



SLOVENSKI STANDARD
SIST EN 14058:2004
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Protective clothing - Garments for protection against cool environments

Schutzkleidung - Kleidungsstücke zum Schutz gegen kühle Umgebungen

Vêtements de protection - Articles d'habillement de protection contre les climats frais

Ta slovenski standard je istoveten z: EN 14058:2004

[SIST EN 14058:2004](https://standards.iteh.ai/catalog/standards/sist/79ad13e5-197e-4b2c-a329-1595c53e4fa8/sist-en-14058-2004)

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ICS:

13.340.10 Varovalna obleka Protective clothing

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English version

Protective clothing - Garments for protection against cool environments

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This European Standard was approved by CEN on 2 January 2004.

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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.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document EN 14058:2004 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of an identical text or by endorsement, at the latest by December 2004, and conflicting national standards shall be withdrawn at the latest by December 2004.

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 89/686/EEC.

For relationship with EU Directives, see informative Annex ZA, which is an integral part of this document.

Annex A and annex C are normative. Annex B and annex D are informative.

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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Introduction

In many cases single garments are placed on the market to protect against local body cooling (for ensembles see EN 342). These garments can be e. g. waistcoats, jackets, coats or trousers and/or separable thermal linings (see Annex D). They can provide a certain degree of protection to cool environment for a certain length of time, depending e. g. on the personal constitution and activity, the accompanying clothing and the environmental features (wind speed, temperature, humidity). The more dangerous the situation (e. g. low effective temperature, long exposure duration, no help nearby) the more important it is to assess the cold protection properties of the garment (see annex B) especially if the user cannot safely identify the risk at low temperature in an appropriate time.

At moderate low temperatures garments against local body cooling are not only used for outdoor activities e. g. in construction industry but can be used for indoor activities e. g. in food processing industry. In these cases garments often do not need to be made of watertight or air impermeable materials. Therefore, in this European Standard, these requirements are optional.

Requirements for thermal insulation of the whole human body in a specific environment can be assessed on the basis of ISO/TR 11079. By this method the resultant effective thermal insulation value I_{cler} can be determined and used to define temperature ranges (see Tables B.1 and B.2). Therefore the protective value of a clothing ensemble is evaluated by comparing its measured insulation value and the calculated required insulation value (IREQ). This comparison is the basis of Tables B.1 and B.2.

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1 Scope

This European Standard specifies requirements and test methods for the performance of single garments for protection against cooling of the body in cool environment.

It does not include specific requirements for headwear or footwear or gloves to prevent local cooling.

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 20811, *Textiles – Determination of resistance to water penetration – Hydrostatic pressure test*.

EN 23758, *Textiles – Care labelling code using symbols (ISO 3758:1991)*.

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

EN ISO 15831:2004, *Clothing – Physiological effects – Measurement of thermal insulation by means of a thermal manikin (ISO/DIS 15831:2004)*.

EN ISO 9237, *Textiles – Determination of permeability of fabrics to air*.

ISO 5085-1, *Textiles – Determination of thermal resistance – Part 1: Low thermal resistance*.

ISO 7000, *Graphical symbols for use on equipment - Index and synopsis*.

3 Terms and definitions

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

3.1

cool environment

environment characterized in general as a possible combination of humidity and wind at temperatures of $-5\text{ }^{\circ}\text{C}$ and above

3.2

garment

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

3.3

ensemble

clothing consisting of a two-piece suit or one-piece suit (coverall) or a number of garments covering the body, except head, hands and feet

3.4

thermal lining

non-watertight layer providing thermal insulation

3.5

properties of clothing materials or material combinations

3.5.1

thermal resistance (insulation) R_{ct}

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. <https://standards.iteh.ai/catalog/standards/sist/79ad13e5-197e-4b2c-a329-1595c53e4fa8/sist-en-14058-2004>

3.5.2

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. 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.

3.5.3

resistance to water penetration WP

hydrostatic pressure supported by a material is a measure of the opposition to the passage of water through the material

The value is given in Pa.

3.6

thermal insulation of the protective clothing

Depending on the end use of the garment different thermal insulation values apply.

