SLOVENSKI STANDARD
SIST EN 463:1996

01-februar-1996

Varovalna obleka za zaščito pred tekočimi kemikalijami – Preskusna metoda: Ugotavljanje odpornosti proti penetraciji curka tekočine (Jet Test)

Protective clothing - Protection against liquid chemicals - Test method: Determination of resistance to penetration by a jet of liquid (Jet Test)

Schutzkleidung - Schutz gegen flüssige Chemikalien - Prüfverfahren: Bestimmung der Beständigkeit gegen die Durchdringung eines Flüssigkeitsstrahls (Jet-Test)

Vetements de protection - Projection contre les produits chimiques liquides - Méthode d'essai: Détermination de la résistance a la pénétration par un jet de liquide (essai au jet)

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English version

Protective clothing for use against liquid chemicals - Test method: Determination of resistance to penetration by a jet of liquid (Jet Test)

Vêtements de protection contre les produits chimiques liquides - Méthode d'essai: Détermination de la résistance à la pénétration par un jet de liquide (essai au jet)

Schutzkleidung zur Anwendung gegen flüssige Chemikalien - Prüfverfahren: Bestimmung der Beständigkeit gegen die Durchdringung eines Flüssigkeitsstrahls (Jet -Test)

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CEN

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

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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 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).

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of an identical text or by endorsement, at the latest by December 1994, and conflicting national standards shall be withdrawn at the latest by December 1994.

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, United Kingdom.

1 Scope

This European Standard specifies a method for determining the resistance of chemical protective clothing to penetration by jets of liquid chemicals.

This European Standard is applicable to clothing which may comprise one or more items and which is intended to be worn where there is a risk of exposure to a forceful projection of a liquid chemical.

This European Standard is applicable to clothing which is intended to be resistant to penetration under conditions which require total body surface cover but do not demand the wearing of gas-tight clothing.

This European Standard is not applicable to permeation of liquid chemicals through materials from which the clothing is made.

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

3 Definitions

For the purposes of this standard the following definitions apply:

3.1 **Garment:** An individual component (of chemical protective clothing), the wearing of which provides protection against contact with chemicals to the part of the body that it covers.

3.2 **Penetration:** The process by which chemical flows through holes or essential openings in the material. The holes may be the result of mechanical damage.

3.3 **Chemical protective clothing:** The combined assembly of garments worn to provide protection against exposure to or contact with chemicals.

3.4 **Chemical protective suit:** Clothing worn to protect against chemicals that covers the whole, or greater part of the body. A chemical protective suit may comprise of garments combined together to provide protection to the body. A suit may also have various types of additional protection such as hood or helmet, boots and gloves joined with it.

3.5 **Assemblage:** A permanent fastening between two or more different garments, or between chemical protective clothing and accessories, obtained, for example by sewing, welding, vulcanising, gluing.

3.6 **Join:** A non-permanent fastening between two different garments, or between chemical protective clothing and accessories.

3.7 **Connection:** An assemblage or join.

3.8 Undergarments: Clothing worn next to the body surface, beneath the upper or outer garments of indoor clothes.

3.9 Calibrated stain: A fluorescent or visible stain, with a defined minimum area, generated by dropping a specified quantity of test liquid onto an absorbent coverall. The calibrated stain is used to measure liquid penetration during spray and jet testing of chemical protective clothing.

4 Principle

An aqueous jet, containing a fluorescent or visible dye tracer, is directed under controlled conditions at chemical protective clothing worn by a test mannequin or human test subject. Inspection of the inside surface of the clothing and the outside surface of absorbent clothing worn underneath allows any points of inward leakage to be identified.

NOTE: As this test requires the use of water containing a dye or tracer care may be necessary to avoid contamination of the surface water drainage system.

5 Liquid for application in the form of a jet

Unless specified in the performance specification the following standard test liquid shall be used:

Prepare the test liquid by dissolving a water soluble fluorescent or visible dye in de-mineralised water at (20 ± 2)°C to form a solution with the detection characteristics given in 6.2.

6 Apparatus and test subjects

6.1 Absorbent coverall, comprising a one piece garment (with hood) of water absorbent fabric (thickness less than 5 mm) which shall produce a calibrated stain in accordance with 6.2.

6.2 Stain detection, a droplet (0,1 ml) of the test liquid placed on the outside surface of the absorbent clothing worn underneath shall be clearly visible and shall give a stain diameter of > 2 cm. Where necessary, for certain dyes ultraviolet lighting shall be used.

This spot shall be clearly identified and shall be used to judge Pass/Fail criteria.

6.3 Nozzle, to generate a jet of test liquid as shown in figure 1.

6.4 Human test subject, of a size ± 10% of the upper width limit of the suit to be tested and ± 5% of the upper height limit of the suit to be tested.

