



# SLOVENSKI STANDARD

## SIST EN 1073-1:1998

01-maj-1998

JUfcj UbUcVY\_UdfYX'fUX]cU\_hj bc'\_cbHLa ]bUMYc'!'%'XY.'NU HJj Y]b'dfYg\_i gbY  
a YrcXY'nUj Ufcj Ub'c'cVY\_c'n'Xcj cXca 'nfU\_UnUnUy ]rc'dfYX'cbYgbUjYb^Ya 'n  
fUX]cU\_hj b]a ]'XYW

Protective clothing against radioactive contamination - Part 1: Requirements and test methods for ventilated protective clothing against particulate radioactive contamination

**iTeh STANDARD PREVIEW**

Schutzkleidung gegen radioaktive Kontamination - Teil 1: Anforderungen und Prüfverfahren für belüftete Schutzkleidung gegen radioaktive Kontamination durch feste Partikel

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Vetement de protection contre la contamination radioactive - Partie 1: Exigences et méthodes d'essais des vêtements de protection ventilés contre la contamination radioactive sous forme de particules

**Ta slovenski standard je istoveten z: EN 1073-1:1998**

### ICS:

13.280	Varstvo pred sevanjem	Radiation protection
13.340.10	Varovalna obleka	Protective clothing

**SIST EN 1073-1:1998**

**en**

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ICS 13.280; 13.340.10

Descriptors: personal protective equipment, accident prevention, protective clothing, work clothing, radiation protection, contamination, radioactivity, specifications, characteristics, classifications, tests, marking, information

English version

## Protective clothing against radioactive contamination - Part 1: Requirements and test methods for ventilated protective clothing against particulate radioactive contamination

Vêtements de protection contre la contamination  
radioactive - Partie 1: Exigences et méthodes d'essais des  
vêtements de protection ventilés contre la contamination  
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Schutzkleidung gegen radioaktive Kontamination durch  
feste Partikel

This European Standard was approved by CEN on 23 November 1997.

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

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## Foreword

This European Standard 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 July 1998, and conflicting national standards shall be withdrawn at the latest by July 1998.

This European Standard 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 standard.

The annex A is normative and contains the activity sequence for the testing of the protection factor.

Further parts of this standard will deal with requirements and test methods for unventilated protective clothing and protection against liquids and gases.

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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## 1 Scope

This European Standard specifies the requirements and test methods for ventilated protective clothing protecting the wearer against particulate radioactive contamination.

This European Standard does not apply for the protection against ionizing radiation and the protection of patients against contamination with radioactive substances by diagnostical and/or therapeutical measures.

## 2 Normative references

This European standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 146

Respiratory protective devices - Powered filtering devices incorporating helmets or hoods - Requirements, testing, marking

EN 270

Respiratory protective devices - Compressed air line breathing apparatus incorporating a hood - Requirements, testing, marking

EN 340

Protective clothing - General requirements

EN 530

Abrasion resistance of protective clothing material - Test methods

EN 863

Protective clothing - Mechanical properties - Test method: Puncture resistance

prEN 943-1

Protective clothing for use against liquid and gaseous chemicals, including liquid aerosols and solid particles - Performance requirements for ventilated and non-ventilated "gas-tight" (Type 1) and "non-gas-tight" (Type 2) protective clothing

EN 1146

Respiratory protective devices for self-rescue - Self-contained open-circuit compressed air breathing apparatus incorporating a hood (compressed air escape apparatus with hood) - Requirements, testing, marking

EN 25978

Rubber- or plastics- coated fabrics - Determination of blocking resistance (ISO 5978 : 1990)

EN 29073-4

Textiles - Test methods for nonwovens - Part 4: Determination of tear resistance

ISO 5082 : 1982

Textiles - woven fabrics - Determination of breaking strength - Grab method

ISO 7854

Rubber- or plastics-coated fabrics - Determination of resistance to damage by flexing

## 3 Definitions

For the purposes of this standard the following definitions apply:

### 3.1 protective clothing against radioactive contamination

Protective clothing intended to provide protection to the skin and if required to the respiratory tract against radioactive contamination.

### **3.2 ventilated protective clothing (against particulate radioactive contamination)**

Protective clothing which is supplied with breathable air ensuring internal ventilation and overpressure. This protective clothing provides protection against particulate radioactive contamination for the respiratory tract and the whole body.

### **3.3 nominal protection factor ( 100 : inward leakage, IL)**

The ratio of the concentration of contaminant in the ambient atmosphere to the concentration of the contaminant in the suit. The concentrations taken into account are the average concentrations recorded during a standardized test.

