
**Geotextiles and geotextile-related
products — Screening test method for
determining the resistance to liquids**

*Géotextiles et produits apparentés — Méthode d'essai pour
la détermination de la résistance aux liquides*

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Foreword

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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 Technical Reports of type 3 do not necessarily have to be reviewed until data they provide are considered to be no longer valid or useful.

Technical Reports are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Attention is drawn to the possibility that some of the elements of this Technical Report ISO/TR 12960 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

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ISO/TR 12960, 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 document, read "...this European prestandard..." to mean "...this Technical Report...".

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 the field of Geotextiles 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 A of this Technical Report is for information only.

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

The text of ENV ISO 12960:1998 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 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.

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Introduction

In nearly all applications geotextiles and geotextile-related products (geotextile products) may be in contact with aqueous solutions of acids, bases or dissolved oxygen. The resistance of geotextile products to these chemicals depends on the one hand on polymer formulation, processing, textile structure and the presence of existing damage and on the other hand on the composition of the liquid and in situ conditions such as temperature, pressure and the presence of further mechanical stress.

It is the purpose of this prestandard to provide a method of screening (index testing) the resistance of geotextile products to these acids and bases.

Since an index test requires exposure times that are short compared to the expected lifetimes of geotextile products, it is necessary to accelerate the process. The data obtainable are suitable for screening but not for deriving performance data such as lifetime, unless supported by further evidence.

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1 Scope

This standard specifies methods for screening the resistance of geotextile products to liquids while not subjecting them to external mechanical stress.

The standard is applicable to all geotextiles and geotextile related products.

NOTE: This standard only considers conditions where the specimens are fully immersed in the liquids. Though outside the scope of this standard, the test conditions may be modified to accommodate particular applications, eg gaseous media. This standard does not preclude use for test specimens that are pre-treated by some method, e.g. by weathering, aqueous extraction conditions or installation damage.

2 Normative references

This European prestandard 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 prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ENV 12226	Geotextiles and geotextile-related products - General tests for evaluation following durability testing
ISO 3696	Water for analytical laboratory use - Specification and test methods

3 Principle

Test specimens are completely immersed in a test liquid for a given test duration at a fixed temperature. The properties of the test specimens are tested before and after immersion and if applicable after drying, and wherever possible, the test results are compared with those of control specimens stored under reference conditions.

4 General requirements and procedure

4.1 Apparatus

A container, e.g. a pneumatic vessel, is to be used, equipped with:

- a sealing lid or equivalent device and if necessary a reflux condenser or equivalent device to restrict evaporation of volatile components;
- a stirring or equivalent device to maintain homogeneity of the liquid and the exchange of matter between the liquid and the specimens;
- specimen holders to ensure correct placing of the specimens (see 4.6.2), the free distance between specimens being at least 10 mm;
- at least one closable aperture in the lid for access to control the composition of the liquid.

The container shall be large enough for the test liquid (see 4.6.1), which shall be held at constant temperature (see 4.3).

The material of the container and equipment shall be resistant to the test chemicals. Such materials are in general borosilicate glass or stainless steel.

4.2 Test liquids

Two types of test liquids are to be used:

- an inorganic acid: 0,025 M sulfuric acid (method A);
- an inorganic base: calcium hydroxide (Ca(OH)₂), used as a saturated suspension, i.e. approximately 2,5 grams per litre (method B).

Chemicals of reagent or analytical grade should be used. Water shall comply with ISO 3696, grade 3.

National safety regulations for handling of chemicals and for disposal of test liquids shall be followed.

NOTE: For any test medium it is an important condition that its composition remains constant during the test exposure. This may be complicated if the concentration of any active component is low or if the liquid is not a stable one-phase system. In such cases the concentration should be monitored and if possible adjusted or replaced on a regular basis. Attention should be given also to possible catalytic or synergistic effects, including effects of simultaneous chemical and mechanical stresses (eg environmental stress cracking in polyolefins). The choice of the concentration of the active species is governed by the aim to avoid significant changes of the concentration during the test and to accelerate the reaction but to avoid a change in the active mechanism by using too high a concentration.

4.3 Test temperatures

The test temperature shall be (60 ± 1) °C for each method.

4.4 Test duration

The test duration shall be 3 days for each method.

4.5 Specimens

Reference is made to ENV 12226.

The number of specimens shall be five test specimens and five control specimens.

NOTE 1: It is recommended that additional specimens be exposed. If a mechanical test is invalid, a further specimen should be tested in its place.

NOTE 2: If the products are sheathed by some coating, which could be penetrated during installation, the product should be tested with and without the coating. If not, the possibility of a change in chemical resistance in case of destruction or damage to the sheath should be noted in the report.

4.6 Procedure

4.6.1 Quantity of the test liquid

The quantity of test liquid shall be greater than 30 times the weight of the specimens and shall cover the specimens completely.

4.6.2 Positioning of specimens

The specimens shall be placed in the vessel free of any significant mechanical stress.

The mean distance between the specimens, between the specimens and the walls of the vessel, and between the specimens and the surface of the liquid, shall be at least 1 cm. No significant proportion of the surface of the specimens shall make contact with a material other than the test liquid itself.

Specimens of different materials shall not be tested in the same vessel. During the test the exchange of matter between liquid and geotextile shall not be hindered by poor convection of the test liquid.

Calcium hydroxide shall be stirred continuously; sulfuric acid at least once per day. The pH of the liquid shall be measured and recorded and, where necessary, liquid shall be replenished or replaced to maintain the original pH at least every seventh day. The liquid and the specimens shall be shielded from light.

4.6.3 Control specimens

The control specimens shall be immersed for one hour in water at the same temperature as the test specimens. Water shall be in accordance with Section 4.2.

4.6.4 Rinsing, wiping and drying

Rinsing shall be performed in water complying with 4.2., then in 0.01 M sodium carbonate solution, finally in water again. The quantities shall be sufficient to ensure thorough cleaning.

In exposing polyester geotextiles to calcium hydroxide it is necessary to remove adhering crystals of calcium terephthalate. This may be done by rinsing for 5 min with a 10% solution (by weight) of trisodiumnitrilotriacetate (NTA) in an agitating device, followed by rinsing in a 3% solution (by weight) of acetic acid and finally rinsing with water.

Specimens shall be dried at room temperature or at elevated temperature up to 60°C. Specimens should not be subjected to undue stress during drying.

4.7 Determination of changes in properties.

The changes are determined in accordance with ENV 12226.

5 Test report

The test report shall contain particulars to the following items:

- reference to this prestandard;
- description of the material;
- results expressed in accordance with ENV 12226;
- date of test;
- any deviations from this standard and any factors likely to have influenced the results.

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Annex A (informative)

Bibliography

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| ISO 175 | Plastics - Determination of the effects of liquid chemicals, including water |
| ISO 554 | Standard atmospheres for conditioning and/or testing - Specifications |
| ISO 3205 | Preferred test temperatures |
| ISO 3301 | Statistical interpretation of data - Comparison of two means in the case of paired observations |

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