



Automatic fire detection and alarm systems

Part 3: Heat alarms



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 22 December 2017.
This Standard was published on 31 January 2018.

The following are represented on Committee FP-002:

- Association of Hydraulic Services Consultants Australia
 - Australasian Fire and Emergency Service Authorities Council
 - Australian Chamber of Commerce and Industry
 - Australian Industry Group
 - Australian Institute of Building Surveyors
 - CSIRO
 - Deafness Forum of Australia
 - Department of Health and Human Services, Vic.
 - Engineers Australia
 - Fire Protection Association Australia
 - National Electrical and Communications Association
 - National Fire Industry Association
 - Property Council of Australia
 - Society of Fire Safety
-

This Standard was issued in draft form for comment as DR AS 1603.3:2016.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

Keeping Standards up-to-date

Australian Standards® are living documents that reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued.

Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments that may have been published since the Standard was published.

Detailed information about Australian Standards, drafts, amendments and new projects can be found by visiting www.standards.org.au

Standards Australia welcomes suggestions for improvements, and encourages readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at mail@standards.org.au, or write to Standards Australia, GPO Box 476, Sydney, NSW 2001.

Australian Standard®

Automatic fire detection and alarm systems

Part 3: Heat alarms

First published as AS 1603.3—1996.
Second edition 2018.

COPYRIGHT

© Standards Australia Limited

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968.

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

ISBN 978 1 76035 982 9

PREFACE

This Standard was prepared by the Standards Australia Committee FP-002, Fire Detection, Warning, Control and Intercom Systems, to supersede AS 1603.3—1996, *Automatic fire detection and alarm systems, Part 3: Heat alarms*.

The objective of this Standard is to prescribe requirements for heat alarms intended for use as a supplementary part of an automatic smoke alarm system in domestic dwellings or residential accommodation buildings as required by the *National Construction Code* or state and territory regulations. For this reason interconnectability is mandated for heat alarms.

The objective of this edition is to define the requirements for heat alarms and harmonize these with the requirements for smoke alarms, having given due consideration to requirements within International Standards, as set out by ISO, and those specific to the Australian environmental and regulatory framework.

Notes used in this Standard are of an advisory nature only and are used to give explanation or guidance to the user on recommended considerations or technical procedures, or to provide an informative cross-reference to other documents or publications. Notes to clauses in this Standard do not form a mandatory part for conforming to this Standard.

Statements expressed in mandatory terms in notes to figures and tables are deemed to be requirements of this Standard.

This Standard incorporates a Commentary on some Clauses. The Commentary directly follows the relevant clause, is designated by 'C' preceding the clause number and is printed in italics in a panel. The Commentary is intended to help readers understand the background to the clause but does not form part of the clause.

CONTENTS

	<i>Page</i>
FOREWORD.....	4
1 SCOPE	5
2 NORMATIVE REFERENCES	5
3 DEFINITIONS.....	6
4 GENERAL REQUIREMENTS	7
5 TESTS.....	15
6 TEST REPORT	36

FOREWORD

This Standard contains requirements for optional functions. These functions do not have to be provided on the heat alarm; however, where these functions are provided, they have to comply with the requirements specified for them.

Each optional function is set out in a separate clause, with its own set of associated requirements, in order to permit heat alarms covered by this Standard to have different combinations of functions and still conform to this Standard.

Two optional sound output patterns are specified in this Standard. The option allows national regulators to choose a sound pattern complying with ISO 8201 or ISO 7731, depending on the desired response of the building's occupant to an alarm condition.

A higher temperature, Class C heat alarm is included for heat alarms installed in areas subject to a greater temperature range, such as leisure accommodation vehicles.

Additional functions not specified in this Standard are permitted, provided they do not jeopardize any mandatory function required by this Standard.

STANDARDS AUSTRALIA

Australian Standard**Automatic fire detection and alarm systems****Part 3: Heat alarms****1 SCOPE**

This Standard specifies requirements, test methods and functional criteria for heat alarms intended for household or similar residential applications.

This Standard also covers (but does not require) the inclusion within the heat alarm of facilities for—

- (a) visual fault condition indication; and
- (b) alarm-silence facility.

Where such facilities are included, this Standard specifies applicable requirements.

2 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard.

