

# ILNAS

Institut luxembourgeois de la normalisation  
de l'accréditation, de la sécurité et qualité  
des produits et services

## ILNAS-EN 943-2:2019

### **Protective clothing against dangerous solid, liquid and gaseous chemicals, including liquid and solid aerosols - Part 2: Performance requirements for**

Vêtements de protection contre les  
produits chimiques dangereux solides,  
liquides et gazeux, y compris les aérosols  
liquides et les particules solides - Partie

Schutzkleidung gegen gefährliche feste,  
flüssige und gasförmige Chemikalien,  
einschließlich Flüssigkeitsaerosole und  
feste Partikel - Teil 2:

03/2019



## National Foreword

This European Standard EN 943-2:2019 was adopted as Luxembourgish Standard ILNAS-EN 943-2:2019.

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English Version

## Protective clothing against dangerous solid, liquid and gaseous chemicals, including liquid and solid aerosols - Part 2: Performance requirements for Type 1 (gas-tight) chemical protective suits for emergency teams (ET)

Vêtements de protection contre les produits chimiques dangereux solides, liquides et gazeux, y compris les aérosols liquides et les particules solides - Partie 2: Exigences de performance des combinaisons des protections chimiques étanches aux gaz (Type 1) destinés aux équipes de secours (ET)

Schutzkleidung gegen gefährliche feste, flüssige und gasförmige Chemikalien, einschließlich Flüssigkeitsaerosole und feste Partikel - Teil 2: Leistungsanforderungen für Typ 1 (gasdichte) Chemikalienschutzkleidung für Notfallteams (ET)

This European Standard was approved by CEN on 17 September 2018.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

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

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## European foreword

This document (EN 943-2:2019) 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 September 2019, and conflicting national standards shall be withdrawn at the latest by September 2019.

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

This document supersedes EN 943-2:2002.

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

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

Annex B includes significant technical changes between this document and the previous edition of this European Standard.

EN 943, *Protective clothing against dangerous solid, liquid and gaseous chemicals, including liquid and solid aerosols* consists of the following parts:

- Part 1: Performance requirements for Type 1 (gas-tight) chemical protective suits
- Part 2: Performance requirements for Type 1 (gas-tight) chemical protective suits for emergency teams (ET)

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## 1 Scope

This document specifies the minimum requirements, test methods, marking and information supplied by the manufacturer, for ventilated and non-ventilated gas-tight chemical protective suits for use by emergency teams (ET).

It specifies full body personal protective ensembles to be worn for protection against solid, liquid and gaseous chemicals, including liquid and solid aerosols. Chemicals such as violently air sensitive reagents, unstable explosives and cryogenic liquids have not been considered since protection against these additional hazards is beyond the scope of this standard.

This document does not establish minimum criteria for protection against non-chemical hazards, e.g. radiological, fire, heat and explosive hazards and infective agents. This type of equipment is not intended for total immersion in liquids.

The seams, joins and assemblages attaching the accessories are included within the scope of this standard. The performance criteria for the accessories, gloves, boots or respiratory protective equipment are given in other standards.

Particulate protection is limited to physical penetration of the particulates only.

## 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 132, *Respiratory protective devices — Definitions of terms and pictograms*

EN 651:2011, *Resilient floor coverings — Polyvinyl chloride floor coverings with foam layer — Specification*

EN 943-1:2015+A1:2019, *Protective clothing against dangerous solid, liquid and gaseous chemicals, including liquid and solid aerosols — Part 1: Performance requirements for Type 1 (gas-tight) chemical protective suits*

EN 1817:2010, *Resilient floor coverings — Specification for homogeneous and heterogeneous smooth rubber floor coverings*

EN 13274-4:2001, *Respiratory protective devices — Methods of test — Part 4: Flame tests*

EN 14325:2018, *Protective clothing against chemicals — Test methods and performance classification of chemical protective clothing materials, seams, joins and assemblages*

EN 14594:2018, *Respiratory protective devices — Continuous flow compressed air line breathing devices — Requirements, testing and marking*

