
Varovalna obleka - Varovanje pred tekočimi kemikalijami - Zahtevane lastnosti za varovalno obleko, ki varuje pred učinki tekočih kemikalij s spoji med različnimi deli obleke, neprepustnimi za vodo, za reševalne ekipe (oprema tipa 3 ET)

Protective clothing - Protection against liquid chemicals - Performance requirements for chemical protective clothing with liquid-tight connections between different parts of the clothing for emergency teams (Type 3 ET Equipment)

Schutzkleidung - Schutz gegen flüssige Chemikalien - Leistungsanforderungen an Chemikalienschutzkleidung mit flüssigkeitsdichten Verbindungen zwischen einzelnen Teilen der Kleidung für Notfallteams (Typ 3-ET Ausrüstung)

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Vêtements de protection - Protection contre les produits chimiques liquides - Exigences de performance pour les vêtements de protection contre les produits chimiques avec liaisons étanches aux liquides entre les différentes parties du vêtement, destinés aux équipes d'urgence (équipement de type 3-ET)

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13.340.10 Varovalna obleka Protective clothing

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**Protective clothing - Protection against liquid chemicals -
Performance requirements for chemical protective clothing with
liquid-tight connections between different parts of the clothing for
emergency teams (Type 3 ET Equipment)**

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 162.

If this draft becomes a European Standard, 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.

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Contents

	Page
Foreword.....	3
1 Scope.....	4
2 Normative references.....	4
3 Terms and definitions	5
4 Performance Requirements.....	6
4.1 Materials	6
4.2 Seams, joins and assemblages	8
4.3 Strength of detachable joints.....	9
4.4 Chemical permeation	9
5 Requirements for the whole suit	11
5.1 General	11
5.2 Compatibility with other equipment	12
5.3 Conditioning.....	12
5.4 Jet test.....	12
5.5 Inward leakage	12
5.6 Visor.....	12
5.6.1 General	12
5.6.2 Distortion of Vision	13
5.6.3 Mechanical strength.....	13
5.7 Facemask	13
5.8 Pass-through.....	13
5.8.1 General	13
5.8.2 Strength of pass-through.....	13
5.8.3 Performance of pass-through.....	13
5.9 Airline supply system	13
5.10 Exhaust assembly.....	13
5.11 Pressure in chemical protective suit.....	14
5.12 Compressed air supply tube.....	14
5.13 Carbon dioxide content of inhalation air.....	14
5.14 Noise associated with air supply to suit	14
5.15 Safety footwear	14
5.16 Lifeline, Personal Line, Safety Line.....	14
5.17 Protection against infective agents.....	14
5.18 Resistance to flame.....	14
6 Test methods.....	14
6.1 Visual inspection.....	14
6.2 Practical performance test.....	15
6.2.1 General	15
6.2.2 Work simulation test.....	15
6.2.3 Information to be recorded	15
6.3 Resistance to penetration by liquids (jet test)	16
6.4 Pull test for joins and assemblages	16
6.5 Exhalation valves	16
6.5.1 Leak tightness test.....	16
6.5.2 Connection between exhalation valve (exhaust assembly) and chemical protective clothing material	16
6.6 Attachment points.....	16
6.7 Testing of the pass through.....	16
7 Marking.....	16
8 Information supplied by the manufacturer.....	17
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 89/686/EEC.....	19

Foreword

This document (prEN 16574:2013) 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 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.

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1 Scope

This European Standard specifies the minimum requirements, test methods, marking and information supplied by the manufacturer for the following ventilated and non-ventilated liquid-tight chemical protective suits.

Full body protective clothing with liquid-tight connections between different parts of the clothing (Type 3 liquid-tight clothing) and, with liquid-tight connections to component parts, gloves, boots, visors or respiratory protective equipment, which may be specified in other European Standards. Examples of such clothing are one-piece coveralls or two piece suits, with or without hood or visor, with or without boot-socks or over-boots, with gloves attached liquid tight to the suit.

It describes personal protective ensembles for use by emergency teams, e.g. first responders or fire brigades, in situations where the chemical hazards are known. Type 3- ET suits are generally used during rescue operations, salvage work, cleanup and decontamination procedures, especially to protect against liquid and solid chemicals. Chemical protective clothing conforming to this standard is not designed to provide protection against gases and vapours, nor substances with a high vapour pressure.