AS

60068	Environmental testing—Tests
60068.1	Part 1: General and guidance
60068.2.1	Part 2.1: Test A: Cold
60068.2.6	Part 2.6: Test Fc: Vibration (sinusoidal)
60068.2.42	Part 2.42: Test Kc: Sulphur dioxide test for contacts and connections
60068.2.78	Part 2.78: Test Cab: Damp heat, steady state

7240	Fire detection and alarm systems
7240.5	Part 5: Point type heat detectors (ISO 7240-5:2003, MOD)

AS IEC

61672	Electroacoustics—Sound level meters
61672.1	Part 1: Specifications

AS ISO

7240	Fire detection and alarm systems
7240.3	Part 3: Audible alarm devices

AS/NZS

60065	Audio, video and similar electronic apparatus—Safety requirements (IEC 60065, Ed.7.2 (2011) MOD)
-------	--

60950	Information technology equipment—Safety
60950.1	Part 1: General requirements (IEC 60950-1, Ed. 2.2 (2013), MOD)

ISO

209	Aluminium and aluminium alloys—Chemical composition
7731	Ergonomics—Danger signals for public and work areas—Auditory danger signals
8201	Acoustics—Audible emergency evacuation signal

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

3 DEFINITIONS

For the purposes of this Standard, the definitions below apply.

3.1 Alarm condition

Audible and visual signal.

3.2 Alarm-silence facility

Means of temporarily disabling or desensitizing a heat alarm.

3.3 Battery-low condition

Combination of battery voltage and series resistance, which results in a fault warning.

3.4 Fault condition

The existence of an actual or incipient condition that may prevent an alarm condition.

3.5 Fault warning

Audible signal indicating fault condition.

3.6 Heat alarm

Device containing, within one housing, all the components necessary for detecting temperature and generating an alarm condition, except possibly the power source.

3.7 Interconnectable heat alarm

Heat alarm that can be interconnected with other compatible heat alarms and smoke alarms to provide a common alarm condition warning.

3.8 Least sensitive orientation

Point of rotation, relative to airflow, about the vertical axis, where a detector produces the highest response time value.

3.9 Mains

A.C. supply from an electricity authority.

3.10 Main power source

Source of power, mains or source of equivalent quality and reliability or non-rechargeable battery intended to supply the heat alarm under all load conditions without reliance on the standby power source.

3.11 Most sensitive orientation

Point of rotation, relative to airflow, about the vertical axis, where a detector produces the lowest response time value.

3.12 Non-removable power source

An internal power source, main or standby, integrated or fixed within the heat alarm such that it is not intended as user-replaceable or serviceable and removal requires the disassembly of the heat alarm.

3.13 Normal condition

Condition in which the heat alarm is supplied with power but is not giving either an alarm condition or a fault condition, although able to give such signals if the condition arises.

3.14 Response threshold (A_{th})

Temperature at which the heat alarm changes to its alarm condition.

3.15 Standby power source

Source of power intended to supply the heat alarm in the event that the main power source is unavailable.

4 GENERAL REQUIREMENTS

4.1 General

The heat alarm shall be resettable—

- (a) meet the requirements of this Clause (4);
- (b) be tested as specified in Clause 5; and
- (c) meet the requirements of the tests.

The heat alarm shall have a recommended service life of at least 10 years under normal conditions of use.

4.2 Optional and additional functions

If an optional function is included, all the corresponding requirements shall be met.

Additional functions may be provided, even if not specified in this Standard. Where provided, such options shall not contradict any requirements of this Standard and, in case of a fault, shall not jeopardize any mandatory function required by this Standard.

NOTE: Each optional function is included in a separate clause, with its own set of associated requirements, in order to permit heat alarms covered by this Standard to have different combinations of functions and still conform to this Standard.

4.3 Classification

Detectors shall conform to one or more of the following classes, in accordance with Table 1 and the test requirements specified in Clause 5:

- (a) A1.
- (b) A2.
- (c) B.
- (d) C.

TABLE 1

HEAT ALARM CLASSIFICATION TEMPERATURES

Heat alarm class	Typical application temperature	Maximum applications temperature	Minimum static response temperature	Maximum static response temperature
A1	25	50	54	65
A2	25	50	54	70
B	40	65	69	85
C	55	80	84	100

In addition to the tests specified in Clause 5, Class C heat alarms shall be assessed for conformity to the dry heat test within Section 5 of AS 7240.5:2004.

4.4 Alarm condition

4.4.1 Alarm condition audible indicator

4.4.1.1 Signal pattern

The alarm signal pattern shall be in accordance with either ISO 8201 or ISO 7731.

4.4.1.2 Signal pattern level—Optional function

Where this function is provided, the alarm condition aural signal pattern shall commence sounding at a level not greater than 45 dBA and rise gradually to the maximum level of not more than 105 dBA over a period of between 3 s to 12 s (see Clause 5.16).

