SLOVENSKI STANDARD
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Geosintetika - Polimerne geosintetične ovire - Ugotavljanje nateznih lastnosti

Geosynthetics - Polymeric geosynthetic barriers - Determination of tensile properties

Geosynthetische Kunststoffdichtungsbahnen - Bestimmung von Zugeigenschaften

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59.080.70	Geotekstilije	Geotextiles

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English Version

Geosynthetics - Polymeric geosynthetic barriers - Determination of tensile properties

Geosynthetische Kunststoffdichtungsbahnen - Bestimmung von Zugeigenschaften

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 189.

If this draft becomes a European Standard, 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.

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

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European foreword

This document (prEN 17323:2018) has been prepared by Technical Committee CEN/TC 189 “Geotextiles”, the secretariat of which is held by NBN.

This document is currently submitted to the CEN Enquiry.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

1 Scope

This document specifies test methods for the determination of tensile properties of polymeric geosynthetic barriers (PE (PEHD and PELLD, FPO (EVA, FPP, and PEVLD), PVC-P and EPDM).

Method A is suitable for testing polymeric geosynthetic barriers (GBRP), PVC, EPDM and FPO (EVA, FPP and PEVLD), non-reinforced (including 80gsm glass fleece) and without backing.

Method B is suitable for testing polymeric geosynthetic barriers (GBRP), PE (HDPE and PELLD), non-reinforced and without backing.

Method C is suitable for testing polymeric geosynthetic barriers (GBRP), reinforced and/or with backing.

Method D is suitable for measuring modulus (if required) of all non-reinforced products.

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.

EN 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 7500-1:2018)*

EN ISO 9862, *Geosynthetics - Sampling and preparation of test specimens (ISO 9862)*

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply

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

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

3.1
cross sectional area A
product of initial width b (mm) and thickness d (mm) of a test specimen

Note 1 to entry: It is expressed in square millimetres, (mm^2).

3.2
yield
first occurrence in the tensile test where there is an increase in strain without an increase in stress

3.3
method A -maximum tensile strength
trength recorded, expressed in N/mm^2, at the highest value of strength on the stress /strain curve

3.4
method A – elongation at break
elongation at break, i.e. at the highest value of strength on the stress/ strain curve, expressed as a percentage

3.5
method B – yield stress
strength recorded, expressed in N/mm^2, at yield elongation

3.6
method B – tensile stress at break
strength recorded, expressed in N/mm^2, at the highest value of strength on the stress /strain curve

3.7
method B – elongation at yield
first occurrence in the tensile test where there is an increase in strain without an increase in stress, expressed as a percentage

3.8
method B – elongation at break
elongation at break, i.e. at the highest value of strength on the stress/ strain curve, expressed as a percentage

3.9
method C – maximum tensile force
tensile strength recorded at break, expressed in N/50 mm, i.e. the highest value of strength on the stress/strain curve directly prior to failure

3.10
method C – elongation at maximum tensile force
strain at break, i.e. at the highest value of strength on the stress/ train curve directly prior to failure, expressed as a percentage

Note 1 to entry: These products may exhibit more than one peak on the stress /strain curve. Where this occurs the tensile strength and elongation at the first distinct peak should also be reported. Examples of stress/stain curves are provided within Annex A for guidance.

3.11
method D – modulus
slope of the stress/strain curve in the strain interval between 1 and 2 %, expressed in MPa

Note 1 to entry: It may be calculated either as the chord modulus or as the slope of the linear least-squares regression line in this interval.

4 Principle

The test specimen is extended along its major longitudinal axis at a constant speed until the specimen ruptures. The force and elongation is continuously recorded throughout the test.

5 Apparatus

5.1 Testing machine

5.1.1 General

Tensile testing machine (constant rate of extension) complying with EN ISO 7500-1, class 1 or better, in which the rate of increase in specimen length is uniform with time, fitted with a set of clamps or jaws which are sufficiently wide to hold the entire width of the specimen and equipped with appropriate means to limit slippage or damage.

