SLOVENSKI STANDARD
SIST EN 343:2003+A1:2007

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Varovalna obleka - Zaġļ ita pred deġjem

Protective clothing - Protection against rain

Schutzkleidung - Schutz gegen Regen

Vetements de protection - Protection contre la pluie

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ICS:

13.340.10 Varovalna obleka Protective clothing

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Protective clothing - Protection against rain

Vêtements de protection - Protection contre la pluie

Schutzkleidung - Schutz gegen Regen

This European Standard was approved by CEN on 2 July 2003 and includes Amendment 1 approved by CEN on 25 July 2007.

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Content

Foreword

This document (EN 343:2003+A1:2007) 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of an identical text or by endorsement, at the latest by February 2008 and conflicting national standards shall be withdrawn at the latest by February 2008.

This document includes Amendment 1, approved by CEN on 2007-07-25.

This document supersedes ⟨A1⟩ EN 343:2003 ⟨A1⟩.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ⟨A1⟩ ⟨A1⟩.

This document 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(s).

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

Introduction

In this European Standard the measured properties of materials and seams of protective clothing and their subsequent classification are intended to ensure an adequate protection level. Water proofness and water vapour resistance are the essential properties to be tested and marked on the label.

Water proofness is the most important property and it is measured on material of the outer garment layer. Tests are made on new and pretreated fabric samples and on parts with seams.

Some waterproof materials are impermeable to water vapour transmission. However other materials on the market combine water proofness with water vapour permeability. This property expressed by low water vapour resistance enhances sweat evaporation and significantly contribute to body cooling. This is valuable, because it contributes to better comfort and less physiological strain and prolongs the wearing time in certain climatic conditions (see annex A).

1 Scope

This European Standard specifies requirements and test methods applicable to materials and seams of protective clothing against the influence of precipitation (e. g. rain, snowflakes), fog and ground humidity.

The testing of rain proofness of ready made garments is excluded in this standard at this time because a separate test method for such a property is currently being prepared.

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 (including amendments).

EN 340, *Protective clothing — General requirements*

EN 388, *Protective gloves against mechanical risks*

EN 530:1994, *Abrasion resistance of protective clothing material — Test methods*

EN 20811, *Textiles — Determination of resistance to water penetration — Hydrostatic pressure test*

EN 31092, *Textiles — Determination of physiological properties — Measurement of thermal and water-vapour resistance under steady-state conditions (sweating guarded - hotplate test) (ISO 11092:1993)*

EN ISO 1421, *Rubber- or plastics-coated fabrics — Determination of tensile strength and elongation at break (ISO 1421:1998)*

EN ISO 7854:1997, *Rubber- or plastics-coated fabrics — Determination of resistance to damage by flexing (ISO 7854:1995)*

[A1⟩ EN ISO 12947-1, *Textiles — Determination of the abrasion resistance of fabrics by the Martindale method — Part 1: Martindale abrasion testing apparatus*

EN ISO 12947-2, *Textiles — Determination of the abrasion resistance of fabrics by the Martindale method — Part 2: Determination of specimen breakdown* ⟨A1]

EN ISO 13934-1, *Textiles — Tensile properties of fabrics — Part 1: Determination of maximum force and elongation at maximum force using the strip method (ISO 13934-1:1999)*

EN ISO 13935-2, *Textiles — Tensile properties of fabrics — Part 2: Determination of maximum force using the grab method* [A1⟩ *(ISO 13935-2:1999)* ⟨A1]

ISO 1817, *Rubber, vulcanized — Determination of the effect of liquids*

[A1⟩ ISO 4674, *Rubber- or plastics-coated fabrics — Determination of tear resistance* ⟨A1]

3 Terms and definitions

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

3.1

water vapour resistance R_{et} [$\frac{m^2 \cdot Pa}{W}$]

water vapour pressure difference between the two faces of a material divided by the resultant evaporative heat flux per unit area in the direction of the gradient. The evaporative heat flux may consist of both diffusive and convective components

Water vapour resistance R_{et}, expressed in square metres pascal per watt, is a quantity specific to textile materials or composites which determines the "latent" evaporative heat flux across a given area in response to a steady applied water vapour pressure gradient.

