NZS 4512:2003

STANDARDS
NEW ZEALAND
PAEREWA AOTEAROA

New Zealand Standard

Fire Detection and Alarm Systems in Buildings

Superseding NZS 4512:1997

NZS 4512:2003

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This Standard was prepared by the Fire Alarms in Buildings Committee (P 4512) for the Standards Council established under the Standards Act 1988.

Standards New Zealand wishes to thank the following nominating organizations for their representation on Committee P 4512:

Building Industry Authority
Disabled Persons Assembly (New Zealand) Inc.
Electrical Contractors' Association of New Zealand Inc.
Fire Protection Association, New Zealand
Fire Protection Contractors' Association of New Zealand
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New Zealand Fire Service
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AMENDMENTS

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RELATED DOCUMENTS

Reference is made in this document to the following:

NEW ZEALAND STANDARDS

NZS 4514:2002	Interconnected smoke alarms for single household units
NZS 4515:xxxx	Fire sprinkler systems for residential occupancies (in preparation)
NZS 4541:xxxx	Automatic fire sprinkler systems (in preparation)
NZS 6401:2003	Electric cables PVC insulated for working voltages up to and including 600/100 V
NZS 7702:1989	Specification for colours for identification, coding and special purposes
NZS ISO/IEC 17025: 1999	General requirements for the competence of testing and calibration laboratories

JOINT AUSTRALIAN/ NEW ZEALAND STANDARDS

AS/NZS 3000:2000	Electrical installations (known as the Australian/ New Zealand Wiring Rules)
AS/NZS 3013:1995	Electrical installations – Classification of the fire and mechanical performance of wiring systems
AS/NZS 3100:1997	Approval and test specification – General requirements for electrical equipment
AS/NZS 4130:2001	Polyethylene (PE) pipes for pressure applications
AS/NZS 5000:1999	Electric cables – Polymeric insulated
AS/NZS ISO/IEC 17020: 2000	General criteria for the operation of various types of bodies performing inspection

INTERNATIONAL STANDARDS

IEC 61000:- - - - Part 4.3:2002	Electromagnetic compatibility Testing and measurement technique – Radiated, radio-frequency, electromagnetic field immunity test

AMERICAN STANDARDS

ASTM B117-97	Standard practice for operating salt spray (fog) apparatus

AUSTRALIAN STANDARDS

AS 1603:- - - -	Automatic fire detection and alarm systems
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AS 1939:1990	Degrees of protection provided by enclosures for electrical equipment
AS 2220:- - - -	Emergency warning and intercommunication systems in buildings
Part 1:1989	Equipment design and manufacture
Part 2:1989	System design, installation and commissioning

BRITISH STANDARDS

BS 2011:- - - -	Environmental testing
Part 2.1Ca:1977	Tests. Test Ca. Damp heat, steady state
BS 5445:- - - -	Components of automatic fire detection systems
Part 7:1984	Specification for point-type smoke detectors using scattered light, transmitted light or ionization
BS 5839:- - - -	Fire detection and alarm systems for buildings
Part 2:1983	Specification for manual call points
BS EN 54-5:2001	Fire detection and fire alarm systems: Heat detectors. Point detectors.
BS EN 54-7:2001	Fire detection and fire alarm systems: Smoke detectors. Point detectors using scattered light, transmitted light or ionization.
BS EN 54-10:2002	Fire detection and fire alarm systems: Flame detectors. Point detectors.
BS EN 54-11:2001	Fire detection and fire alarm systems: Manual call points
BS EN 54-12:1996	Fire detection and fire alarm systems: Optical smoke detectors
BS EN 50130-4: 1996	Alarm systems. Electromagnetic compatibility. Product family standard: Immunity requirements for components of fire, intruder and social alarm systems.

BS EN 60068-2:- - - -	Environmental testing. Test methods.
Part 1:1993	Tests A. Cold
Part 2:1993	Tests B. Dry heat
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BS EN 60651:1994	Specification for sound level meters

OTHER PUBLICATIONS

Building Industry Authority	New Zealand Building Code Handbook and Approved Documents
NZECP 28	New Zealand Electrical Code of Practice, Selection and Installation of Cables
SAA HB 20:1996	Graphical symbols for fire protection drawings
UL 268:1996	Smoke detectors for fire protective signalling systems
UL 521:2002	Heat detectors for fire protective signalling systems

NEW ZEALAND LEGISLATION

Building Act 1991
Building Regulations 1992
Electricity Regulations 1997
Fire Safety and Evacuation of Buildings Regulations 1992
Fire Service Act 1975
Local Government Act 1974
New Zealand Building Code (Schedule 1 of New Zealand Building Regulations 1992)
Radiocommunications Regulations 2001

FOREWORD

This Standard provides a complete specification for the design, manufacture, installation and maintenance of *building* alarm systems, whether operated manually or automatically in the event of *fire*. It is intended that this Standard will continue to be used as an integral part of the Acceptable Solutions by the Building Industry Authority Approved Documents, and also to facilitate New Zealand Fire Service approval of *evacuation schemes* under the Fire Safety and Evacuation of Buildings Regulations.

This edition is a partial technical revision of, and supersedes, NZS 4512:1997. It incorporates a complete revision of NZS 2139:1967 (*Specification for heat actuated fire detectors*) in the form of a normative appendix.

This Standard does not specify what type of alarm system is required for a particular *building*. Instead, based on "*declared functional requirements*" determined by the system *owner*, it provides an integrated set of rules for the correct design, manufacture, installation and maintenance of the system.

