
**Textiles — Determination of the
total heat transfer through textiles in
simulated environments**

*Textiles — Détermination du transfert de chaleur total à travers les
textiles dans des simulations d'environnements*



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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 38, *Textiles*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document specifies the testing method for the determination of the amount of the heat transferred through clothing fabrics by the combined dry and evaporative heat emission under the simulated and specified conditions.

The amount of heat emission through clothing from our body is very important for comfort in hot environment or during vigorous activities. It is why we consider the comfort of our body as a thermal balancing among ambient climate, energy metabolism and the performance of clothing through removing the excessive heat from our body. The total heat transfer from the body occurs during both the dry heat transmission such as radiation, convection, conduction and the evaporative heat transmission by sweating at the same time. The amount of total heat transfer depends on both gradients of temperature and humidity, for example, the evaporative heat emission has more weight in hot environment with moderate humidity because the dry heat transfer is decreased by the reduction of the temperature difference between body and ambient climate.

Therefore, this document specifies the testing method for the determination of the amount of the heat transferred through clothing fabrics by the combined dry and evaporative heat emission simultaneously under the simulated and specified standard conditions using sweating guarded hot plate. It is for evaluating the performance of clothing fabrics for cooling down the excessive heat from our body.

Textiles — Determination of the total heat transfer through textiles in simulated environments

1 Scope

This document specifies the test method for determining the amount of heat transferred through clothing fabrics by the combined dry and evaporative heat emission under simulated and specified conditions. This test method can be used for fabrics, films, coatings, foams and leathers including multilayer assemblies used in hot environment or in activities.

The application of this measurement technique is restricted to a maximum amount of total heat transfer which depend on the dimensions and construction of the apparatus used (e.g. about 1 200 W/m² for the maximum specifications of the equipment according to ISO 11092).

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.

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

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

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:

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

3.1

dry heat emission

heat transferred by the temperature difference between the two faces of a material divided by the resultant heat flux per unit area in the direction of the gradient in dry state

Note 1 to entry: It is a quantity which determines the dry heat flux across a given area in response to a steady applied temperature gradient.

3.2

evaporative heat emission

heat transferred by the 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, when evaluated non-isothermally

Note 1 to entry: It is a quantity 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 may consist of condensation as well as diffusive and convective components.