



**SLOVENSKI STANDARD**  
**oSIST prEN 1875-3:2021**

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**Gumirane ali plastificirane tekstilije - Ugotavljanje nadaljnje trgalne trdnosti - 3.  
del: Trapezoidna metoda**

Rubber- or plastics- coated fabrics - Determination of tear strength - Part 3: Trapezoidal method

Mit Kautschuk oder Kunststoff beschichtete Textilien - Bestimmung der Weiterreißfestigkeit - Teil 3: Verfahren mit trapezförmigen Probekörpern

Supports textiles revêtus de caoutchouc ou de plastique - Détermination de la résistance au déchirement - Partie 3: Méthode sur éprouvettes trapézoïdales

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**Ta slovenski standard je istoveten z: prEN 1875-3**

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**ICS:**

59.080.40	Površinsko prevlečene tekstilije	Coated fabrics
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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 1875-3**

September 2021

ICS 59.080.40

English Version

## Rubber- or plastics- coated fabrics - Determination of tear strength - Part 3: Trapezoidal method

Supports textiles revêtus de caoutchouc ou de plastique - Détermination de la résistance au déchirement - Partie 3: Méthode sur éprouvettes trapézoïdales

Mit Kautschuk oder Kunststoff beschichtete Textilien - Bestimmung der Weiterreißfestigkeit - Teil 3: Verfahren mit trapezförmigen Probekörpern

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 248.

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.

This draft European Standard was established by CEN 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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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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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 (prEN 1875-3:2021) has been prepared by Technical Committee CEN/TC 248 “Textiles and textile products”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 1875-3:1997.

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## 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: Three tongue and trousers test pieces;*
- EN ISO 4674-2, *Rubber- or plastics- coated fabrics- Determination of tear resistance- Part 2: Ballistic method;*
- EN 1875-3, *Rubber- or plastics- coated fabrics -Determination of tear resistance- Part 3: Trapezoidal method.*

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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## 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)*

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## 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

**prEN 1875-3:2021 (E)****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 propagate 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 in line with the loading direction is completed. Other results shall be rejected.

If it cannot be ensured that the tear is in line with the loading direction but oriented by an angle of less than  $45^\circ$  to the loading direction, these test results may also be reported, however, shall be indicated by an additional note.

Repeat this operation for each test specimen.

## 8 Calculation and expression of results

Divide the peak trace into four equal subsections, beginning with the first peak and ending with the last peak. The first and the last subsection shall not be used for evaluation. Determine the tear force as the average of the five highest peaks, in newtons, of the two remaining middle subsections.

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.

**prEN 1875-3:2021 (E)****9 Test report**

The test report shall include the following:

- a) reference to this document, i.e. prEN 1875-3:2021;
- 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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