Suits described in this standard have to completely cover the body. It is designed with liquid tight connections to suit socks, or booties and liquid tight gloves. They are not designed as respiratory protection, but they need to provide adequate liquid protection (Jet test) where joints to respiratory devices are required. Minimum performance classes for mechanical properties are defined.

This standard specifies special performance requirements for both the materials of construction of the chemical protective suit and for the suit as a whole, including component parts, such as respiratory protective devices, gloves, boots, seams, joins and assemblages. This standard does not establish minimum criteria for protection for non-chemical hazards, e.g. radiological, fire, heat, explosives etc. This type of equipment is not intended for total immersion in liquids. Chemical protective clothing conforming to this standard is not designed to provide protection against gases and vapours.

The basic performance criteria for the component parts: gloves, boots or respiratory protective equipment are given in other European Standards. (these Type 3-ET garments need to fulfil the requirements of the related product standards for gloves or boots etc and the minimum requirements defined in this Standard). The chemical protection suits specified in this standard are designed to be used with respiratory protective devices.

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 136:1998, *Respiratory protective devices — Full face masks — Requirements, testing, marking*

EN 340, *Protective clothing — General requirements*

EN 388, *Protective gloves against mechanical risks*

EN 464, *Protective clothing — Protection against liquid and gaseous chemicals, including aerosols and solid particles — Test method: Determination of leak-tightness of gas-tight suits (Internal pressure test)*

EN 943-2, *Protective clothing against liquid and gaseous chemicals, including liquid aerosols and solid particles — Part 2: Performance requirements for "gas-tight" (Type 1) chemical protective suits for emergency teams (ET)*

EN 12021, *Respiratory protective devices — Compressed air for breathing apparatus*

EN 14325:2004, *Protective clothing against chemicals — Test methods and performance classification of chemical protective clothing materials, seams, joins and assemblages*

EN 14593-1:2005, *Respiratory protective devices — Compressed air line breathing apparatus with demand valve — Part 1: Apparatus with a full face mask — Requirements, testing, marking*

EN 14593-2:2005, *Respiratory protective devices — Compressed air line breathing apparatus with demand valve — Part 2: Apparatus with a half mask at positive pressure - Requirements, testing, marking*

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

EN 14605, *Protective clothing against liquid chemicals — Performance requirements for clothing with liquid-tight (Type 3) or spray-tight (Type 4) connections, including items providing protection to parts of the body only (Types PB [3] and PB [4])*

EN 61672-1, *Electroacoustics — Sound level meters — Part 1: Specifications (IEC 61672-1)*

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

EN ISO 17491-3, *Protective clothing — Test methods for clothing providing protection against chemicals — Part 3: Determination of resistance to penetration by a jet of liquid (jet test) (ISO 17491-3)*

EN ISO 20345:2004, *Personal protective equipment — Safety footwear (ISO 20345:2011)*

ISO 16602, *Protective clothing for protection against chemicals — Classification, labelling and performance requirements*

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3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in CEN ISO/TR 11610, EN 943-2 and the following apply.

3.1

Type 3-ET suit

liquid-tight chemical protective suit for use by emergency teams (ET)

3.2

Type 3a-ET suit

Type 3-ET suit with a breathable air supply independent of the ambient atmosphere and worn inside the suit

NOTE 1 to entry For example, when a self-contained open-circuit compressed air breathing apparatus is worn inside a type 3-ET suit, it is considered a type 3a-ET suit.

3.3

type 3b-ET suit

type 3-ET suit with a breathable air supply worn outside the suit

NOTE 1 to entry For example, when a self-contained open circuit compressed air breathing apparatus is worn outside a type 3-ET suit, it is considered a type 3b-ET suit.

3.4

bootees

sock-like extension of the chemical protective suit leg that covers the entire foot. It should mainly protect against chemicals. Bootees are worn under the main protective footwear

NOTE 1 to entry If it is worn external over the main footwear, then the wording integral overshoe should be used.

prEN 16574:2013 (E)

3.5 exhaust assembly
device that enables exhaled air to be vented from a chemical protective suit to the atmosphere to prevent over-pressure within the suit

NOTE 1 to entry An exhaust assembly can consist of one or more exhalation valves.

