



# SLOVENSKI STANDARD

## SIST EN 1875-3:2023

01-april-2023

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### **Gumirane ali plastificirane tekstilije - Ugotavljanje nadaljnje trgalne trdnosti - 3. del: Trapezoidna metoda (izračun petih najvišjih vrednosti)**

Rubber- or plastics- coated fabrics - Determination of tear strength - Part 3: Trapezoidal method (five-highest-peak calculation)

Mit Kautschuk oder Kunststoff beschichtete Textilien - Bestimmung der Weiterreißfestigkeit - Teil 3: Verfahren mit trapezförmigen Probekörpern (Berechnung der fünf höchsten Scheitelwerte)

Supports textiles revêtus de caoutchouc ou de plastique - Détermination de la résistance au déchirement - Partie 3 : Méthode sur éprouvettes trapézoïdales (calcul des cinq pics les plus hauts)

**Ta slovenski standard je istoveten z: EN 1875-3:2023**

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#### **ICS:**

59.080.40	Površinsko prevlečene tekstilije	Coated fabrics
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**SIST EN 1875-3:2023**

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EUROPEAN STANDARD

EN 1875-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

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English Version

## Rubber- or plastics-coated fabrics - Determination of tear strength - Part 3: Trapezoidal method (five-highest-peak calculation)

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This European Standard was approved by CEN on 25 December 2022.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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## European foreword

This document (EN 1875-3:2023) has been prepared by Technical Committee CEN/TC 248 “Textiles and textile products”, the secretariat of which is held by BSI.

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 August 2023, and conflicting national standards shall be withdrawn at the latest by August 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1875-3:1997.

In comparison with the previous edition, the main technical changes are as follows:

- in the title: addition of the mention of the five-highest-peak calculation;
- in Clause 2: substitution of EN 22286 (and correction) by EN ISO 2286-1 and EN ISO 2286-3;
- in Clause 3: addition of term and definition of “tear force” (3.4);
- in Clause 5: addition of clamping system; specification of the minimum width of the jaws (5.2);
- in 6.1: clarification of atmosphere for conditioning and testing; specification of the duration of conditioning for textiles coated on one and both sides;
- gathering of former 6.3, 6.4 and 6.5 to one sub-clause (new 6.3) called “Selection and preparation of test pieces”;
- in 6.5, supplement description of the preparation on coated woven substrates;
- in Clause 7: addition of further requirements (for example, no slippage, tear propagation) on testing;
- in Clause 8: the calculation (expression of results) has been changed to be based on the entire trace;
- addition of Figure A.1 – test specimen.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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

**EN 1875-3:2023 (E)****Introduction**

Tearing is amongst the more usual ways of destruction for many thin and flexible materials. Knowledge of the resistance of these materials to this type of behaviour is therefore very important. In practice, tearing can result from very different circumstances: hence the large number of test methods that have been developed in order to predict the behaviour of the materials in various situations.

This document forms part of a European Standard on tear resistance of coated fabrics as follows

- EN ISO 4674-1, *Rubber- or plastics-coated fabrics - Determination of tear resistance - Part 1: Constant rate of tear methods (ISO 4674-1)*;
- EN ISO 4674-2, *Rubber- or plastics-coated fabrics - Determination of tear resistance- Part 2: Ballistic pendulum method (ISO 4674-2)*;
- EN 1875-3, *Rubber- or plastics-coated fabrics - Determination of tear strength - Part 3: Trapezoidal method (five-highest-peak calculation)*.

The first part describes two methods using a tensile testing machine at a constant rate of elongation. The second part describes a dynamic method using the kinetic energy of a falling pendulum. For these two parts, tearing propagates in a direction parallel to the applied force. The third part uses a trapezoidal test piece, where tearing propagates in a direction perpendicular to the applied force.

Trapezoidal method should logically be classified with the constant speed methods but is generally considered apart owing to the direction of propagation.

Attention is drawn to the fact that the results of the different methods cannot be compared, owing to the differences of principle.

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<https://standards.iteh.ai/catalog/standards/sist/d47e8bc6-08ec-4d90-be45-ce21d0f9e114/sist-en-1875-3-2023>

## 1 Scope

This document specifies test conditions and the procedure to be followed for determining the tear strength of a trapezoidal specimen of a rubber- or plastics-coated fabric, using a tensile testing machine. This test can be carried out:

- either on test specimens conditioned in reference atmospheres; or
- on test specimens which have been subjected to any necessary treatment for the application considered, for example dipping.

## 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 1421, *Rubber- or plastics-coated fabrics - Determination of tensile strength and elongation at break (ISO 1421)*

EN ISO 2231, *Rubber- or plastics-coated fabrics - Standard atmospheres for conditioning and testing (ISO 2231)*

EN ISO 2286-1, *Rubber- or plastics-coated fabrics - Determination of roll characteristics - Part 1: Methods for determination of length, width and net mass (ISO 2286-1)*

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)*

## 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:

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

### 3.1

#### **tearing**

tearing action

### 3.2

#### **tear**

result of tearing

### 3.3

#### **tear strength**

property of a coated fabric to resist a force tending to separate the threads or fibres making up the coated fabric before tearing, by breaking some of these threads or fibres

### 3.4

#### **tear force**

force required to propagate a tear initiated under the specified conditions

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### 3.5

#### **peak value**

point in the tearing force-displacement diagram at which the slope of the curve relative to the recorded force values is switching from positive to negative

Note 1 to entry: The peak value for calculation is defined by a load drop of minimum 10 % related to the previous increase in load.

