
**JUfcj UbUcVY_UdfYX'fUX]cU_hj bcghe '!&"XY. NU Hj Y]b'dfYg_i gbY'a YrcXY'nU
bYdfYnfU Yj Ubc'j Ufcj Ubc'cVY_c'dfch]cbYgbUjYb' n'fUX]cU_hj b]a]'XYW**

Protective clothing against radioactive contamination - Part 2: Requirements and test methods for non-ventilated protective clothing against particulate radioactive contamination

Schutzkleidung gegen radioaktive Kontamination - Teil 2: Anforderungen und Prüfverfahren für unbelüftete Schutzkleidung gegen radioaktive Kontamination durch feste Partikel
(standards.iteh.ai)

Vêtements de protection contre la contamination radioactive - Partie 2: Exigences et méthodes d'essai des vêtements de protection non ventilés contre la contamination radiocative sous forme de particules
SIST EN 1073-2:2002
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ICS:

13.280	Varstvo pred sevanjem	Radiation protection
13.340.10	Varovalna obleka	Protective clothing

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en

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ICS 13.280; 13.340.10

English version

Protective clothing against radioactive contamination - Part 2:
Requirements and test methods for non-ventilated protective
clothing against particulate radioactive contamination

Vêtements de protection contre la contamination
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Schutzkleidung gegen radioaktive Kontamination durch
feste Partikel

This European Standard was approved by CEN on 24 March 2002.

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 Management Centre 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 Management Centre 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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document EN 1073-2:2002 has been prepared by Technical Committee CEN/TC 162, "Protective clothing including hand and arm protection and life jackets", 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 2003, and conflicting national standards shall be withdrawn at the latest by January 2003.

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.

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, Malta, 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 non-ventilated protective clothing protecting the wearer against particulate radioactive contamination. Such clothing is intended to protect only the body, arms and legs of the wearer, but it may be used with accessories which provide protection to additional areas of the wearer (e.g. boots, gloves, RPE). Protection to these other areas is specified in other European Standards.

This European Standard does not apply for the protection against ionizing radiation and the protection of patients against contamination with radioactive substances by diagnostic and/or therapeutic 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 (including amendments).

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 — Part 1: Performance requirements for ventilated and non-ventilated "gas-tight" (Type 1) and "non-gas-tight" (Type 2) protective suits.*

EN 1073-1, *Protective clothing against radioactive contamination — Part 1: Requirements and test methods for ventilated protective clothing against particulate radioactive contamination.*

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

prEN 13982-2, *Protective clothing for use against solid particulate chemicals — Part 2: Test methods for determination of inward leakage of aerosols of fine particles into suits (ISO/DIS 13982-2:1999).*

EN ISO 9073-4, *Textiles — Test methods for nonwovens — Part 4: Determination of tear resistance (ISO 9073-4:1997).*

prCEN ISO/TR 11610, *Protective clothing — Glossary of terms and definitions (ISO/DTR 11610:2002).*

EN ISO 13934-2, *Textiles — Tensile properties of fabrics — Part 2: Determination of maximum force using the grab method (ISO 13934-2:1999).*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in prCEN ISO/TR 11610 and the following terms and 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 [EN 1073-1]

3.2

non-ventilated protective clothing (against particulate radioactive contamination)

clothing, intended to provide protection to the body only (not the respiratory tract, face, head, hands or feet) from particulate radioactive contamination, and which is not supplied with clean air to ensure internal ventilation and positive pressure

3.3

total inward leakage (TIL)

ratio, given in percentage between the test particle concentrations inside the suit and the test chamber

The challenge concentration corresponds to 100 %.

3.4

nominal protection factor (100 :TIL)

ratio of the concentration of the test particles in the ambient atmosphere to the concentration of the test particles inside the suit

3.5

particulate radioactive contamination

presence of radioactive substances in the form of solid particles in or on a material or in a place where they are undesirable or could be harmful

4 Requirements

The design and the material of non-ventilated protective clothing against particulate radioactive contamination shall fulfil all mandatory requirements of this standard. In case of classification at least class 1 shall be reached.

4.1 Design

4.1.1 The non-ventilated 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 shall minimise the risk of contamination and shall minimise physiological stress. Testing according to "practical performance test" (see 5.2).

4.1.3 The clothing can be designed for single use or to be reusable.

4.1.4 The clothing may consist of one or more garments designed to be worn together, and may incorporate permanently attached accessories (e.g. hood, gloves, overboots, respiratory protection), may be intended to be joined to such accessories and/or used with them, or be intended for use without accessories. Where relevant, the performance of the clothing is tested with any accessories also fitted according to the instructions of the manufacturer, and the information supplied by the manufacturer (see clause 7) shall make this clear.

The user, in consultation with the manufacturer, shall assess which parts of the body need protection for their application, and what accessories, if any, are required to provide the necessary level of protection.

4.2 Materials

The materials used for non-ventilated protective clothing against particulate radioactive contamination shall meet the requirements according to Table 1 after the pre-treatment in accordance with 5.1.1 and after the conditioning according to 5.1.2.

NOTE If protection against hazardous chemicals is required then the testing should be carried out according to the relevant standard for chemical protective clothing.

Table 1 - Requirements for the materials

Requirement	Classification	Test according to
Abrasion resistance	6 > 2 000 Cycles 5 > 1 500 Cycles 4 > 1 000 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
Puncture resistance	4 > 100 N 3 > 50 N 2 > 10 N	EN 863
Resistance to blocking ^a	2 no blocking 1 blocking	EN 25978
Tear resistance	6 > 150 N 5 > 80 N 4 > 40 N 3 > 20 N 2 > 10 N 1 > 2 N	EN ISO 9073-4
Resistance to ignition	shall not continue to burn	EN 1146, EN 13274-4 (single burner test)
^a For uncoated woven material the test is not applicable		

4.3 Nominal protection factor

Non-ventilated protective clothing shall be classified according to Table 2. Testing according to 5.3.

Table 2 - Total inward leakage

Class	Mean value of inward leakage at the three sampling positions inside the suit during exercise of		Nominal protection factor ^a
	one activity (TIL _E) %	all activities (TIL _A) %	
3	0,3	0,2	500
2	3	2	50
1	30	20	5

a Nominal protection factor = 100 :TIL_A

4.4 Seam, assemblage and join strength

4.4.1 Seam strength

A sample of each type of straight seam construction shall be tested in accordance with A.2 of EN ISO 13934-2:1999 (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 EN ISO 13934-2 is only applicable to straight seams joining two pieces of material.

Table 3 - Classification of seam strength

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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 5.4 and withstand a pull of: