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## Fire detection and alarm systems —

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**

*Systemes de detection et d'alarme d'incendie —*

*Partie 27: Détecteurs d'incendie ponctuels utilisant un détecteur de fumée basé sur le principe de la diffusion de la lumière, de la transmission de la lumière ou de l'ionisation, un détecteur de monoxyde de carbone à cellule électrochimique et un détecteur de chaleur*



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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 7240-27 was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 3, *Fire detection and alarm systems*.

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 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*

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- *Part 16: Sound system control and indicating equipment*
- *Part 19: Design, installation, commissioning and service of sound systems for emergency purposes*
- *Part 21: Routing equipment*
- *Part 22: Smoke-detection equipment for ducts*
- *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*

The following parts are under development:

- Part 17, dealing with short-circuit isolators;
- Part 18, dealing with input/output devices;
- Part 20, dealing with aspirating smoke detectors;
- Part 24, dealing with sound-system loudspeakers;
- Part 25, dealing with components using radio links;
- Part 26, dealing with oil mist detectors.

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## Introduction

A fire detection and fire alarm system is required to function satisfactorily not only in the event of fire, but also during and after exposure to conditions it can likely meet in practice, such as corrosion, vibration, direct impact, indirect shock and electromagnetic interference. Some tests specified are intended to assess the performance of fire detectors under such conditions.

The performance of fire detectors is assessed from results obtained in specific tests; this part of ISO 7240 is not intended to place any other restrictions on the design and construction of such detectors.

Smoke detectors using ionization or optical sensors, and complying with ISO 7240-7, are well established for the protection of life and property. Even so, they can respond to stimuli other than smoke and in some circumstances can be prone to false alarms. False alarm rates are usually minimized by careful application, giving some limitations in use, and occasionally with a reduction in protection provided.

It is generally accepted that fire detectors using carbon monoxide (CO) sensors alone, while suitable for the detection of smouldering fires involving carbonaceous fuels, can be relatively insensitive to free-burning fires supported by a plentiful supply of oxygen. This limitation can be largely overcome by the inclusion of a heat sensor whose output is combined in some way with that of the CO sensor. Performance requirements for CO fire detectors and for CO and heat detectors can be found in ISO 7240-6 and ISO 7240-8, respectively.

Although the CO-detector — heat-detector combination is capable of responding to free-burning fires, it can still be relatively insensitive to low-temperature fires that produce large amounts of visible smoke but low concentrations of CO and little heat. This limitation prevents the CO and heat detector from being a true replacement for a smoke detector in life-safety applications.

Many false-alarm sources that affect smoke detectors do not produce CO. It is possible, therefore, that by adding a CO sensor to a smoke detector, and combining its output in some way with that of the smoke sensor, the incidence of false alarms can be reduced. This reduction can be achieved while simultaneously providing the ability to respond to a broader range of fire types than is possible with either a smoke or CO detector alone.

It can be possible to improve the performance even further by adding a heat sensor to assist in the response to clean-burning, high-energy fires. This improvement is seen as secondary to the overall performance and for this reason the heat sensor is treated as optional for compliance with this part of ISO 7240.