AS 7240.27:2018

Australian STANDARD

Fire detection and fire 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 (ISO 7240-27:2018, MOD)

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AS 7240.27:2018

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Part 27: Point type fire detectors using a smoke sensor in combination with a carbon monoxide sensor and, optionally, one or more heat sensors (ISO 7240-27:2018, MOD)

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Preface

This Standard was prepared by the Standards Australia Committee FP-002, Fire Detection, Warning, Control and Intercom Systems, to supersede AS ISO 7240.27:2016, *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*.

The objective of this Standard is to specify requirements, test methods and performance criteria for multi-sensor point fire detectors that incorporate a smoke sensor, a carbon monoxide (CO) sensor and, optionally, one or more heat sensors, for use in fire detection and alarm systems installed in buildings (refer to AS ISO 7240.1).

For the testing of other types of fire detectors using smoke, CO and, optionally, heat sensors working on different principles, this Standard can be used only for guidance. This Standard is not applicable to fire detectors using smoke, CO and, optionally heat sensors, which have special characteristics and which have been developed for specific risks.

The major changes in this edition are as follows:

(a) Other carbon monoxide sensing technologies are now permitted by introducing additional environmental tests.

(b) A damp heat, steady-state (operational) test like that used in European Standard EN 54-31 has been incorporated.

(c) For tests in the gas chamber, the allowable background of carbon monoxide has been increased from 1 µl/l to 1,5 µl/l.

(d) 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.

(e) 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_2 have been reached.

This Standard is an adoption with national modifications, and has been reproduced from, ISO 7240-27:2018, *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*. The modifications are set out in Appendix ZZ, which has been added at the end of the source text.

Appendix ZZ lists the variations to ISO 7240-27:2018 for the application of this Standard in Australia.

As this document has been reproduced from an International Standard, a full point substitutes for a comma when referring to a decimal marker.

Australian Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms "normative" and "informative" are used in Standards to define the application of the appendices or annexes to which they apply. A "normative" appendix or annex is an integral part of a Standard, whereas an "informative" appendix or annex is only for information and guidance.

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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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 NO_2 and SO_2 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 NO_2, SO_2 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.

Australian Standard®

Fire detection and fire 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 (ISO 7240-27:2018, MOD)

1 Scope

This document specifies requirements, test methods and performance criteria for multi-sensor point fire detectors that incorporate a smoke sensor, a carbon monoxide (CO) sensor and, optionally, one or more heat sensors, for use in fire detection and alarm systems installed in buildings (see ISO 7240-1).

For the testing of other types of fire detectors using smoke, CO and, optionally, heat sensors working on different principles, this document can be used only for guidance. This document is not applicable to fire detectors using smoke, CO and, optionally heat sensors, which have special characteristics and which have been developed for specific risks.

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 209, *Aluminium and aluminium alloys — Chemical composition*

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

ISO 7240-5:2012, *Fire detection and alarm systems — Part 5: Point-type heat detectors*

ISO 7240-7:2011, *Fire detection and alarm systems — Part 7: Point-type smoke detectors using scattered light, transmitted light or ionization*

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

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

IEC 60068-2-2, *Environmental testing — Part 2-2: Tests — Test 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 60068-2-30, *Environmental testing — Part 2-30: Tests — Test Db: Damp, cyclic (12 h + 12 h cycle)*

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

IEC 60068-2-78, *Environmental Testing — Part 2-78: Tests — Test 2-78: Body Cab: Damp Heat, Steady State*

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

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.