

Protective clothing against heat and flame -
Determination of heat transmission on exposure to
flame (ISO 9151:2016, Corrected version 2017-03)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 9151:2016 sisaldab Euroopa standardi EN ISO 9151:2016 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 9151:2016 consists of the English text of the European standard EN ISO 9151:2016.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 07.12.2016.	Date of Availability of the European standard is 07.12.2016.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

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English Version

Protective clothing against heat and flame - Determination
of heat transmission on exposure to flame (ISO 9151:2016,
Corrected version 2017-03)

Vêtements de protection contre la chaleur et les
flammes - Détermination de la transmission de chaleur
à l'exposition d'une flamme (ISO 9151:2016, Version
corrigée 2017-03)

Schutzkleidung gegen Hitze und Flammen -
Bestimmung des Wärmedurchgangs bei
Flammeneinwirkung (ISO 9151:2016, korrigierte
Fassung 2017-03)

This European Standard was approved by CEN on 6 November 2016.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

This document (EN ISO 9151:2016) has been prepared by Technical Committee ISO/TC 94 "Personal safety - Protective clothing and equipment" in collaboration with 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 June 2017, and conflicting national standards shall be withdrawn at the latest by June 2017.

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

This document supersedes EN 367:1992.

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(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 9151:2016, Corrected version 2017-03 has been approved by CEN as EN ISO 9151:2016 without any modification.

Annex ZA (informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 89/686/EEC

This European Standard has been prepared under a Commission's standardization request M/031 to provide one voluntary means of conforming to essential requirements of Directive 89/686/EEC on the approximation of the laws of the Member States relating to personal protective equipment.

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding essential requirements of that Directive and associated EFTA regulations.

Table ZA.1 — Correspondence between this International Standard and Annex II of the Directive 89/686/EEC Personal Protective Equipment

Essential Requirements of Directive 89/686/EEC	Clause(s)/subclause(s) of this International Standard	Remarks/Notes
3.6, Protection against heat and/or fire	Complete Standard	Together with the requirements in the product standard

WARNING 1 — Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 — Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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. www.iso.org/directives

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on 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 the following URL: <http://www.iso.org/iso/foreword.html>

The committee responsible for this document is ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 13, *Protective clothing* and by Technical Committee CEN/TC 162, *Protective clothing including hand and arm protection and lifejackets* in collaboration.

This second edition cancels and replaces the first edition (ISO 9151:1995), of which Clauses/[subclauses 2, 3.3, 5.1, 5.2, 5.3, 5.6, 6, 8.1, 8.2, 9.1.2, 9.3.1, 9.3.2, 10](#), all figures, and [Annexes A and B](#) have been technically revised. Tolerances have been added to specified dimensions where appropriate. Results of a recent inter-laboratory trial have been added to [Annex A](#).

To improve reproducibility, the following major modifications have been made from the previous version of this test method:

- a) The percentage minimum purity of the propane used has been provided (see [5.2](#));
- b) Two alternative methods for constructing the calorimeter are described with additional information on the figures; additional instructions are given for inserting the calorimeter into the mounting block; and the total mass of the calorimeter and mounting block is specified (see [5.3](#));
- c) Tolerances for the dimensions of machined parts have been added to text and drawings where required;
- d) Control of air movement during testing is specified (see [Clause 6](#));
- e) The specified relative humidity and temperature ranges for the conditioning and testing atmospheres have been changed (see [8.1](#) and [8.2](#));
- f) Additional procedures for calibration and stabilization of thermocouple temperature, including a procedure to check on the linearity of the thermocouple output during regulation of the incident heat flux density, have been added (see [9.1.1](#) and [9.1.2](#)); and
- g) Test report requirements have been revised (see [Clause 10](#)).

This corrected version of ISO 9151:2016 includes the following changes:

- in 5.3, second paragraph, the tolerance's value has been corrected from " ± 002 " to " $\pm 0,002$ ";
- in 9.3.3, second paragraph, the reference to [Annex A](#) has been corrected to [Annex B](#).

Introduction

Heat transmission through clothing is largely determined by its thickness including any air gaps trapped between adjacent layers. The air gaps can vary considerably in different areas of the same clothing assembly. The present method provides a grading of materials when tested under standard test conditions without an air gap.

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Protective clothing against heat and flame — Determination of heat transmission on exposure to flame

1 Scope

This document specifies a method for determining the heat transmission through materials or material assemblies used in protective clothing. Materials may then be ranked by comparing heat transfer indices, which provide an indication of the relative heat transmission under the specified test conditions. The heat transfer index should not be taken as a measure of the protection time given by the tested materials under actual use conditions.

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 5725-2, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

IEC 60584-1, *Thermocouples — Part 1: Reference tables*

IEC 60584-3, *Thermocouples — Part 3: Extension and compensating cables — Tolerances and identification systems*

3 Terms and definitions

For the purposes of this document, the following 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

test specimen

all the layers of fabric or other materials arranged in the order and orientation as used in practice, including, where applicable, undergarment fabrics

3.2

incident heat flux

Q

amount of energy applied to the exposed face of the specimen, per unit time

Note 1 to entry: The unit is kW/m².