

Australian Standard[®]

Fire detection and alarm systems

Part 5: Point type heat detectors (ISO 7240-5:2003, MOD)



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 9 January 2004.
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 - Australasian Fire Authorities Council
 - Australian Building Codes Board
 - Australian Chamber of Commerce and Industry
 - Australian Electrical and Electronic Manufacturers Association
 - Australian Government Analytical Laboratories, Scientific Services Laboratory
 - Australian Industry Group
 - Australian Institute of Building Surveyors
 - Deafness Forum of Australia
 - Department of Defence (Australia)
 - Fire Protection Association Australia
 - Institute of Security Executives
 - National Electrical and Communications Association
 - Property Council of Australia
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STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 7240.5—2004

Fire detection and alarm systems

Part 5: Point type heat detectors (ISO 7240-5:2003, MOD)

RECONFIRMATION NOTICE

Technical Committee FP-002 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

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NOTES

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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 1603.2—1997, *Automatic fire detection and alarm systems—Part 2: Point type smoke detectors*. The Committee intends to withdraw AS 1603.2—1997 five years after the publication of this Standard.

Amendment No. 1 (February 2007), is identical to ISO 7240-5:2003, Technical Corrigendum 1 and has been bound at the end of this Standard. The amendment relates to Clauses 2 and 5.

This Standard has been adopted with national modifications and has been reproduced from ISO 7240-5:2003, *Fire detection and fire alarm systems—Part 5, Point type heat detectors*. A modification for Australian conditions is the addition of the indicator visibility requirement of AS 2362.25. The variations are set out in Annex ZA.

As this Standard is reproduced from an International Standard, the following applies:

- (a) Its number does not appear on each page of text and its identity is shown only on the cover and title page.
- (b) In the source text ‘this International Standard’ should read ‘this Australian Standard’.
- (c) A full point should be substituted for a comma when referring to a decimal marker.

References to International standards should be replaced by references to Australian Standards as follows:

<i>References to International Standard or other Publication</i>		<i>Australian/New Zealand Standard</i>	
IEC		AS	
60068	Environmental testing	60068	Environmental testing
60068-1	Part 1: General and guidance	60068.1	Part 1: General and guidance
60068-2-1	Part 2: Tests. Test A: Cold	60068.2.1	Part 2: Tests-Test A: Cold
60068-2-2	Part 2: Tests. Test B: Dry heat	60068.2.2	Part 2: Tests-Test B: Dry heat
60068-2-6	Part 2: Tests. Test Fc: Vibration (sinusoidal)	60068.2.6	Part 2: Tests-Test Fc: Vibration (sinusoidal)
60068-2-27	Part 2: Tests. Test Ea and guidance: Shock	60068.2.27	Part 2: Tests-Tests Ea and guidance: Shock
60068-2-78	Part 2: Tests. Test Cab: Damp heat, steady state	60068.2.78	Part 2: Tests- Test Cab: Damp heat, steady state

The terms ‘normative’ and ‘informative’ are used in this Standard to define the application of the annex to which they apply. A ‘normative’ annex is an integral part of a standard, whereas an ‘informative’ annex is only for information and guidance.

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INTRODUCTION

This part of ISO 7240 has been drawn up by the Sub-Committee ISO/TC 21/SC 3 and is based on a draft prepared by European Standards Technical Committee CEN/TC 72 "*Fire detection and fire alarm systems*".

A fire detection and 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 heat detectors under such conditions.

The performance of heat detectors is assessed from the results obtained in specific tests; ISO 7240-5 is not intended to place any other restrictions on the design and construction of such detectors.

AUSTRALIAN STANDARD

Fire detection and alarm systems

Part 5: Point type heat detectors (ISO 7240-5:2003, MOD)

1 Scope

This part of ISO 7240 specifies the requirements, test methods and performance criteria for point heat detectors for use in fire detection and fire alarm systems for buildings (see ISO 7240-1).

For other types of heat detector, or for detectors intended for use in other environments, this part of ISO 7240 can be used only for guidance. Heat 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 209-1, *Wrought aluminium and aluminium alloys — Chemical composition and forms of products — Part 1: 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. Tests A: Cold*

IEC 60068-2-2, *Environmental testing — Part 2-2: Tests. Tests 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 60068-2-42, *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 following terms and definitions given in ISO 7240-1 and the following apply.

