SLOVENSKI STANDARD
SIST EN 343:2019

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Varovalna obleka - Zaščita pred dežjem

Protective clothing - Protection against rain

Schutzkleidung - Schutz gegen Regen

Habillement de protection - Protection contre la pluie

Ta slovenski standard je istoveten z: **EN 343:2019**

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13.340.10	Varovalna obleka	Protective clothing

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Protective clothing - Protection against rain

Habillement de protection - Protection contre la pluie

Schutzkleidung - Schutz gegen Regen

This European Standard was approved by CEN on 5 November 2018.

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

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European foreword

This document (EN 343:2019) 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of an identical text or by endorsement, at the latest by September 2019, and conflicting national standards shall be withdrawn at the latest by September 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 343+A1:2007.

This document has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of Regulation (EU) 2016/245.

For relationship with Regulation (EU) 2016/245, see informative Annex ZA, which is an integral part of this document.

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Introduction

In this document 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 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 pretreated fabric samples and on parts with seams.

A test method for an optional readymade garment test after cleaning is described (rain tower test). 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 document specifies requirements and test methods for the performance of materials and ready-made garments for protection against the effects of precipitation (e.g. rain, snowflakes), fog and ground humidity. Garments for protection against other effects than precipitation (e.g. water splashes, waves) are excluded from this standard. The protective effects and requirements of footwear, gloves and separate headwear are excluded from the scope of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 388:2016, *Protective gloves against mechanical risks*

EN 530:2010, *Abrasion resistance of protective clothing material - Test methods*

EN 14360:2004, *Protective clothing against rain - Test method for ready made garments - Impact from above with high energy droplets*

EN 20811:1992, *Textiles — Determination of resistance to water penetration — Hydrostatic pressure test*

EN ISO 1421:2016, *Rubber- or plastics-coated fabrics - Determination of tensile strength and elongation at break (ISO 1421:2016)*

EN ISO 4674-1:2016, *Rubber- or plastics-coated fabrics - Determination of tear resistance - Part 1: Constant rate of tear methods (ISO 4674-1:2016)*

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

EN ISO 11092:2014, *Textiles - Physiological effects - Measurement of thermal and water-vapour resistance under steady-state conditions (sweating guarded-hotplate test) (ISO 11092:2014)*

EN ISO 12947-1:1998, *Textiles - Determination of the abrasion resistance of fabrics by the Martindale method - Part 1: Martindale abrasion testing apparatus (ISO 12947-1:1998)*

EN ISO 12947-2:2016, *Textiles - Determination of the abrasion resistance of fabrics by the Martindale method - Part 2: Determination of specimen breakdown (ISO 12947-2:2016)*

EN ISO 13688:2013, *Protective clothing - General requirements (ISO 13688:2013)*

EN ISO 13934-1:2013, *Textiles - Tensile properties of fabrics - Part 1: Determination of maximum force and elongation at maximum force using the strip method (ISO 13934-1:2013)*

EN ISO 13935-2:2014, *Textiles - Seam tensile properties of fabrics and made-up textile articles - Part 2: Determination of maximum force to seam rupture using the grab method (ISO 13935-2:2014)*

EN ISO 13938-1:1999, *Textiles - Bursting properties of fabrics - Part 1: Hydraulic method for determination of bursting strength and bursting distension (ISO 13938-1:1999)*

EN ISO 13938-2:1999, *Textiles - Bursting properties of fabrics - Part 2: Pneumatic method for determination of bursting strength and bursting distension (ISO 13938-2:1999)*

ISO 1817:2015, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

ISO 7000:2014, *Graphical symbols for use on equipment — Registered symbols*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
water vapour resistance
R_{et}
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

Note 1 to entry: It 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. The evaporative heat flux can consist of both diffusive and convective components.

Note 2 to entry: The water-vapour resistance is expressed in square metres pascal per watt.

[SOURCE: EN ISO 11092:2014, 2.2]

3.2
resistance to water penetration
WP
hydrostatic pressure supported by a material as a measure of the opposition to the passage of water through material

Note 1 to entry: WP is expressed in pascal.

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

3.4
liner
insert with a waterproof property

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

3.6
lining
innermost material without waterproof property

4 Performance assessment and requirements

4.1 General requirements and innocuousness

4.1.1 General requirements

When tested in accordance with 6.2.1 the requirements according to EN ISO 13688 and the following requirements shall be met:

— the garment shall not have rough, sharp or hard surfaces that irritate or injure the user;

— all pockets shall be constructed to avoid water inside the garment;

— closures, such as slide fasteners, fasteners, buttons etc. shall not open inadvertently.

NOTE 1 Hoods are not a mandatory part of rain protection garments.