4.4.1.3 Signal pattern frequency characteristics—Optional function

Where this function is provided, the signal pattern shall have a fundamental frequency of 520 Hz with odd harmonics to approximate a square wave.

4.4.2 Alarm condition visual indicator

Heat alarms shall be provided with an integral visual alarm indicator, by which the individual heat alarm, when in alarm condition, can be identified. The visual alarm indicator shall be red in the alarm condition. The indicator shall flash or be continuously illuminated when the alarm condition is present.

Visual alarm indicators shall not operate on interconnected heat alarms that have not reached their response threshold (A_{th}). This visual alarm indicator may also perform other additional functions, provided the alarm indication is distinct from any additional function. The failure of any visual alarm condition indicator shall not prevent the alarm condition.

4.5 Main power source visual indicator

A heat alarm intended for connection to the external main power source shall be provided with a visual indicator. The indicator shall be continuously illuminated when the power source is present. The indicator shall be green when lit, but may extinguish in the alarm condition. The failure of any visual condition indicator shall not prevent the alarm condition.

4.6 Fault condition visual indicator—Optional function

Where this function is provided, the following requirements apply.

The heat alarm shall be provided with an integral visual fault condition indicator that is amber or yellow when lit. The indicator shall flash or be continuously illuminated when the fault condition is present. The indicator may be combined with the alarm condition visual indicator provided the fault visual indicator is suppressed during the alarm condition. The failure of any visual fault condition indicator shall not prevent the alarm condition.

4.7 Heat alarm signals—Requirements for heat alarms with additional features

The following requirements apply to heat alarms that employ features in addition to those required by this Standard:

- (a) The alarm condition shall take precedence over any other signal, even when such other signal is initiated first.
- (b) The alarm signal shall be distinctive from the signals of non-alarm condition functions.

NOTE: A common sounder may be used, provided distinctive signals are obtained.

- (c) If a fault condition audible signal is provided, it shall be distinctive from alarm condition audible signals.

NOTE: The fault condition audible signal may be common to other functions employed.

- (d) Any fault condition associated with features provided in addition to those specified in this Standard shall not interfere with the operation and supervision of the heat alarm.

4.8 Test facility

A test facility shall be provided to simulate the presence of the response threshold (A_{th}). The test facility shall be accessible from outside the heat alarm when installed as specified in the installation instructions.

4.9 Means of calibration

The calibration shall not be readily adjustable after production.

4.10 User-replaceable components

Except for batteries or fuses, a heat alarm shall have no user-replaceable or serviceable components.

4.11 Main power source

4.11.1 General

The main power source of the heat alarm may be internal (see Clause 4.11.2) or external (see Clause 4.11.3) to the heat alarm housing.

4.11.2 Internal

Where the main power source is internal to the heat alarm, the power source shall meet the following requirements:

- (a) It shall be capable of supplying the quiescent load of the heat alarm together with the additional load resulting from weekly operation of the test facility for 10 s over a period of at least one year before the battery-low condition is given.
- (b) It shall provide a distinctive battery-low condition fault warning audible signal before the battery is incapable of operating for alarm condition purposes (see Clause 5.15). Indication of the distinctive battery-low condition shall occur at least once every minute.
- (c) At the point when a battery-low condition commences, the heat alarm shall be capable of the following:
 - (i) An alarm condition as specified in Clause 5.16, for at least four minutes.
 - (ii) In a non-alarm condition, a fault warning for at least 30 days.
- (d) It shall be replaceable, unless the power source is non-removable and its operating life in the heat alarm is 10 years or greater.

Documented data concerning the heat alarm loads and the battery characteristics shall be provided.

4.11.3 External

Where the main power source is external to the heat alarm, an internal or external standby power source shall be provided (see Clause 4.12).

4.12 Standby power source

4.12.1 General

For heat alarms intended for connection to an external main power source, a standby power source shall be provided and the following requirements apply:

- (a) *Non rechargeable standby power source* The standby power source shall be capable of meeting the requirements of Clause 4.11.2.
- (b) *Rechargeable-cell standby power source* The standby power source shall be capable of supplying the quiescent load of the heat alarm for a minimum period of 72 h before entering a battery-low condition, at which time it shall be capable of the following:
 - (i) An alarm condition as specified in Clause 5.16 for at least 4 min.
 - (ii) In a non-alarm condition, a fault warning for at least 24 h.

Documented data concerning the heat alarm loads and the standby power source characteristics shall be provided.

