



SLOVENSKI STANDARD
SIST ENV 343:1999

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Protective clothing - Protection against foul weather

Schutzkleidung - Schutz gegen schlechtes Wetter

Vêtements de protection - Protection contre les intempéries

Ta slovenski standard je istoveten z: **ENV 343:1998**

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ICS:

13.340.10 Varovalna obleka Protective clothing

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EUROPEAN PRESTANDARD
PRÉNORME EUROPÉENNE
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ENV 343

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Descriptors: personal protective equipment, protective clothing, weather resistance, winds, specifications, thermal insulation, water vapor tests, water tightness, marking

English version

Protective clothing - Protection against foul weather

Vêtements de protection - Protection contre les intempéries

Schutzkleidung - Schutz gegen schlechtes Wetter

This European Prestandard (ENV) was approved by CEN on 22 January 1998 as a prospective standard for provisional application.

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

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Foreword

This European Prestandard 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 Prestandard 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 standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this European Prestandard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

This European prestandard as a prospective standard for provisional application is published to achieve at least a common basis in Europe for requirements and test methods for protective clothing against foul weather in the interest of especially manufacturers, test institutes and end-users. The measured properties 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. Test is made on new and pretreated fabric samples and on parts with seams.

Traditional waterproof materials are often impermeable to water vapour transmission. Several new materials on the market combine water proofness with measurable levels of water vapour transmission. Such a property (low water vapour resistance) would enhance sweat evaporation and significantly contribute to body cooling. This is particularly valuable in warm and hot conditions, resulting in better comfort and less physiological strain. Sufficient technical data is missing for certain parts of this prestandard and should be gathered in the near future e. g. by research. This is e. g. needed for assessing the watertight behaviour of a garment, the influence of moisture on the inside and/or outside of materials, on the water vapour permeability, design features like openings for ventilations, etc.

1 Scope

This European prestandard specifies requirements and test methods applicable to materials and seams of protective clothing against the influence of foul weather as defined in 3.1.

The protective clothing may be proposed and/or used in combination with a thermal lining, but the aforementioned requirements and test methods only apply when the thermal lining is separable from the outer garment of the proposed protective clothing.

2 Normative references

This European prestandard 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 Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 340 : 1993	Protective clothing – General requirements
EN 530	Abrasion resistance of protective clothing material – Test methods
prEN ISO 13934-1	Textiles – Tensile properties of fabrics – Part 1: Determination of maximum force and elongation at maximum force – Strip method (ISO/DIS 13934-1:1994)
prEN ISO 13935-2	Textiles – Seam tensile properties of fabrics and made-up textile articles – Part 2: Determination of seam maximum force – Grab method (ISO/DIS 13935-2:1994)
EN 20811	Determination of resistance of textile fabrics to water penetration – Hydrostatic pressure test (ISO 811 : 1981)
EN 31092	Textiles – Physiological effects – Measurement of thermal and water-vapour resistance under steady-state conditions (sweating guarded-hotplate test) (ISO 11092 : 1993)
ISO 1421	Fabrics coated with rubber or plastics – Determination of breaking strength and elongation at break
ISO 1817	Rubber, vulcanized – Determination of the effect of liquids
ISO 4674	Fabrics coated with rubber or plastics – Determination of tear resistance
ISO 5085-1	Textiles – Determination of thermal resistance – Part 1: Low thermal resistance
ISO 8096-3:1988	Rubber- or plastics-coated fabrics for water-resistant clothing; Specification – Part 3: Natural rubber- and synthetic rubber-coated fabrics

3 Definitions

For the purposes of this prestandard, the following definitions apply:

3.1 foul weather: Possible combination of precipitation, rain and fog, ground humidity and wind at temperatures of -5°C and above.

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

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.

3.3 thermal resistance (insulation) $R_{ct} \left[\frac{\text{m}^2 \cdot \text{K}}{\text{W}} \right]$

Temperature difference between the two faces of a material divided by the resultant heat flux per unit area in the direction of the gradient. The dry heat flux may consist of one or more conductive, convective and radiant components. Thermal resistance R_{ct} , expressed in square metres kelvin per watt, is a quantity specific to textile materials or composites which determines the dry heat flux across a given area in response to a steady applied temperature gradient.

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3.4 water penetration resistance (wp) [Pa]: The hydrostatic pressure supported by a material is a measure of the opposition to the passage of water through the material.

3.5 outer shell material: The outermost material of which the protective clothing is made.

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3.6 liner: An insert with a watertight property.

3.7 thermal liner: A layer with a watertight property providing additional thermal insulation

3.8 thermal lining: A non-watertight layer providing thermal insulation.

3.9 lining: An innermost material without watertight property and thermal insulation.

4 Performance requirements

The components of the garment (see also Annex D) 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	Thermal lining
Resistance to water penetration (before and/or after pretreatment)	4.1	X	X		
		(in combination)			
Water vapour resistance	4.2	X	X	X	X
		(or in combination)			
Thermal resistance	4.3				X
Tensile strength	4.4	X			
Tear resistance	4.5	X			
Dimensional change	4.6	X	X	X	X
		(or in combination)			
Seam strength	4.7	X			

4.1 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 wp	class		
	1	2	3
Specimen to be tested			
– before pretreatment	wp ≥ 8 000 Pa	no test required*)	no test required*)
– before pretreatment, seams	wp ≥ 8 000 Pa	wp ≥ 8 000 Pa	wp ≥ 13 000 Pa
– after each pretreatment (see 5.1.2.1 to 5.1.2.4)	no test required	wp ≥ 8 000 Pa	wp ≥ 13 000 Pa
*) 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.			

4.2 Water vapour resistance

Testing of water vapour resistance, see 5.2.

4.2.1 Water vapour resistance of the garment

Water vapour resistance of all layers of the garment together with the exception of the separable thermal lining (optional component) shall be in accordance with table 3.

Table 3: Classification of water vapour resistance

Water vapour resistance	class		
	1	2	3
$R_{et} \left[\frac{m^2 \cdot Pa}{W} \right]$	$R_{et} > 150$	$20 < R_{et} \leq 150$	$R_{et} \leq 20$

4.2.2 Water vapour resistance of the separable thermal lining

If the garment contains a separable thermal lining, the water vapour resistance of the thermal lining (optional component) shall be in accordance with table 4.

Table 4: Classification of water vapour resistance of the separable thermal lining

Water vapour resistance	class	
	1	2
$R_{et} \left[\frac{m^2 \cdot Pa}{W} \right]$	$R_{et} > 40$	$R_{et} \leq 40$