3.6.1

effective thermal insulation $I_{c/e}$

thermal insulation from skin to outer clothing surface under defined conditions measured with a stationary manikin

The effective thermal insulation value, $I_{c/e}$, is determined in relation to the naked body surface area.

The value is given in $\text{m}^2\text{K/W}$.

3.6.2

resultant effective thermal insulation I_{cler}

thermal insulation from skin to outer clothing surface under defined conditions measured with a moving manikin

The resultant effective thermal insulation value, I_{cler} , is determined in relation to the naked body surface area.

The value is given in m^2K/W .

3.6.3

insulation required IREQ

required resultant thermal insulation calculated on the basis of the thermal parameters of the environment (e. g. air temperature, mean radiant temperature, air velocity, relative humidity) and the body metabolism

NOTE see ISO/TR 11070.

4 Performance requirements

4.1 General

The ergonomic requirements of EN 340 shall be applied.

4.2 Thermal resistance, R_{ct}

When tested in accordance with 5.1, the thermal resistance R_{ct} of all layers of the garment shall be in accordance with Table 1.

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Table 1 — Classification of thermal resistance R_{ct}

R_{ct} m^2K/W	Class
$0,06 \leq R_{ct} < 0,12$	1
$0,12 \leq R_{ct} < 0,18$	2
$0,18 \leq R_{ct} < 0,25$	3

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NOTE Garments containing materials with a thermal resistance above 0,25 m^2K/W are normally intended for use in cold environments and therefore do not fall into the scope of this European Standard.

4.3 Air permeability, AP (optional)

When tested in accordance with 5.3, the air permeability AP shall be in accordance with Table 2, if required.

Table 2 — Classification of air permeability AP

AP mm/s	Class
$100 < AP$	1
$5 < AP \leq 100$	2
$AP \leq 5$	3

4.4 Resistance to water penetration, WP (optional)

When tested in accordance with 5.4, resistance to water penetration of any applied water barrier and of seams shall be in accordance with Table 3, if required.

Table 3 — Classification of resistance to water penetration WP

WP Pa	Class
$8\ 000 \leq WP \leq 13\ 000$	1
$WP > 13\ 000$	2

4.5 Water vapour resistance, R_{et}

If water penetration resistance is required as in 4.4 then water vapour resistance R_{et} shall be measured in accordance with 5.2. In this case the water vapour resistance R_{et} of all layers of the garment shall be less than $55\text{ m}^2\text{ Pa/W}$.

4.6 Thermal insulation, I_{cle} and I_{cler} (optional)

The resultant effective thermal insulation I_{cler} shall have a minimum value of $0,170\text{ m}^2\text{K/W}$ or the effective thermal insulation I_{cle} shall have a minimum value of $0,190\text{ m}^2\text{K/W}$ when measured in accordance with 5.5.

Thermal insulation of a garment is assessed on the basis of measured insulation values for a complete ensemble of which a garment is only one part. Performance of a garment in terms of preserving heat balance at normal body temperature also depends on internal body heat production. Therefore the protective value of a garment is evaluated by comparing its measured insulation value and the calculated required insulation value (IREQ). This comparison is the basis of Tables B.1 and B.2.

5 Testing

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5.1 Thermal resistance, R_{ct}

Testing shall be in accordance with EN 31092 or in accordance with ISO 5085-1 if applicable to the specimen thickness.

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5.2 Water vapour resistance, R_{et}

Testing shall be in accordance with EN 31092.

5.3 Air permeability, AP

Air permeability shall be measured in accordance with EN ISO 9237.

In case that the composite material cannot be tested in one piece because of technical reasons, it is necessary to separate the individual components and measure the component with the lowest value.

Measurement shall be carried out at a pressure differential of 100 Pa and a test area of 20 cm^2 .

5.4 Resistance to water penetration, WP

Testing of resistance to water penetration of the material and seams, in accordance with EN 20811, but with an increase of water pressure of $(980 \pm 50)\text{ Pa/min}$ and the following deviations:

Number of specimens:

- 5 specimens for the testing of the seams;
- 5 specimens for the testing of material.

Size of specimens: at least 130 mm diameter.