



**SLOVENSKI STANDARD
SIST EN ISO 13937-2:2000**

01-november-2000

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Textiles - Tear properties of fabrics - Part 2: Determination of tear force of trouser-shaped test specimens (Single tear method) (ISO 13937-2:2000)

Textilien - Weiterreißigenschaften von textilen Flächengebilden - Teil 2: Bestimmung der Weiterreißkraft mit dem Schenkel-Weiterreißversuch (einfacher Weiterreißversuch) (ISO 13937-2:2000)

Textiles - Propriétés de déchirement des étoffes - Partie 2: Détermination de la force de déchirure des éprouvettes pantalons (Méthode de la déchirure unique) (ISO 13937-2:2000)

Ta slovenski standard je istoveten z: EN ISO 13937-2:2000

ICS:

59.080.30 Tkanine Textile fabrics

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 13937-2

April 2000

ICS

English version

Textiles - Tear properties of fabrics - Part 2: Determination of
tear force of trouser-shaped test specimens (Single tear
method) (ISO 13937-2:2000)

Textiles - Propriétés de déchirement des étoffes - Partie 2:
Détermination de la force de déchirure des éprouvettes
pantalons (Méthode de la déchirure unique)(ISO 13937-
2:2000)

Textilien - Weiterreißigenschaften von textilen
Flächengebilden - Teil 2: Bestimmung der Weiterreißkraft
mit dem Schenkel-Weiterreißversuch (einfacher
Weiterreißversuch) (ISO 13937-2:2000)

This European Standard was approved by CEN on 2 July 1999.

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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

The text of EN ISO 13937-2:2000 has been prepared by Technical Committee CEN/TC 248 "Textiles and textile products", the secretariat of which is held by BSI, 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 Octobre 2000, and conflicting national standards shall be withdrawn at the latest by Octobre 2000.

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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Introduction

EN ISO 13937 has been prepared as a part of several test methods for the determination of certain mechanical properties of textiles using mainly tensile-testing machines, e.g. tensile properties, seam tensile properties, tear properties, seam slippage. Test requirements for these standards agree where appropriate. The results obtained by one of the methods should not be compared with those obtained by other methods. Annex E lists test methods standardized in this context.

EN ISO 13937 specifies methods for the determination of tear force of fabrics. Part 1 describes a ballistic pendulum method, parts 2 to 4 describe methods using tensile-testing machines.

1 Scope

This part of EN ISO 13937 describes a single-tear method to determine fabric tear force, known as the trouser test, using a test specimen cut to form trouser-shaped legs. The tear force measured is the force required to propagate a previously started single tear when the force is applied parallel to the cut and the fabric tears in the direction of applied force.

The test is mainly applicable to woven textile fabrics. It may be applicable to fabrics produced by other techniques, e.g. to some nonwovens (with the same under-mentioned restrictions as for the woven fabrics).

In general the method is not applicable to knitted fabrics and woven elastic fabrics. It is not suitable for highly anisotropic fabrics or loose fabrics where tear transfer from one direction to another direction of the fabric during the tear test is likely to occur.

The method only allows the use of constant-rate-of-extension (CRE) testing machines.

NOTE 1: For other tear test methods using tensile-testing machines part 3 of EN ISO 13937 describes a method known as the wing test and part 4 the tongue test method. Part 1 of EN ISO 13937 describes the ballistic pendulum (Elmendorf) method.

NOTE 2: For the trapezoidal test method, see ISO 9073-4 for nonwovens or ISO 4674 for coated fabrics.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 139	Textiles - Standard atmospheres for conditioning and testing
ISO 7500-1	Metallic materials - Verification of static uniaxial testing machines - Part 1 - Tensile testing machines
ISO 10012-1	Quality assurance requirements for measuring equipment - Part 1: Metrological confirmation system for measuring equipment

3 Terms and definitions

For the purposes of this part of EN ISO 13937 the following terms and definitions apply:

3.1 constant-rate-of-extension (CRE) testing machine: Tensile-testing machine where one clamp is stationary whilst the other is moving with a constant speed throughout the test and where the entire testing system is virtually free from deflection.

3.2 gauge length: Distance between the two effective clamping points of a testing device.

NOTE: The effective clamping points (or lines) of jaws can be checked by clamping a test specimen under defined pretension with carbon copy paper to produce a gripping pattern on the test specimen and/or jaw faces.

3.3 tear force: Force required to propagate a tear initiated under the specified conditions.

NOTE: The tear force is qualified as "across warp" or "across weft" according to whether the tear is made across the warp (warp threads are torn) or weft threads (weft threads are torn) respectively.

3.4 peak: Point on a force/extension curve where the gradient, relative to the force values recorded, changes from positive to negative.

NOTE: For tear recordings, the peak to be used for calculation is defined by rising and falling of force of at least 10 % of the last decreasing or increasing force values respectively.

3.5 length of tear: Measured distance propagated by a tearing force from the initiation of the force until its termination.

3.6 Trouser shaped test specimen: Rectangular test specimen having a single cut of defined length made in the centre of the shorter edge to form two trouser legs for clamping (see figures 1 and 2).

