



**SLOVENSKI STANDARD**  
**SIST EN 469:1996**

**01-december-1996**

---

**Zaščitna obleka za gasilce - Zahteve in preskusne metode za zaščitno obleko za gasilce**

Protective clothing for firefighters - Requirements and test methods for protective clothing for firefighting

Schutzkleidung für die Feuerwehr - Prüfverfahren für Schutzkleidung für die Brandbekämpfung

Vêtements de protection pour sapeurs pompiers - Exigences et méthodes d'essai pour les vêtements de protection pour la lutte contre l'incendie

<https://standards.iteh.ai/catalog/standards/sist/517dec3b-0bf2-40dc-a71a-672860a189b5/sist-en-469-1996>

**Ta slovenski standard je istoveten z: EN 469:1995**

---

**ICS:**

13.220.10	Gašenje požara	Fire-fighting
13.340.10	Varovalna obleka	Protective clothing

**SIST EN 469:1996**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 469:1996

<https://standards.iteh.ai/catalog/standards/sist/517dec3b-0bf2-40dc-a71a-672860a189b5/sist-en-469-1996>

EUROPEAN STANDARD

EN 469

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 1995

ICS 13.340.10

Descriptors: Personal protective equipment, firefighting, fire protection, heat protection, protective clothing, tests, design, specifications, labelling

English version

**Protective clothing for firefighters - Requirements  
and test methods for protective clothing for  
firefighting**

Vêtements de protection pour sapeurs pompiers  
- Exigences et méthodes d'essai pour les  
vêtements de protection pour la lutte contre  
l'incendie

Schutzkleidung für die Feuerwehr -  
Anforderungen und Prüfverfahren für  
Schutzkleidung für die Brandbekämpfung

**STANDARD PREVIEW**  
(standards.iteh.ai)

SIST EN 469:1996  
<https://standards.iteh.ai/catalog/standards/sist/517dec3b-0bf2-40dc-a71a-672860a189b5/sist-en-469-1996>

This European Standard was approved by CEN on 1994-12-25. 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.

The European Standards exist 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

## CEN

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

© 1995

All rights of reproduction and communication in any form and by any means reserved in all countries to CEN and its members.

Ref. No. EN 469:1995 E

Page 2  
EN 469:1995

### Foreword

This European Standard was prepared by CEN/TC 162 "Protective clothing including hand and arm protection and lifejackets" of which the secretariat is held by DIN.

This European Standard has been prepared under a mandate given to CEN by the Commission of the European Communities and the European Trade Association, and supports essential requirements of EC Directive(s).

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 November 1995, and conflicting national standards shall be withdrawn at the latest by November 1995.

The annex A is normative and contains the heat resistance test.

The annex B is informative and contains the relationship between this European Standard and the EC-Directive for PPE.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

**ITeH STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 469:1996

<https://standards.iteh.ai/catalog/standards/sist/517dec3b-0bf2-40dc-a71a-672860a189b5/sist-en-469-1996>

## 0 Introduction

Firefighters protective clothing is intended to protect the body of the firefighter, excluding the head, hands and feet, from the effects of heat and flame. The outer material provides protection against the clothing itself burning on contact with a flame.

Heat protection is achieved by the use of a multilayer clothing assembly, which may contain multilayer materials, material combinations, component assemblies or a series of separate garments. Additional thermal protection may be provided by the use of an interlining, or a removable inner lining, or specified over or under garments. Where more than one garment is needed to meet the basic safety requirements each garment needs to be labelled to ensure that the correct combination is used.

The air trapped in materials such as quilts and waddings or between the various layers of materials plays an important part in achieving the required heat insulation. Protection is reduced in areas where the garments are tight fitting or which are compressed by belts or straps.

Protection against water penetration may be provided in the form of a moisture barrier. The moisture barrier should preferably allow the passage of water vapour for the whole life of the garment, so as not to impede the loss of sweat.

Suitable clothing can enable the firefighter to work for longer periods under hazardous conditions. However, it is not possible to relate the performance levels achieved in laboratory testing to protection times under actual use conditions because the heat hazard encountered can vary so much.

