

Geosynthetics - Screening test method for determining the resistance of geotextiles and geotextile-related products to oxidation (ISO 13438:2018)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 13438:2018 sisaldab Euroopa standardi EN ISO 13438:2018 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 13438:2018 consists of the English text of the European standard EN ISO 13438:2018.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 19.12.2018.	Date of Availability of the European standard is 19.12.2018.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 59.080.70

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

**Geosynthetics - Screening test method for determining the
resistance of geotextiles and geotextile-related products to
oxidation (ISO 13438:2018)**

Géosynthétiques - Méthode de détermination de la
résistance des géotextiles et produits apparentés à
l'oxydation (ISO 13438:2018)

Geotextilien und geotextilverwandte Produkte -
Auswahlprüfverfahren zur Bestimmung der
Oxidationsbeständigkeit (ISO 13438:2018)

This European Standard was approved by CEN on 3 December 2018.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

This document (EN ISO 13438:2018) has been prepared by Technical Committee ISO/TC 221 "Geosynthetics" in collaboration with 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 June 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

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 ISO 13438:2004.

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

Endorsement notice

The text of ISO 13438:2018 has been approved by CEN as EN ISO 13438:2018 without any modification.

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Method A	1
4.1 Principle	1
4.2 Specimens	2
4.3 Apparatus for oven testing	2
4.4 Test procedure	2
4.4.1 Leaching	2
4.4.2 Exposure in air	3
5 Method B for PVAL	4
5.1 Principle for first evaluation of service lives	4
5.2 Apparatus and reagents	4
5.2.1 Apparatus	4
5.2.2 Reagents	4
5.2.3 Specimens	4
5.3 Test procedure	5
5.3.1 Quantity of test liquid and of gas phase	5
5.3.2 Positioning and installing the specimens	5
5.3.3 Test conditions	5
5.3.4 Procedure during exposure	6
5.3.5 Removing the specimens	6
5.3.6 Control specimens	6
5.4 Principle for follow up procedure	6
6 Determination of mechanical properties	6
7 Test report	7
Bibliography	8

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 procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 221, *Geosynthetics*.

This second edition cancels and replaces the first edition (ISO 13438:2004), which has been technically revised. The main changes compared to the previous edition are as follows:

- procedural guidance regarding the use of exposure ovens has been added;
- procedural guidance regarding the use of autoclaves has been added.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

In many civil engineering applications, geotextiles and geotextile-related products can come into contact with water or aqueous solutions present in the soil environment. At the same time, in specific parts of the construction, they can be exposed to oxygen, giving rise to oxidative degradation processes. These processes are usually very slow.

Polyolefin materials, such as polypropylene (PP) and polyethylene (PE), are inherently more sensitive to oxidation than those based on polyethylene terephthalate (PET). Other polymers, such as poly(vinyl alcohol) (PVAL according to ISO 1043-1), are also sensitive to oxidation in specific conditions (aqueous media with oxidizing agent). This behaviour can be improved very effectively by the use of appropriate stabilizing additives.

It is the purpose of this document to provide a method for screening the resistance to oxidation of geotextiles and geotextile-related products in service for 25, 50 and 100 years. In order to achieve the sufficiently short exposure times needed for screening tests, the oxidative degradation process is accelerated. This acceleration can be achieved either by raising the temperature or by increasing the concentration of the active reaction partner. Raising the temperature can lead to the oxidation rate being limited by oxygen diffusion, thus invalidating the acceleration. This applies particularly to materials with a low surface-to-volume ratio and less to nonwovens made from fine fibres. Two methods are therefore proposed.

Method A (which was Method B in the previous edition) uses temperature alone as the accelerating factor and is used for PE, PP, PA and AR.

Method B operates at moderately high temperatures and, at the same time, the oxygen concentration is increased by using pure oxygen at high pressure. Method B is used for PVAL.

Geosynthetics — Screening test method for determining the resistance of geotextiles and geotextile-related products to oxidation

1 Scope

This document specifies a screening test method for determining the resistance of geotextiles and geotextile-related products to oxidation. The test is applicable to products as follows:

- **Method A** for material consisting solely in polypropylene (PP), polyethylene (PE), polyamide (PA), aramide (AR);
- **Method B** for material consisting solely in polyvinyl alcohol (PVAL).

The data are suitable for screening purposes but not for deriving performance data such as lifetime, unless supported by further evidence.

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.

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

EN 12226, *Geotextiles and geotextile-related products — General tests for evaluation following durability testing*

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:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Method A

4.1 Principle

Test specimens are stored in water (Grade 3 or better according to ISO 3696) at 80 °C for 28 days before being exposed to an elevated temperature in air over a fixed time period, using a regulated laboratory oven as described in 4.3. Oven ageing shall be carried out at a temperature of (100 ± 1) °C.

NOTE In the previous edition, the only difference between Methods A and B was the temperature (100 °C and 110 °C). With this revision, this difference was deleted.

The test specimens shall hang freely in the oven space.

After the fixed time period of oven ageing, the exposed test specimens are submitted to a tensile test. The tensile strength and the strain at maximum load are measured for both the control specimens and