INTERNATIONAL STANDARD

ISO 10321

Second edition
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Geosynthetics — Tensile test for joints/seams by wide-width strip method

Géosynthétiques — Essai de traction des joints/coutures par la méthode de la bande large

Reference number
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Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 10321 was prepared by Technical Committee ISO/TC 221, *Geosynthetics*.

This second edition cancels and replaces the first edition (ISO 13021:1992), which has been technically revised.

Geosynthetics — Tensile test for joints/seams by wide-width strip method

1 Scope

This International Standard specifies an index test method for determination of the tensile properties of joints and seams in geosynthetics, using a wide-width strip. The method is applicable to most geosynthetics. It is also applicable to geogrids, but the specimen dimensions may need to be altered. This test is not applicable to polymeric or bituminous geosynthetic barriers.

This method quantifies the tensile strength of a joint or seam between geosynthetics. It can provide data to indicate the joint or seam tensile strength which can be achieved.

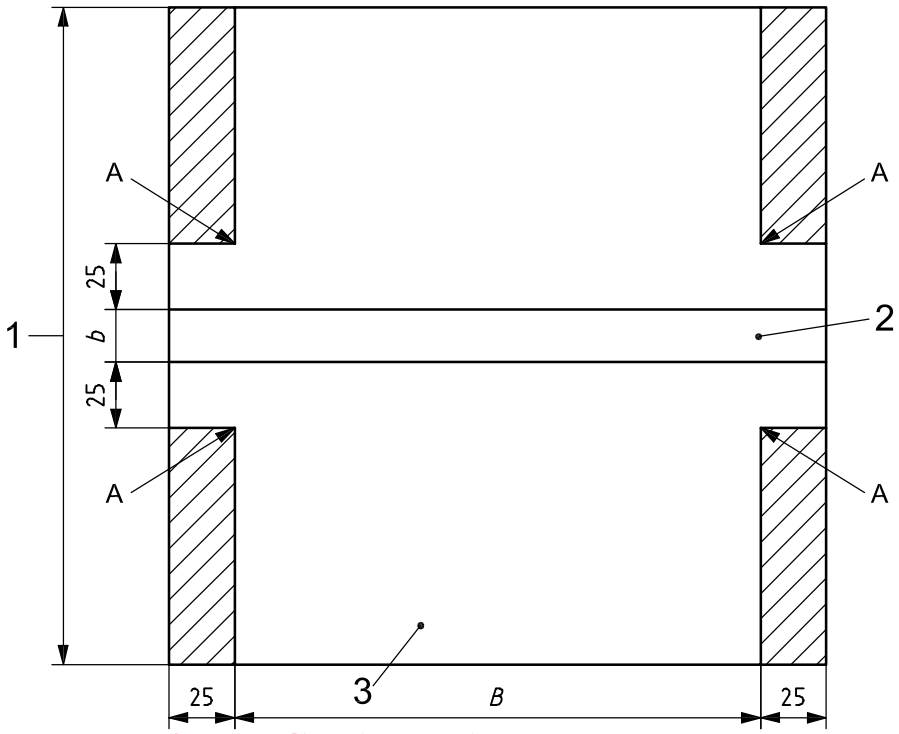
A joint or seam efficiency can be calculated by comparison of the joint/seam tensile strength with the tensile strength of the unjointed material, as determined by ISO 10319.

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

Some modification of techniques may be necessary for particular geosynthetics, e.g. strong geosynthetics, meshes or geosynthetics made from glass fibre, to prevent them from slipping in the jaws or being damaged as a result of being gripped in the jaws.

The basic test for joints or seams in all kinds of geosynthetics uses test specimens of 200 mm width, with the provision for the seam or joint to extend for 25 mm on each side, in order to provide joint or seam stability during the test (see Figure 1).

Dimensions in millimetres



Key

1 length, in millimetres
2 joint/seam
3 finished specimen
A see 6.3.5 and 8.4 b)
B specimen width, in millimetres
b joint/seam width, in millimetres

Figure 1 — Preparation of test specimen

2 Normative references

The following referenced documents are indispensable for the application 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 — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system*

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

ISO 10318:2005, *Geosynthetics — Terms and definitions*

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

3 Terms and definitions

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

3.1
seam
series of stitches joining two or more separate pieces of a material or materials of planar structure, e.g. geosynthetics or related products

3.2
joint
junction at which two or more separate pieces of a geosynthetic are joined by a method other than stitching

3.3
joint/seam strength
$T_{j/s\ max}$
maximum tensile stress of the seam formed by joining two or more sheets

NOTE The joint or seam strength is expressed in kilonewtons per metre.

[ISO 10318:2005]

3.4
joint/seam efficiency
$\xi_{j/s}$
ratio of the joint or seam strength to the tensile strength of the material measured in the same direction

NOTE The joint or seam efficiency is expressed in percent.