### 3.6

#### **tear crack length**

measured crack length which from the beginning until the end of its action is induced by a tearing force

## 4 Principle

The threads or fibres forming a coated fabric are subjected successively to a force designed to break them. The values of the breaking forces are recorded as the mobile jaw moves.

## 5 Apparatus

### 5.1 Constant rate of extension (CRE)

Tensile testing machine shall be in compliance with the apparatus described in EN ISO 1421. The tear forces shall be recorded by a measurement instrument (autographic recorder). In the case of computer-aided recording of force and extension, the frequency of data collection shall be not less than  $8 \text{ s}^{-1}$ . Under conditions of use, the accuracy of the apparatus shall be of class 1 in accordance with EN 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. After the first 2 s of the test, the rate of increase in the distance between the clamps shall be uniform to within 5 %.

### 5.2 Clamping system

The width of each jaw shall be not less than the width of the portion of the test piece to be clamped, i.e.  $\geq 75 \text{ mm}$ .

## 6 Test specimens

### 6.1 Atmosphere for conditioning and testing

Unless otherwise specified, the samples shall be conditioned in climate B at  $(23 \pm 2) \text{ }^\circ\text{C}$  and  $(50 \pm 5) \%$  relative humidity as defined in EN ISO 2231. The test shall be carried out in the same atmosphere. For textiles which are coated on one side, an exposition of minimum 16 h is recommended.

For textiles which are coated on both sides, an exposition of minimum 24 h is recommended.

These requirements need not to be applied to samples that have been subjected to some treatments such as dipping.

### 6.2 Sampling

Specimens shall be taken from the sample at a position with no visible or functional flaw and shall be located within the useful width of the part as defined in EN ISO 2286-1.



### 6.3 Selection and preparation of test pieces

Select ten test pieces, each  $(150 \pm 1)$  mm long x  $(75 \pm 1)$  mm wide (Figure 1). Select five test pieces in the longitudinal direction and five in the transverse direction, from the full usable width and length of the sample (see EN ISO 2286-1).

Select test pieces for tearing in the transverse direction (i.e. tearing across longitudinal or warp threads in the case of woven substrates) so that their width is parallel to the longitudinal edge of the coated fabric.

Select test pieces for tearing in the longitudinal direction (i.e. tearing across transverse or weft threads in the case of woven substrates) so that their width is perpendicular to the longitudinal edge of the coated fabric.

In the case of woven substrates, the longitudinal direction complies with the orientation of the warp threads and the transverse direction with the orientation of the weft threads, even if the warp threads and weft threads are not in an angle of  $90^\circ$ .

Mark the position of the attachments on the test specimen, then make the initiating incision, as shown in Figure 1.

## 7 Procedure

Adjust the test machine to give a rate of jaw traverse of  $(100 \pm 10)$  mm/min.

Place a test specimen in the attachments such that the lower edge of the upper attachment and the upper edge of the lower attachment coincide with the marks on the test specimen. The specimen is then stretched on the side of the incision and forms a fold on the other side.

Start the tensile testing machine. Tearing propagates in a direction almost perpendicular to the length of the test specimen.

Continue the test until rupture, recording the load-deformation curve. This curve normally contains peaks. Tear the specimen completely.

The test is to be considered correct if no slippage occurs in the jaws, no delamination takes place between coating and base fabric during the test and the tear propagates almost perpendicular to the length of the test specimen. Other results shall be rejected.

If it cannot be ensured that the tear propagates almost perpendicular to the length of the test specimen but oriented by an angle of less than  $45^\circ$  to this direction, these test results may also be reported, however, shall be indicated by an additional note.

If results are still rejected, then, and the sentence "This testing is not suitable for this sample." shall be reported.

## 8 Calculation and expression of results

Determine the tear force as the average of the five highest peaks, in newtons, of the entire trace.

From the average tear force determined for each test piece calculate the overall arithmetic mean of the tear force in newtons, rounded to three digits, for each direction tested.

When an anomaly occurs (direction of tearing, recording curve not containing any peaks, coated fabric support separation, etc.), this anomaly shall be mentioned in the test report and results interpreted with caution.

**EN 1875-3:2023 (E)****9 Test report**

The test report shall include the following:

- a) reference to this document, i.e. EN 1875-3:2023;
- b) full details for the identification of the sample and any deviations from sampling;
- c) if the electronic evaluation method was not used, a note that the manual evaluation method was applied;
- d) if required, the thickness of the material, in millimetres (mm), to the nearest 0,01 mm;
- e) mean tear force, in newtons (N), to the nearest 0,1 N for longitudinal and transverse direction;
- f) standard atmosphere used for conditioning and testing, as given in EN ISO 2231;
- g) if applicable, any special specimen treatment;
- h) date of the test;
- i) any anomalies with respect to testing and/or the tear behaviour of the test specimens;
- j) any deviations from the procedure specified.

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