



SLOVENSKI STANDARD
SIST EN 14360:2004

01-oktober-2004

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Protective clothing against rain - Test method for ready made garments - Impact from above with high energy droplets

Schutzkleidung gegen Regen - Prüfverfahren für fertige Bekleidungssteile - Beaufschlagung von oben mit Tropfen von hoher Energie

Vêtements de protection contre les intempéries - Méthode d'essai pour les vêtements pret a porter - Impact de fortes précipitations

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Ta slovenski standard je istoveten z: EN 14360:2004

ICS:

13.340.10	Varovalna obleka	Protective clothing
59.080.01	Tekstilije na splošno	Textiles in general

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en

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ICS 13.340.10; 59.080.01

English version

Protective clothing against rain - Test method for ready made garments - Impact from above with high energy droplets

Vêtements de protection contre les intempéries - Méthode d'essai pour les vêtements prêt à porter - Impact de fortes précipitations

Schutzkleidung gegen Regen - Prüfverfahren für fertige Bekleidungsstücke - Beaufschlagung von oben mit Tropfen von hoher Energie

This European Standard was approved by CEN on 16 April 2004.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 14360:2004) has been prepared by Technical Committee CEN/TC 162 “Protective clothing including hand and arm protection and life jackets”, 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 January 2005, and conflicting national standards shall be withdrawn at the latest by January 2005.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to support Essential Requirements of EU Directive 89/686/EEC Personal Protective Equipment.

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

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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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1 Scope

This European Standard specifies a test method for determining the rain tightness of clothing for protection against rain, using a static manikin exposed to artificial rain. It is applicable to the testing of jackets, trousers, coats and one or two piece suits.

This standard is not applicable to the testing of garments for resistance to other weather conditions, e.g. snow, hail-, or strong winds.

2 Normative references

Not applicable.

3 Terms and definitions

For the purposes of this European Standard, the following term and definition apply.

garment

individual component of a clothing ensemble, the wearing of which provides protection to the part of the body that it covers

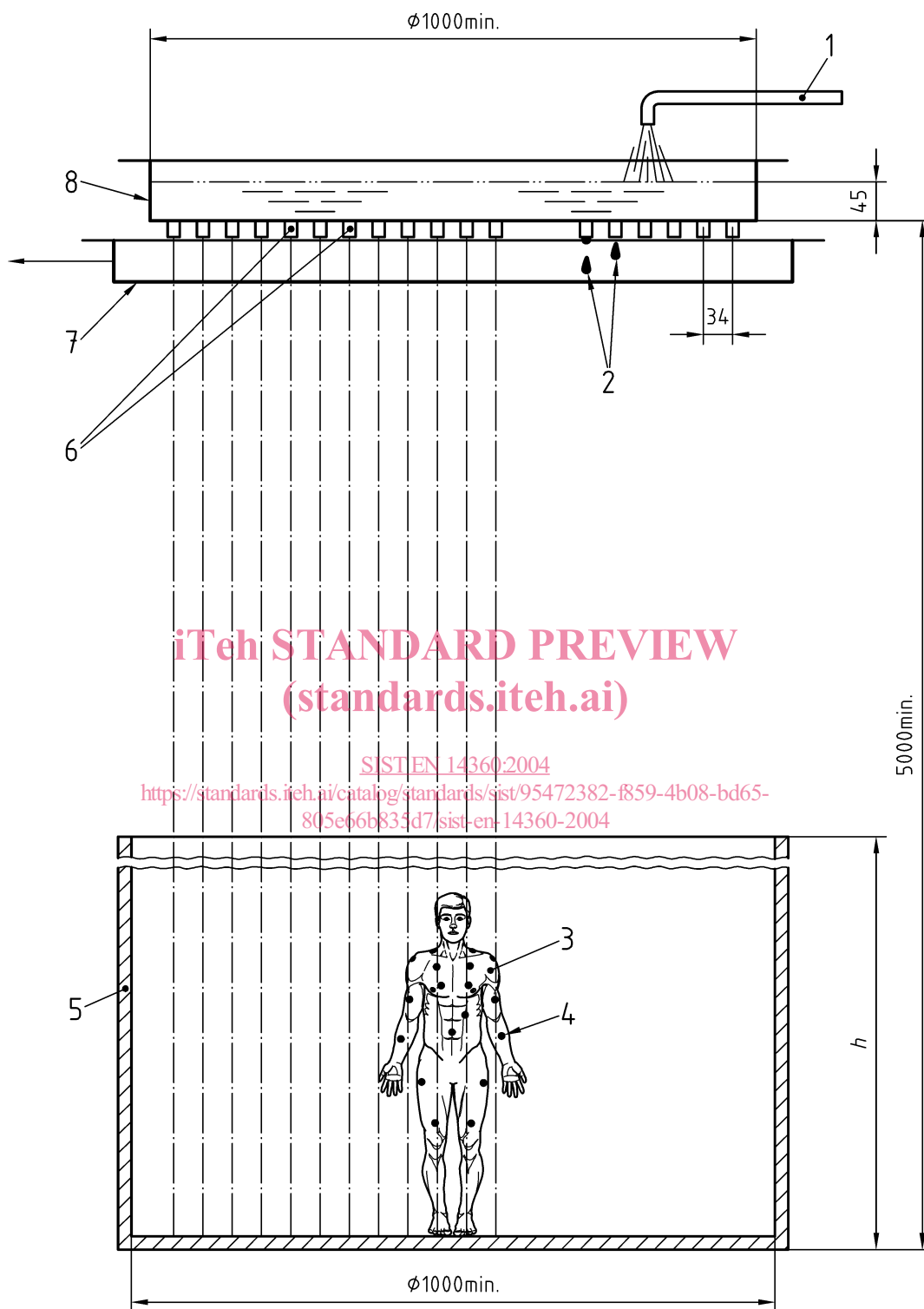
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4 Principle