[ISO 10318:2005]

4 Principle

A geosynthetic specimen, 200 mm wide and containing a joint/seam, is gripped across its entire width in the clamps of a tensile testing machine, operated at a prescribed rate of extension, and subjected to a longitudinal force (perpendicular to the seam axis) until the joint/seam of the geosynthetic ruptures.

5 Apparatus and materials

5.1 Tensile testing machine

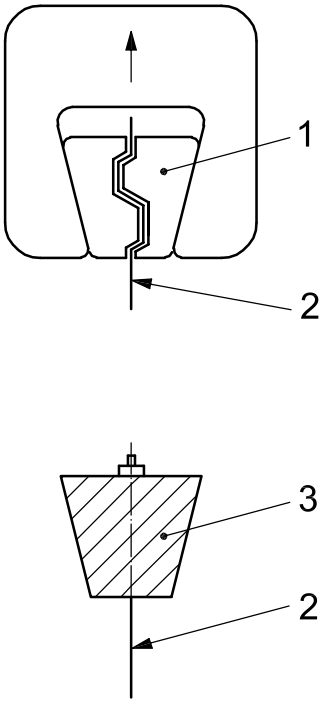
Tensile testing machine, constant rate of extension type, complying with ISO 7500-1, Class 2 or higher, in which the rate of increase of the specimen length is uniform with time.

5.2 Jaws

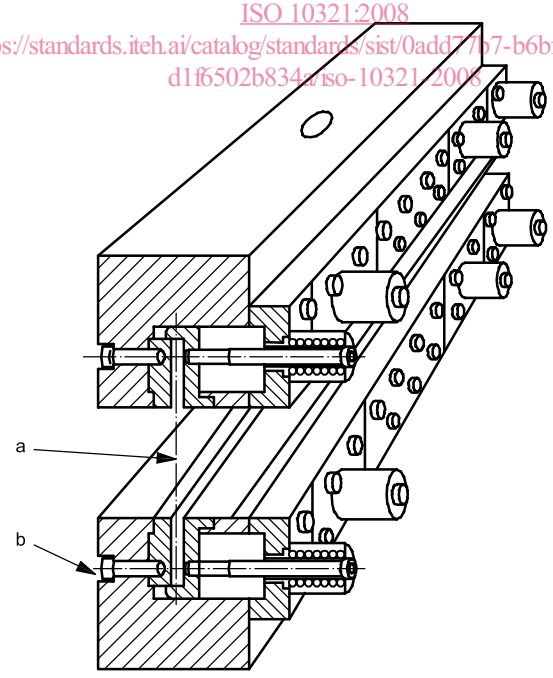
Jaws which are sufficiently wide to hold the entire width of the specimen and with appropriate means to limit slippage or damage. Each jaw shall have faces measuring at least the width of the specimen, i.e. 200 mm.

NOTE It is stressed that it is essential to choose jaw faces that limit any slippage of the geosynthetic that may occur, especially for stronger geosynthetics. Examples of types of jaw face, which have been found satisfactory, are given in Figure 2.

Dimensions in millimetres

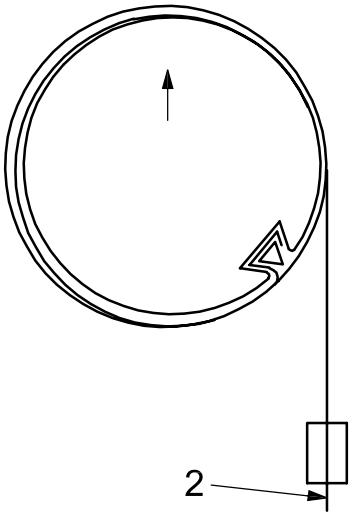


a) Wedge jaws



b) Compressive block jaws

Figure 2 — Examples of jaw faces for testing geosynthetics



c) Capstan

Key

1 serrated wedge
2 geosynthetic
3 epoxy or soft-metal wedge

[a] Specimen maximum width: 0,5 m.
[b] Compressive force adjustable up to 400 kN.

Figure 2 (*continued*)

5.3 Water

For wet specimens only, water complying with Grade 3 of ISO 3696.

5.4 Non-ionic wetting agent

For wet specimens only.

6 Test specimens

6.1 Number of test specimens

Cut at least five test specimens, each of which includes the seam or joint.

6.2 Selection of test specimens

Select specimens in accordance with ISO 9862.

6.3 Dimensions of test specimens

6.3.1 General

Prepare test specimens from the jointed or seamed specimen, each of sufficient length to ensure an initial jaw separation of 100 mm plus the joint or seam width, b (see Figure 1) and with the seam or joint located along the centre-line of the specimen, perpendicular to the direction of the applied load.