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**Reaction to fire tests for floorings —**

**Part 1:**

**Determination of the burning behaviour  
using a radiant heat source**

*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*



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 9239-1 was prepared by Technical Committee ISO/TC 92, *Fire safety*, Subcommittee SC 1, *Fire initiation and growth*.

This third edition cancels and replaces the second edition (ISO 9239-1:2002) which has been technically revised.

ISO 9239 consists of the following parts, under the general title *Reaction to fire tests for floorings*:

- *Part 1: Determination of the burning behaviour using a radiant heat source*
- *Part 2: Determination of flame spread at a heat flux level of 25 kW/m<sup>2</sup>*

## Introduction

The measurements in the test method in this part of ISO 9239 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 may be hazardous and that there is a possibility that toxic and/or harmful gases may be evolved during the test. Operational hazards may 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 should be made and safety precautions should be identified and provided. Written safety instructions should be issued. Appropriate training should be given to relevant personnel. Laboratory personnel should ensure that they follow written instructions at all times.

## 1 Scope

This part of ISO 9239 specifies a method for assessing the wind-exposed 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 performance of the flooring, including any substrate if used. Modifications of the backing, bonding to a substrate, underlay or other changes of the flooring may affect test results.

This part of ISO 9239 is applicable to the measurement and description of the properties of floorings in response to heat and flame under controlled laboratory conditions. It should not 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 13943, *Fire safety — Vocabulary*

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

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

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

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

## 3 Terms and definitions

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

### 3.1

#### **heat flux**

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

NOTE Heat flux is expressed in kilowatts per square metre ( $\text{kW/m}^2$ ).

### 3.2

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

##### **CHF**

incident heat flux, in  $\text{kW/m}^2$ , 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, in  $\text{kW/m}^2$ , 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**

heat flux at which the flame extinguishes (CHF) or the heat flux 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 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

### 3.7

#### **sustained flaming**

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