4 Principle

A rectangular test specimen is cut in the centre of the shorter edge to form a trouser shape. The legs of the trouser are gripped in the clamps of a recording tensile testing machine to form a straight line and pulled in the direction of the cut to tear the fabric. The force to continue the tear over a specified distance is recorded. The tear force is calculated from the force peaks of the autographic trace, or on-line by electronic means.

5 Sampling

Select samples either in accordance with the procedure laid down in the material specification for the fabric, or as agreed between the interested parties.

In the absence of an appropriate material specification an example of a suitable sampling procedure is given in annex A.

An example of a pattern for cutting test specimens from the laboratory sample is given in annex B. Avoid test areas with folded or creased places, selvages and areas not representative of the fabric.

6 Apparatus

6.1 General

The system for metrological confirmation of the tensile-testing machine shall be in accordance with ISO 10012-1.

6.2 CRE machine, having the following characteristics:

- a) Capable of operating at a constant-rate-of-extension of (100 ± 10) mm/min;
- b) capable of gauge length to be set to (100 ± 1) mm;
- c) provided with means for recording the force applied to the test specimen during the tear test;
- d) under conditions of use, the accuracy of the apparatus shall be class 1 of ISO 7500-1 The error of the indicated or recorded maximum force at any point in the range in which the machine is used shall not exceed $\pm 1\%$, and the error of the indicated or recorded jaw separation shall not exceed ± 1 mm;
- e) if recording of force and extension is obtained by means of data acquisition boards and software, the frequency of data collection shall be at least 8 per second.

If a class 2 tensile testing machine has to be used, this shall be stated in the test report.

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6.3 Clamping device, comprising the two jaws of the machine, the central points of which are in the line of pull, the front edges at right angles to the line of pull and the clamping faces in the same plane.

The jaws shall be capable of holding the test specimen without allowing it to slip and designed so that they do not cut or otherwise weaken the test specimen.

The width of the jaws shall preferably be 75 mm, but shall not be less than the width of the test specimen.

6.4 Equipment for cutting out test specimens, preferably a hollow punch or template to give test specimens of the dimensions shown in figure 1.

7 Atmosphere for conditioning and testing

The atmospheres for preconditioning, conditioning and testing shall be as specified in ISO 139.

8 Preparation of test specimens

8.1 General

From each laboratory sample two sets of test specimens shall be cut, one set in the warp direction and the other in the weft direction.

For other than woven fabrics, use the relevant designation for direction, e.g. length and transverse.

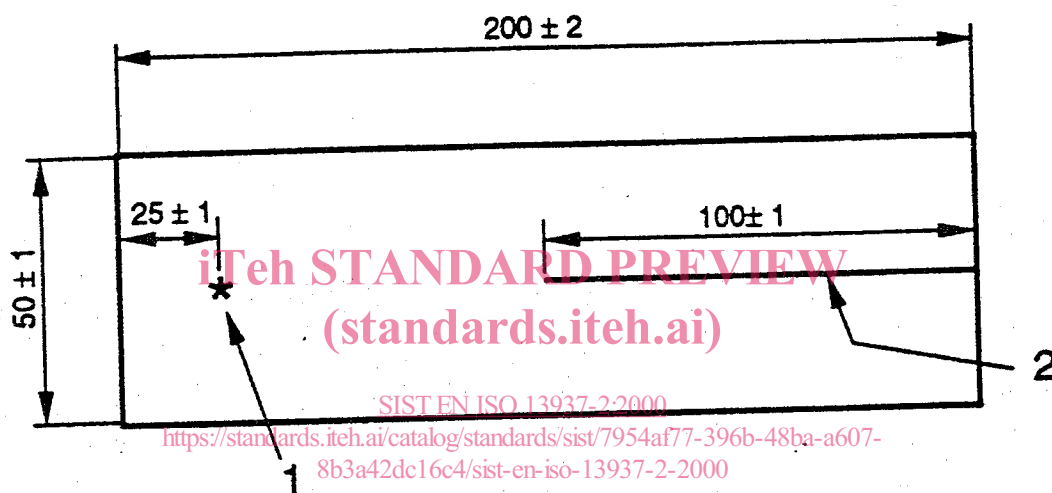
Each set shall consist of at least five test specimens, or more if agreed. In accordance with clause 5 and annex B, no two test specimens shall contain the same longitudinal or transverse threads, and no specimen shall be cut within 150 mm of the edge of the fabric.

8.2 Dimensions

8.2.1 Test specimens 50 mm wide

The test specimen (see figure 1) shall be a rectangular strip $200 \text{ mm} \pm 2 \text{ mm}$ long by $50 \text{ mm} \pm 1 \text{ mm}$ wide; in it shall be made, a longitudinal slit $100 \text{ mm} \pm 1 \text{ mm}$ in length beginning from the centre of the width. Mark the end of tear (25 ± 1) mm from the uncut end of the strip to indicate the position of the tear at the completion of the test.

Dimensions in millimetres



- 1 Mark for end of tear length
- 2 Cut

Figure 1 - Trouser-shaped test specimen