5.1.2 Extensometer (where required)

Capable of measuring the distance between two reference points on the specimen without any damage to the specimen or slippage, care being taken to ensure that the measurement represents the true movement of the reference points. Example: mechanical, optical, infrared or other types. All with an electrical output.

The extensometer shall be capable of measuring to an accuracy of +/- 2 % of the indicated reading. If any irregularity of the stress/strain curve due to the extensometer is observed, this result shall be discarded and another specimen shall be tested.

6 Test specimens

6.1 Preparation of test specimens

Prepare the test specimens over the full roll width and in accordance with EN ISO 9862.

The test specimens shall be punched so that the edges are smooth and free from notches: examination with a low-power magnifier is recommended to check the absence of notches. Punch dies shall be kept sharp by regular honing, and a suitable backing material shall be used with punch dies to ensure a clean-cut edge.

A set of test specimens (longitudinal or transverse direction) with a mesh or fabric internal layer, backing or laminated reinforcement shall have the same number of treads. Cutting of threads should be avoided.

The test specimens shown in Figures 1, 2 and 4 shall be obtained by the use of punch dies.

6.2 Number of test specimens

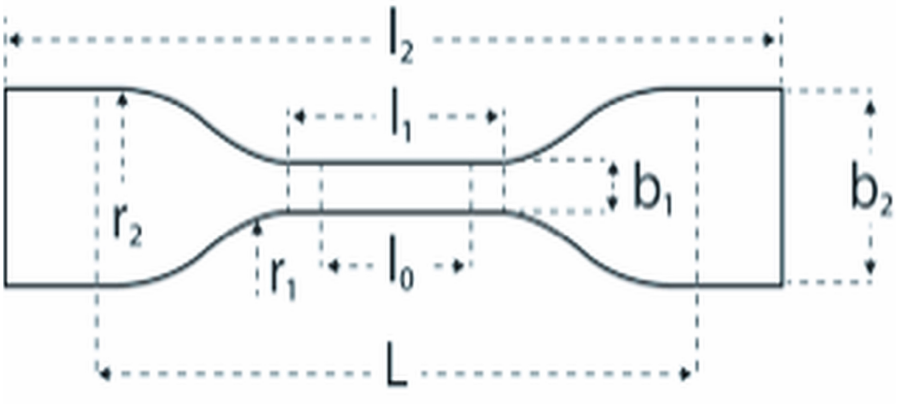
Prepare a minimum of five test specimens in both the machine and cross-machine directions.

6.3 Dimensions of test specimens

6.3.1 Method A

Prepare test specimens in accordance with Figure 1.

Dimensions in millimetres



Key

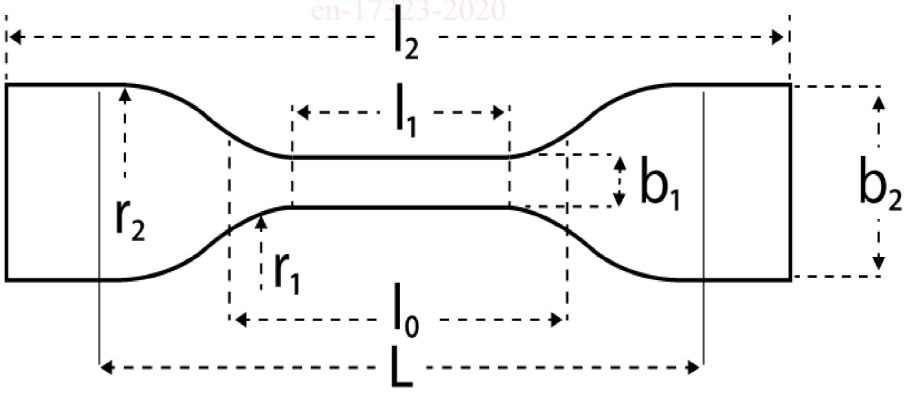
b_1	width of narrow parallel-sided portion: 6 mm ± 0,4 mm	L	initial distance between grips: 80 mm ± 5 mm
b_2	width of ends: 25 ± 1 mm	l_2	overall lengts: ≥ 115 mm
l_0	gauge length for extensometer, 25 mm	r_1	small radius: 14 mm ± 1 mm
l_1	length of narrow parallel-sided portion: 33 mm ± 2 mm	r_2	large radius: 25 mm ± 2 mm

Figure 1 — Test specimen for Method A

6.3.2 Method B

Prepare test specimens in accordance with Figure 2.

