



**SLOVENSKI STANDARD**  
**oSIST prEN 14325:2016**  
**01-julij-2016**

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**Varovalne obleke pred kemikalijami - Preskusne metode in zahteve za razvrščanje materialov za izdelavo varovalnih oblek, šivanje, spajanje in sestavljanje (montaža)**

Protective clothing against chemicals - Test methods and performance classification of chemical protective clothing materials, seams, joins and assemblages

Schutzkleidung gegen Chemikalien - Prüfverfahren und Leistungseinstufung für Materialien, Nähte, Verbindungen und Verbünde

Vêtements de protection contre les produits chimiques - Méthodes d'essai et classification de performance des matériaux, coutures, jonctions et assemblages des vêtements de protection chimique

**Ta slovenski standard je istoveten z: prEN 14325**

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## Protective clothing against chemicals - Test methods and performance classification of chemical protective clothing materials, seams, joins and assemblages

Vêtements de protection contre les produits chimiques  
- Méthodes d'essai et classification de performance des matériaux, coutures, jonctions et assemblages des vêtements de protection chimique

Schutzkleidung gegen Chemikalien - Prüfverfahren und Leistungseinstufung für Materialien, Nähte, Verbindungen und Verbünde

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**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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**prEN 14325:2016 (E)****European foreword**

This document (prEN 14325:2016) 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 document is currently submitted to the CEN Enquiry.

This document will supersede EN 14325:2004.

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.

This edition includes the following significant technical changes:

- a) addition of clear definitions for the terms specimen breakdown, abrasion rub and abrasion cycle;
- b) addition of pre-treatment by decontamination;
- c) addition of chemical permeation barrier determination after pre-treatment by abrasion or flexing;
- d) change of abrasion test method from EN 530 to EN ISO 12947-2 with specimen breakdown definition of EN 530:2010;
- e) addition of assessment of abrasion resistance by hydrostatic head for materials for which the pressure pot method cannot be applied, and limitation of assessment by visual inspection only to materials with hydrostatic head less than 200 mm;
- f) addition of assessment of flex cracking resistance by hydrostatic head for materials, for which the pressure pot method cannot be applied, and limitation of assessment by visual inspection only to materials with hydrostatic head less than 200 mm;
- g) deletion of 4.8, Bursting resistance;
- h) addition of new 4.8, Resistance to absorption;
- i) addition of new 4.11.3, Classification of permeation resistance by cumulative permeation;
- j) modification of classification levels in 4.12, Repellency to liquids, to percentage levels, which are statistically meaningful when compared to the uncertainty of measurement of the test method;
- k) specification of size of test specimen for 4.14, Resistance to ignition;
- l) specification of size of test specimen for 4.15, Resistance to flame;
- m) addition of 4.15, Crumple flex cracking resistance;
- n) addition of 4.16, Crumple flex cracking resistance at  $-30\text{ }^{\circ}\text{C}$ ;
- o) modification of specification for abrasive paper in Annex A;

- p) addition of new normative Annex B, Determination of the resultant property value to be used for performance classification;
- q) addition of new informative Annex C, Use of time to cumulative mass for reporting material permeation resistance;
- r) addition of new normative Annex D, Uncertainty of measurement;
- s) addition of new informative Annex E, Guidance to Manufacturers for Performance Classification;
- t) addition of new normative Annex F, Specification for pressure pots & addition of a round pressure pot.

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**prEN 14325:2016 (E)****1 Scope**

This European Standard specifies the performance classification and test methods for materials used in chemical protective clothing, including gloves and including footwear, when the footwear is an integral part of the clothing, and for seams, joins and assemblages. This is a reference standard to which chemical protective clothing performance standards may refer in whole or in part, but this standard is not exhaustive in the sense that product standards may well require testing according to test method standards which are not included in this standard.

For some of the test method standards for chemical protective clothing referenced in this European Standard, this European Standard modifies the requirements for conditioning, sampling, calculation of test results and reporting. At these instances this standard takes precedence over the referenced test method standards.

**NOTE** While these performance levels are intended to relate to the usage to which the chemical protective clothing is to be put, it is essential that the chemical protective clothing manufacturer or supplier indicate the intended use of the protective clothing and that the user (specifier) carries out a risk assessment in order to establish the correct performance level for the intended task. This should be included as a mandatory requirement in the information to be supplied by the manufacturer in the product standard.

