



SLOVENSKI STANDARD

SIST EN 14574:2005

01-marec-2005

Geosintetika – Ugotavljanje prebodne odpornosti podporne geosintetike proti preluknjanju s piramidnim bodalom

Geosynthetics - Determination of the pyramid puncture resistance of supported geosynthetics

Geokunststoffe - Bestimmung der Pyramidendurchdrückwiderstandes von Geokunststoffen auf harter Unterlage

Géosynthétiques - Détermination de la résistance au poinçonnement pyramidal de géosynthétiques sur support

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Ta slovenski standard je istoveten z: EN 14574:2004

ICS:

59.080.70 Geotekstilije Geotextiles

SIST EN 14574:2005 **en**

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EUROPEAN STANDARD

EN 14574

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2004

ICS 59.080.70

English version

Geosynthetics - Determination of the pyramid puncture resistance of supported geosynthetics

Géosynthétiques - Détermination de la résistance au poinçonnement pyramidal de géosynthétiques sur support

Geokunststoffe - Bestimmung der Pyramidendurchdrückwiderstandes von Geokunststoffen auf harter Unterlage

This European Standard was approved by CEN on 15 November 2004.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 14574:2004) has been prepared by Technical Committee CEN/TC 189 "Geosynthetics", the secretariat of which is held by IBN.

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 June 2005, and conflicting national standards shall be withdrawn at the latest by June 2005.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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EN 14574:2004 (E)**1 Scope**

This document specifies an index test method to determine the puncture resistance of a geosynthetic on a rigid support.

This method simulates the efficiency of a geosynthetic protecting a geosynthetic barrier material or an other contact surface against sharp rigid elements under short term loading.

Annex A (informative) specifies a test method which could be applicable to a soft support.

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.

EN 485-2	<i>Aluminium and aluminium alloys - Sheet, strip and plate - Part 2: Mechanical properties</i>
EN 963	<i>Geotextiles and geotextile-related products - Sampling and preparation of test specimens</i>
EN ISO 845	<i>Cellular plastics and rubbers - Determination of apparent (bulk) density (ISO 845:1988)</i>
EN ISO 10320	<i>Geotextiles and geotextile-related products - Identification on site (ISO 10320:1999)</i>
EN ISO 12236	<i>Geotextiles and geotextile-related products - Static puncture test (CBR-Test) (ISO 12236:1996)</i>
EN ISO 3386-1	<i>Polymeric materials, cellular flexible - Determination of stress-strain characteristics in compression - Part 1: Low-density materials (ISO 3386-1:1986)</i>
EN ISO 7500-1	<i>Metallic materials - Verification of static uniaxial testing machines - Part 1: Tension/compression testing machines (ISO 7500-1:1999)</i>

3 Terms and definitions

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

3.1 puncture load

load of the piston as it is pushed onto the test specimen at a constant rate of advance.

3.2 push-through load

maximum load at perforation of the geosynthetic.

4 Principle

A test specimen lies flat on an aluminium plate supported by a steel base, secured in a tensile/compression testing machine. A force is exerted on the centre of the test specimen by an inverted steel pyramid, attached to a load indicator, until perforation of the specimen occurs. The recorded push-through load is considered to be representative for the protection efficiency of the specimen.

5 Apparatus

5.1 Test configuration (see Figure 1)

A suitable testing machine with a force reading accuracy according to ISO 7500-1 shall be used. The press shall be able to maintain a constant test speed of the loading piston. A special piston and electric signal equipment for determining the moment of push-through are the additional pieces of test equipment needed.

5.2 Underlying aluminium medium

A 3 mm thick aluminium plate (AlMgSi1F32 according to EN 485-2) is used as the underlying medium for this test method. The aluminium plate simulates a hard, rigid support. It shall be placed on a steel base.

5.3 Loading piston (see Figure 2)

The upper part of the loading piston can be a cylinder with a diameter of $(25 \pm 0,1)$ mm or a square shape with a polished and hardened solid steel pyramid-shaped apex. The apex shall be a four sided pyramid with an apex angle of 90° rounded off with a radius (R) of $(0,5 \pm 0,02)$ mm. The edges of the pyramid shall be rounded off with a radius of $(0,5 \pm 0,02)$ mm. The transitional edge from the base of the pyramid to the cylinder or square shall have a radius (R) of $(0,5 \pm 0,1)$ mm.

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5.4 Electrical equipment for the determination of the push-through load

An electrical circuit shall be placed between the loading piston and the underlying medium in order to determine the puncture load at failure.

6 Specimens

6.1 Sampling

Take specimens in accordance with EN 963.

6.2 Number and dimension of specimens

Cut ten test specimens of 100 mm x 100 mm from the sample.

7 Conditioning

Condition the test specimens, and conduct the tests in the standard atmosphere as defined in ISO 554, i.e. at a relative humidity of (65 ± 5) % and a temperature of (20 ± 2) °C.

EN 14574:2004 (E)**8 Procedure**

Select the load range of the tensile/compression testing machine such that the perforation occurs between 10 % and 90 % of the full-scale load.

Lay the test specimen flat on the smooth aluminium plate. Test at a machine speed of $(1,0 \pm 0,1)$ mm/min until the puncture load is registered by the electrical circuit between the loading piston and the aluminium plate.

NOTE Where the electrical circuit does not stop the test automatically, great care should be taken to ensure that the push-through load recorded represents the correct value.