3.6 personal line
length of cord fitted to breathing apparatus sets or chemical protective suits with the purpose of preventing team members from getting separated from each other or lost in conditions of limited visibility

NOTE 1 to entry For example, the line can be used to join one or more team members together or to join several team members to a fixed guide line.

3.7 Integral overshoe
sock like extension of the chemical protective suit that covers the entire foot and the personal (safety) footwear worn. This means an overshoe might be capable to protect against chemicals and it might protect the basic footwear worn against mechanical or other stressors

4 Performance Requirements**4.1 Materials**

Chemical protective clothing materials shall be tested according to the requirements of Table 1 and in accordance with the test methods specified in EN 14325. A performance class of at least 1 shall be obtained for all requirements.

Chemical protective clothing materials shall not be known to cause skin irritation or have any adverse effect to health (see also EN 340:2003, 4.2).

Prior to product testing, all chemical protective clothing materials (including the relevant components, joins and assemblages) shall be cleaned and disinfected as it is required in of EN 14325:2004, 5.2, in accordance with the manufacturer's instructions.

Unless otherwise specified all specimens shall be conditioned and treated acc. the requirement of 5.3 of EN 14325:2004.

Chemical protective clothing materials of construction (garment, bootees, boots, gloves, visor, if fitted) shall fulfil all the test requirements given in Table 1. Pre-conditioning and conditioning shall be carried out in accordance with EN 14325:2004, 4.2 and 4.3 as required.

Type 3-ET suits shall fulfil the minimum performance classes specified in Table 1.

Table 1 — Minimum performance requirements of Type 3-ET chemical protective clothing materials

Material	Clause in	Performance requirement	Performance Class
Garment	EN 14325:2004, 4.4	Abrasion resistance	2
	4.5 EN 14325:2004	Flex cracking resistance	1
	4.6 EN 14325:2004	Flex cracking at -30 C (optional)	2
	4.7 EN 14325:2004	Trapezoidal tear resistance	2
	4.9 EN 14325:2004	Tensile strength	2
	4.10 EN 14325:2004	Puncture resistance	2
Optional	4.15 EN 14325:2004	Resistance to flame (EN 13274-4 Procedure 3)	Class 1
	EN 14126:2004 4.1.4.2	Resistance to penetration by infective agents due to mechanical contact with substances containing contaminated liquids	Class 2
	Resistance to permeation by liquids	EN 14325:2004 4.11	At least 5 chemicals out of table 4 class 2 (normalized breakthrough)
Bootees	4.4 EN 14325:2004	Abrasion resistance	2
Integral overshoe (upper)	4.4 EN 14325:2004	Abrasion resistance	3
	4.7 EN 14325:2004	Trapezoidal tear resistance	3
	4.10 EN 14325:2004	Puncture resistance	2
Integral overshoe (outsole)	6.2.1 EN ISO 20345:2004	Puncture resistance	6.2.1 EN ISO 20345
Gloves	6.1 EN 388	Abrasion resistance	3
	6.1 EN 388	Puncture resistance	1
	6.1 EN 388	Tear resistance	2
	6.1 EN 388	Cut resistant	1
Visor or Face cuff if appl.	5.5 EN 14325	Mechanical seam strength	2
Visor	5.6.4 EN 943-1:Draft 2012	Mechanical strength	No damage, function shall still be given
Boots	EN 20345 EN 15090: 2006	Requirements for fire-fighters boots	type 3

prEN 16574:2013 (E)

4.2 Seams, joins and assemblages

Seams (suit to suit, bootee to bootee), joins or assemblages (visor to suit, glove to suit, booties to suit, boots to suit) shall be tested and classified according to table 2. For each chemical tested, the permeation test shall be carried out using the same test configuration; diameter cell, the same collection medium and the same collection system (open or closed loop) as was used for testing the suit fabric.