As the human test subject is not required to move during the test, a test mannequin (test dummy) is preferred. However, a human test subject is permitted. If a human test subject is used, extreme care must be taken to ensure the health and safety of the test subject. In particular, as a pressurized jet of liquid is used, care must be taken to protect the subject's eyes, ears, nose and mouth.

7 Preparation of samples for the jet test

The test subject shall be fitted with the correct size of absorbent coverall of the type described in 6.1, and shall be limited to wearing one layer of undergarments underneath the absorbent coverall. The human test subject shall then be dressed in the correct size of test garment, as described in clause 6 of EN 340, in accordance with the manufacturers' instructions.

The human test subject shall also be fitted with the following accessories:

a) gloves resistant to penetration by the test liquid; the sleeves over the cuffs of the the test garment shall be fitted over the outside of the gloves;

b) boots resistant to penetration by the test liquid; the trousers of the test garment shall be fitted over the outside of the boots;

NOTE: Any gaps in the final assembly around the head, face and neck through which the liquid may pass, which may be attributable to a lack of complete cover provided by items that are not part of the test chemical protective clothing, should be sealed to prevent liquid entering which could run down inside the garment and disguise penetration of the jet through other areas.

8 Procedure

8.1 Selection of test spot(s)

Individual tests shall be made on;

a) connections, including joints and assemblages (including zips) which are integral to the chemical protective clothing, and to gloves, boots, and hood;

b) connections between different parts of the protective suit

Each test spot shall be identified for use on the test report (see clause 9).

8.2 Jet test

The jet nozzle shall be positioned 1 m from the test spot at an angle which is most likely to cause penetration by the liquid jet.

The test is made at ambient temperature.

The liquid jet shall be directed at each test spot for 5 s.

Allow the clothing to drain for 2 min.

Remove the test chemical protective clothing and examine the internal surface for signs of penetration. Similarly, examine the external surface of the absorbent coverall. Either mark the location and extent of any sign of penetration on the test chemical protective clothing and the coverall or photograph the absorbent coverall.

9 Report

The test report shall include the following information:

a) the establishment of the test in accordance with this standard;

b) the manufacturer/supplier and any identifying mark;

c) the composition of the liquid used in the tests;

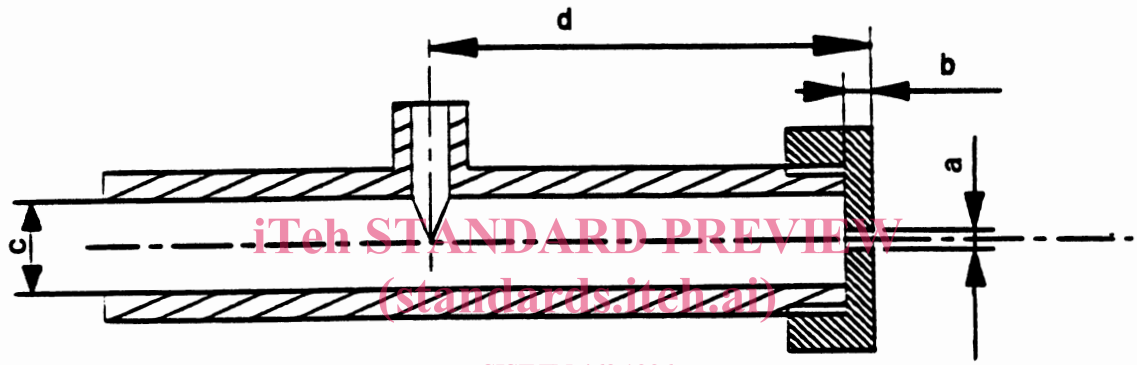
d) for each chemical protective clothing test, the location of each test spot and direction of the jet shall be indicated on diagrams of a human figure (front and back separately) or by reference to photographs.

Approximate areas of contamination of the internal surfaces of the test clothing and the external surface of the absorbent coverall. Contaminated areas should preferably be indicated by shading on diagrams of a human figure (front and back separately) or by reference to photographs. Penetration of isolated spots of liquid (satin diameters < 2 cm) should be marked by a single cross;

e) report the total number of penetration spots;

f) the size range of the garment tested as defined in EN 340;

g) any further qualifying remarks and observations.



a diameter of the opening of the nozzle, (4 ± 0,1)mm
b length of the opening of the nozzle, (4 ± 0,1)mm
c inner diameter of the tube, (12,5 ± 1)mm
d the distance between the opening of the nozzle and the manometer, (80 ± 1) mm
The water pressure at the manometer: 150 kPa

Figure 1: Shape of nozzle