EESTI STANDARD EVS-EN 31092:2000

Tekstiil. Rõivafüsioloogiliste omaduste määramine. Soojustakistuse ja auruläbilaskvustakistuse määramine muutumatutes tingimustes (sweating guarded-hotplate test)

Textiles - Determination of physiological properties - Measurement of thermal and water-vapour resistance under steady-state conditions (sweating guarded - hotplate test)

EESTI STANDARDIKESKUS

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 31092:2000 sisaldab Euroopa standardi EN 31092:1993 ingliskeelset teksti.	This Estonian standard EVS-EN 31092:2000 consists of the English text of the European standard EN 31092:1993.
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EUROPEAN STANDARD
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Descriptors: Textiles, woven fabrics, physiological properties, thermal comfort, measurements, thermal resistance, water vapour tests.

English version

Textiles

Physiological effects

Measurement of thermal and water-vapour resistance under steady-state conditions (sweating guarded-hotplate test) (ISO 11 092:1993)

Textiles; effets physiologiques; mesurage de la résistance thermique et de la résistance à la vapeur d'eau en régime stationnaire (essai de la plaque chaude gardée transpirante) (ISO 11 092:1993)

Textilien; physiologische Wirkungen; Messung des Wärme- und Wasserdampfdurchgangswiderstandes unter stationären Bedingungen (sweating guarded-hotplate test) (ISO 11 092:1993)

This European Standard was approved by CEN on 1993-12-16 and is identical to the ISO Standard as referred to.

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CEN

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Foreword

This European Standard is the endorsement of ISO 11 092. Endorsement of International Standard

ISO 11 092 : 1993 Textiles; physiological effects; measurement of thermal and water-vapour resistance under steady-state conditions (sweating guarded-hotplate test)

was recommended by CEN/TC 248 'Textiles and textile products', under whose competence this European Standard will henceforth fall.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by June 1994 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard:

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Endorsement notice

The text of the International Standard ISO 11 092 : 1993 was approved by CEN as a European Standard without any modification.

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Introduction

ISO 11092 is the first of a number of standard test methods in the field of clothing comfort.

The physical properties of textile materials which contribute to physiological comfort involve a complex combination of heat and mass transfer. Each may occur separately or simultaneously. They are time-dependent, and may be considered in steady-state or transient conditions.

Thermal resistance is the net result of the combination of radiant, conductive and convective heat transfer, and its value depends on the contribution of each to the total heat transfer. Although it is an intrinsic property of the textile material, its measured value may change through the conditions of test due to the interaction of parameters such as radiant heat transfer with the surroundings.

Several methods exist which may be used to measure heat and moisture properties of textiles, each of which is specific to one or the other and relies on certain assumptions for its interpretation.

The sweating guarded-hotplate (often referred to as the "skin model") described in this International Standard is intended to simulate the heat and mass transfer processes which occur next to human skin. Measurements involving one or both processes may be carried out either separately or simultaneously using a variety of environmental conditions, involving combinations of temperature, relative humidity, air speed, and in the liquid or gaseous phase. Hence transport properties measured with this apparatus can be made to simulate different wear and environmental situations in both transient and steady states. In this standard only steady-state conditions are selected.

1 Scope

This International Standard specifies methods for the measurement of the thermal resistance and water-vapour resistance, under steady-state conditions, of e.g. fabrics, films, coatings, foams and leather, including multilayer assemblies, for use in clothing, quilts, sleeping bags, upholstery and similar textile or textile-like products.

The application of this measurement technique is restricted to a maximum thermal resistance and water-vapour resistance which depend on the dimensions and construction of the apparatus used (e.g. 2 $m^2 \cdot K/W$ and 700 $m^2 \cdot Pa/W$ respectively, for the minimum specifications of the equipment referred to in this International Standard).

The test conditions used in this standard are not intended to represent specific comfort situations, and performance specifications in relation to physiological comfort are not stated.

2 Definitions

For the purposes of this International Standard, the following definitions apply.

2.1 thermal resistance, 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.

2.2 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.

2.3 water-vapour permeability index, i_{mt}: Ratio of thermal and water-vapour resistances in accordance with equation (1):

$$i_{mt} = S \cdot \frac{R_{ct}}{R_{et}} \qquad \ldots (1)$$

where S equals 60 Pa/K

i_{mt} is dimensionless, and has values between 0 and 1. A value of 0 implies that the material is water-vapour impermeable, that is, it has infinite water-vapour resistance, and a material with a value of 1 has both the thermal resistance and water-vapour resistance of an air layer of the same thickness.

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