

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 dangereux chimiques 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) destinées 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)

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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European foreword

This document (prEN 943-2:2016) 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 943-2:2002.

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 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)

1 Scope

This European Standard 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 standard does not establish minimum criteria for protection for non-chemical hazards, e.g. radiological, fire, heat, explosive hazards, 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, 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 132, *Respiratory protective devices - Definitions of terms and pictograms*

EN 651, *Resilient floor coverings - Polyvinyl chloride floor coverings with foam layer - Specification*

EN 943-1:2015, *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, *Resilient floor coverings - Specification for homogeneous and heterogeneous smooth rubber floor coverings*

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

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

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

EN 14594:2005, *Respiratory protective devices - Continuous flow compressed air line breathing apparatus - Requirements, testing, marking*

EN 15090:2012, *Footwear for firefighters*

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

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.

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 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 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

Note 1 to entry: For 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, except for the minimum permeation by chemicals as specified in this standard. Beyond that, 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 as cited in EN 943-1.

Table 1 — Minimum performance requirements of chemical protective clothing materials

Property	Testing reference	Regular robustness	Enhanced robustness
Abrasion resistance	EN 943-1	class 4	class 6
Flex cracking resistance	EN 943-1	class 1	class 4
Flex cracking resistance at low temperatures (–30°C)	EN 943-1	class 2	class 2
Trapezoidal tear resistance	EN 943-1	class 3	class 3
Tensile strength	EN 943-1	class 4	class 6
Puncture resistance	EN 943-1	class 2	class 3
Resistance to flame	EN 943-2 8.2	class 1	class 3
Seam strength	EN 943-1	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 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 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 Hydroxide 40 %	CAS 1310-73-2 EINECS 215-185-5	liquid	Inorganic base
7	Sulphuric Acid 96 %	CAS 7664-93-9 EINECS 231-639-5	liquid	Inorganic mineral acid
8	Ammonia	CAS 7664-41-7 EINECS 231-635-3	gas	Basic gas