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**Geotextiles and geotextile-related  
products — Procedure for simulating  
damage during installation —**

**Part 1:  
Installation in granular materials**

iTeh STANDARD PREVIEW

*Géotextiles et produits apparentés — Mode opératoire de simulation des  
dégâts lors de l'installation —*

*Partie 1: Installation dans des matériaux granulaires*

*ISO/TR 10722-1:1998*

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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 main task of technical committees is to prepare International Standards, but in exceptional circumstances a technical committee may propose the publication of a Technical Report of one of the following types:

- type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;
- type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;
- type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

ISO/TR 10722-1, which is a Technical Report of type 2, 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).

Throughout the text of this Technical Report, read "... this European prestandard ..." to mean "... this part of ISO/TR 10722 ...".

This document is being issued in the Technical Report (type 2) series of publications (according to subclause G.3.2.2 of part 1 of the ISO/IEC Directives, 1995) as a "prospective standard for provisional application" in

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the field of the simulation of site damage during installation of a geosynthetic in granular materials because there is an urgent need for guidance on how standards in this field should be used to meet an identified need.

This document is not to be regarded as an “International Standard”. It is proposed for provisional application so that information and experience of its use in practice may be gathered. Comments on the content of this document should be sent to the ISO Central Secretariat.

A review of this Technical Report (type 2) will be carried out not later than three years after its publication with the options of: extension for another three years; conversion into an International Standard; or withdrawal.

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

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## Foreword

This European Prestandard ENV ISO 10722-1:1998 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".

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

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## 1. Scope

This European prestandard describes a procedure for damaging geosynthetics in the laboratory to simulate site damage during installation when a geosynthetic is laid between two layers of compacted granular material. The damage is assessed visually and by the loss in tensile strength. Other reference tests may be used to assess the damage caused by this test. The test method described is an index test procedure.

This prestandard is part 1 of a series of 2 prestandards. Part 2 will describe a test procedure for damage simulation when a geosynthetic is laid on a soft subsoil.

## 2. Normative References

This European Prestandard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate points 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.

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|----------------|---|
| ISO 554        | Standard atmospheres for conditioning and/or testing - Specifications.  |
| EN 963         | Geotextiles and geotextile-related products - Sampling and preparation of test specimens.   |
| EN ISO 10319   | Geotextile and geotextile-related products - Wide width tensile test (ISO 10319:1993).  |
| EN ISO 12236   | Geotextile and geotextile-related products - Static puncture test (CBR test).   |
| EN 918         | Geotextile and geotextile-related products - Dynamic puncture test (Cone drop test).  |
| EN 933-1       | Tests for the geometrical properties of aggregates - Determination of the particle size distribution - Sieving method   |
| prEN 1097-2    | Tests for mechanical and physical properties of aggregates - Methods for determination of resistance to fragmentation - Part 2: Los Angeles abrasion and slag test. |
| prEN ISO 12956 | Geotextile and geotextile-related products - Determination of the characteristic opening size.  |
| prEN 12040     | Geotextile and geotextile-related products - Determination of water permeability normal to the plane without load (ISO/DIS 11058).                                  |

### 3. Definitions

For the purpose of this European prestandard the following definitions shall apply:

**3.1 Reference test:** the test used to determine a particular property of the geosynthetic being damaged in the procedure;

**3.2 Damage index:** the percentage change of the particular property used as a measure of the damage caused by the procedure.

### 4. Principle

A geosynthetic specimen is placed between two layers of a synthetic aggregate and subject to a period of dynamic loading. The geosynthetic specimen is removed from the test apparatus, examined for any visual damage and then subject to a mechanical or hydraulic test, to measure the change in mechanical or hydraulic properties. The result is expressed as the change (in percent) of the reference property. The visual damage is also reported.

### 5. Test Specimens

#### 5.1 Sampling

Take specimens from the samples in accordance with EN 963.

#### 5.2 Number and Dimensions of Test Specimens

Cut six specimens of 1,0 m by 0,50 m from the test sample. Each specimen is then cut into two 1,0 m by 0,25 m subspecimens, one to be used in the damage procedure, the other in the reference test.

Specimens prepared for this test, which are to be subsequently subject to a tensile test, shall be dimensioned as required in EN ISO 10319. When other reference tests are used, the specimens shall be dimensioned to suit the particular reference test procedure.

### 6. Conditioning

Condition the test specimens and conduct the tests in the standard atmosphere for testing, defined in ISO 554 i.e. at a relative humidity of  $65\% \pm 5\%$  and a temperature of  $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$  until the change in mass between successive readings made at intervals of not less than two hours does not exceed 0,25% of the mass of the test specimens.

The test shall be performed in the same atmosphere.

**NOTE:** Conditioning and/or testing at a specified relative humidity may be omitted if it can be shown that the results are not affected by this omission.

## 7. Apparatus

### 7.1 Compression Machine

A compression machine which can be controlled to produce a sinusoidal pressure of between  $(5 \pm 5)$  kPa and  $(900 \pm 10)$  kPa on the loading platen, at a frequency of 1 Hz.

### 7.2 Test Container

The test container shall be a rigid metal box, fabricated from mild or stainless steel, of minimum dimensions, 300 mm by 300 mm internal dimensions, in plan and shall consist of two parts each 75 mm deep. The two parts of the box shall be bolted or clipped together during the damage procedure. Shims of sufficient thickness to allow the specimen to be retained without any induced tension shall be fitted between the two parts. The lower part of the box shall be mounted on a rigid base which deflects less than 1 mm when the test load is applied directly to the base. Figures 1 and 2 show a typical arrangement of the apparatus.

### 7.3 Loading Plate

The loading plate shall have dimensions of 100 mm by 200 mm.

The loading plate shall be constructed from steel or aluminium and shall have adequate stiffness to transmit the loading forces to the aggregate without deflection.

### 7.4 Aggregate

The aggregate used in the damage procedure is a sintered aluminium oxide. The properties of the aggregate shall comply with the following requirements:

- Grading: when tested in accordance with EN 933-1, 100% of the aggregate shall pass a 10 mm sieve and 0% shall pass a 5 mm sieve.
- Hardness: when tested in accordance with prEN 1097-2 the aggregate shall have a Los Angeles abrasion resistance of not less than 1,9.

**NOTE:** The aggregate can be obtained from:

Ets Semanaz & Cie (Corindon SD 5-10 mm)  
11bis Quai du Rancy  
F-94388 Port de Bonneuil sur Marne Cédex  
France

or

English Abrasives Ltd. (Dynagrip),  
P.O. Box 117,  
Doxey Road,  
Stafford,  
ST16 1UN United Kingdom

The aggregate shall be sieved on a 5 mm aperture sieve after every five uses and any material passing the sieve shall be discarded. The aggregate shall be totally discarded after twenty uses.

## 8 Procedure

### 8.1 Damage Procedure

Fill the lower part of the test container with the aggregate. Place the aggregate in two equal layers, each compacted with a flat plate loaded to a pressure of  $(200 \pm 2)$  kPa, for 60 s, over the whole area of the test container. Strike the top layer off level with the top of the lower part of the container.

Place the specimen across the top of the lower part of the container, the centre of the specimen aligned with the centre of the container and with the free edges equally spaced from each side of the container. Roll up the free ends of the specimen outside the container in such a way that the specimen is not damaged during the test. Position the upper part of the container and bolt or clip it into position making sure the specimen is smooth, free from wrinkles but not pre-tensioned. The upper part of the container is then loosely filled with aggregate to a depth of 75 mm above the specimen.

Position the loading plate centrally in the container and apply a load of  $5 \pm 5$  kPa. Set the loading apparatus to produce a cyclic loading of between  $5 \pm 5$  kPa and  $900 \pm 10$  kPa at a frequency of 1 Hz for 200 loading cycles. The pressure is determined using the area of the loading platen, not the area of the test container.

Remove the specimen carefully from the test container, ensuring that no additional damage occurs during removal.

Repeat the procedure for other specimens from the sample.



## 8.2 Measurement of Damage

A measurement of the damage shall be made by subjecting the undamaged subspecimen and the damaged subspecimen to the same reference test. The reference test shall normally be EN ISO 10319, but other reference tests may be selected from one of the following mechanical or hydraulic tests: EN ISO 12236, prEN ISO 12956 or prEN 12040

**NOTE:** The reference test to be used shall be agreed between parties prior to the commencement of the test.

Optionally the specimen is visually examined for damage and an assessment of the damage is made. The examination includes making a record of the number of holes in the specimen and a qualitative assessment of any abrasion damage.

## 9 Calculations

Calculate the change in the reference property as:

$$\Delta R = \frac{R_d}{R_o} \times 100$$

$R_d$  = Reference value damaged specimen  
 $R_o$  = Reference value undamaged specimen  
 $\Delta R$  = Percentage change in the reference value (damage index)

Calculate the mean value of  $\Delta R$ , the standard deviation and the coefficient of variation for the six specimens.

## 10 Test Report

The test report shall include the following information:

- a) number and date of this prestandard;
- b) identification of the sample, date of receipt and date of testing;
- c) the conditioning atmosphere;
- d) the temperature at which the test was carried out;
- e) the orientation of the sample and specimens cut from the material roll or sheet;
- f) the visual damage report;
- g) the test method used to measure the reference value;
- h) the mean value of the change in the reference value;
- i) the standard deviation and coefficient of variation of the change in the reference value;
- j) the aggregate used in the test;
- k) any deviations from this procedure.