PD ISO/TS 3814:2014



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Standard tests for measuring reaction-to-fire of products and materials — Their development and application

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National foreword

This Published Document is the UK implementation of ISO/TS 3814:2014.

The UK participation in its preparation was entrusted to Technical Committee FSH/21/-/8, Reaction to fire tests - Classification and application of test results.

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

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ISBN 978 0 580 77281 8

ICS 13.220.50

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 March 2014.

Amendments issued since publication

Date	Text affected

PD ISO/TS 3814:2014

TECHNICAL SPECIFICATION

ISO/TS 3814

First edition
2014-03-01

Standard tests for measuring reaction-to-fire of products and materials — Their development and application

Essais de mesurage de la "réaction au feu" des matériaux de bâtiment — Leur élaboration et leur application

Reference number
ISO/TS 3814:2014(E)

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Published in Switzerland

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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 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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 WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 92, *Fire safety*, Subcommittee SC 1, *Fire initiation and growth*.

This first edition cancels and replaces ISO/TR 3814:1989, which has been technically revised.

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Introduction

A fire can constitute a hazard to both the structure, e.g. building, transport, and to its occupants, because of the heat generated and the production of smoke and gaseous products of combustion. Consequently, early codes and regulations for fire safety were designed to prevent rapid fire development and spread within individual structures and also from one structure to another. These codes have since developed into more complex laws governing public safety. Formerly, a distinction was made between the protection of persons from fire and the protection of property, with more importance being placed upon the latter. However, this distinction becomes somewhat difficult to make when considering modern, large-area, high-rise structures, where protection of the occupants in-place needs to be substituted for rapid evacuation. Restrictions on the use of combustible materials, compartmentalization, early fire detection, and suppression are key factors for in-place protection of occupants and are also important for minimizing property loss.

Real-scale fire tests are the ideal way to quantify the fire hazard of products. However, such tests are impractical in the vast majority of cases. The reaction-to-fire tests developed by ISO/TC 92/SC 1 seek to quantify aspects of the fire hazard that may result from the use of particular products in particular applications in a meaningful, cost-effective, and reproducible way.

This Technical Specification describes the work being carried out by ISO/TC 92/SC 1 on the development of tests and guidance for the “reaction-to-fire” of products and discusses the role and limitation of these tests in reducing fire danger.

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Standard tests for measuring reaction-to-fire of products and materials — Their development and application

1 Scope

This Technical Specification describes the relevance of, and how to apply, the fire tests developed by ISO/TC 92/SC 1 so that they can be used effectively to reduce the hazard of fire. Each reaction-to-fire test is related to the different phases of a developing fire in buildings and transport and has to be seen in its relation to the fire scenario and phase of the fire it represents. Some reaction-to-fire tests are proposed to assess the fire hazard in those different phases.

Although this Technical Specification does not address smouldering combustion, this does not mean that smouldering is not important in some fire development situations. However, there are no tests in Subcommittee 1 (SC 1) which currently address this phenomenon.

This Technical Specification is aimed at indicating those ISO tests which produce relevant and useful data for fire safety engineering and those which do not. This Technical Specification is also of use to regulators, people who are performing reaction-to-fire tests including manufacturers and all people who are responsible to create, control, and assess fire safety concepts.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies

ISO 5657, *Reaction to fire tests — Ignitability of building products using a radiant heat source*

ISO/TS 5658-1, *Reaction to fire tests — Spread of flame — Part 1: Guidance on flame spread*

ISO 5658-2, *Reaction to fire tests — Spread of flame — Part 2: Lateral spread on building and transport products in vertical configuration*

ISO 5658-4, *Reaction to fire tests — Spread of flame — Part 4: Intermediate-scale test of vertical spread of flame with vertically oriented specimen*

ISO 5660-1, *Reaction-to-fire tests — Heat release, smoke production and mass loss rate — Part 1: Heat release rate (cone calorimeter method) and smoke production rate (dynamic measurement)*

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

ISO 9239-2, *Reaction to fire tests for floorings — Part 2: Determination of flame spread at a heat flux level of 25 kW/m2*

ISO 9705-1, *Reaction to fire tests — Room corner test for wall and ceiling lining products — Part 1: Test method for a small room configuration*

ISO/TR 9705-2, *Reaction-to-fire tests — Full-scale room tests for surface products — Part 2: Technical background and guidance*

ISO/TR 11925-1, *Reaction to fire tests — Ignitability of building products subjected to direct impingement of flame — Part 1: Guidance on ignitability*

ISO 11925-2, *Reaction to fire tests — Ignitability of products subjected to direct impingement of flame — Part 2: Single-flame source test*

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