Additional personal protective equipment is needed to protect the head, hands, and feet, and in many firefighting situations breathing apparatus must be worn. Additional clothing may need to be worn to deal with specific situations, e.g. chemical spillages. In these cases, it is necessary for the user to assess that the combined personal protective equipment as a whole provides an adequate degree of protection and to appreciate that it is possible for one type of equipment to be comprised by the presence of another.

Because the concept of firefighters protective clothing is based on the use of layers of clothing, the firefighter needs to be trained to know what clothing is appropriate for each particular application. He may need to add extra clothing for specific tasks. He also needs to know when his clothing is approaching its limits and what action to take. It is possible to define a limited area which has a lower level of heat protection and which provides the wearer with an early warning of potential hazard.

The basic safety requirements in this standard establish a level of performance for firefighters protective clothing for use in general structural firefighting operations. This does not prevent the specifying of garments having a higher level of performance for particularly vulnerable parts of the body or for use against specific hazards. Different levels of performance may be established in other standards for firefighters protective clothing used in other specific applications such as forest firefighting and fire entry.

## 1 Scope

This standard specifies test methods and minimum requirements for clothing to be worn during structural firefighting operations and associated activities where there is a risk of heat and/or flame.

This standard covers the general clothing design, the minimum performance levels of the materials used, and the methods of test for determining these performance levels. The required performance levels may be achieved by the use of one or more garments.

It does not cover special clothing for use in high risk situations, e.g. fire entry suits, or clothing for use in long term firefighting operations in high ambient temperatures, e.g. forest firefighting. It does not cover protection for the head, hands and feet or protection against other hazards, e.g. chemical, biological, radiation and electrical hazards. These aspects may be dealt with in other standards.

## 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 20811	Textile fabrics - Determination of resistance to water penetration - hydrostatic pressure test (ISO 811:1981)
ISO 3175	Textiles - Determination of dimensional change on dry cleaning in perchlorethylene - Machine method
ISO 4674:1977	Fabrics coated with rubber or plastics - Determination of tear resistance
EN 24920	Textile fabrics - Determination of resistance to surface wetting (Spray test) of fabrics (ISO 4920:1981)
ISO 5077	Textiles - Determination of dimensional change in washing and drying
ISO 5081	Textiles - Woven fabrics - Determination of breaking strength and elongation - (Strip method)
ISO 6330:1984	Textile - Domestic washing and drying procedures for textile testing
EN 340	Protective clothing - General requirements
EN 366:1993	Protective clothing - Protection against heat and fire - Method of test: Evaluation of materials and material assemblies when exposed to a source of radiant heat
EN 367	Protective clothing - Protection against heat and flames - Test method: Determination of the heat transmission on exposure to flame
EN 368	Protective clothing - Protection against liquid chemicals - Test method: Resistance of materials to penetration by liquids
EN 532	Protective clothing - Protection against heat and flame - Method of test for limited flame spread
EN 31092	Textiles - Physiological effects - Measurement of thermal and water-vapour resistance under steady-state conditions (sweating guarded-hotplate test) (ISO 11 092:1993)

### 3 Definitions

For the purposes of this standard the following definitions apply:

#### 3.1 Firefighters protective clothing

Specific garments providing protection for the firefighter's upper and lower torso, neck, arms, and legs, but excluding the head, hands, and feet.

#### 3.2 Outer material

The outermost material of which the protective clothing is made.

#### 3.3 Removable inner liner

An inner garment designed to be attached or to be worn separately under an outer garment in order to provide thermal insulation.

#### 3.4 Component assembly

The material combination found in a multilayer garment arranged in the order of the finished garment construction and including any inner liner.

#### 3.5 Multilayer clothing assembly

A series of layers of garments arranged in the order as worn. It may contain multilayer materials, material combinations or separate layers of clothing material in single layers.

<https://standards.iteh.ai/catalog/standards/sist/517dec3b-0bf2-40dc-a71a-672860a189b5/sist-en-469-1996>

#### 3.6 Garment

A single item of clothing which may consist of single or multiple layers.

#### 3.7 Under garment

A garment which is worn under an outer garment.

#### 3.8 Closure system

A method of fastening openings in the garment including combinations of more than one method of achieving a secure closure, e.g. a slide fastener covered by an overlap fastened down with a touch and close fastener. This term does not cover seams.