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A manikin with the shape and size of an adult person wearing long underwear made of absorbent fabric is dressed in the garments to be tested and exposed to artificial rain for a specific period. After the exposure the underwear and the inner side of the garment are visually inspected for wet areas. In addition, sensors on the manikin may be used in order to detect the timing of water ingress at individual sites.

Dimensions in millimetres



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Key

- | | | | |
|---|--------------------|---|-----------------|
| 1 | Water filling pipe | 5 | Protection wall |
| 2 | Droplets | 6 | Nozzles |
| 3 | Manikin | 7 | Movable tub |
| 4 | Sensors | 8 | Rain water tub |

Figure 1 — Example of a rain tower device

5 Test device

5.1 Rain tower, (as shown in Figure 1) comprising a circular tub at least 1 000 mm in diameter supported at least 5 000 mm above the floor, and supplied with water from an inflow pipe. The base of the tub shall be fitted with approximately 682 nozzles with a hole diameter of 0,6 mm placed at 34 mm centres to deliver water droplets over a circular area with a diameter of 932 mm at a density of approximately 1 000 droplets /m². The tub shall have an overflow pipe placed so as to maintain a water depth of (45 ± 5) mm in the tub.

NOTE 1 The diameter of the water droplets correspond to those described in EN 29865 (app. 5 mm). The amount of water is (450 ± 50) l/(m²h) (see Figure 1).

NOTE 2 To prevent water from the atmosphere condensing inside the garment the water temperature should be the same as the air temperature in the room in which the test is conducted within ± 5 °C.

NOTE 3 To prevent a blockage of the nozzles, water with low calcium content should be used.

