

INTERNATIONAL
STANDARD

ISO
7240-29

First edition

**Fire detection and alarm systems —
Part 29:
Video fire detectors**

*Systèmes de détection et d'alarme d'incendie —
Partie 29: Détecteurs de fumée vidéo*

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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).

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. 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.

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

This first edition of ISO 7240-29 cancels and replaces the first edition of ISO/TS 7240-29:2017, which has been technically revised.

The main changes are as follows:

- additional detail has been added to the requirements for the response threshold value (RTV) test for video smoke detectors Type A and AB;
- the RTV test has been eliminated for Type B detectors;
- requirements have been provided for controllers that are and are not in the same environment as the cameras;
- the dark and light background during fire tests can now be replaced with high and low illumination of the background;
- the non-uniform illumination test has been corrected to remove references to alternate background screens and related diagrams have been corrected;
- the requirement to operationally test the detector during hot and cold conditioning tests has been removed;
- the operational impact test has been modified to reference IEC 62262;
- the operational vibration test has been eliminated;
- a vibration endurance test has been added for the controller.

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A list of all parts in the ISO 7240 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.

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Introduction

A video fire detection system differs from some point-type detectors (e.g. ISO 7240-6, ISO 7240-7) in that the detection is performed remotely from the actual fire and therefore does not involve sensor contact with the products of combustion. The fire detection is based on mathematical algorithm analysis of a video image. The video image from a camera might be processed by software to determine the presence of smoke and/or flame (depending on the capability of the system) which is visible in the image.

Video fire detectors consist of three elements: a sensor, an image processor, and a transmission path between the sensor and image processor. The elements can be in a single cabinet, or the sensor and processor can be in separate cabinets, interconnected by a transmission path.

The processor incorporates an alarm and fault signalling interface to connect to a compatible fire detection control and indicating equipment transmission path.

Two types of detectors are specified to differentiate equipment that senses smoke or flame. A single detector can also sense both smoke and flame.

Two enclosure protection ratings are specified for dust and water ingress protection.

Three environmental temperature ranges are specified, for detectors suitable for installation indoors or outdoors.

A fire detection and alarm system is required to function satisfactorily not only in the event of fire, but also during and after exposure to conditions likely to be met in practice, including corrosion, vibration, direct impact, indirect shock and electromagnetic interference. Tests are intended to assess the performance of the video fire detectors under such conditions.

This document is not intended to place any other restrictions on the design and construction of such detectors.

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Fire detection and alarm systems —

Part 29: Video fire detectors

1 Scope

This document specifies requirements, test methods and performance criteria for video fire detectors (VFDs), which operate in the visible spectrum, for use in fire detection and alarm systems installed in and around buildings (see ISO 7240-1). For the testing of other types of VFD working on different principles, this document can be used only for guidance.

Detectors developed for the protection of specific risks that incorporate special characteristics (including additional features or enhanced functionality for which this document does not define a test or assessment method) are beyond the scope of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 2560, *Welding consumables — Covered electrodes for manual metal arc welding of non-alloy and fine grain steels — Classification*

IEC 60064, *Tungsten filament lamps for domestic and similar general lighting purposes — Performance requirements*

IEC 60068-1, *Environmental testing — Part 1: General and guidance*

IEC 60068-2-1, *Environmental testing — Part 2-1: Tests — Tests A: Cold*

IEC 60068-2-2, *Environmental testing — Part 2-2: Tests — Tests B: Dry heat*

IEC 60068-2-6, *Environmental testing — Part 2-6: Tests — Test Fc: Vibration (sinusoidal)*

IEC 60068-2-27, *Environmental testing — Part 2-27: Tests — Test Ea and guidance: Shock*

IEC 60068-2-42, *Environmental testing — Part 2-42: Tests — Test Kc: Sulphur dioxide test for contacts and connections*

IEC 60068-2-75, *Environmental testing — Part 2-75 Tests – Test Eh: Hammer tests*

IEC 60068-2-78, *Environmental testing — Part 2-78: Tests — Test Cab: Damp heat, steady state*

IEC 60081, *Double-capped fluorescent lamps — Performance specifications*

IEC 60529, *Degrees of protection provided by enclosures (IP code)*

IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

IEC 62599-2, *Alarm systems — Part 2: Electromagnetic compatibility — Immunity requirements for components of fire and security alarm systems*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions 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/>

3.1.1 response threshold value

RTV

time it takes the detector to signal an alarm

Note 1 to entry: When tested as specified in [5.1.6](#).

Note 2 to entry: The response threshold value can depend on signal processing in the detector and in fire detection control and indicating equipment.

3.1.2 field of view

FOV

image captured by the video fire detector

Note 1 to entry: The FOV can be expressed as an angle or as a width and height at a specified distance.

