



**International
Standard**

ISO 13431

**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*

**Second edition
2024-08**

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Published in Switzerland

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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 document 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).

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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*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 189, *Geosynthetics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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

The main changes are as follows: [ISO 13431:2024](https://standards.iso.org/iso/bbdeb4c6-73fe-4e9f-89df-6c2a5d514825/iso-13431-2024)

- normative references have been updated;
- units have been added in the Notes to entry in [Clause 3](#);
- the possibility of other test conditions, upon agreement by parties, have been added in [4.2](#), [5.3.3](#), [5.3.5](#);
- conditions for lateral contraction have been added in [4.3.3](#);
- figure keys have been slightly modified;
- charts of the recorded temperature and humidity have been added to the test report for the duration of tests in [Clause 8](#).

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

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

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*

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

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

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

3 Terms and definitions

ISO 13431:2024

For the purposes of this document, the terms and definitions given in 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 ISO 10319

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

3.2 pre-tension force

F_p
tensile force, equal to 1 % of the *tensile strength* (3.1), but not more than 10 % of the *tensile creep load* (3.7), 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* (3.2)

Note 1 to entry: 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. the gauge length for grid structures should be a whole number of meshes or ribs.

Note 2 to entry: Nominal gauge length is expressed in mm.

3.4

technically representative width

TRW

small width that exhibits tensile strength and strain characteristics per unit width, under identical test conditions and within $\pm 5\%$ of *tensile strength* (3.1) and $\pm 20\%$ of strain at the maximum load, of the values measured in accordance with ISO 10319

Note 1 to entry: Technically representative width is expressed in millimetres.

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 as a percentage.

3.6

tensile creep rupture

tensile failure of a specimen subject to a constant tensile load, which is less than the *tensile strength* (3.1)

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* (3.1) of the sample. The tensile creep load includes the *pre-tension force* (3.2) 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* (3.7)

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

3.9

creep time

time elapsed from the end of the *loading time* (3.8)

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

3.10

time to tensile creep rupture

time elapsed from the end of the *loading time* (3.8) until *tensile creep rupture* (3.6) of the specimen

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