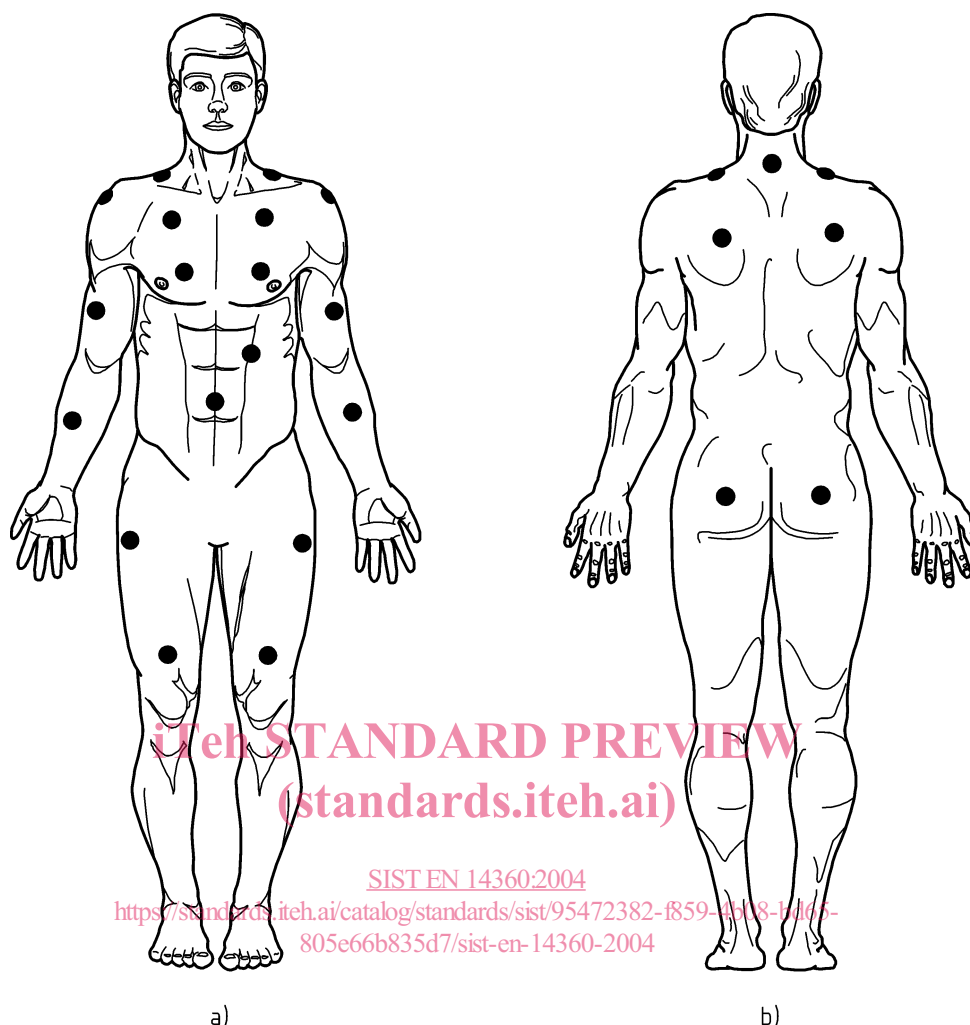
5.2 Thermometers, one in the room in which the test is to be carried out to measure the air temperature and one immersed in the tub to measure the temperature of the water.

5.3 Manikin, with the shape of an adult person, (1 820 ± 40) mm tall and with a chest girth of (1 000 ± 60) mm, comprising a head, torso, abdomen, buttocks, arms, hands, straight legs and feet. The arms shall be moveable to make putting on the garment easier.

NOTE It is possible to use alternative manikin sizes (children or female) with the appropriate garment size.

5.4 Underwear to fit manikin, comprising a undershirt with long sleeves and underpants with long legs. For testing of jackets with a hood, the undershirt shall have a hood. The underwear shall be made of water absorbent fabric (e.g. washed cotton). When the underwear is tested in accordance with Annex B, the mean time for the drops to be wicked into the fabric shall be not greater than 2 s.

5.5 Optionally humidity sensors, connected to a recording system. The humidity sensors shall be placed either on the manikin at convex places or on the underwear. Figure 2 shows a possible position of the sensors. The most critical locations are: shoulders, chest, wrist, back, abdomen (zipper) and shoulder blade.



Key

- a Front view
- b Rear view

Figure 2 — Positions of humidity sensors on the manikin

6 Dressing and positioning the manikin

If only a single piece is to be tested, the manikin has to be fully dressed:

- a) Jacket testing in combination with any appropriate water tight trousers.
- b) Trousers testing in combination with any appropriate water tight jacket.

The manikin shall be dressed with the underwear (5.4) and the garments of a size adequate to the manikin. Any zippers, fastening elements and pockets shall be closed. The draw-cord at the hem of the jacket, if fitted, shall be pulled tight. If the jacket has a hood this shall be put on the manikin's head in the normal wearing position, with any draw-cord pulled tight. If the jacket does not have a hood, the head of the manikin shall be covered with a plastic bag in order to prevent water wicking through the collar inside the jacket. The plastic bag shall not cover the seams in the neckline. If during testing it is found that there is water ingress around the face or through the hood, additional tests shall be carried out with the head and hood covered by plastic bag. If the lower ends of the trouser legs are adjustable they shall be adjusted to the tightest position. The hem area of sleeves and body of the