9 Calculation and expression of test results

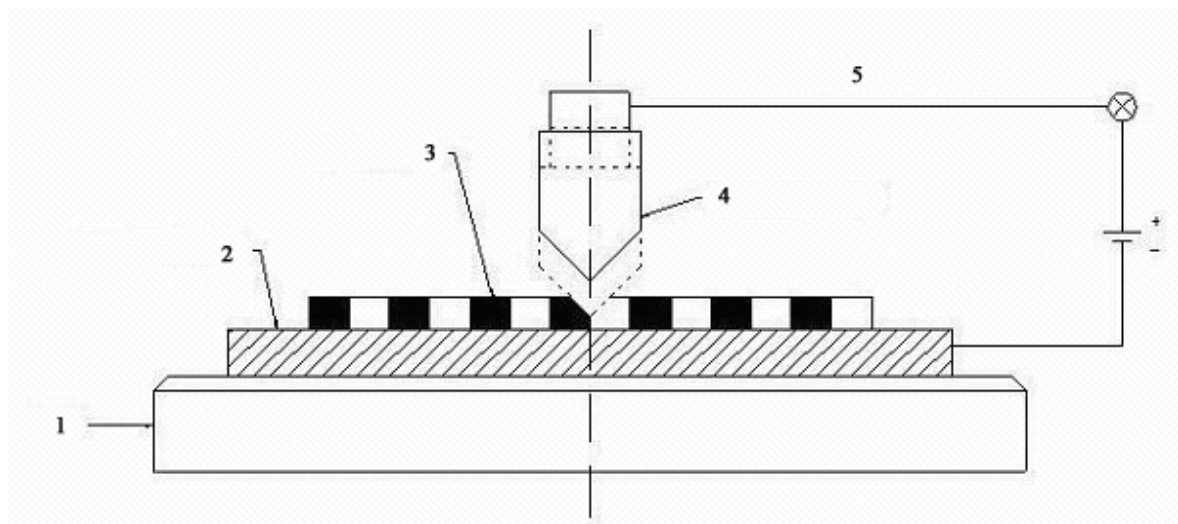
The push-through load (in N) is expressed as the arithmetic average of 10 individual tests.

10 Test Report

The test report shall include the following particulars:

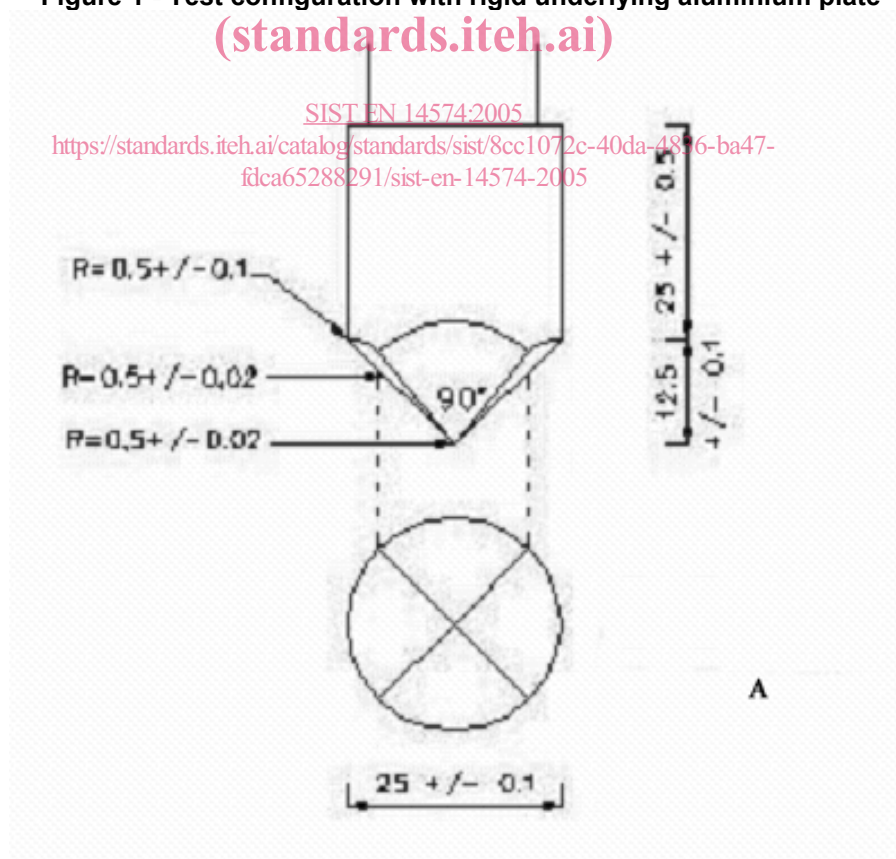
- a) reference number and date of publication of this standard;
- b) identification of the sample tested according to EN ISO 10320, date of receipt;
- c) conditioning atmosphere for the test, and whether tested dry or wet;
- d) individual test results and average push-through load (in N);
- e) coefficient of variation of push-through load (in %);
- f) any deviation from this procedure.

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**Key**

- 1 Base
- 2 Aluminium plate
- 3 Test specimen
- 4 Loading piston
- 5 Electrical circuit

Figure 1 - Test configuration with rigid underlying aluminium plate
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**Key**

- A view from below

Figure 2 - Loading piston (e.g. with cylindrical upper part)