

Reaction to fire tests for floorings - Part 1:  
Determination of the burning behaviour using a  
radiant heat source (ISO 9239-1:2025)

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>See Eesti standard EVS-EN ISO 9239-1:2025 sisaldab Euroopa standardi EN ISO 9239-1:2025 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 02.07.2025.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN ISO 9239-1:2025 consists of the English text of the European standard EN ISO 9239-1:2025.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 02.07.2025.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
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ICS 13.220.40, 97.150

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EUROPEAN STANDARD

**EN ISO 9239-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

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ICS 13.220.40; 97.150

Supersedes EN ISO 9239-1:2010

English Version

**Reaction to fire tests for floorings - Part 1: Determination  
of the burning behaviour using a radiant heat source (ISO  
9239-1:2025)**

Essais de réaction au feu des revêtements de sol -  
Partie 1: Détermination du comportement au feu à  
l'aide d'une source de chaleur rayonnante (ISO 9239-  
1:2025)

Prüfungen zum Brandverhalten von Bodenbelägen -  
Teil 1: Bestimmung des Brandverhaltens bei  
Beanspruchung mit einem Wärmestrahler (ISO 9239-  
1:2025)

This European Standard was approved by CEN on 29 June 2025.

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

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

## European foreword

This document (EN ISO 9239-1:2025) has been prepared by Technical Committee ISO/TC 92 "Fire safety" in collaboration with Technical Committee CEN/TC 127 "Fire safety in buildings" the secretariat of which is held by BSI.

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 January 2026, and conflicting national standards shall be withdrawn at the latest by January 2026.

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

This document supersedes EN ISO 9239-1:2010.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

## Endorsement notice

The text of ISO 9239-1:2025 has been approved by CEN as EN ISO 9239-1:2025 without any modification.

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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 document 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](http://www.iso.org/directives)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

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

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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 92, *Fire Safety*, Subcommittee SC 1, *Fire initiation and growth*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 127, *Fire safety in buildings*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This fourth edition cancels and replaces the third edition (ISO 9239-1:2010), which has been technically revised.

The main changes compared to the previous edition are as follows:

- change in definition of HF-E/CHF ([3.2](#), [3.3](#), [3.4](#))
- change in definition of tiles (size) ([3.11](#))
- adding information about generic adhesives ([6.3](#))
- defining securing method for edges of tiles ([6.5](#))
- securing of loose laid flooring ([6.6](#))
- calculation is now made from HF-E and/or HF-30 values ([8.2.6](#))
- reporting of values in the HF-E and/or HF-30 values, and calculate mean CHF from these ([9.2](#))
- adding of explanation of what to do if sample re-ignites after extinguishment ([9.3](#))
- adding references to LED light sources ([A.3.2.](#))
- adding of [Annex D](#) “Example of report template”

A list of all parts in the ISO 9239 series can be found on the ISO website.

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](http://www.iso.org/members.html).

## Introduction

The measurements in the test method in this document provide a basis for estimating one aspect of fire exposure behaviour of floorings. The imposed radiant flux simulates the thermal radiation levels likely to impinge on the floor of a corridor whose upper surfaces are heated by flames or hot gases or both, during the early stages of a developing fire in an adjacent room or compartment under wind-opposed flame-spread conditions.

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# Reaction to fire tests for floorings —

## Part 1: Determination of the burning behaviour using a radiant heat source

**WARNING** — The possibility of a gas-air fuel explosion in the test chamber should be recognized. Suitable safeguards consistent with sound engineering practice should be installed in the panel fuel supply system. These should include at least the following:

- a gas-feed cut-off which is immediately activated when air and/or gas supply fail;
- a temperature sensor or a flame detection unit directed at the panel surface that stops fuel flow when the panel flame goes out.

The attention of all persons concerned with managing and carrying out this test is drawn to the fact that fire testing can be hazardous and that there is a possibility that toxic and/or harmful gases can be evolved during the test. Operational hazards can also arise during the testing of specimens, such as the possibility of an explosion, and during the disposal of test residues.

An assessment of all the potential hazards and risks to health shall be made and safety precautions shall be identified and provided. Written safety instructions shall be issued. Appropriate training should be given to relevant personnel. Laboratory personnel shall ensure that they follow written instructions at all times.

### 1 Scope

This document specifies a method for assessing the wind-opposed burning behaviour and spread of flame of horizontally mounted floorings exposed to a heat flux radiant gradient in a test chamber, when ignited with pilot flames. [Annex A](#) gives details of assessing the smoke development, when required.

This method is applicable to all types of flooring, e.g. textile carpet, cork, wood, rubber and plastics coverings as well as coatings. Results obtained by this method reflect the reaction to fire performance of the flooring, including any substrate if used. Modifications of the backing, bonding to a substrate, underlay or other changes of the flooring can affect test results. It cannot be used alone to describe or appraise the fire hazard or fire risk of floorings under actual fire conditions.

Information on the precision of the test method is given in [Annex B](#).

### 2 Normative references

The following referenced documents are indispensable for the application 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 554, *Standard atmospheres for conditioning and/or testing — Specifications*

ISO 3182, *Light measuring system for smoke emission testing*

ISO 13943, *Fire safety — Vocabulary*

ISO 14697, *Reaction-to-fire tests — Guidance on the choice of substrates for building and transport products*

ISO 14934-2, *Fire tests — Calibration and use of heat flux meters — Part 2: Primary calibration methods*

ISO 14934-3, *Fire tests — Calibration and use of heat flux meters — Part 3: Secondary calibration method*

ISO/TS 19850, *Fire tests — Use of LED (light-emitting diode) as an alternative to white light for measuring smoke parameters*

EN 13238, *Reaction to fire tests for building products — Conditioning procedures and general rules for selection of substrates*

IEC 60584-1, *Thermocouples — Part 1: EMF specifications and tolerances*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13943 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

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

#### 3.1

##### **heat flux**

amount of thermal energy emitted, transmitted or received per unit area and unit time

Note 1 to entry: Heat flux is expressed in kilowatts per square metre (kW/m<sup>2</sup>).

#### 3.2

##### **heat flux at extinguishment**

##### **HF-E**

incident *heat flux* (3.1), in kW/m<sup>2</sup>, at the surface of a specimen at the point where the flame ceases to advance and may subsequently go out

#### 3.3

##### **heat flux at X min**

##### **HF-X**

*heat flux* (3.1), in kW/m<sup>2</sup>, received by the specimen at the most distant spread of flame position observed during the first X min of the test

#### 3.4

##### **critical heat flux**

##### **CHF**

*heat flux* (3.1) at which the flame extinguishes (HF-E) or the *heat flux* (3.1) after the test period of 30 min (HF-30), whichever is the lower value (i.e. the flux corresponding to the furthest extent of spread of flame within 30 min)

#### 3.5

##### **heat flux profile**

curve relating the *heat flux* (3.1) on the specimen plane to the distance from the zero point

#### 3.6

##### **zero point of heat flux profile**

inner edge of the hottest side of the specimen holder (see [Figures 6, 8 and 9](#))

#### 3.7

##### **sustained flaming**

persistence of flame on or over the surface of the specimen for a period of more than 4 s

#### 3.8

##### **flame-spread distance**

furthest extent of travel of a *sustained flaming* (3.7) along the length of the test specimen within a given time