**2 Normative references**

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 863, *Protective clothing — Mechanical properties — Test method: Puncture resistance*

EN 13274-4, *Respiratory protective devices — Methods of test — Part 4: Flame tests*

EN 20811, *Textiles — Determination of resistance to water penetration — Hydrostatic pressure test (ISO 811)*

EN ISO 139, *Textiles — Standard atmospheres for conditioning and testing (ISO 139)*

EN ISO 6530, *Protective clothing — Protection against liquid chemicals — Test method for resistance of materials to penetration by liquids (ISO 6530)*

EN ISO 7854, *Rubber- or plastics-coated fabrics — Determination of resistance to damage by flexing (ISO 7854)*

EN ISO 9073-4, *Textiles — Test methods for nonwovens — Part 4: Determination of tear resistance (ISO 9073-4)*

EN ISO/TR 11610, *Protective clothing — Vocabulary (ISO/TR 11610)*

EN ISO 12947-2, *Textiles — Determination of the abrasion resistance of fabrics by the Martindale method — Part 2: Determination of specimen breakdown (ISO 12947-2)*

EN ISO 13934-1, *Textiles — Tensile properties of fabrics — Part 1: Determination of maximum force and elongation at maximum force using the strip method (ISO 13934-1)*

EN ISO 13935-2, *Textiles — Seam tensile properties of fabrics and made-up textile articles — Part 2: Determination of maximum force to seam rupture using the grab method (ISO 13935-2)*



EN ISO 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025)*

ISO 6529, *Protective clothing — Protection against chemicals — Determination of resistance of protective clothing materials to permeation by liquids and gases*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO/TR 11610 and the following apply.

#### 3.1

##### **abrasion rub**

one revolution of the outer drives of the Martindale abrasion tester

[SOURCE: EN ISO 12947-1]

#### 3.2

##### **abrasion cycle**

completion of all the translational abrasion movements tracing a Lissajous figure comprising 16 rubs, i.e. 16 revolutions of the two outer drives and 15 revolutions of the inner drive of the Martindale abrasion tester

[SOURCE: EN ISO 12947-1]

#### 3.3

##### **material**

one or several substances, in form of flexible planar structure, of which an item of clothing is made, excluding hardware and labels

##### 3.3.1

##### **single layer material**

material consisting of only one layer of material

##### 3.3.2

##### **multilayer material**

material consisting of several layers, which may be either permanently bonded together (e.g. by coating, laminating, gluing) or intimately combined (e.g. by weaving, quilting) prior to the garment manufacturing stage, or which can be separated without any damage to each individual layer

##### 3.3.3

##### **multilayer material consisting of separate layers**

multilayer material, where individual layers that are neither permanently bonded together nor intimately combined, can be separated without any damage to the individual layers

**prEN 14325:2016 (E)****3.4****uncertainty (of measurement)**

parameter, associated with the result of a measurement, that characterizes the dispersion of the values that could reasonably be attributed to the measurand

NOTE 1 to entry: The parameter may be, for example, a standard deviation (or a given multiple of it), or the half-width of an interval having a stated level of confidence.

NOTE 2 to entry: Uncertainty of measurement comprises, in general, many components. Some of these components may be evaluated from the statistical distribution of the results of series of measurements and can be characterized by experimental standard deviations. The other components, which also can be characterized by standard deviations, are evaluated from assumed probability distributions based on experience or other information.

NOTE 3 to entry: It is understood that the result of the measurement is the best estimate of the value of the measure and, and that all components of uncertainty, including those arising from systematic effects, such as components associated with corrections and reference standards, contribute to the dispersion.

[SOURCE: JCGM 100:2008]

**3.4.1****standard uncertainty**

uncertainty of the result of a measurement expressed as a standard deviation

[SOURCE: JCGM 100:2008]

**3.4.2****combined standard uncertainty**

standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities, equal to the positive square root of a sum of terms, the terms being the variances or covariances of these other quantities weighted according to how the measurement result varies with changes in these quantities

[SOURCE: JCGM 100:2008]

**3.4.3****expanded uncertainty ( $U$ )**

quantity defining an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurand

NOTE 1 to entry: The fraction may be viewed as the coverage probability or level of confidence of the interval.

NOTE 2 to entry: To associate a specific level of confidence with the interval defined by the expanded uncertainty requires explicit or implicit assumptions regarding the probability distribution characterized by the measurement result and its combined standard uncertainty. The level of confidence that may be attributed to this interval can be known only to the extent to which such assumptions may be justified.

NOTE 3 to entry: Expanded uncertainty is termed *overall uncertainty* in paragraph 5 of Recommendation INC-1 (1980).

[SOURCE: JCGM 100:2008]

**3.4.4****coverage factor ( $k$ )**

numerical factor used as a multiplier of the combined standard uncertainty in order to obtain an expanded uncertainty

NOTE 1 to entry: A coverage factor,  $k$ , is typically in the range 2 to 3. In testing and performance classification according to this EN standard, a coverage factor  $k = 2$  is used.

[SOURCE: JCGM 100:2008]

### 3.5

#### **specimen breakdown**

in abrasion resistance or flex cracking resistance testing, the visually observed deterioration in a specimen after exposure to a specified number of abrasion rubs or cycles of flexing

#### EXAMPLE

- in woven fabrics, when two separate threads are completely broken;
- in knitted fabrics, when one thread is broken down;
- 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).

[SOURCE: EN ISO 12947-1]

## **4 Performance classification of materials**

### **4.1 Determination of property value for performance classification**

A number of performance classification levels are identified for the various properties of materials to be found in this standard.

The value of each property defined in 4.4 to 4.17 and which shall be used for performance classification, shall be determined in accordance with Annex B.

Testing shall be conducted by laboratories accredited for the specified test method(s) according to EN ISO 17025.

If not specified otherwise within 4.4, 4.5, 4.6, 4.7, 4.9, 4.16, 4.17 or within the specific test method itself, a material with different behaviour in the length and cross directions, shall be tested for its performance in both directions. The performance classification shall be based on the results obtained for the direction resulting in the lower performance classification when evaluated according to Annex B.

For a material with different surface characteristics, the fabric side that will appear on the outside of the apparel shall be tested for all test methods that are linked to surface performance (i.e. 4.4, 4.5, 4.6, 4.8, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16, 4.17) and the performance classification shall be based on the results for this side.

If the chemical protective clothing consists of multiple layers of materials, with or without separable layers, all layers shall be tested together with the chemical protective clothing outer surface being tested for those properties which are linked to surface performance.

For materials which require pre-treatment, the performance classification shall be based on the lowest performance classification obtained on testing new (not pre-treated) and pre-treated materials.

## prEN 14325:2016 (E)

### 4.2 Pre-treatment

#### 4.2.1 Pre-treatment by cleaning and disinfection and decontamination

Before each test, all chemical protective clothing material samples, with the exception of single-use chemical protective clothing, shall undergo pre-treatment by cleaning, disinfection and decontamination.

If the manufacturer's instructions indicate that cleaning or disinfection is not allowed, i.e. single use garments, then testing shall be carried out on new material.

If the manufacturer's instructions indicate that multiple use of garments is allowed, but that re-use of the garment is not permitted once the garment has been chemically contaminated, i.e. limited-use garments, then testing shall be conducted on material which has been pre-treated by cleaning and disinfection only. The cleaning and disinfection shall be in line with the manufacturer's instructions, on the basis of standardized procedures. If the number of cleaning and disinfection cycles is not specified, the tests shall be carried out after 5 cycles of pre-treatment, each consisting of one wash cycle, one dry cycle and one disinfection cycle carried out in the sequence as indicated by the manufacturer's instructions. This shall be reflected in the information supplied by the manufacturer. If the garment can be washed or alternatively dry-cleaned it shall only be washed, dried and disinfected. If only dry-cleaning is allowed, the garment shall only be dry-cleaned and disinfected in accordance with the manufacturer's instructions.

If the manufacturer's instructions indicate that cleaning, disinfection and decontamination is allowed, testing shall be carried out on material, which has been pre-treated by cleaning, disinfection and decontamination. If the number of cleaning, disinfection and decontamination cycles is not specified, the tests shall be carried out after 5 cycles of pre-treatment, each consisting of one cycle of pre-treatment by cleaning, disinfection and decontamination carried out in the sequence as indicated in the manufacturer's instructions. This shall be reflected in the information supplied by the manufacturer. If the manufacturer's instructions specify different decontamination procedures for different chemicals, testing shall be carried out on material which has been pre-treated by cleaning, disinfection and decontamination according to each of the listed decontamination procedures, i.e. testing of as many pre-treated materials as there are specified decontamination procedures.

#### 4.2.2 Pre-treatment by abrasion

Specimens, which have been pre-treated according to 4.2.1, shall be pre-treated by one of the numbers of abrasion rubs given in Table 1 prior to testing according to 4.11.

#### 4.2.3 Pre-treatment by flexing

Specimens, which have been pre-treated according to 4.2.1, shall be pre-treated by one of the numbers of flexing cycles given in Table 2 prior to testing according to 4.11.

### 4.3 Conditioning

Unless otherwise indicated in the test method standard, all specimens shall be conditioned by storage at  $(20 \pm 2) ^\circ\text{C}$  and  $(65 \pm 5) \%$  relative humidity in accordance with EN ISO 139 for at least 24 h. If applicable, the tests shall be started within 5 min of removing the specimen from the conditioning atmosphere, unless otherwise indicated in the test method standard.

Conditioning may be omitted or aligned with the conditions of 4.3 if it can be shown that test results are not affected by the foreseeable changes of temperature and relative humidity.