



SLOVENSKI STANDARD

SIST EN 470-1:1996

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Zaščitna obleka za uporabo pri varjenju in sorodnih postopkih - 1. del: Splošne zahteve

Protective clothing for use in welding and allied processes - Part 1: General requirements

Schutzkleidung für Schweißen und verwandte Verfahren - Teil 1: Allgemeine Anforderungen

Vêtements de protection utilisés pendant le soudage et les techniques connexes - Partie 1: Exigences générales

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ICS:

13.340.10	Varovalna obleka	Protective clothing
25.160.01	Varjenje, trdo in mehko spajkanje na splošno	Welding, brazing and soldering in general

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en

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EUROPEAN STANDARD

EN 470-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 1995

ICS 13.340.10

Descriptors: Personal protective equipment, protective equipment, heat protection, welding, projection, weld metal, ultraviolet radiation, specifications, tests, marking, instructions

English version

Protective clothing for use in welding and allied processes - Part 1: General requirements

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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.

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CEN

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

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

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Foreword

This European Standard has been prepared by the 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 EN 470-1 was originally submitted to Formal Vote as prEN 470.

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of an identical text or by endorsement, at the latest by November 1995, and conflicting national standards shall be withdrawn at the latest by November 1995.

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

Annexes A and B are informative.

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.

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1 Scope

This part of this European Standard specifies test methods and general performance requirements for protective clothing for operators engaged in welding and allied processes with comparable risks.

This type of protective clothing is intended to protect the wearer against small splashes of molten metal, short contact time with flame, and ultra violet radiation, and to be worn continuously for up to 8 h at ambient temperature.

Additional requirements, which apply to certain specific types of welding operations, will be included in subsequent parts of this standard.

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 340

Protective clothing - General requirements

EN 348

Protective Clothing - Test method: Determination of behaviour of material on impact of small splashes of molten metal

EN 532

Clothing for protection against heat and flame - Method of test for limited flame spread

ISO 2589

Leather - Physical testing - measurement of thickness

ISO 3175

Textiles - Determination of dimensional change on dry cleaning in perchlorethylene - Machine method

ISO 3376

Leather - Determination of tensile strength and elongation

ISO 3377

Leather - Determination of Tearing Load

ISO 4674 : 1977

Fabrics coated with rubber or plastics - Determination of tear resistance

ISO 5077

Determination of dimensional change of textiles in domestic washing and drying

ISO 5081

Textiles - Woven fabrics - Determination of Breaking Strength

ISO 6330 : 1984

Textiles - Domestic washing and drying procedures for textile testing

IUC/4¹⁾

Determination of substances (fats and solubles) soluble in dichloromethane

IUP/35¹⁾

Methods of sampling and physical testing of leather

¹⁾ Information on sources of supply can be obtained from the Secretariat of CEN/TC 162, which is held by DIN, Burggrafenstr 6, D-10787 Berlin

3 Definitions

For the purposes of this standard the following definitions apply:

3.1 Protective clothing

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

3.2 Protective Garment

An individual item of protective clothing such as a protective coat, apron, trousers, boiler suit or overall.

3.3 Garment Assembly

Two or more layers of the same or different materials joined together at the garment manufacturing stage and including all layers of the material and seams present in that region of the garment. A garment assembly specimen is normally a section cut through the garment but may be a replicate in all respects of a section through the proposed garment.

3.4 Welding

Process used in joining metal components involving local melting of metal.

3.5 Allied Processes

Processes having similar types and levels of risk as welding, such as flame cutting.

4 Design

4.1 General

General requirements which are not specifically covered in this standard shall be in accordance with EN 340. Welders' protective garments may be designed to provide protection for specific areas of the body, e.g. sleeves, aprons, and gaiters. Welders' protective clothing shall be designed to avoid electrical conduction from the outside to the inside. Metal fasteners shall be covered.

4.2 Sizes

Garment sizes shall be in accordance with the requirements of EN 340. Protective coats shall be of sufficient length to overlap the top of the trousers.

4.3 Pockets

NOTE: Welders' protective garments shall preferably be constructed without pockets or with internal pockets.

If trousers have pockets, these shall be side pockets only and shall not extend more than 10° from the side seam of the trousers. Other external pockets shall be constructed with a closeable flap which shall completely overlap the top of the pocket opening and which shall not be capable of being tucked into the pocket.

4.4 Closures

Closures shall be designed so that they do not create openings or folds in areas where molten metal splashes are likely to lodge. Cuffs may be provided with closures to reduce their width. The closure and any fold which it creates shall be on the underside of the cuff. Trousers shall not have pleats or turn-ups. They may have side slits which shall have a means of closure and the slit and closure shall be covered.

5 General requirements for outer materials

5.1 Tensile strength

When tested as specified in 7.4 the outer materials shall have a minimum tensile strength of 300 N.

5.2 Tear strength

When tested as specified in 7.5 the outer materials shall have a minimum tear strength of 15 N.

5.3 Dimensional Change: Textiles

If, when tested as specified in 7.6, textile outer materials give a dimensional change of more than 3 % in either the machine and cross directions, this fact shall be marked on the clothing (see 8) and shall be referred to in the instructions for use (see 9).

5.4 Dimensional Change: Leather

When tested as specified in 7.6 leather outer materials shall give an area dimensional change of not more than 5 %.

5.5 Additional general requirements for leather

5.5.1 Fat content

When sampled, dried at $(102 \pm 2)^\circ\text{C}$ and tested in accordance with 7.9.1 the fat content of the leather shall not exceed 15%.

5.5.2 Thickness

When tested in accordance with 7.9.2 the thickness of the leather outer material shall be at least 1mm at any point.

6 Specific safety requirements

6.1 Flame spread

When tested in accordance with 7.7 outer materials shall meet the following requirements.

- a) no specimen shall give flaming to the top or either side edge,
- b) no specimen shall give hole formation,
- c) no specimen shall give flaming or molten debris,
- d) the mean value of afterflame time shall be $\leq 2\text{s}$,
- e) the mean value of afterglow time shall be $\leq 2\text{s}$.

6.2 Impact of Molten Metal Drops

When tested in accordance with 7.8 garment assemblies shall require at least 15 drops of molten metal to raise the temperature behind the test specimen by 40 K.

7 Testing

7.1 Sampling

Test samples shall be representative of the material to be tested. The number and size of the test specimens required shall be in accordance with the relevant test methods. All tests shall be carried out on materials as received unless otherwise specified (see 7.2).

7.2 Pretreatment of textile material

Testing of textile materials and garment assemblies for specific safety requirements (see clause 6) shall be carried out on samples either washed or dry cleaned in accordance with the care label.

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 once in accordance with the procedures of ISO 6330 : 1984. 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. If the material or garment has no care label, separate samples shall be tested after five cycles of washing and five cycles of dry cleaning.

7.3 Conditioning

Unless otherwise specified in the test method, textile specimens shall be conditioned for at least 24 hours and leather specimens for at least 7 days in an atmosphere having a temperature of $(20 \pm 2)^\circ\text{C}$ and a relative humidity of $(65 \pm 5) \%$ before testing. Testing shall be carried out within 5 min of removal from this atmosphere.

7.4 Tensile strength

The tensile strength of textile materials shall be determined in accordance with ISO 5081 in both the machine and cross directions.

The tensile strength of leather shall be determined in accordance with ISO 3376 in two directions at right angles in the plane of the material.

7.5 Tear Strength

The tear strength of textile materials shall be determined in accordance with procedure A1 of ISO 4674 : 1977 in both the machine and cross directions.

The tear strength of leather shall be determined in accordance with ISO 3377 in two directions at right angles in the plane of the material.

7.6 Dimensional change

The dimensional change of textile materials shall be determined in accordance with ISO 5077 using the washing or dry cleaning procedure specified in 7.2.

The dimensional change of leather shall be determined in accordance with IUP/35.

7.7 Flame spread

The flame spread behaviour shall be determined in accordance with EN 532 after the washing or dry cleaning procedure specified in 7.2.

7.8 Behaviour on impact of small molten metal drops

The behaviour on impact of small molten metal drops shall be determined in accordance with EN 348 after the washing or dry cleaning procedure specified in 7.2.

If the average value of a set of ten specimens falls between 15 and 15,5 drops, then a second set of ten specimens shall be tested and the classification shall be based on the average of the twenty specimens.

7.9 Specific tests for leather

7.9.1 Determination of Fat content

The fat content shall be determined in accordance with IUC/4.

7.9.2 Determination of thickness

The thickness shall be determined in accordance with ISO 2589.

8 Marking

Welders protective clothing for which compliance with this standard is claimed shall be marked according to EN 340 and with the following information:

- a) the pictogram for clothing against heat and flame incorporating the number of this European Standard, (see figure 1)
- b) the dimensional change, if greater than 3%.

9 Instructions for use

9.1 General

When welders' protective clothing is delivered to the consumer, instructions for use shall be provided according to EN 340.

9.2 Intended Use

Basic information concerning the intended use of the welders protective clothing shall be provided (see A.1).

9.3 Improper Use

Attention shall be drawn to the dangers of improper use.

- a) The limited flame spread properties will be reduced if the welder's protective clothing is contaminated with flammable materials.
- b) The welder's protective clothing itself does not provide protection against electric shock. During arc welding it is essential for safety that suitable insulating layers should be provided to prevent the welder contacting electrical conductive parts of his equipment (see A.3).
- c) The electrical insulating effect of the welder's protective clothing will be reduced by wetness, humidity or sweat.

d) A increase in the oxygen content of the air will reduce the protection of the welder's protective clothing against flame. Care should be taken when welding in confined spaces if it is possible that the atmosphere may become enriched with oxygen.



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Figure: Pictogram

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