3.2
water penetration resistance *W*p **[Pa]**
hydrostatic pressure supported by a material is a measure of the opposition to the passage of water through the material

3.3
outer shell material
outermost material of which the protective clothing is made

3.4
liner
insert with a watertight property

3.5
thermal liner
layer with a watertight property providing additional thermal insulation

3.6
lining
innermost material without watertight property.

4 Performance requirements

4.1 General

The ergonomic requirements of EN 340 shall be applied. The components of the garment (see also annex C) are tested in accordance with the following requirements. The application of the single tests to each component is shown in Table 1.

Table 1 — Application of performance tests on the components

Property	Reference clause	Outer shell material	Liner or thermal liner	Lining
Resistance to water penetration (before and/or after pretreat-ment)	4.1	X (in combination if applicable	X	
Water vapour resistance	4.2	X	X	X
		(in combination if applicable)		
Tensile strength	4.3	X		
Tear resistance	4.4	X		
Dimensional change	4.5	X	X	X
		(in combination if applicable)		
Seam strength	4.6	X		

4.2 Resistance to water penetration

When tested in accordance with 5.1, resistance to water penetration of the outer shell material together with any applied watertight layer shall be in accordance with Table 2.

If a specimen gets different classes of classification in the different tests for marking in accordance with clause 6, the lowest class shall be indicated.

Table 2 — Classification of resistance to water penetration

Water penetration resistance *W*p	Class		
	1	2	3
Specimen to be tested – material before pretreatment – material after each pretreatment (see 5.1.3.2 to 5.1.3.5)	*W*p ≥ 8 000 Pa no test required	no test required [a] *W*p ≥ 8 000 Pa	no test required [a] *W*p ≥ 13 000 Pa
– seams before pretreatment	*W*p ≥ 8 000 Pa	*W*p ≥ 8 000 Pa	*W*p ≥ 13 000 Pa

[a] no test required because the worst case situation for class 2 and class 3 is after pretreatment

NOTE: For each class several requirements shall be met.

4.3 Water vapour resistance

When tested in accordance with 5.2, water vapour resistance of all layers of the garment shall be in accordance with Table 3.

Table 3 — Classification of water vapour resistance

Water vapour resistance R_{et}	Class		
	1 [a]	2	3
$\frac{m^2 \cdot Pa}{W}$	R_{et} above 40	20 < R_{et} ≤ 40	R_{et} ≤ 20

[a] WARNING: class 1 has a restricted wearing time, see annex A.

4.4 Tensile strength of the outer shell material

When tested in accordance with 5.3, the outer shell material shall withstand a minimum tensile force of 450 N in both orthogonal directions of the material. For materials with an elongation of more than 50 % this requirement is not applicable.

4.5 Tear resistance of the outer shell material

When tested in accordance with 5.4 the outer shell material shall withstand a minimum tearing force of 25 N in both orthogonal directions of the material.

4.6 Dimensional change of the protective clothing

When tested in accordance with 5.5 and as specified in Table 1, the dimensional change of relevant materials in both orthogonal directions shall not exceed ± 3 % after five washing or dry cleaning cycles.

4.7 Seam strength of the outer shell material

When tested in accordance with 5.6, the seam strength of the outer shell material shall be at least 225 N. For materials with an elongation of more than 50 % this requirement is not applicable.

5 Testing requirements

5.1 Testing of resistance to water penetration

5.1.1 General

Testing of resistance to water penetration, in accordance with EN 20811, with an increase of hydrostatic pressure of (980 ± 50) Pa/min.

5.1.2 Number and size of specimens

Number of specimens:

— 5 specimens for the testing of material before pretreatment;

— 5 specimens for the testing of the seams before pretreatment;

— 5 specimens for the testing of material after pretreatment by dry-cleaning and/or washing;

— 4 specimens for the testing after pretreatment by abrasion;

— 4 specimens for the testing after pretreatment by repeated flexing, i.e. 2 specimens in production direction and 2 specimens across the production direction;

— 4 specimens for the testing after pretreatment by fuel and oil, i.e. 2 specimens for testing with fuel and 2 specimens for testing with oil.

Specimens are to be cut off from the layers as specified in Table 1 (see also annex C) and shall have a size of at least 130 mm diameter.

5.1.3 Pretreatments of outer shell material and liner or thermal liner in combination

5.1.3.1 General

Separate samples will be used for each of the following pretreatments prior to testing the resistance to water penetration: