



**SLOVENSKI STANDARD**  
**oSIST prEN ISO 13431:2023**  
**01-julij-2023**

---

**Geotekstilije in geotekstilijam sorodni izdelki - Ugotavljanje obnašanja pri lezenju in pretrgu zaradi lezenja (ISO/DIS 13431:2023)**

Geotextiles and geotextile-related products - Determination of tensile creep and creep rupture behaviour (ISO/DIS 13431:2023)

Geotextilien und geotextilverwandte Produkte - Bestimmung des Zugkriech- und des Zeitstandbruchverhaltens (ISO/DIS 13431:2023)

Géotextiles et produits apparentés - Détermination du comportement au fluage en traction et de la rupture au fluage en traction (ISO/DIS 13431:2023)

**Ta slovenski standard je istoveten z: prEN ISO 13431**

---

**ICS:**

59.080.70      Geotekstilije      Geotextiles

**oSIST prEN ISO 13431:2023**      **en,fr,de**



# DRAFT INTERNATIONAL STANDARD

## ISO/DIS 13431

ISO/TC 221

Secretariat: BSI

Voting begins on:  
2023-06-01Voting terminates on:  
2023-08-24

---

---

## Geotextiles and geotextile-related products — Determination of tensile creep and creep rupture behaviour

*Géotextiles et produits apparentés — Détermination du comportement au fluage en traction et de la rupture au fluage en traction*

ICS: 59.080.70

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

[oSIST prEN ISO 13431:2023](https://standards.iteh.ai/catalog/standards/sist/b3350459-2abf-422d-9b68-1045e07afc3c/osist-pren-iso-13431-2023)

<https://standards.iteh.ai/catalog/standards/sist/b3350459-2abf-422d-9b68-1045e07afc3c/osist-pren-iso-13431-2023>

This document is circulated as received from the committee secretariat.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

**ISO/CEN PARALLEL PROCESSING**



Reference number  
ISO/DIS 13431:2023(E)

© ISO 2023

# iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN ISO 13431:2023](https://standards.iteh.ai/catalog/standards/sist/b3350459-2abf-422d-9b68-1045e07afc3c/osist-pren-iso-13431-2023)

<https://standards.iteh.ai/catalog/standards/sist/b3350459-2abf-422d-9b68-1045e07afc3c/osist-pren-iso-13431-2023>



## **COPYRIGHT PROTECTED DOCUMENT**

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

<b>Foreword</b> .....	<b>iv</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative References</b> .....	<b>1</b>
<b>3 Terms and Definitions</b> .....	<b>1</b>
<b>4 Specimens</b> .....	<b>3</b>
4.1 Sampling.....	3
4.2 Number of specimens.....	3
4.3 Dimensions of specimens.....	3
4.4 Conditioning.....	4
<b>5 Determination of tensile creep behaviour</b> .....	<b>4</b>
5.1 Principle.....	4
5.2 Apparatus.....	4
5.2.1 General.....	4
5.2.2 Specimen grips.....	5
5.2.3 Loading system.....	5
5.2.4 Strain measuring system.....	5
5.3 Procedure.....	5
5.3.1 Tensile characteristics.....	5
5.3.2 Technically representative width.....	5
5.3.3 Test loads.....	6
5.3.4 Specimens preparation.....	6
5.3.5 Measurements.....	6
<b>6 Determination of tensile creep rupture</b> .....	<b>6</b>
6.1 Principle.....	6
6.2 Apparatus.....	7
6.2.1 General.....	7
6.2.2 Specimen grips.....	7
6.2.3 Loading system.....	7
6.2.4 Time recording system.....	7
6.3 Procedure.....	7
6.3.1 Wide-width tensile characteristics.....	7
6.3.2 Technically representative width.....	7
6.3.3 Load levels.....	8
6.3.4 Specimens preparation.....	8
6.3.5 Time recording.....	8
6.3.6 Graph.....	8
<b>7 Calculations (for use of TRW specimens)</b> .....	<b>8</b>
7.1 Example 1.....	9
7.2 Example 2.....	9
<b>8 Test report</b> .....	<b>9</b>

## ISO/DIS 13431:2023(E)

### 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](http://www.iso.org/directives)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO [had/had not] received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights. 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](http://www.iso.org/iso/foreword.html).

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

This fourth edition cancels and replaces the third edition (ISO 13431:1999), which has been technically revised.

The main changes compared to the previous edition are as follows:

- normative references have been updated in [Section 2](#);
- In [clause 3](#) units have been added in Note for each entry;
- In [clause 4.2](#), [5.3.3](#), [5.3.5](#) the possibility of other test conditions, upon agreement by Parties, has been added;
- in [clause 4.3.3](#) conditions for lateral contraction have been added;
- key of figures has been slightly modified;
- in [clause 8](#) the "Test Report" contains also charts of the recorded temperature and humidity for the whole duration of tests.

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](http://www.iso.org/members.html)

# Geotextiles and geotextile-related products — Determination of tensile creep and creep rupture behaviour

## 1 Scope

This document specifies a method for determining the tensile creep and creep rupture behaviour of geotextiles and geotextile-related products in an unconfined situation.

Application of this standard is limited to those products and applications where the risk of collapse of a structure due to premature failure or to strain/time variation of the reinforcement under constant load is of essential importance.

As the test is carried out over a long period of time and the procedure is complex, it is therefore recommended that the test is not considered to be a routine quality control test. The results of the test cannot be representative of the performance of the products when subject to soil pressures.

## 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 554, *Standard atmospheres for conditioning and/or testing — Specifications*

EN ISO 9862, *Geosynthetics — Sampling and preparation of test specimens*

EN ISO 10318-1, *Geosynthetics - Part 1: Terms and definitions*

EN ISO 10319, *Geotextiles - Wide-width tensile test*

## 3 Terms and Definitions

For the purposes of this document, the terms and definitions given in EN ISO 10318-1 and the following apply.

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

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

### 3.1

#### **tensile strength**

Maximum load per unit width, developed in a specific material subjected to an external tensile load, when measured in accordance with EN ISO 10319.

Note 1 to entry: Tensile strength is expressed in kilonewtons per metre (kN/m).

## ISO/DIS 13431:2023(E)

### 3.2 pre-tension force

$F_p$

tensile force, equal to 1 % of the tensile strength, but not more than 10 % of the tensile creep load, applied to the specimen to enable the gauge length and strain zero to be determined under reproducible conditions.

Note 1 to entry: The pre-tension force is expressed in kilonewtons (kN).

### 3.3 nominal gauge length

Initial distance between two reference points located on the specimen parallel to the applied load before the application of the pre-tension force. The gauge length should be set to be completely clear from the clamping devices. The gauge length should be a representative part of the specimen, e.g. for grid structures the gauge length should be a whole number of meshes or ribs.

Note 1 to entry: nominal gauge length is expressed in mm.

### 3.4 technically representative width TRW

A small width, that exhibits tensile strength/ strain characteristics per unit width, under identical test conditions, within  $\pm 5\%$  for tensile strength and  $\pm 20\%$  for strain at the maximum load, of the values measured in accordance with EN ISO 10319.

Note 1 to entry: technically representative width is expressed in mm.

### 3.5 tensile creep strain

Time dependent change in tensile strain of a specimen subject to a constant tensile load.

Note 1 to entry: tensile creep strain is expressed in %.

### 3.6 tensile creep rupture

Tensile failure of a specimen subject to a constant tensile load, which is less than the tensile strength.

Note 1 to entry: In some materials tensile creep rupture is preceded by an increasing rate of strain.

### 3.7 tensile creep load

Constant tensile static load per unit width, applied to the specimen.

Note 1 to entry: The tensile creep load is usually expressed as a percentage of the tensile strength of the sample. The tensile creep load includes the preload and, if applicable, any load due to the loading device.

Note 2 to entry: tensile creep load is expressed in kilonewtons per metre (kN/m).

### 3.8 loading time

Time required to apply the full tensile creep load.

Note 1 to entry: loading time is expressed in seconds.

### 3.9 creep time

Time elapsed from the end of the loading time.

Note 1 to entry: creep time is expressed in hours.

### 3.10

#### **time to creep rupture**

Time elapsed from the end of the loading time until tensile creep rupture of the specimen.

Note 1 to entry: time to creep rupture is expressed in hours.

### 3.11

#### **initial strain**

Change in the gauge length (strain), measured on the specimen at  $(60 \pm 5)$  s after the end of the loading time.

Note 1 to entry: initial strain is expressed in %.

### 3.12

#### **lateral contraction**

Decrease in the width of the specimen during the tensile test, expressed as a percentage of the width of the specimen under pre-tension force, measured at the centre of the gauge length (see [figure 2](#)).

Note 1 to entry: lateral contraction is expressed in %.

## 4 Specimens

### 4.1 Sampling

Take a sample and prepare specimens in accordance with EN ISO 9862.

### 4.2 Number of specimens

For the determination of tensile creep behaviour (see [clause 5](#)), cut minimum four specimens from the sample.

For the determination of tensile creep rupture (see [clause 6](#)), cut minimum twelve specimens from the sample.

A higher number of specimens can be cut, upon agreement between Parties.

### 4.3 Dimensions of specimens

**4.3.1** The size of the specimens is determined:

- to suit the dimensions of the apparatus being used;
- to suit the accuracy of the measuring equipment being used;
- to comply with the technically representative width (TRW);
- to allow the minimum gauge length to be established within the grips such that there is a distance of not less than 20mm between either end of the marked gauge length and the grips.

**4.3.2** The minimum gauge length of the specimens shall be in accordance EN ISO 10319 (see [figure 1](#)) and:

- not less than 200 mm;
- for geogrids not less than two full elements;
- for all samples, such length as will enable the measurement of the gauge length to an accuracy of  $\pm 0,1$  %.

## ISO/DIS 13431:2023(E)

**4.3.3** The width of the specimens shall be:

- for products which exhibit significant lateral contraction ( $> 10\%$ ), when tested in accordance with EN ISO 10319 (see [figure 2](#)): 200 mm;
- a specimen less than 200 mm wide can be used only if the value of the lateral contraction is not more than 10 % (see [figure 2](#)), where:

Lateral contraction in % =  $((W - W')/(W)) \cdot 100$

- for geogrids: not less than three full elements;
- for all other materials: a technically representative width (TRW).

NOTE The size of the specimens has a major influence on the feasibility and the accuracy of the test. The loads required are dependent upon the width of the specimen.

## 4.4 Conditioning

Condition the test specimens in a standard atmosphere for testing defined in ISO 554, until the change in mass between successive readings made at intervals of not less than 2 h does not exceed 0,25 % of the mass of the specimens.

Tests shall be carried out under the same conditions.

It is required to control and report the temperature of the test.

NOTE Conditioning and/or testing at a specified relative humidity can be omitted if it can be shown that the results are not affected by this omission. As this test is carried out over a long period of 1 000 h, the omission of humidity control is based upon experimental evidence from tests carried out over a similar period of time on similar samples of the same polymer.

## 5 Determination of tensile creep behaviour

### 5.1 Principle

The specimens are loaded with a constant static force, in constant ambient conditions of temperature and humidity.

The load is distributed evenly across the specimen width.

The elongation of the specimen is recorded continuously or is measured at specific time intervals. The load is maintained for a minimum period of 1000 h. If the specimen fails before 1000 h the time to creep rupture is recorded.

Specimens from the sample shall first be tested in accordance with EN ISO 10319 to determine the tensile strength and the TRW of the sample.

### 5.2 Apparatus

#### 5.2.1 General

A schematic representation of suitable equipment is shown in [figures 3](#) and [4](#).

The apparatus shall consist of a device to grip the specimen without slipping, a loading system and a system to measure the change in gauge length with time.