

# Reaction to fire tests — Horizontal surface spread of flame on floor-covering systems —

## Part 1: Flame spread using a radiant heat ignition source

ICS 13.220.40; 59.080.60; 97.150

# National foreword

This British Standard reproduces verbatim ISO 9239-1:1997, including Technical Corrigendum 1:1997 and Technical Corrigendum 2:1998, and implements it as the UK national standard.

The UK participation in its preparation was entrusted by Technical Committee FSH/21, Reaction to fire tests, to Subcommittee FSH/21/3, Spread of flame tests, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

### Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

**Compliance with a British Standard does not of itself confer immunity from legal obligations.**

### Summary of pages

This documents comprises a front cover, an inside front cover, pages i and ii, the ISO title page, pages ii to iv, pages 1 to 18, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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# INTERNATIONAL STANDARD

**ISO**  
**9239-1**

First edition  
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## **Reaction to fire tests — Horizontal surface spread of flame on floor-covering systems —**

### **Part 1:**

**Flame spread using a radiant heat ignition  
source**

*Essais de réaction au feu — Propagation superficielle horizontale d'une  
flamme sur des revêtements de sol —*

*Partie 1: Propagation de flamme utilisant une source de chaleur radiante*



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**Descriptors:** Textiles, floor coverings, textile floor coverings, tests, fire tests, flammability testing, determination, flame propagation, test equipment.

## 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.

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

This International Standard was initiated by ISO/TC 38/SC 19, *Textile floor coverings*, and was progressed to DIS in 1988. ISO/TAG-5 recommended expansion of the scope to include materials other than textiles. In 1992, ISO/TC92/SC1 conducted a ballot for a new work item on flame spread over all types of floor covering. This work item was well supported and the development of flame spread tests for floor coverings, including both textiles and non-textiles, was begun by ISO/TC 92/SC 1 in 1993. It was considered that DIS 9239.1 was a suitable starting point although the fire model used had only been validated for flame spread down a corridor under wind-opposed conditions. It was also recognised that over-emphasis had been placed in DIS 9239.1 on determination of critical radiant flux, which requires observation of flame-out. Since the understanding of fire propagation hazards requires measurements on the rate of flame spread, it was realised that additional test data must be obtained for the early stages of fire growth.

Research conducted after the introduction of the radiant panel test has shown that higher heat fluxes than  $11 \text{ kW/m}^2$  may be imposed on floor-coverings in post-flashover situations. Hence, it has been necessary to reappraise the scope of this International Standard to relate mainly to pre-flashover conditions.

International Standard ISO 9239-1 was prepared by Technical Committee ISO/TC 92, *Fire safety*, Subcommittee SC 1, *Reaction to fire*.

Further parts are in preparation.

Annex A, Annex B and Annex C of this part of ISO 9239 are for information only.



## Introduction

ISO/TR 5658-1 describes the development of standard tests for flame spread and explains the theory of flame spread including horizontal flame spread over floor coverings.

Floor coverings are not readily involved in fires but if fire develops due to other contents of a building burning, then floor coverings may ignite and it is necessary to be able to determine whether the floor covering will propagate flames.

This part of ISO 9239 provides a simple method by which horizontal surface spread of flame on a horizontal specimen can be determined for comparative purposes. This method is useful for research, development, quality control purposes and national requirements. Some laboratories use this part of ISO 9239 for measuring the smoke emission from floor-covering systems.

Fire is a complex phenomenon: its behaviour and its effects depend upon a number of interrelated factors. The behaviour of materials and products depends upon the characteristics of the fire, the method of the use of the materials and the environment in which they are exposed. The philosophy of “reaction to fire” tests is explained in ISO/TR 3814.

A test such as is specified in this part of ISO 9239 deals only with a simple representation of a particular aspect of the potential fire situation typified by a radiant heat source and flame; it cannot alone provide any direct guidance on behaviour or safety in fire.

This test procedure does not rely on the use of asbestos-based materials.

**CAUTION — So that suitable precautions may be taken to safeguard health, the attention of all concerned in fire tests is drawn to the possibility that toxic or harmful gases may be evolved during exposure of test specimens.**

## 1 Scope

This part of ISO 9239 describes a test method for measuring the wind-opposed flame spread behaviour of horizontally mounted floor-covering systems exposed to a radiant heat gradient in a test chamber when ignited with a pilot flame.

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.

This test method provides data suitable for comparing the performance of essentially flat materials, composites and assemblies, which are used primarily as the exposed surfaces of floors.

This test method is applicable to all types of floor covering such as textile carpets, cork, wood, rubber and plastic coverings and coatings.

Results obtained by this method reflect the performance of the total end-use floor covering system. Modifications of the carpet-backing, bonding to a substrate, the type of substrate, underlay or other changes of the system may affect test results.

The test is intended for regulatory purposes, specification acceptance, design purposes, classification, or development and research.

This part of ISO 9239 is applicable to the measurement and description of the properties of materials, products or assemblies 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 materials, products or assemblies under actual fire conditions.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 9239. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 9239 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/IEC Guide 52:1990, *Glossary of fire terms and definitions*.

ISO/TR 14697:—, *Reaction to fire tests — Guidance rules on the use of substrates*<sup>1)</sup>.

## 3 Definitions

For the purposes of this part of ISO 9239, the definitions given in ISO/IEC Guide 52 apply, together with the following.

### 3.1

#### assembly

fabrication of materials and/or composites

### 3.2

#### average heat for sustained burning

the average of the values of heat for sustained burning measured at a number of specified positions expressed in units of MJ/m<sup>2</sup>

<sup>1)</sup> To be published.