SLOVENSKI STANDARD
SIST EN 12447:2021

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Nadomešča:
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Geotekstilije in geotekstilijam sorodni izdelki - Presejalna preskusna metoda za ugotavljanje odpornosti proti hidrolizi v vodi

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

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

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

Ta slovenski standard je istoveten z: **EN 12447:2021**

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59.080.70	Geotekstilije	Geotextiles

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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 18 July 2021.

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Contents

Page

European foreword

This document (EN 12447:2021) has been prepared by Technical Committee CEN/TC 189 “Geosynthetics”, the secretariat of which is held by NBN.

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of an identical text or by endorsement, at the latest by March 2022, and conflicting national standards shall be withdrawn at the latest by March 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12447:2001.

In comparison with the previous edition, the following technical modifications have been made:

— test temperature has been reduced;

— the exposure of the control specimen has been extended to 6 h;

— tables with test durations have been added.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This document 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.

1 Scope

This document 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 tests described in this document do not allow the determination of reduction factors. The tests described in this document are screening tests to show the ability of a product to serve for a certain time. The reference strength and retained strength of products investigated in this document need to be determined in the same way in accordance with EN 12226.

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.

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

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12226, *Geosynthetics - General tests for evaluation following durability testing*

EN ISO 2062, *Textiles - Yarns from packages - Determination of single-end breaking force and elongation at break using constant rate of extension (CRE) tester (ISO 2062)*

EN ISO 3696, *Water for analytical laboratory use - Specification and test methods (ISO 3696)*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

4 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.

Both the machine and cross machine direction shall be tested unless otherwise agreed.

Coated 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.

5 Water

Use deionised water according to EN ISO 3696, class 3.

6 Safety precautions

Refer to national safety regulations.

7 Apparatus

7.1 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 (80 ± 2) °C and a separate means of recording the temperature of the solution.

NOTE Experience has shown that some types of glass are susceptible to hydrolysis.

Make sure to regularly control that no corrosion in the container is occurring.

7.2 Thermometer

A thermometer capable of measuring the temperature with an accuracy of ± 1 °C.

7.3 Tubes

Made of chemically inert material, e.g. borosilicate glass tubes or polished stainless steel tubes of minimum 60 mm external diameter, for winding yarn specimens.

8 Specimens

8.1 Size and shape

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

8.2 Number of specimens

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

It is recommended to expose additional specimens in case an extra mechanical test is required (see Clause 10).

9 Procedure

Deionised water as specified in Clause 5 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 (80 ± 2) °C and recorded at least once a day.

Test yarns as strands or wind them loosely on a tube, e.g. glass (see 7.3). Do not overwind, and separate the yarns by at least one diameter. Wind the control specimens in the same way.

Because shrinkage may occur during the test, all specimens should be mounted in such a way that not significant pre-tension occurs during the exposure to the water.

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.

The following Table 1 shows the test duration for service life of geosynthetics reinforcement applications or other applications where long-term strength is required in natural soil with 4 ≤ pH ≤ 9 and a soil temperature ≤ 25 °C:

Table 1 — Test duration for service life of geosynthetics in reinforcement applications or other applications where long-term strength is required in natural soil

Test duration	Service life
28 days	25 years
56 days	50 years
112 days	100 years

The following Table 2 shows the test duration for service life of geosynthetics in other applications in natural soil with 4 ≤ pH ≤ 9 and a soil temperature ≤ 25 °C:

Table 2 — Test duration for service life of geosynthetics in other applications in natural soil

Test duration	Service life
14 days	25 years
28 days	50 years
56 days	100 years

The control specimens shall be exposed to the same environment for 6 hours and then removed and stored in dark at room temperature.

10 Determination of changes in properties

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

Exposed and control specimens shall be tested in accordance with EN 12226. Exposed and control yarn specimens shall be tested in accordance with EN ISO 2062.

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

11 Test report

The test report shall at least include the following information:

a) a reference to this document, i.e. EN 12447:2021;

b) a description of the material;

c) the procedure and conditions used;

d) changes in maximum tensile force as defined in EN 12226;

e) date of test;

f) any deviation from this document or other factors that may influence the result of this test.