3.1

typical application temperature

temperature that an installed detector can be expected to experience for long periods of time in the absence of a fire condition

NOTE This temperature is deemed to be 29 °C below the minimum static response temperature corresponding to the class marked on the detector, as specified in Table 1.

3.2

maximum application temperature

maximum temperature that an installed detector can be expected to experience, even for short periods of time, in the absence of a fire condition

NOTE This temperature is deemed to be 4 °C below the minimum static response temperature corresponding to the class marked on the detector, as specified in Table 1.

3.3

static response temperature

temperature at which the detector would produce an alarm signal if subjected to a vanishingly small rate of rise of temperature

NOTE Rates of rise of temperature of approximately 0,2 K/min are normally found to be suitable for measuring this, however lower rates can be required in some instances (see 5.3).

4 General requirements

4.1 General

In order to comply with this part of ISO 7240, the detector shall meet the requirements of this clause, which shall be verified by visual inspection or engineering assessment, shall be tested as specified in Clause 5, and if applicable Clause 6; and shall meet the requirements of the tests corresponding to its marked class(es).

4.2 Classification

4.2.1 General classes

Detectors shall conform to one or more of the following classes: A1, A2, B, C, D, E, F or G in accordance with the requirements of the tests specified in Clause 5 (see Table 1).

Table 1 — Detector classification temperatures

Detector Class	Typical application temperature °C	Maximum application temperature °C	Minimum static response temperature °C	Maximum static response temperature °C
A1	25	50	54	65
A2	25	50	54	70
B	40	65	69	85
C	55	80	84	100
D	70	95	99	115
E	85	110	114	130
F	100	125	129	145
G	115	140	144	160

4.2.2 Suffix-R and suffix-S detectors

Manufacturers may optionally give additional information concerning the type of response exhibited by the detector by adding the suffix “S” or “R” to the above classes. Detectors, which are marked with the letter “S” or “R” as a suffix to the class marking, shall be tested in accordance with the applicable test, as specified in Clause 6, and shall meet the requirements of that test, in addition to the tests of Clause 5.

- Detectors with a suffix “S” to their class do not respond below the minimum static response temperature corresponding to their classification (see Table 1), even at high rates of rise of air temperature.
- Detectors with a suffix “R” to their class incorporate a rate-of-rise characteristic which meets the response-time requirements (see 5.4.3) for high rates of rise of air temperature, even when starting at air temperatures substantially below the typical application temperature.

4.3 Position of heat-sensitive elements

Each detector shall be constructed such that at least part of its heat-sensitive element(s), except elements with auxiliary functions (e.g. characteristic correctors), shall be ≥ 15 mm from the mounting surface of the detector.

4.4 Individual alarm indication

Class A1, A2, B, C or D detectors shall be provided with an integral red visual indicator, by which the individual detector which released an alarm may be identified until the alarm condition is reset. Where other conditions of the detector may be visually indicated, they shall be clearly distinguishable from the alarm indication, except when the detector is switched into a service mode. For detachable detectors, the indicator may be integral with the base or the detector head. The visual indicator shall be visible from a distance of 6 m at up to 5° from the axis of the detector in any direction, in an ambient light intensity up to 500 lx.

Class E, F or G detectors shall be provided with either an integral red indicator, or with another means for locally indicating the alarm status of the detector.

4.5 Connection for ancillary devices

Where the detector provides for connections to ancillary devices (e.g. remote indicators, control relays), open- or short-circuit failures of these connections shall not prevent the correct operation of the detector.

4.6 Monitoring of detachable detectors

For detachable detectors, a means shall be provided for a remote monitoring system (e.g. the control and indicating equipment) to detect the removal of the head from the base, in order to give a fault signal.

4.7 Manufacturer's adjustments

It shall not be possible to change the manufacturer's settings except by special means (e.g. a special code or tool, or by breaking or removing a seal).

4.8 On-site adjustment of response behaviour

If there is provision for on-site adjustment of the response behaviour of the detector, then the following apply.

- a) A corresponding class shall be declared for each setting at which the manufacturer claims compliance with this part of ISO 7240; and for each such setting, the detector shall comply with the requirements of this part of ISO 7240 for the corresponding class. Access to the adjustment means shall be possible only by the use of a code or special tool or by removing the detector from its base or mounting.