### **3.4 particulate radioactive contamination**

Presence of radioactive substances in or on a material or in a place where they are undesirable or could be harmful.

### **3.5 seam**

A permanent fastening between two or more pieces of protective clothing material.

### **3.6 assemblage**

A permanent fastening between two or more different garments, or between protective clothing and accessories, obtained, for example by sewing, welding, vulcanising, gluing.

### **3.7 join**

A non-permanent fastening between two different garments, or between protective clothing and accessories.

### **3.8 closure**

A device, for example, zipper, "touch and close" fastener, etc., to close openings for donning or removing the protective clothing.

## **4 Requirements**

### **4.1 Design**

**4.1.1** Protective clothing against radioactive contamination shall comply with the general requirements specified in EN 340.

**4.1.2** The design of the protective clothing shall be such that the protective clothing is straightforward to put on and take off, and to minimize the risk of contamination. Testing according to "practical performance test" (see 5.2).

**4.1.3** The clothing can be designed for single or multiple use.

**4.1.4** The ventilated protective clothing (see 3.2) may consist of one or several parts. The clothing may be fitted with a respiratory protective device to enable the wearer to breath in case of failure of the primary air supply.

### **4.2 Materials**

The materials used for protective clothing against particulate radioactive contamination shall meet the requirements according to table 1 after the pretreatment in accordance with 5.1.1 and after the conditioning according to 5.1.2.

Table 1: Requirements for the materials

Requirement	Classification	Test according to	applicable for	
			reusable materials	single use materials
Abrasion resistance	6 > 2000 Cycles 5 > 1500 Cycles 4 > 1000 Cycles 3 > 500 Cycles 2 > 100 Cycles 1 > 10 Cycles	EN 530, Method 2 00 abrasive paper according to prEN 943-1 and 9 kPa downward pressure	yes	yes
Flex cracking resistance	6 > 100000 Cycles 5 > 40000 Cycles 4 > 15000 Cycles 3 > 5000 Cycles 2 > 2500 Cycles 1 > 1000 Cycles	ISO 7854 Method B	yes	no
Puncture resistance	3 > 100 N 2 > 50 N 1 > 10 N	EN 863	yes	yes
Resistance to blocking (see note 1)	2 no blocking 1 blocking	EN 25978	yes	no
Tear resistance	6 > 150 N 5 > 80 N 4 > 40 N 3 > 20 N 2 > 10 N 1 > 2 N	EN 29073-4	yes	yes
Flammability of materials, visor and ancillary parts	shall not continue to burn	EN 1146 (single burner test)	yes	yes
NOTE 1: Uncoated materials shall not be tested against resistance to blocking. The test report shall be marked "Not tested against .... ."				
NOTE 2: If protection against hazardous chemicals is required then testing has to be carried out according to the relevant chemical standards.				

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**4.3 Nominal protection factor (100 : IL)**

Ventilated protective clothing shall be classified according to table 2. Testing according to 5.4 with the necessary activity sequence according to annex A, at the minimum design air flow rate.

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Table 2: Leakage

Class	Maximum value of mean inward leakage into the hood during exercise of		Nominal protection factor
	one activity %	all activities %	
5	0,004	0,002	50000
4	0,01	0,005	20000
3	0,02	0,01	10000
2	0,04	0,02	5000
1	0,10	0,05	2000

NOTE 1: Maximum value is calculated as the average performance over all test sequences.  
NOTE 2: Nominal protection factor is the reciprocal of the IL obtained during all activities (100 : IL)

4.4 Seam strength, Joins and Assemblages

4.4.1 Seam strength

A sample of each type of straight seam construction shall be tested in accordance with A.2 of ISO 5082 : 1982 (Constant-rate-of-traverse). Three specimens of each type of seam shall be tested and the mean of each set of three samples calculated. The garment seam performance shall be classified according to the levels of performance given in table 3 using the lowest result, i.e. the weakest seam type.

NOTE: The test method described in ISO 5082 : 1982 is only applicable to straight seams joining two pieces of material.

Table 3: Classification of seam strength

Class	Seam strength N
5	> 300
4	> 125
3	> 75
2	> 50
1	> 30

4.4.2 Joins and assemblages

The joins and assemblages between the suit and detachable parts e.g. between gloves and sleeves, boots and trouser legs, shall be tested in accordance with 5.5 and withstand a pull of 100 N.

4.5 Visor

The visor shall comply with table 4. Where antifogging compounds are used or specified by the manufacturer they shall not have an adverse affect on the health of the wearer, or on the clothing.