



SLOVENSKI STANDARD

SIST EN 14786:2006

01-julij-2006

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Protective clothing - Determination of resistance to penetration by sprayed liquid chemicals, emulsions and dispersions - Atomizer test

Schutzkleidung - Bestimmung des Widerstandes gegen Durchdringung von flüssigen gespritzten Chemikalien, Emulsionen und Dispersionen - Spritzverfahren

Vêtements de protection - Détermination de la résistance à la pénétration par les produits chimiques liquides pulvérisés, les émulsions et les dispersions - Essai de pulvérisation

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ICS:

13.340.10

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English Version

Protective clothing - Determination of resistance to penetration
by sprayed liquid chemicals, emulsions and dispersions -
Atomizer test

Vêtements de protection - Détermination de la résistance à
la pénétration par les produits chimiques liquides
pulvérisés, les émulsions et les dispersions - Essai de
pulvérisation

Schutzkleidung - Bestimmung des Widerstandes gegen
Durchdringung von flüssigen gespritzten Chemikalien,
Emulsionen und Dispersionen - Spritzverfahren

This European Standard was approved by CEN on 16 March 2006.

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.

This European Standard exists 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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Foreword

This European Standard (EN 14786:2006) 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 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 October 2006, and conflicting national standards shall be withdrawn at the latest by October 2006.

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 EU Directive 89/686/EEC.

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this European Standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Introduction

This European standard specifies a test method to measure a penetration index for protective clothing materials against atomized emulsions and dispersions of liquid chemicals, e.g. pesticides used in agricultural crop spraying. The data may be used as a guide for screening protective clothing materials but the results of the test are affected by the physical properties of the test chemical, e.g. low volatility chemicals.

Clothing, which has been developed from materials selected by means of this method of test, should be used only in well-defined circumstances, i.e. when an evaluation of the finished item has indicated an acceptable level of performance (e.g. in laboratory and field testing of a garment, consideration of exposure levels to specified chemicals etc.).

Clothing made of these materials is not for use as the sole means of protection where resistance to permeation by chemicals at the molecular level (to be determined by EN ISO 6529) is essential and where a complete barrier to liquid (or gaseous chemicals) is required (e.g. risk of exposure to massive and forceful discharges of concentrated liquid chemicals).

The potential performance levels of materials as assessed by the test method described in this standard are intended to be used in product specifications for protective apparel against atomized liquids, emulsified and dispersed chemicals.

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1 Scope

This European Standard specifies a test method to determine the resistance of textile materials against penetration by atomized liquid chemicals, emulsions and dispersions. These materials are intended to be used in both limited-use and reusable protective clothing.

The penetration is expressed in percent, as ratio of the amounts of chemical applied and retained by the textile. The methods of quantitative physico-chemical analysis used for mass detection will depend on the chemical under test.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 22768-1, *General tolerances - Part 1: Tolerances for linear and angular dimensions without individual tolerance indications (ISO 2768-1:1998)*

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply.

3.1

penetration

process by which a chemical flows through holes or essential openings in the material.

NOTE The holes may be the result of mechanical damage

3.2

permeation

the process by which a chemical moves through a protective clothing material on a molecular level.

NOTE Permeation involves:

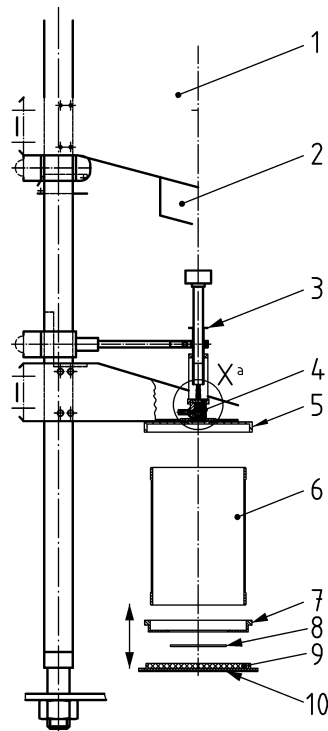
- sorption of the molecules of the chemical into the contacted (outside) surface of the material;
- diffusion of the sorbed molecules in the material, and
- desorption of the molecules from the opposite (inner) surface of the material.