Dimensions in millimetres



Key

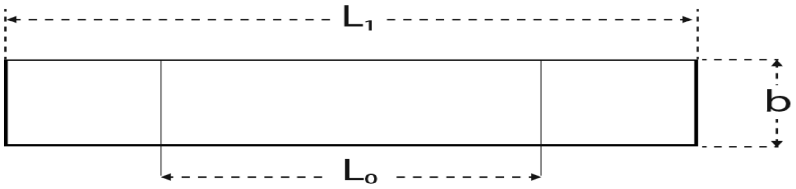
b_1	width of narrow parallel-sided portion: 6 mm ± 0,4 mm	L	initial distance between grips: 80 mm ± 5 mm
b_2	width of ends: 25 ± 1 mm	l_2	overall lengts: ≥ 115 mm
l_0	Reference length for measurement of yield and break elongation, 50 mm	r_1	small radius: 14 mm ± 1 mm
l_1	length of narrow parallel-sided portion: 33 mm ± 2 mm	r_2	large radius: 25 mm ± 2 mm

Figure 2 — Test specimen for Method B

6.3.3 Method C

Prepare specimens in accordance with Figure 3.

Dimensions in millimetres



Key

b width: 50 mm ± 0,5 mm

L_1 overall length, min. 200 mm

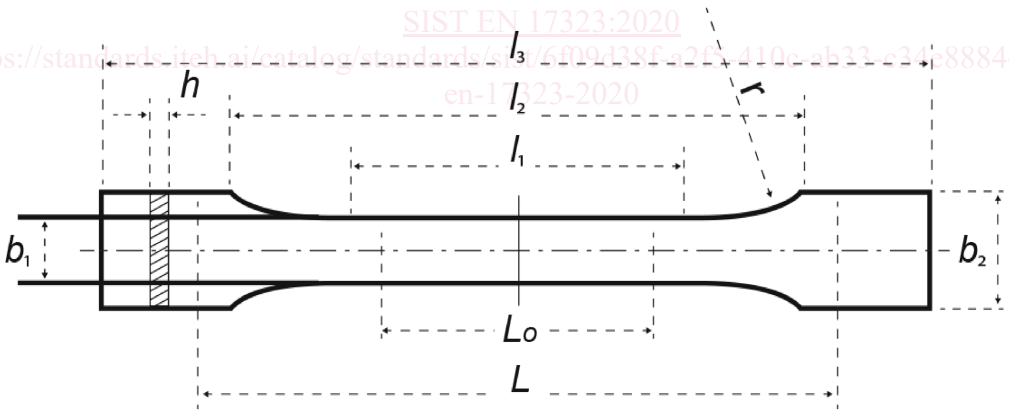
L_0 initial distance between grips: 120 mm ± 5 mm

Figure 3 — Test specimen for Method C

6.3.4 Method D

Prepare specimens in accordance with Figure 4.

Dimensions in millimetres



Key

b_1 width of narrow parallel-sided portion: 10 mm ± 0,2 mm

b_2 width of ends: 20 ± 0,5 mm

l_0 gauge length (for extensometer): 50 mm± 0,5 mm

l_1 length of narrow parallel-sided portion: 60 mm ± 0,5 mm

L_2 initial distance between grips: 115 mm ± 5 mm

L_3 overall lengths: ≥ 150 mm

r Radius ⩾ 60 mm (recommended radius): 60 mm ± 0,5 mm

Figure 4 — Test specimen for Method D