



**BSI Standards Publication**

## **Geosynthetics — Wide-width tensile test**

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## National foreword

This British Standard is the UK implementation of EN ISO 10319:2024. It is identical to ISO 10319:2024. It supersedes BS EN ISO 10319:2015, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/553, Geosynthetics.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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### Amendments/corrigenda issued since publication

| Date  | Text affected |
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| <hr/> |               |

English Version

## Geosynthetics - Wide-width tensile test (ISO 10319:2024)

Géosynthétiques - Essai de traction des bandes larges  
(ISO 10319:2024)

Geokunststoffe - Zugversuch am breiten Streifen (ISO  
10319:2024)

This European Standard was approved by CEN on 23 September 2024.

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## **European foreword**

This document (EN ISO 10319:2024) 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of an identical text or by endorsement, at the latest by April 2025, and conflicting national standards shall be withdrawn at the latest by April 2025.

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 10319:2015.

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

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## **Endorsement notice**

The text of ISO 10319:2024 has been approved by CEN as EN ISO 10319:2024 without any modification.

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

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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 fourth edition cancels and replaces the third edition (ISO 10319:2015), which has been technically revised.

The main changes are as follows:

- the term “load” changed to “force” in all instances;
- difference between strain and elongation clarified in [Clause 3](#) and [Figure 1](#) modified accordingly;
- difference between tensile strength at first and second peak clarified in [Clause 3](#) and [9.2](#);
- illustration of suitable jaws and grips introduced in [Figure 3](#);
- testing of metallic products limited to woven steel wire meshes in [6.4.6](#);
- testing products narrower than 200 mm introduced in [6.4.7](#);
- testing at lower or higher temperatures introduced, with the related conditioning in [7.3](#) and the related procedure added in [Annex A](#);
- formulae for strain calculation introduced in [9.1](#);
- formulae for tensile strength of products narrower than 200 mm introduced in [9.2](#);
- test report requirements updated in [Clause 10](#).

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).

# Geosynthetics — Wide-width tensile test

## 1 Scope

This document specifies an index test method for the determination of the tensile properties of geosynthetics (polymeric, glass and metallic), using a wide-width strip. This document is applicable to most geosynthetics, including woven geotextiles, nonwoven geotextiles, geocomposites, knitted geotextiles, geonets, geomats and metallic products. It is also applicable to geogrids and similar open-structure geotextiles, but specimen dimensions will possibly need to be altered. It is not applicable to polymeric or bituminous geosynthetic barriers, but it is applicable to clay geosynthetic barriers.

This document specifies a tensile test method that covers the measurement of tensile force, elongation characteristics and includes procedures for the calculation of secant stiffness, maximum load per unit width and strain at maximum force. Singular points on the tensile force-extension curve are also indicated.

Procedures for measuring the tensile properties of both conditioned and wet specimens are included in this document.

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

ISO 7500-1, *Metallic materials — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system*

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

ISO 9863-1, *Geosynthetics — Determination of thickness at specified pressures — Part 1: Single layers*

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

ISO 10321, *Geosynthetics — Tensile test for joints/seams by wide-width strip method*

EN 10223-3, *Steel wire and wire products for fencing and netting — Part 3: Hexagonal steel wire mesh products for civil engineering purposes*

## 3 Terms and definitions

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 nominal gauge length

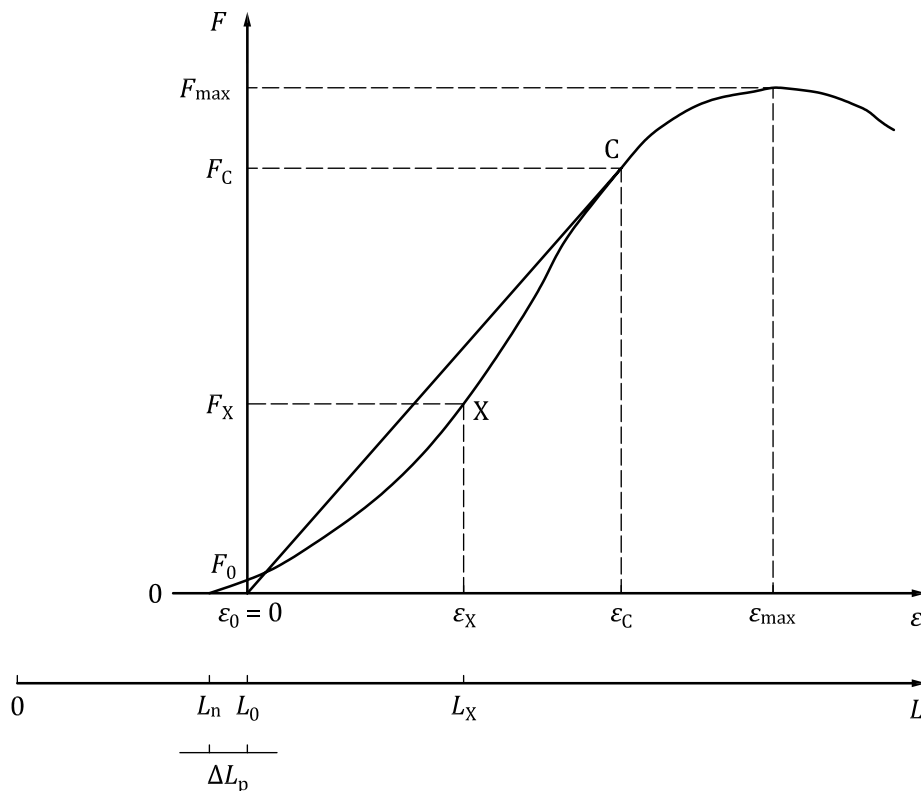
$L_n$   
initial distance between two reference points located on the specimen parallel to the applied force direction

Note 1 to entry: The nominal gauge length is normally 60 mm (30 mm on either side of the specimen symmetrical centre).

### 3.2 elongation at pre-tension force

$\Delta L_p$   
measured increase in gauge length (mm) corresponding to an applied pre-tension force of 1 % of the expected *maximum tensile force* (3.4)

Note 1 to entry: The elongation at pre-tension force is indicated in [Figure 1](#).



#### Key

|                      |                                                                                                |
|----------------------|------------------------------------------------------------------------------------------------|
| $F$                  | tensile force, in kN                                                                           |
| $F_{\max}$           | maximum tensile force, in kN                                                                   |
| $F_0$                | pre-tension force, in kN                                                                       |
| $F_c$                | tensile force for secant stiffness calculation at point C                                      |
| $F_x$                | tensile force at strain $\varepsilon_x$                                                        |
| C                    | selected point for the stiffness calculation                                                   |
| $\varepsilon$        | tensile strain, in per cent                                                                    |
| $\varepsilon_0$      | tensile strain at pre-tension force set as the origin of the abscissa, in per cent             |
| $\varepsilon_{\max}$ | tensile strain at maximum tensile force, in per cent                                           |
| $\varepsilon_x$      | tensile strain corresponding to the generic length $L_x$ , in per cent                         |
| $\varepsilon_c$      | tensile strain for secant stiffness calculation at point C, in per cent                        |
| $L$                  | length, equal to the distance between the two reference points measured during the test, in mm |
| $L_n$                | nominal gauge length, in mm                                                                    |