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Second edition
2018-05

**Fire detection and alarm systems —
Part 27:
Point type fire detectors using a
smoke sensor in combination with
a carbon monoxide sensor and,
optionally, one or more heat sensors**

Systèmes de détection et d'alarme d'incendie —

Partie 27: Détecteurs ponctuels d'incendie utilisant un capteur de fumée en combinaison avec un capteur de monoxyde de carbone (CO) et, optionnellement, un ou plusieurs capteurs 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.

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).

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For an explanation on 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 the following URL: 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 second edition cancels and replaces the first edition (ISO 7240-27:2009), which has been technically revised.

The main changes compared to the previous edition are as follows:

- other carbon monoxide sensing technologies are now permitted by introducing additional environmental tests;
- a damp heat, steady-state (operational) test like that used in the European standard EN 54-31 has been incorporated;
- for tests in the gas chamber, the allowable background of carbon monoxide has been increased from 1 µl/l to 1,5 µl/l;
- in the test for exposure to chemical agents at environmental concentrations, the concentration of heptane and ethanol have been increased to 500 µl/l and 1000 µl/l, respectively and the exposure times to NO₂ and SO₂ have been reduced to 1 h and 24 h, respectively;
- the test for exposure to chemical agents associated with a fire has been deleted as being too complex and not relevant due to CO sensors having already responded when high concentrations of NO₂, SO₂ and CO have been reached;
- a Bibliography has been added which list standards and documents not used as normative references.

A list of all parts in the ISO 7247-series can be found on the ISO website.

Introduction

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

The performance of fire detectors is assessed from results obtained in specific tests; this document 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 minimised 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 and heat detector 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 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 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 is 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 document.