NOTE 2 Protective garments against rain typically consist of the outermost shell of a garment ensemble containing additional layers underneath. It has been demonstrated that the garment layers underneath can support the overall breathability and comfort if they provide a moisture management capability.

For material testing 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 pretreatment)	4.2	X	X	
Water vapour resistance	4.3	X	X	X
Tensile strength	4.4	X		
Tear resistance	4.5	X (wovens)		
Bursting strength	4.6	X (knits)		
Dimensional change	4.7	X	X	X
Seam strength	4.8	X		

4.1.2 Innocuousness

When tested in accordance with 6.2.2 the requirements of EN ISO 13688:2013, 4.2, shall be met with regard to innocuousness.

4.2 Resistance to water penetration, WP

When tested in accordance with 6.3, resistance to water penetration WP of the outer shell material together with any applied waterproof layer shall be in accordance with Table 2.

For each class all requirements given in Table 2 shall be met.

If a specimen gets different classes of classification in the different tests for marking in accordance with Clause 8, the lowest value of water penetration shall be used to classify the garment.

Table 2 — Classification of resistance to water penetration

Water penetration resistance WP	Class			
	1	2	3	4
Specimen to be tested — material before pre-treatment; — material after each pre-treatment (see 5.2 to 5.5)	WP ≥ 8 000 Pa —	— WP ≥ 8 000 Pa	— WP ≥ 13 000 Pa	— WP ≥ 20 000 Pa
— seams before pre-treatment	WP ≥ 8 000 Pa	WP ≥ 8 000 Pa	WP ≥ 13 000 Pa	—
— seams after pretreatment by cleaning (see 5.2)	—	—	—	WP ≥ 20 000 Pa
NOTE 1 000 Pa approximately 102 [mmH_2O]				

4.3 Water vapour resistance, R_{et}

When tested in accordance with 6.4, water vapour resistance R_{et} of all layers of the garment in combination shall be in accordance with Table 3.

Table 3 — Classification of water vapour resistance

Water vapour resistance R_{et}	Class			
	1	2	3	4
$\frac{m^2 \cdot Pa}{W}$	$R_{et} > 40$	$25 < R_{et} \leq 40$	$15 < R_{et} \leq 25$	$R_{et} \leq 15$
WARNING — All classes can result in a restricted wearing time, see Annex A.				

4.4 Tensile strength of the woven outer shell material

When tested in accordance with 6.5, 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 woven outer shell material

When tested in accordance with 6.6 the outer shell material shall withstand a minimum tearing force of 20 N in both orthogonal directions of the material.

4.6 Bursting strength of the knitted outer shell material

When tested in accordance with 6.7 the knitted outer shell material shall withstand a minimum bursting strength of 100 kPa for the 50 cm^2 test area or 200 kPa for the 7,3 cm^2 test area.

4.7 Dimensional change of the protective clothing

When tested in accordance with 6.8 and as specified in Table 1, the dimensional change in both orthogonal directions shall not exceed + 3 % for woven materials and shall not exceed + 5 % for knitted materials after five washing or dry cleaning cycles according to 5.2.

4.8 Seam strength of the outer shell material

When tested in accordance with 6.9, the seam strength of the outer shell material shall be at least 200 N. For materials with an elongation of more than 50 % this requirement is not applicable.

4.9 Waterproofness of a readymade garment (optional)

When tested according to 6.10 the following requirements for the garments shall be met:

Table 4 — Requirements for readymade garment test in rain tower

Wicking length[a] on sleeves and lower hems	max. 5 cm
Wicking length[a] on trouser hems	max. 10 cm
Wicking length[a] on hood hems	max. 4 cm
Wet tricot area[a] on manikin	0 cm^2
[a] Measurement of wicking length starts at the last stitching.	

5 Pretreatment

5.1 General

The specimens used for testing resistance to water penetration shall be pretreated according to 5.2 to 5.5 except for materials intended for class 1.

5.2 Pretreatment by cleaning

Cleaning shall be in line with the manufacturer's instructions on the basis of standardized processes.

If the number of cleaning cycles is not specified, the tests shall be carried out – in case of laundering after 5 laundering cycles (one laundering cycle consisting of one washing and one drying), or – in case of dry cleaning after 5 cycles of dry cleaning. This shall be reflected in the information supplied by the manufacturer.

If the manufacturer's instructions indicate that both cleaning methods are allowed, the test specimen shall undergo the laundering procedure only.

NOTE Manufacturer's instructions typically indicate one or several of the various methods and processes of EN ISO 6330, EN ISO 15797, ISO 3715 and a qualification label according to EN ISO 30023 or equivalent as standardized processes for cleaning.

5.3 Pretreatment by abrasion

4 specimens shall be submitted to pretreatment by abrasion. The pretreatment shall be carried out on the outer face of the outer shell material but with all materials of the clothing assembly combined with any applied waterproof layer.