#### 3.9 Material combination

A material produced from a series of separate layers, intimately combined prior to the garment manufacturing stage, e.g. a quilted fabric.

#### 3.10 Interlining

A layer found between the outermost layer and the innermost lining in a multilayer garment, not next to the wearer's skin.

### 3.11 Innermost lining

The lining found on the innermost face of a component assembly.

### 3.12 Moisture barrier

A fabric or membrane used in a component assembly to enable the properties of the assembly to comply with the manufacturer's claims concerning hydrostatic pressure and water vapour permeability ( see 7.6 ).

### 3.13 Hardware

Non-fabric items used in protective clothing including those made of metal or plastic, e.g. fasteners, rank markings, buttons, etc.

### 3.14 Integral melting

Liquefaction of a material when exposed to heat to the extent of causing a hole in its structure, either by shrinking and/or dripping away under specified test conditions (see 6.1 and 6.5).

### 3.15 Seam

The junction of two edges of material which are permanently attached in the garment by sewing or any other method.

## 4 General clothing design

4.1 The firefighters protective clothing shall provide protection for the firefighter's upper and lower torso, neck, arms, and legs, but excluding the head, hands, and feet. It shall consist of:

- a) a single outer garment, or
- b) an outer two piece suit consisting of a jacket and a pair of trousers with a minimum overlap of 30 cm, or
- c) a series of outer and under garments designed to be worn together.

4.2 The clothing shall be designed to minimize restrictions of movement. It shall be compatible with other protective equipment which may be necessary, e.g. boots, helmet, gloves, and breathing apparatus.

4.3 Where multilayer clothing assemblies are used to achieve the specified performance levels the layers shall be either permanently attached or the various garments shall be clearly labelled that they must always be used in combination, (see clause 9).

4.4 Seams shall be constructed to give the minimum loss in strength and protection and to maintain the integrity of the garment.

4.5 Hardware penetrating the outer material shall not be exposed on the innermost surface of the component assembly.

4.6 Closure systems shall be constructed so as to fulfil the performance requirements of the garment.



4.7 The clothing shall have retroreflective elements to the user's requirements provided that they do not affect the performance of the clothing.

4.8 The ends of the sleeves shall be designed to protect the wrist and to prevent the entry of burning debris. They shall not hinder the donning of the garment and shall be compatible with the wearing of protective gloves.

4.9 The clothing shall also protect the wearer's neck.

4.10 The clothing should be as light as possible commensurate with the attainment of the required performance levels.

4.11 The clothing shall be designed to promote ease of cleaning.

4.12 Any labels or trim shall not adversely affect the performance of the garment.

## 5 Sampling and pretreatment

5.1 Samples shall be taken so as to be representative of the materials and garment construction employed.

5.2 The number and size of specimens for the different tests shall be in accordance with the respective standards. All tests shall be carried out on materials as received unless otherwise specified (see 5.4).

5.3 In all surface tests the outermost surface is exposed, except for flame spread testing of the innermost lining (see 6.1) and testing of water vapour permeability (see 7.6) when the innermost surface is exposed.

5.4 Before testing for the basic safety requirements (6.1, 6.2 and 6.3) the test materials shall be washed five times in a front loading horizontal drum machine using 1 g/l IEC detergent in soft water and finally dried in accordance with the procedures of ISO 6330. Washing shall be carried out by procedure 2A (at  $(60 \pm 3) ^\circ\text{C}$ ) and drying by procedure E (tumble drying) unless otherwise specified in the care labelling. Materials which are labelled as dry cleanable only shall be dry cleaned five times in accordance with ISO 3175.

## 6 Basic safety requirements

### 6.1 Flame spread

Flame spread shall be tested in accordance with EN 532 after the pretreatment specified in 5.4 and the following requirements shall be satisfied.

- a) No specimen shall give flaming to top or either side edge;
- b) No specimen shall give hole formation in any layer, except for the outer layer of a multilayer assembly;
- c) No specimen shall give flaming or molten debris;
- d) The mean value of afterflame time shall be  $\leq 2$  s;
- e) The mean value of afterglow time shall be  $\leq 2$  s.

The component assembly of the outer garment shall be tested by applying the flame to the outer surface of the garment.