



# SLOVENSKI STANDARD

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### Material za varovalno obleko, odporen proti obrabi - Preskusne metode

Abrasion resistance of protective clothing material - Test methods

Abriebfestigkeit von Schutzkleidungsmaterial - Prüfverfahren

Résistance à l'abrasion du matériau constitutif d'un vêtement de protection - Méthodes d'essai

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Varovalna obleka

Protective clothing

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 530**

July 2010

ICS 13.340.10

Supersedes EN 530:1994

English Version

## Abrasion resistance of protective clothing material - Test methods

Résistance à l'abrasion du matériau constitutif d'un vêtement de protection - Méthodes d'essai

Abriebfestigkeit von Material für Schutzkleidung - Prüfverfahren

This European Standard was approved by CEN on 19 June 2010.

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## Foreword

This document (EN 530:2010) has been prepared by Technical Committee CEN/TC 162 "Protective clothing including hand and arm protection and lifejackets", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by January 2011, and conflicting national standards shall be withdrawn at the latest by January 2011.

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

This document supersedes EN 530:1994.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

Annex A provides details of significant technical changes between this European Standard and the previous edition EN 530:1994.

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According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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**EN 530:2010 (E)****Introduction**

This document describes testing of abrasion resistance of materials for protective clothing. It should be noted that in order to carry out the abrasion test according to this document the following parameters are to be specified:

- abradant;
- replacement of the abradant;
- conditioning and testing atmosphere;
- debris removal;
- pressure applied;
- judgement of deterioration in case of using method 1;
- number of cycles in case of using method 2.

In general these parameters are specified in product standards.

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## 1 Scope

This European Standard describes two test methods on abrasion resistance of materials using the same abrasion apparatus. The first method describes the determination of the abrasion resistance of protective clothing materials. The second method describes abrasion pre-treatment of these materials where the test specimens are used afterwards in other test methods or for evaluating the remaining protective properties.

The abradant is regarded to be a woven wool fabric for the purposes of this standard.

If other abradants (e.g. glass paper) are used, they should be specified in the requirement standard. Mounting instructions of special abradants should be described in requirement standards.

This European Standard is applicable as a reference standard on abrasion for standards and specifications on protective clothing textile materials.

## 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 ISO 139:2005, *Textiles — Standard atmospheres for conditioning and testing (ISO 139:2005)*

EN ISO 12947-1:1998, *Textiles — Determination of the abrasion resistance of fabrics by the Martindale method — Part 1: Martindale abrasion testing apparatus (ISO 12947-1:1998)*

## 3 Terms and definitions

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

### 3.1

#### specimen breakdown

- in woven fabrics, when two separate threads are completely broken;
- in knitted fabrics, when one thread is broken down causing a hole to appear;
- in pile fabrics, when the pile is fully worn off;
- in nonwovens, when the first hole resulting from the wear is of a diameter at least equal to 0,5 mm;
- in coated material, when coating surface has the first hole resulting from the wear of a diameter at least equal to 0,5 mm (hole does not have to be through material)

### 3.2

#### abrasion rub

one revolution of the outer drives of the Martindale abrasion tester

### 3.3

#### test interval

amount of rubs to be preset for mandatory abrasion stop for breakdown evaluation and for cleaning the specimen and abradant or to change it

**EN 530:2010 (E)****4 Methods of test****4.1 Principles**

The abrasion test using the Martindale abrasion machine is presented in two methods of operation.

**Method 1: Determination of abrasion resistance**

Determination of abrasion resistance employs the instrument in the conventional manner and produces an abraded disc of material 38 mm in diameter. This is convenient where only the loss of finish or appearance, or the mass or volume of abrasion loss, is to be determined and requires only small amounts of material to be tested.

**Method 2: Pre-treatment procedure**

Pre-treatment procedure employs the instrument in inverted mode, i.e. the specimen is placed on the abradant table instead of in the test piece holder and the abradant is mounted in the test piece holder. This provides an abraded area which allows post-abrasion testing or evaluation to be carried out.

**4.2 Conditioning and testing atmosphere**

Condition the material to be tested, and the abradant, in the standard atmosphere in accordance with EN ISO 139:2005 unless otherwise specified in the requirement standard. Conduct the test in the same atmosphere.

If other atmosphere is used, it shall be stated in the test report.

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**5 Apparatus and materials****5.1 Abrasion machine** <https://standards.iteh.ai/catalog/standards/sist/29cdb5c4-0e2a-4888-b427-18045eb7e956/sist-en-530-2010>

Martindale abrasion machine as described in EN ISO 12947-1.

**5.2 Abradant**

Woven wool fabric conforming to EN ISO 12947-1:1998, Table 1.

If other abradants are used, these shall be specified in the specific product requirement standard.

**5.3 Foam**

Polyetherurethane foam material as specified in EN ISO 12947-1:1998, Table 3.

Foam is used in test pieces holders under specimen or abradant.

When tested material or abradant have a mass per unit area more than 500 g/m<sup>2</sup>, foam is not used.

**5.4 Felt**

Felt backing as specified in EN ISO 12947-1:1998, Table 2.

Felt is used in abrasion tables under the tested material or abradant.

**5.5 Cutter**

Punch or press cutter, to cut a circle of  $(38^{+0,5}_0)$  mm in diameter.



## 5.6 Magnifying glass or microscope

Magnifying glass or stereo microscope, e.g., 8x magnification.

## 5.7 Useful life of auxiliary materials

Renew the abradant for every test. For abrasion tests with more than 50 000 rubs, change the abradant after every 50 000 rubs.

Inspect the felt for soiling and wear after every abrasion test. If soiling or detectable wear shows visible or touchable change (e.g. pilling) in the surface of the felt, replace the felt.

When foam is used in abrasion testing, use a new piece for every abrasion test.

## 6 Procedure of Method 1: Determination of abrasion resistance

### 6.1 Test specimen

Using the punch or press cutter, take at least four pieces for test specimens. Exclude the selvage area at least 100 mm from the edge when cutting the specimens at random from the entire material. For woven fabrics, take the specimens so that they each contain different warp and weft threads. Specimens shall not include seams.

If the end point of the test is expressed in terms of mass loss, determine the mass of each specimen taken, to an accuracy of 1 mg before the test starts.

### 6.2 Setting up the machine

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#### 6.2.1 Mounting specimen in test piece holder

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Place the ring of the test piece holder in position on the mounting plate provided on the base of the machine. Insert the specimen face side downwards, centrally on the ring. Place the foam backing on top. Foam shall not be used for test specimens with a mass per unit area of more than 500 g/m<sup>2</sup>.

Place the metal insert carefully and centrally on top of the specimen or on top of the foam and specimen, so that its hollowed side faces upwards, and press down.

Ensure that the specimen is retained in a wrinkle-free condition during the further assembly with the test piece holder.

NOTE When screws are used for this assembly, the following procedure should be followed:

Hold the ring containing the specimen and the metal insert firmly in the mounting plate, start to screw the top of the test piece holder on to the ring, taking care that the screw threads are not crossed. Having started the screwing down operation, use both hands to maintain a continuous downward pressure on the assembly, against the mounting plate.

#### 6.2.2 Mounting the woven wool fabric abradant on abrading table

Cut circular pieces with a diameter of  $(140 \pm 5)$  mm of abradant to fit the abrading table and cut the same number and size of felt backings. Use a new abradant on the abrasion tables.

Place the felt backing on the abrading table and place the abradant over the felt. Check that weft and warp of the woven wool abradant lie parallel to the edges of the machine frame.

Compress the felt and abradant on the abrading table with a pressing weight described in EN ISO 12497-1. Fit the clamping ring (or appropriate device) and secure the felt and abradant firmly. Remove the pressing weight. Ensure that the abradant is retained in a wrinkle-free condition.