Table 2 — Minimum Performance requirements for seams, joins and assemblages

Component	Performance requirement	Clause in	Performance Class
Seam			
Suit material to suit material	Resistance to permeation by liquids	EN 14325:2004 4.11	At least 5 chemicals out of table 4 class 2 (normalized breakthrough)
	Seam strength	EN 14325:2004 5.5	>= Class 2
Closure assembly (usually a zipper)	Pass Jet test	ISO 17491-3:2008	The total stain area on any one undergarment of each suit shall be less than or equal to three times the total calibrated stain area. ^a
	Closure strength ^b	EN 14325:2004 5.5	100 N
Assemblages	Resistance to permeation by liquids	EN 14325:2004 4.11	At least 5 chemicals out of table 4 class 2 (normalized breakthrough)
Visor or face cuff to suit	Resistance to permeation by liquids	EN 14325:2004 4.11	At least 5 chemicals out of table 4 class 2 (normalized breakthrough)
Glove to suit (permanent)	Resistance to permeation by liquids	EN 14325:2004 4.11	At least 5 chemicals out of table 4 class 2 (normalized breakthrough)
	strength durability	EN 14325:2004 5.5	>= Class 2
Bootee to suit (permanent)	Resistance to permeation by liquids	EN 14325:2004 4.11	At least 5 chemicals out of table 4 class 2 (normalized breakthrough)
Boots to suit (permanent)	Resistance to permeation by liquids	EN 14325:2004 4.11	At least 5 chemicals out of table 4 class 2 (normalized breakthrough)
	strength durability	EN 14325:2004 5.5	>= Class 2
Material seams (suit material to suit material)	Resistance to penetration by contaminated liquids under hydrostatic pressure	EN 14126:2004 4.1.4.1	At least 5 chemicals out of table 4 class 2 (normalized breakthrough)
	Resistance to penetration by infective agents due to mechanical contact with substances containing contaminated liquids	EN 14126:2004 4.1.4.2	Class 2
NOTE 1 If it is not possible to test adjacent seams or assemblages separately, they may be tested together.			
NOTE 2 When the strength of a seam is tested, the value shall be taken regardless of where the break occurs (jaw breaks excluded).			
^a The inner side of the assembly shall be checked for ingress of the test liquid onto the inner surface of the suit material.			

4.3 Strength of detachable joins

The strength of detachable joins between the suit and detachable parts e.g., between gloves (chemical resistant) and sleeves, boots and trouser legs, and bonded in facemasks, shall not be less than 100 N when tested in accordance with 6.4.

If additional, separate outer gloves are used to fulfil additional mechanical and thermal requirements the pull force of the outer gloves shall be more than 30 N.

4.4 Chemical permeation

Chemical protective clothing materials of construction (garment, booties, boots, gloves, visor, if fitted) shall fulfil liquid permeation requirements given in Table 3.

If the manufacturer claims a suit is reusable after cleaning and disinfection (not decontamination), the suits shall be treated as described in clause 4.1 of this standard.

If the type 3-ET suit only achieves class 2 or lower after testing with a chemical in accordance with this standard the chemical protective suit may be unsuitable for use with this chemical under continuous exposure.

NOTE 1 The list of permeation test chemicals specified in Table 2 is not inclusive of all the chemicals for which the type 3-ET suit may be used.

NOTE 2 The standard test chemicals in Table 4 are representative of a number of different groups or classes of chemicals regardless of their physical state (i.e. their generic representation

NOTE 3 Despite obtaining favourable permeation performance results, exposure of the type 3-ET suit material to a given chemical or chemicals can result in significant chemical permeation into that material. After operational use, the user should ascertain whether permeation has occurred and, if so, whether such permeation either presents a hazard to subsequent wearers or compromises the future level of protection afforded by the material.

The permeation performance requirements in table 3 shall be fulfilled when tested with the battery of chemicals listed in table 4. Additional chemicals may be tested if the manufacturer wishes to claim additional suit performance beyond the minimum performance requirements specified by this standard. If claiming these additional chemicals in the user instructions, the manufacturer shall provide the corresponding test reports. The fabric, seams and all suit components shall be tested against the same chemicals. The manufacturer shall select at least 5 chemicals from Table 4, these 5 chemicals shall be used for all testing.