3.1.3 active field of view

aFOV

area in the *field of view* ([3.1.2](#)) in which smoke and/or flame can be detected by the *video fire detector* ([3.1.5](#))

3.1.4 illuminator

light source, internal or external to the *video fire detector* ([3.1.5](#)), that assists the equipment to operate in low ambient light conditions

3.1.5 video fire detector

VFD

self-contained device or distributed system in which analysis of video images is performed in order to detect the presence of smoke and/or flame within the images being analyzed

3.2 Abbreviated terms

EM	electromagnetic compatibility
FDCIE	fire detection control and indicating equipment
aFOV	active field of view
FOV	field of view
MIC	measuring ionization chamber
IP	ingress protection

VFD	video fire detector
RTV	response threshold value

4 Requirements

4.1 Conformity

In order to claim conformance to this document, the VFD shall meet the following requirements.

- The VFD shall conform to the requirements of [Clause 4](#). This conformance shall be verified by visual inspection or engineering assessment.
- The VFD shall be tested as specified in [Clause 5](#), and shall meet the requirements of the tests.
- The VFD shall be marked in accordance with [Clause 6](#) and shall be accompanied by the documentation specified in [Clause 7](#), which shall be verified by visual inspection.

4.2 Fire phenomena

The manufacturer shall declare, in the data presented in [Clause 7](#), a phenomenon of fire in [Table 1](#) to which the VFD is designed to respond.

Table 1 — Fire phenomena types

Type	Fire phenomena
A	Smoke
B	Flame
AB	Smoke and flame

NOTE 1 Type AB VFDs can detect flame emitted by test fire for type A VFD, and can also detect smoke from a type B test fire. Thus, a type AB VFD is not required to detect the smoke emitted by test fire for type A but it can signal an alarm to all the test fires.

NOTE 2 VFDs can have two types (Type A and B) if the flame detection and smoke detection algorithms within the VFD can be separately activated/monitored.

4.3 Immunity to unwanted alarms

Detectors shall be immune to phenomena that can cause unwanted alarms.

Optional tests shall be performed where the manufacturer claims immunity to the phenomena.

4.4 Detection range

The manufacturer shall declare the ranges at which the VFD shall detect a fire in the data supplied in [Clause 7](#).

4.5 Camera lenses

VFDs may use interchangeable or variable focal length lenses.

A change of focus of the camera lens that prevents the VFD from detecting a fire shall cause a fault signal.

4.6 Camera lens monitoring

Contamination of the camera lens that prevents the VFD from detecting a fire shall cause a fault signal.

Complete obscuration of the camera lens that inhibits fire detection in the operating FOV shall cause a fault signal.

4.7 Individual alarm indication

Where the VFD does not display an image of the FOV to the user, each video fire detector shall be provided with an integral red visual indicator by which the individual detector signalling an alarm can be identified, until the alarm condition is reset. Where other conditions of the detector can be visually indicated, these shall be clearly distinguishable from the alarm indication.

Where the indicator is mounted on the camera, the visual indicator shall be visible from a distance of 6 m in an ambient light intensity up to 500 lx at an angle of up to:

- a) 5° from the axis of the detector in any direction, and
- b) 45° from the axis of the detector in at least one direction.

4.8 Connection of ancillary devices

The detector may provide for connections to ancillary devices (remote indicators, control relays, etc.), but open- or short-circuit failures of these connections shall not prevent the correct operation of the detector.

4.9 Monitoring of detachable cameras

For detachable cameras, a means shall be provided to detect the disconnection of the camera, in order to give a fault signal.

4.10 Connection of more than one VFD to the FDCIE transmission path

Where a VFD is designed to share the transmission path to the FDCIE with other devices, connections shall be such that a single transmission fault does not prevent an alarm signal from more than one VFD.

Where more than one VFD share the transmission path to the FDCIE, connections shall be such that one VFD fault signal does not prevent the alarm signal from any other VFD.

4.11 Manufacturer's adjustments

It shall not be possible to change the manufacturer's settings except by special means (e.g. the use of a special code or tool) or by breaking or removing a seal.

4.12 On-site adjustment of response behaviour

If there is provision for on-site adjustment of the response behaviour of the detector, then:

- a) for all of the settings for which the manufacturer claims conformance, the detector shall conform with the requirements of this document and access to the adjustment means shall be possible only by the use of a code or special tool or by removing the detector from its base or mounting;
- b) any setting or settings for which the manufacturer does not claim conformance with this document shall be accessible only by the use of a special code or tool, and it shall be clearly marked on the detector or in the associated data that if these setting or settings are used, the detector does not conform with this document.

Adjustments may be carried out at the VFD or at the fire detection control and indicating equipment.