4 Principle

A test specimen is contaminated by a small quantity of atomized liquid chemical, emulsion or dispersion, injected by a two-phase nozzle operated by a microprocessor controlled step motor. Part of the chemicals will penetrate and wet the test specimen. The flow of chemical passing through the material will be taken up by an absorbent under the test specimen (see Figure 1 for a schematic representation of the test equipment).

After 30 min. exposure time the textile and the adsorbent are extracted and analysed in order to determine the amounts of chemical retained and passed through. The extraction efficiency shall be proven and should be larger than 95 %. Depending on the type of chemical different techniques such as e. g. high pressure liquid chromatography (HPLC) or gas chromatography (GC) are used for the quantitative analysis.

The penetration of a protective clothing material is defined as the ratio of the mass of chemical penetrated to the mass of chemical applied.



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Key

- a Detail X: see Figure 6
- 1 Fastenings
- 2 Controlled step motor
- 3 Syringe with test chemical
- 4 Two-phase nozzle
- 5 Nozzle holder
- 6 Covering cylinder
- 7 Mask
- 8 Textile specimen
- 9 Sorbent
- 10 Ground plate of specimen holder

Figure 1 - Schematic representation of the test equipment

5 Apparatus

5.1 Test chamber

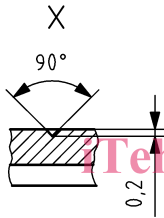
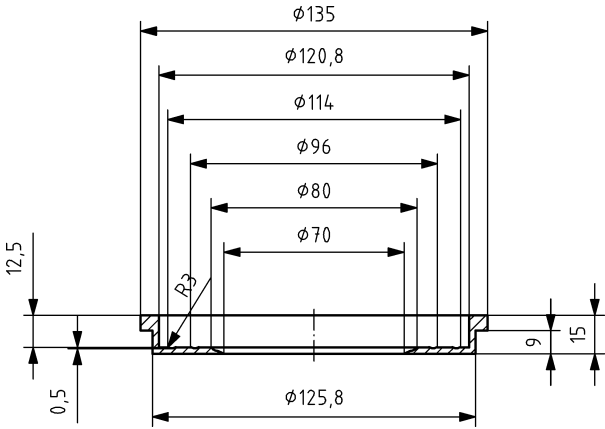
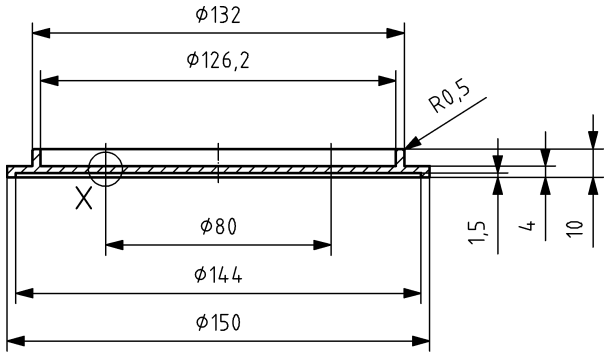
The test chamber consists of the sample holder and a covering cylinder. The dimensions are given in Figure 2 to Figure 4.

The sample holder consists of a ground plate and a mask. Both are made of stainless steel or chromium-plated brass (see Figure 2 and Figure 3).

- ground plate: the ground plate takes up the covering cylinder, the absorbent and the textile sample
- mask: the mask fixes the textile sample with a defined open area for the spray.

The covering cylinder encapsulates the atomizer and test equipment. It is preferably made of glass to observe the spray-cone during application but may also be made of stainless steel or chromium-plated brass (see Figure 4).

Dimension in millimetres



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General tolerances: EN 22768-1

Figure 2 - Dimensions of ground plate

Figure 3 - Dimensions of sample holder mask