- b) Any setting(s) for which the manufacturer does not claim compliance with this part of ISO 7240 shall be accessible only by the use of a code or special tool; it shall be clearly marked on the detector or in the associated data that if these setting(s) are used, the detector does not comply with this part of ISO 7240.

These adjustments may be carried out at the detector or at the control and indicating equipment.

4.9 Marking

Each detector shall be clearly marked with the following information:

- a) a reference to this part of ISO 7240 (i.e. ISO 7240-5);
- b) the class(es) of the detector (e.g. A1, A1R, A1S, A2, B, etc.). If the detector has provision for on-site adjustment of the class (see 4.8), then the marking of the class may be replaced by the symbol "P";
- c) the name or trademark of the manufacturer or supplier;
- d) the model designation (type or number);
- e) the wiring-terminal designations;
- f) some mark(s) or code(s) (e.g. serial number or batch code) by which the manufacturer can identify, at least, the date or batch and place of manufacture, and the version number(s) of any software contained within the detector.

For detachable detectors, the detector head shall be marked with a), b), c), d) and f), and the base shall be marked with, at least d) and e).

Where any marking on the device uses symbols or abbreviations not in common use, then these should be explained in the data supplied with the device.

The marking shall be visible during installation of the detector and shall be accessible during maintenance.

The markings shall not be placed on screws or other easily removable parts.

4.10 Data

Either the detectors shall be supplied with sufficient technical, installation and maintenance data to enable their correct installation and operation or, if all of these data are not supplied with each detector, reference to the appropriate data sheet(s) shall be given on, or with, each detector.

To enable correct operation of the detectors, these data should describe the requirements for the correct processing of the signals from the detector. This may be in the form of a full technical specification of these signals, a reference to the appropriate signalling protocol or a reference to suitable types of control and indicating equipment, etc.

For detectors with provision for on-site adjustment of their class, these data shall identify the applicable classes and shall describe the method of programming (e.g. by selecting a switch position on the detector or a setting from a menu in the control and indicating equipment).

Additional information may be required by organizations certifying that detectors conform to the requirements of this part of ISO 7240.

4.11 Requirements for software-controlled detectors

4.11.1 General

For detectors which rely on software control, the requirements of 4.11.2, 4.11.3 and 4.11.4 shall be met in order to fulfil the requirements of this part of ISO 7240.

4.11.2 Software documentation

4.11.2.1 The manufacturer shall submit documentation which gives an overview of the software design. This documentation shall be in sufficient detail for the design to be inspected for compliance with this part of ISO 7240 and shall include at least the following:

- a) a functional description of the main program flow (e.g. as a flow diagram or schema) including the following:
 - 1) a brief description of the modules and the functions that they perform,
 - 2) the way in which the modules interact,
 - 3) the overall hierarchy of the program,
 - 4) the way in which the software interacts with the hardware of the detector,
 - 5) the way in which the modules are called, including any interrupt processing;
- b) a description of which areas of memory are used for the various purposes (e.g. the program, site-specific data and running data);
- c) a designation by which the software and its version can be uniquely identified.

4.11.2.2 The manufacturer shall have available detailed design documentation, which needs to be provided only if required by the testing authority. It shall comprise at least the following:

- a) an overview of the whole system configuration, including all software and hardware components;
- b) a description of each module of the program, containing at least
 - 1) the name of the module,
 - 2) a description of the tasks performed,
 - 3) a description of the interfaces, including the type of data transfer, the valid data range and the checking for valid data;
- c) full source code listings, as hard copy or in machine-readable form (e.g. ASCII-code), including global and local variables, constants and labels used, and sufficient comment for the program flow to be recognized;
- d) details of any software tools used in the design and implementation phase (e.g. CASE-tools, compilers).

4.11.3 Software design

In order to ensure the reliability of the detector, the following requirements for software design shall apply:

- a) the software shall have a modular structure;
- b) the design of the interfaces for manually and automatically generated data shall not permit invalid data to cause error in the program operation;
- c) the software shall be designed to avoid the occurrence of deadlock of the program flow.

4.11.4 The storage of programs and data

The program necessary to comply with this part of ISO 7240 and any preset data, such as manufacturer's settings shall be held in non-volatile memory. Writing to areas of memory containing this program and these