENT

Structure reference : .....
.....
.....

Soils in contact with the geotextile
Nature : In place ..... **or Backfill** .....

Mechanical characteristics : Sieve : d_{95}..... **% (75 µm)** ..... **% (2 µm)** .....
Atterberg limits .....

Physico - chemical characteristics : water content ..... **pH** .....
Organic matter .....
Other chemicals .....
Temperature .....

Remarks
.....
.....

Other environmental factors

Sunlight exposure
.....
.....
Water flow
.....
.....

Remarks
.....
.....
.....
.....
.....
Give reference to standards

Date : **Name :**