AS 7240.6:2017
ISO 7240-6:2011

AS 7240.6:2017

Australian STANDARD

Fire detection and alarm systems

Part 6: Carbon monoxide fire detectors using electro-chemical cells

STANDARDS Australia

AS 7240.6:2017

This Australian Standard® was prepared by Committee FP-002, Fire Detection, Warning, Control and Intercom Systems. It was approved on behalf of the Council of Standards Australia on 26 June 2917.

This Standard was published on 15 August 2017.

The following are represented on Committee FP-002:

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Australasian Fire and Emergency Service Authorities Council
Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Institute of Building Surveyors
CSIRO
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This Standard was issued in draft form for comment as DR AS 7240.6:20[illegible].

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ISBN 978 1 76035 863 1

Australian Standard®

Fire detection and alarm systems

Part 6: Carbon monoxide fire detectors using electro-chemical cells

Originated as AS 1603.14-2001.
Revised and redesignated AS 7240.6-2006.
Second edition 2017.

Published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001, Australia.

Preface

This Standard was prepared by the Standards Australia Committee FP-002, Fire Detection, Warning, Control and Intercom Systems to supersede AS 7240.6:2006,*Fire detection and alarm systems, Part 6: Carbon monoxide fire detectors using electro-chemical cells*.

The objective of this Standard is to specify requirements, test methods and performance criteria for point-type fire detectors using an electrochemical-cell carbon-monoxide sensor, for use in fire detection and alarm systems.

This Standard is identical with, and has been reproduced from, ISO 7240-6:2011, *Fire detection and alarm systems — Part 6: Carbon monoxide fire detectors using electro-chemical cells.*

As this document has been reproduced from an International Standard, the following applies:

(a) In the source text 'this International Standard' should read 'Australian Standard';

(b) A full point substitutes for a coma when referring to a decimal marker.

Australian or Australian/New Zealand 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.

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 7240-6 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 7240-6:2004), which has been technically revised.

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 3: Audible alarm devices*

— *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*

— *Part 16: Sound system control and indicating equipment*

— *Part 17: Short-circuit isolators*

— *Part 18: Input/output devices*

— *Part 19: Design, installation, commissioning and service of sound systems for emergency purposes*

— *Part 20: Aspirating smoke detectors*

— *Part 21: Routing equipment*

— *Part 22: Smoke-detection equipment for ducts*

— *Part 24: Sound-system loudspeakers*

— *Part 25: Components using radio transmission paths*

— *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*

A part 23 dealing with visual alarm devices and a part 29 dealing with video fire detectors are under development.

Introduction

This part of ISO 7240 has been drawn up by ISO/TC 21/SC 3 and is based on a standard prepared by Standards Australia International Technical Committee FP-002 "*Fire detection, warning, control and intercom systems*".

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 that the system is likely to meet 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 part of ISO 7240 is not intended to place any other restrictions on the design and construction of such detectors.

Carbon monoxide (CO) fire detectors can react promptly to slow, smouldering fires involving carbonaceous materials because CO does not depend solely on convection, but also moves by diffusion, and CO fire detectors can be better suited to applications where other fire detection techniques are prone to false alarms, i.e. due to dust, steam and cooking vapours.

Whilst CO gas has greater mobility than smoke, it can be diluted by ventilation systems and can be affected by convection currents. Hence, it is necessary to take into account the same considerations as for point smoke detectors. Recirculating systems confined to a single room have little effect on dilution, as this is similar to the natural diffusion of the CO gas.

CO fire detectors can be less affected by stratification than other types of fire detectors.

It is important that the location of CO fire detectors take into account areas where false operation or non-operation is likely. CO fire detectors might not be suitable for detecting fires involving

— clean-burning liquids,

— PVC-insulated cables,

— combustible metals,

— certain self-oxidizing chemicals,

— non-carbonaceous materials.

Some typical locations where it is important to carefully evaluate the use of CO fire detectors are areas where CO gas can be present from exhausts and normal manufacturing processes.

EXAMPLES Car parks, car park return air plenums, loading docks.

Generally, cigarette smoke does not contain sufficient CO to cause alarms, even though smoke can be clearly visible. However, in heavy smoking or incense-burning areas, it is important to measure the CO concentration before installing CO fire detectors.

This part of ISO 7240 includes a number of Electromagnetic Compatibility (EMC) immunity requirements. The details for these requirements have been taken from EN 50130-4.

Australian Standard®

Fire detection and alarm systems

Part 6: Carbon monoxide fire detectors using electro-chemical cells

1 Scope

This part of ISO 7240 specifies requirements, test methods and performance criteria for point fire detectors using electro-chemical cells that operate using carbon-monoxide detection principles for use in fire detection and alarm systems installed in buildings (see ISO 7240-1).

For the testing of other types of CO fire detectors working on different principles, this part of ISO 7240 can be used only for guidance. Fire detectors with special characteristics and developed for specific risks are not covered by this part of ISO 7240.

2 Normative references

The following referenced documents are indispensable for the application 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*

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 heat, 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 Cab: Damp heat, steady state*

EN 50130-4, *Alarm systems — Part 4: Electromagnetic compatibility — Product family standard: Immunity requirements for components of fire, intruder and social alarm systems*

3 Terms and definitions

For the purposes of this document, the terms, definitions and symbols given in ISO 7240-1 and the following apply.

3.1
response threshold value
CO concentration in the proximity of the specimen at the moment that it enters an alarm state when tested as specified in 5.1.5

Note 1 to entry: The response threshold value can depend on signal processing in the detector and in the control and indicating equipment.