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**Geotextiles and geotextile-related  
products — Abrasion damage simulation  
(sliding block test)**

*Géotextiles et produits apparentés — Simulation de l'endommagement par  
abrasion (essai du bloc glissant)*

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## Foreword

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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.

International Standard ISO 13427 was prepared by the European Committee for Standardization (CEN) in collaboration with ISO Technical Committee TC 38, *Textiles*, Subcommittee SC 21, *Geotextiles*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Annex ZZ provides a list of corresponding International and European Standards for which equivalents are not given in the text.

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## Foreword

The text of EN ISO 13427:1998 has been prepared by Technical Committee CEN/TC 189 "Geotextiles and geotextile-related products", the secretariat of which is held by IBN, in collaboration with Technical Committee ISO/TC 38 "Textiles".

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of an identical text or by endorsement, at the latest by February 1999, and conflicting national standards shall be withdrawn at the latest by February 1999.

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

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## 1 Scope

This standard specifies a test method for the determination of the resistance of geotextiles to abrasion using a sliding block. After abrasion the loss in tensile properties is determined. The method is applicable to woven and nonwoven geotextiles and geotextile-related products.

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 963	Geotextiles and geotextile-related products - Sampling and preparation of test specimens
ISO 554	Standard atmospheres for conditioning and/or testing - Specifications
prEN ISO 13934-1	Textiles - Tensile properties of fabrics - Part 1: Determination of maximum force and elongation at maximum force - Strip method (ISO/DIS 13934-1:1994)
ISO/DIS 6344-2	Coated abrasives - Grain size analysis - Part 2: Determination of grain size distribution of macrogrits P 12 to P220

## 3 Definition

For the purposes of this standard the following definition applies:

**abrasion:** Wearing away of any part of a material by rubbing against another surface.

## 4 Principle

A test specimen, mounted on a fixed platform, is rubbed by an abradant with specified surface characteristics. Under controlled conditions of pressure and abrasive action, the abradant is moved along on a horizontal axis with a uniaxial motion. Resistance to abrasion is expressed as the percentage loss of tensile strength of the test specimen.

NOTE: Changes in other specified index properties may also be measured.

## 5 Apparatus

5.1 Abrasion tester (see figure 1), having the following essential parts:

### 5.1.1 Balanced head and block assembly

The assembly shall consist of two parallel, smooth plates 50 mm x 200 mm, one of which moves with a reciprocating motion. The frequency of the reciprocating plate shall be adjustable to a maximum of 90 double strokes per minute. The stroke length shall be  $(25 \pm 1)$  mm. The second plate is rigidly supported by a double-lever assembly to provide free movement in a direction perpendicular to the reciprocating plate. This plate is held stationary during the test and is well balanced so that a vertical load can be maintained by means of dead weights.

Both plates are equipped with clamps at each end to hold the test specimen and the abrading medium. The clamps have rough surfaces to prevent slippage of the specimen or the abrading material during the test.

### 5.1.2 Indicator

An indicator for counting the number of cycles (1 cycle = 1 double stroke) shall be used.

### 5.1.3 Weights

Weights shall be used for applying the vertical load to the specimen.

## 6 Test specimens

Take a sample in accordance with EN 963.

From the laboratory sample prepare five test specimens. Cut rectangular specimens  $(50 \times 600)$  mm  $\pm 1$  mm and mark the machine direction.

For the tensile test, cut two specimens of 300 mm length. Take one specimen for abrasion and one for reference.

If the material to be tested is known to have different characteristics on the two sides (e.g. physical characteristics or as a consequence of the manufacturing process), then the complete test shall be carried out separately on each face using 10 specimens; the report shall include details of this extension of the test procedure, and separate results for each side shall be given.

## 7 Conditioning

Condition the test specimens in a standard temperate atmosphere defined in ISO 554 until the change in mass between two successive weighings made at intervals of not less than 2 h does not exceed 0,25 % of the mass of the test specimens.

## 8 Procedure

8.1 Test the conditioned specimens in the standard atmosphere for testing as described in clause 7.

8.2 Place the specimen to be tested in the upper (stationary) plate and secure it by means of the clamp at each end of the plate. Place the abrading medium on the lower (reciprocating) plate and secure it by means of the clamp at each end of the plate. Use emery cloth with abrasant P 100 in accordance with ISO/DIS 6344-2.

NOTE: When testing geotextiles, the specimen can be secured to the stationary plate by using a touch and close fastener or some other type of non-penetrating adhesive.

8.3 Lower the top plate onto the bottom plate by releasing the support pin for the top plate. Be sure the abrading medium and the specimen are properly aligned.

8.4 Load the pressure (top) plate with a  $(6 \pm 0,01)$  kg load, including the top plate.

8.5 Start the tester and operate at a maximum frequency of 90 cycles per minute.

8.6 Operate the tester at the specified frequency for 750 cycles, or until the specimen ruptures.

NOTE: If a specimen ruptures before the specified number of cycles is reached, the rupture of the specimen and the number of cycles completed at the time of rupture are reported.

8.7 If the specimen or the abrading material slips in the clamps, discard the specimen and test another specimen after adjustments are made.

8.8 Replace the abrading medium after each test.

8.9 Carry out the tensile test according to prEN ISO 13934-1.

## 9 Calculation and expression of results.

Determine the loss in tensile strength and report to the nearest 1 %:

$$\text{Loss in tensile strength (in \%)} = 100 (A - B)/A$$

where:

A is the tensile strength of the reference specimen,  
B is the tensile strength of the abraded specimen.

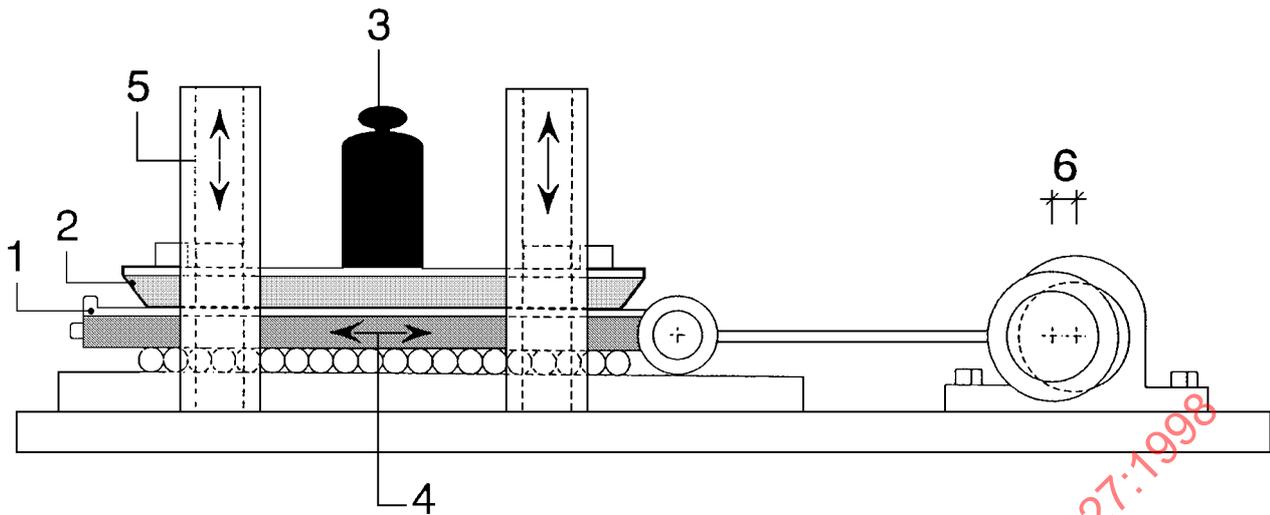
Calculate the average loss in tensile strength and the coefficient of variation for the series of five specimens.

## 10 Test report

The test report shall include the following:

- a) number and year of publication of this standard, i.e. EN ISO 13427;
- b) identification of the sample;
- c) average loss of tensile strength (in %);
- d) coefficient of variation (in %);
- e) any deviation from the procedure, e.g. number of cycles, load, etc.;
- f) any unusual behaviour, such as rupture during test, etc.

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- 1 Sliding block with emery abrasant
- 2 Geotextile specimen (50 mm x 300 mm)  $\pm$  1mm
- 3 Total mass (6  $\pm$  0,01) kg
- 4 (25  $\pm$  1) mm linear motion
- 5 Vertical guidance
- 6 Eccentricity 12,5 mm

Figure 1: Example of testing apparatus with sliding block.

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