

# Geotextiles and geotextile-related products — Screening test method for determining the resistance to hydrolysis in water

The European Standard EN 12447:2001 has the status of a  
British Standard

ICS 59.080.70

## National foreword

This British Standard is the official English language version of EN 12447:2001. It supersedes DD ENV 12447:1998 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/553, Geosynthetics, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
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This British Standard, having been prepared under the direction of the Sector Policy and Strategy Committee for Building and Civil Engineering, was published under the authority of the Standards Policy and Strategy Committee on 3 December 2001

### Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 7 and a back cover.

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### Amendments issued since publication

Amd. No.	Date	Comments

English version

## Geotextiles and geotextile-related products - Screening test method for determining the resistance to hydrolysis in water

Géotextiles et produits apparentés - Méthode d'essai sélective pour la détermination de la résistance à l'hydrolyse dans l'eau

Geotextilien und geotextilverwandte Produkte - Auswahlprüfverfahren zur Bestimmung der Hydrolysebeständigkeit in Wasser

This European Standard was approved by CEN on 10 August 2001.

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**Foreword**

This European Standard has been prepared by Technical Committee CEN/TC 189 "Geosynthetics", the secretariat of which is held by IBN.

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of an identical text or by endorsement, at the latest by April 2002, and conflicting national standards shall be withdrawn at the latest by April 2002.

This European Standard supersedes ENV 12447:1997.

This standard includes a Bibliography.

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 describes a screening test method to establish a minimum acceptance level of resistance of geotextiles and geotextile-related products to soil moisture.

In certain polymers moisture leads to hydrolysis throughout the thickness of the fibre (internal hydrolysis) but the rate of degradation is such that over short periods it is only measurable at elevated temperatures, e.g. by immersion in hot water.

NOTE This standard should be used with reference to CR ISO 13434.

## 1 Scope

This European Standard specifies a screening test method for determining the resistance of geotextiles and geotextile-related products to hydrolysis by exposing test specimens to water at elevated temperatures, followed by an evaluation of the changes in properties resulting from such exposure. It is intended as a means of establishing a minimum acceptable level of durability.

The test is applicable to any geotextile and geotextile-related product susceptible to hydrolysis, in particular polyester and polyamide based materials, and in addition to the yarns from which these geotextiles are made. Reinforcing materials shall be tested without the coating and manufacturers shall ensure that the degradation of the coating will not attack or have any negative influence on the degradation of the yarns.

This method is not intended for determining the resistance of geotextiles to hydrolysis under highly acid or alkaline conditions.

NOTE Performance tests to predict long-term lifetime or to compare products of different polymers or of similar polymers with differing structures can be based on the same method but with a wider range of temperatures and durations.

## 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 (including amendments).

EN ISO 2062	Textiles - Yarns from packages - Determination of single-end breaking force and elongation at break (ISO 2062:1993).
EN 12226	Geotextiles and geotextile-related products - General tests for evaluation following durability testing.
EN ISO 3696:1995	Water for analytical laboratory use - Specification and test methods (ISO 3696:1987).

### **3 Principle**

Both test and control specimens are immersed in hot water for specified durations and at a specified temperature. The properties of the specimens are determined after immersion.

### **4 Water**

Use deionised water to EN ISO 3696:1995, class 3.

### **5 Safety precautions**

Refer to national safety regulations.

### **6 Apparatus**

#### **6.1 Container**

The container shall be made of a material which is inert under the conditions of test such as stainless steel or borosilicate glass.

The total volume of the test specimens shall not exceed 10% of the free space in the container. The test specimens shall be suspended free of significant load and shall be exposed to the test medium on both sides.

The container shall be provided with a means of heating and controlling the temperature to  $(95 \pm 1) ^\circ\text{C}$  and a separate means of measuring the temperature.

NOTE Experience has shown that some types of glass are susceptible to hydrolysis. It is therefore essential to monitor the pH.

#### **6.2 Thermometer**

To measure the temperature in the container.

#### **6.3 Tubes**

Made of chemically inert material, typically borosilicate glass tubes of 60 mm external diameter, for winding yarn specimens.

### **7 Specimens**

#### **7.1 Size and shape**

Prepare specimens to the size and shape specified in EN 12226. If the requirements of EN 12226 can not be met due to container capacity then the relevant components (such as yarns or the components of a geocomposite) should be tested individually.

NOTE Allowance is made for shrinkage by immersing the control specimens for 1 h only (see clause 9). Shrinkage at test temperature in boiling water may be evaluated according to ISO 5077 for woven geotextiles, grids and nonwovens or the same procedure applied to yarns and monofilaments. The deformation due to shrinkage is not expected to exceed 5 %.

## 7.2 Number of specimens

Prepare enough specimens to provide a minimum of five test specimens and five control specimens.

NOTE It is recommended to expose additional specimens in case an extra mechanical test is required (see clause 9).

## 8 Procedure

Deionised water as specified in clause 4 shall always be used in the tests.

NOTE The quality of the water used as hydrolysing agent in this test is important for the reproducibility of the test results.

Expose the test specimens, free of significant load, on both sides to the test medium.

The test temperature shall be  $(95 \pm 1)$  °C.

Test yarns as strands or wind them loosely on a glass tube (see 6.3). Do not overwind, and separate the yarns by at least one diameter. Wind the control specimens in the same way.

The ratio between the mass of water and the mass of the test specimens shall be at least 30:1. Cover the specimens completely with water. Do not treat materials differing in chemical composition in the same enclosure.

It is essential that pH is monitored at least once a week. If the pH exceeds 8, measured at room temperature, the water should be replaced.

The test duration is 28 days.

The control specimens shall be exposed to the same environment for one hour and then removed and stored.

## 9 Determination of changes in properties

The test and control specimens shall be conditioned for at least 16 h at  $(20 \pm 2)$  °C and  $(65 \pm 5)$  % relative humidity before evaluation of the desired properties. For the method of test refer to EN 12226.

Exposed and control yarns shall be tested in accordance with EN ISO 2062 and the results evaluated according to EN 12226.

If the mechanical test on one of the specimens is invalid (see EN 12226), a further specimen shall be tested in its place.

**10 Test report**

The test report shall contain the following information:

- a) a reference to this European Standard;
- b) a description of the material;
- c) the procedure and conditions used;
- d) changes in properties as defined in EN 12226;
- e) date of test;
- f) any deviation from this standard or other factors that may influence the result of this test.



**Bibliography**

- ISO 5077                      Textiles - Determination of dimensional change in washing and drying.
- CR ISO 13434                Guidelines to durability of geotextiles and geotextile-related products.

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