4.12.2 *Monitoring of standby power source*

Where the standby power source is internal it shall be monitored for fault conditions. These conditions shall be battery-low condition and open- and short-circuit failure.

4.12.3 *Battery low condition silence—Optional function*

Where this function is provided, the following requirement applies.

Where a rechargeable-cell standby power source is used and the standby power source has become depleted due to a loss of the main power source, it shall be possible, upon the restoration of the main power source, to silence the battery low condition for up to a maximum of 24 h by the operation of a battery-low condition silence control.

NOTE: This control may be common with the test control.

4.12.4 *External power source*

Where both the main and standby power sources are external to the heat alarm the external power source shall conform to AS 7240.4. The standby power source shall be a rechargeable battery.

The transmission path(s) from the external power source to the heat alarm shall be supervised. A fault in the transmission path(s) shall initiate a visual and audible fault signal at the external power source.

4.13 *Service-disconnect facility*

Heat alarms having an internal power source that is not intended to be user-replaceable or serviceable shall have a disconnect facility. The disconnect facility shall not require the disassembly of the heat alarm. Removal of the heat alarm from its mounting base is not disassembly.

A means of indicating the disconnection shall be provided. The extinguishment of an indicator satisfies this requirement.

NOTE: A disposable tab to enable the heat alarm's internal power source on initial use does not satisfy this requirement.

C4.13 *The service-disconnect facility only applies to heat alarms where the main or standby power source is not serviceable by the end user, i.e. non removable. This facility is provided to the end user in order to disable the power source for the despatch of the heat alarm for servicing or disposal.*

4.14 *Battery connections*

Except where a polarized connector is used, lead or terminal connections to batteries shall be identified with the correct polarity (e.g. plus or minus). The polarity may be indicated on the unit adjacent to the battery terminals or leads.

Any leads connecting the terminal connectors of batteries in heat alarms to the heat-alarm circuit board shall be provided with strain-relieving devices adjacent to both battery

terminal connectors and the heat alarm circuit board, so that when the leads are subjected to a pulling force of 20 N without jerks for 1 min in any direction allowed by the design, the pull is not transmitted to the joints between the leads and the battery terminal connectors or between the leads and the heat alarm circuit board.

4.15 User-replaceable battery

4.15.1 General

Removal and replacement of user-replaceable batteries shall not require the use of tools or disassembly.

NOTE: Removal of the heat alarm from its mounting base is not disassembly.

4.15.2 Indication

The removal of any user-replaceable battery shall result in a visible, mechanical or aural indication warning that the battery has been removed. The visible warning shall not depend upon a power source.

NOTE: Conformity may be achieved by, but is not restricted to, one of the following examples:

- (a) A warning flag that will be exposed with the battery removed and the cover closed.
- (b) A hinged cover or battery compartment that cannot be closed when the battery is removed.
- (c) A unit that cannot be replaced upon its mounting base/bracket with the battery removed.

4.16 Electrical safety

The apparatus shall be designed and constructed so as to present no danger, either in normal use or under fault conditions, as determined by Clause 5.23.

4.17 Connection of external ancillary devices

The heat alarm may provide for connections to external ancillary devices (e.g. remote indicators, control relays, transmitters). Open- or short-circuit failure of these connections shall not prevent the correct operation of the heat alarm.

4.18 Terminals for external conductors

If the heat alarm or base is intended to have external connections, it shall provide for the connection of conductors by means of screws, nuts or similar means.

For mains-powered heat alarms that utilize a 'flying lead' type connector, the connector shall be regarded as a conductor. 'Flying lead' type connectors shall be subjected to a pull test, such that, when the connector is subjected to a pulling force of 20 N without jerks for 1 min in any direction allowed by the design, the connector does not become detached.

If terminals are provided, they shall allow the connection of conductors having nominal cross-sectional areas of between 0.4 mm² and 1.5 mm². Terminals shall be designed so that they clamp the conductor between metal surfaces without rotation of those surfaces but with contact pressure and without damage to the conductor. Disconnection of the conductors, or access to the conductors for disconnection, shall not be possible without the use of a tool.

4.19 Interconnectable heat alarms

A means of connecting a number of heat alarms to give a common alarm condition shall be provided in accordance with the following requirements:

- (a) The audible alarm condition shall be emitted by all of the interconnecting heat alarms when any of the interconnected heat alarms enters an alarm state.
- (b) If the heat alarms are provided with an alarm-silence facility, initiation of the alarm-silence period of one of the heat alarms shall not prevent the audible alarm condition being emitted by that heat alarm when any of the other heat alarms enters an alarm state.