International

ISO 7240-27

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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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 third edition cancels and replaces the second edition (ISO 7240-27:2018), which has been technically revised.

The main changes are as follows:

— the use of the threshold values of Band 1 and Band 2 (introduced in the previous edition) has been simplified, thereby avoiding unnecessary repetitions.

A list of all parts in the ISO 7240 series can be found on the ISO website.

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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. The tests specified in this document are intended to assess the performance of the fire detectors under such conditions.

The performance of multi-sensor point fire detectors that incorporate a smoke sensor, a carbon monoxide (CO) sensor and, optionally, one or more heat sensors is assessed from results obtained in the tests specified in this document, This document is not intended to place any restrictions on the design and construction of such detectors.

Smoke detectors using ionization or optical sensors, and conforming to 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 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 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 therefore possible 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 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.

This document includes a requirement for smoke detectors that operate on the scattered or transmitted light principle to be marked with one of two possible nominal response threshold value of Band 1 or Band 2. This marking provides for a clearer choice of response values so that the risk of unwanted alarms can be decreased in installations where unfavourable environmental conditions are present.

NOTE For some test fires, smoke detectors that operate on the scattered or transmitted light principle and that have been factory set to the upper response threshold value band can fall outside one of the classification limits given in ISO/TR 7240-9.