TECHNICAL SPECIFICATION

ISO/TS 7240-9

Second edition
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Fire detection and alarm systems —

Part 9: Test fires for fire detectors

Systèmes de détection et d'alarme d'incendie —
Partie 9: Essais sur foyers pour détecteurs d'incendie

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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.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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/TS 7240-9 was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 3, *Fire detection and alarm systems*.

This second edition cancels and replaces the first edition (ISO/TS 7240-9:2006) which has been technically revised.

ISO 7240 consists of the following parts, under the general title *Fire detection and alarm systems*:

— *Part 1: General and definitions*

— *Part 2: Control and indicating equipment*

— *Part 3: Audible alarm devices*

— *Part 4: Power supply equipment*

— *Part 5: Point-type heat detectors*

— *Part 6: Carbon monoxide fire detectors using electro-chemical cells*

— *Part 7: Point-type smoke detectors using scattered light, transmitted light or ionization*

— *Part 8: Carbon monoxide fire detectors using an electro-chemical cell in combination with a heat sensor*

— *Part 9: Test fires for fire detectors* [Technical Specification]

— *Part 10: Point-type flame detectors*

— *Part 11: Manual call points*

— *Part 12: Line type smoke detectors using a transmitted optical beam*

— *Part 13: Compatibility assessment of system components*

— *Part 14: Guidelines for drafting codes of practice for design, installation and use of fire detection and fire alarm systems in and around buildings* [Technical Report]

— *Part 15: Point type fire detectors using scattered light, transmitted light or ionization sensors in combination with a heat sensor*

— *Part 16: Sound system control and indicating equipment*

— *Part 17: Short-circuit isolators*

— *Part 18: Input/output devices*

— *Part 19: Design, installation, commissioning and service of sound systems for emergency purposes*

— *Part 20: Aspirating smoke detectors*

— *Part 21: Routing equipment*

— *Part 22: Smoke-detection equipment for ducts*

— *Part 23: Visual alarm devices*[1)]

— *Part 24: Sound-system loudspeakers*

— *Part 25: Components using radio transmission paths*

— *Part 27: Point-type fire detectors using a scattered-light, transmitted-light or ionization smoke sensor, an electrochemical-cell carbon-monoxide sensor and a heat sensor*

— *Part 28: Fire protection control equipment*

A part 29 dealing with video fire detectors is under development.

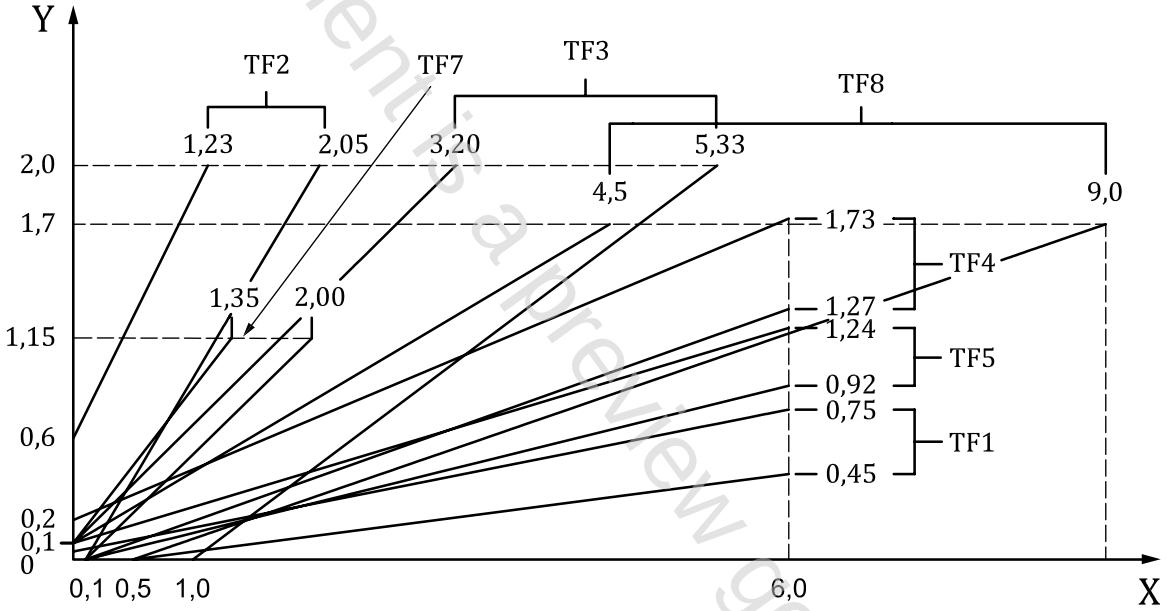
1) To be published.

Introduction

This part of ISO 7240 is based on ISO/TR 7240-9:2006. It provides a summary of the standard test fires defined in other parts of ISO 7240 and where they are used. It has been published to provide a convenient catalogue of fire tests but the formal definition and description of each fire remains within the individual parts of ISO 7240.

The combustibles selected represent a spectrum of large (*m*) and small (*y*) combustion particles for both grey and black smoke. These include burning liquids, plastics and cellulosic (wood) materials, and glowing and smouldering fabrics.

Figure 1 shows the limits of *m* vs *y* where they are defined for the relevant test fires. It illustrates how the test fires are designed to represent a reasonable cross–section of fire types and thus ensure that the response characteristics of the detectors being assessed are broadly capable of detecting the majority of common fires that may occur in practise.



Key

Y absorption index, m, dB/m

X MIC, y (dimensionless)

Figure 1 — Composite of ISO test fires TF1 to TF5, TF7 and TF8 profile curves: *m* versus *y*

The test fires in this part of ISO 7240 are intended to be applicable for the evaluation of all automatic fire detectors (smoke, heat, flame, etc.). They are employed on a selective basis for use in concert with a specified International Standard covering the particular type of detector. For example, test fire TF6, methylated spirits, is used to evaluate the response of heat detectors. Test fires TF1 through TF5 are selected to evaluate the response of system-connected smoke detectors. Test fire TF7 is selected in lieu of test fire TF2 to evaluate the response of smoke alarms intended primarily for installation in residential type occupancies. In view of the residential type application, smoke alarms are evaluated for compliance with test fire TF7 using a 3 m high rather than a 4 m high ceiling. Test fires TF2, TF3 and TF9 are suitable for testing the response of a detector to carbon monoxide. Carbon monoxide output curves are also shown for TF4, TF5 and TF8.

Fire detection and alarm systems —

Part 9:
Test fires for fire detectors

1 Scope

This Technical Specification describes methods of test using test fires to which fire detectors, such as smoke, heat, flame are subjected as specified in other parts of ISO 7240 for such detectors.

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 7240-1, *Fire detection and alarm systems — Part 1: General and definitions*

3 Terms, definitions and symbols

For the purposes of this document, the terms, definitions and symbols given in ISO 7240-1 and the following apply.

3.1
sensitivity
relative degree of response of a smoke detector

Note 1 to entry: A high sensitivity denotes response to a lower concentration of smoke particles than a low sensitivity under identical smoke build-up conditions.

4 Characteristics of test fires — Description

Fifteen test fires are described in Clause 7 and designated TF1 through TF9. Their characteristic features are shown in Table 1.

The test fires shall be carried out in accordance with the descriptions of Clause 7. It is permissible to vary slightly the quantities of fuel used, if necessary, to produce the required values of fire parameters.