EN 15090:2012, *Footwear for firefighters*

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

EN ISO 26986:2012, *Resilient floor coverings — Expanded (cushioned) poly(vinyl chloride) floor covering - Specification (ISO 26986:2010)*

ISO 17491-1:2012, *Protective clothing — Test methods for clothing providing protection against chemicals — Part 1: Determination of resistance to outward leakage of gases (internal pressure test)*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in CEN ISO/TR 11610, EN 132 and EN 943-1, together with the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 3.1

##### **Type 1a-ET – gas-tight chemical protective suit for emergency teams (Type 1a-ET suit)**

Type 1a gas-tight chemical protective suit as defined in EN 943-1:2015+A1:2019 for use by emergency teams

#### 3.2

##### **Type 1b-ET – gas-tight chemical protective suit for emergency teams (Type 1b-ET suit)**

Type 1b gas-tight chemical protective suit as defined in EN 943-1:2015+A1:2019 for use by emergency teams

#### 3.3

##### **attachment point**

fixing to the outside of the chemical protective suit to enable equipment required to be fitted

EXAMPLE A torch.

#### 3.4

##### **lifeline**

attached rope the purpose of which is to help to retrieve and pull someone back to safety

Note 1 to entry: This item should not be considered to be a fall-protection device.

### 4 General performance requirements

The gas-tight chemical protective suits Type 1a-ET and Type 1b-ET shall fulfil the requirements of EN 943-1:2015+A1:2019, except for the minimum permeation by chemicals that shall be as specified in this standard. The additional or restrictive requirements of this European Standard shall be fulfilled. The performance class requirements given below are the minimum performance requirements.

### 5 Additional performance requirements

#### 5.1 General

The chemical protective clothing shall meet the requirements given in Table 1, when tested in preconditioned condition against the appropriate clause of EN 14325:2018 as cited in EN 943-1:2015+A1:2019.

**Table 1 — Minimum performance requirements of chemical protective clothing materials**

Property	Testing reference	Regular robustness	Enhanced robustness
Abrasion resistance	EN 943-1:2015+A1:2019	class 4	class 6
Flex cracking resistance	EN 943-1:2015+A1:2019	class 1	class 4
Flex cracking resistance at low temperatures (-30°C)	EN 943-1:2015+A1:2019	class 2	class 2
Trapezoidal tear resistance	EN 943-1:2015+A1:2019	class 3	class 3
Tensile strength	EN 943-1:2015+A1:2019	class 4	class 6
Puncture resistance	EN 943-1:2015+A1:2019	class 2	class 3
Resistance to flame	EN 943-2 8.2	class 1	class 3
Seam strength	EN 943-1:2015+A1:2019	class 5	class 5
NOTE The difference between regular robustness and enhanced robustness lies in the strength and durability of either the fabric or the construction of the garment or both. Enhanced robustness is intended for those tasks where high mechanical stress to the suits is expected or where it is intended that the suit is used multiple times.			

Pressure pot end point test described in EN 14325:2018 shall be used for abrasion, flex cracking and flame resistance testing.

## 5.2 Resistance to permeation by chemicals

All chemical protective materials of construction that are required to be tested for resistance to permeation in EN 943-1:2015+A1:2019 shall be tested for resistance to permeation by the chemicals in Table 2.

**Table 2 — Chemicals for permeation tests**

Type	CAS No EG-No	Physical state under standard environmental condition	Generic representation
1	Dichloromethane CAS 75-09-2 EINECS 200-838-9	Liquid	Chlorinated hydrocarbon
2	Methanol CAS 67-56-1 EINECS 200-659-6	Liquid	Primary alcohol
3	n-Hexane CAS 110-54-3 EINECS 203-777-6	Liquid	Saturated hydrocarbon
4	Toluene CAS 108-88-3 EINECS 203-625-9	Liquid	Aromatic hydrocarbon
5	Diethylamine CAS 109-89-7 EINECS 203-716-3	liquid	Amine
6	Sodium CAS 1310-73-2	liquid	Inorganic base