This Standard is applicable to *fire alarm systems* in *buildings*, except for interconnected smoke alarms in single household units which are covered in NZS 4514.

Several substantive changes have been made to reflect shifts in technology. These include the use of supplementary alphanumeric displays, verbal messages to enhance alarm recognition, and indicators to aid location of an operated *detector*. Remote signalling technology advances have led to the deletion of the previous allowance of a single site-wide "*sector control unit*" alarm.

Field experience, the desire to reduce unwanted alarms, and improved technology have led to some relaxations regarding signalling of *fire* on failure, the coverage area of a single *control unit*, the location of *detectors* in the presence of beams and joists, and the equivalence of a sprinkler head to a *heat detector*. Changes have also been made to better provide for the increasing use of *staged evacuation*.

To achieve a higher degree of national consistency, more detailed specifications have been included for *indicating units* intended for Fire Service use.

New sections cover requirements for delay timers and *owner* isolation facilities in special circumstances. Specific verification methods have been provided for battery and charger capacity calculations. Informative appendices have been added to aid system specifiers and installers with the tasks of *detector* selection and location, and the integration of supplementary *detectors* and systems.

The installation of such systems being in considerable decline, specific provisions for pneumatic *fire alarm systems* have been discontinued

in this edition. A replacement general provision has been introduced to allow the alternative use of pneumatic and other specialist non-electronic *fire* detection technologies.

To assist with New Zealand Building Code (NZBC) compliance, some terminology (especially that referring to system types) has been aligned more closely with the Approved Documents for the NZBC.

Where possible, alignment with suitable overseas or international standards has been sought, however this has not been at the expense of reliability and cost-effectiveness in *fire* protection.

To allow time for the development and approval of new equipment and contracts, the changed or new provisions and requirements of the following clauses will not become effective until three months from the date of publication of this Standard:

107.1(e), 401.1, 402.8.2, 403.1.2, 404.1, 405.2.1 (m), 506, A3.2.

The changed or new provisions and requirements of the following clauses will not become effective until twelve months from the date of publication of this Standard:

204.7, 204.9, 204.13, 205.4, 207.2, 208.1 (b), 208.1 (c), 208.1 (g), 208.1 (h), 210.6, 211.6, 212.6(b), 216.5, 216.7, 216.11, 218.6 (a), 218.6 (c), 218.8 (a), 402.2 (n), 402.9, 405.4, 406.1, A3.4, E4, E7.

REVIEW OF STANDARDS

Suggestions for improvement of this Standard will be welcomed. They should be sent to the Chief Executive, Standards New Zealand, Private Bag 2439, Wellington 6020.

NEW ZEALAND STANDARD

FIRE DETECTION AND ALARM SYSTEMS IN BUILDINGS

PART 1
GENERAL

101 SCOPE

101.1 General
This Standard specifies the requirements for *fire detection and alarm systems* in *buildings*. It applies to their design, installation, extension, modification, commissioning, testing and maintenance.

101.2 Application
This Standard applies to the following *fire alarm systems*:

(a) *Single zone* (manual or automatic) – see Part 3;

(b) *Multizone* (manual or automatic) – see Part 2.

101.3
Equipment to this Standard is intended to operate within the temperature range 0 ºC to 40 ºC. Special precautions will be necessary for more adverse conditions.

101.4
This Standard specifies performance and test requirements for electrical and electronic *fire alarm systems*. Alternative technologies that do not comply with the specific requirements but give equivalent performance are not necessarily prohibited. In such cases, appraisal testing will need to demonstrate this to the satisfaction of the relevant authority.

102 OBJECTIVE
The objective of this Standard is to provide specifiers, users, *manufacturers*, suppliers, installers and maintenance *persons* with requirements to enable a *fire* warning from a *fire alarm system* in a *building* to operate at the earliest practicable moment to facilitate appropriate emergency measures.

103 INTERPRETATION

103.1
In this Standard the word “shall” identifies mandatory requirements for compliance with the Standard, while the word “should” refers to practices which are advised or recommended.

103.2
This Standard contains two types of Appendices. A ‘normative’ Appendix forms an integral part of the body of a Standard. An ‘informative’ Appendix is only for information and guidance. All Appendices for reasons of convenience, are placed after the body of the Standard.

103.3
Terms that are italicized in the text are defined in section 104.

103.4
Interpretations and clarifications of this Standard shall be referred to Standards New Zealand.

104 DEFINITIONS

For the purposes of this Standard the following definitions shall apply:

ADDRESSABLE FIRE ALARM SYSTEM. An *automatic fire alarm system* that can identify at the *control unit* the status of the individual *detectors* or *manual call points*, or the status of groups of *detectors* or *manual call points* that are part of a common *zone*.

ALARM TRANSPORT SYSTEM. An alarm communications system offering a communication link between 2 points without necessarily having a dedicated signal path between the 2 points.

ALERTING DEVICE. A device that gives warning to the occupants of the *building* that the *fire alarm system* has been actuated. An *alerting device* may comprise an audible or *visual alarm* or a combination of both.

AMBIENT NOISE LEVEL. The average A-weighted sound pressure level measured over the noisiest period 30 minutes of normal use.

ANALOGUE DETECTOR. A *detector* which automatically provides information on the level of the *fire* phenomenon that it monitors to the *control unit* which determines the significance of that information.

ANCILLARY SERVICES. See section 203.

APPRAISAL CERTIFICATE. A certificate, containing detailed testing results supporting a technical opinion that a specifically identified *fire alarm system* complies with the requirements of this Standard, and which has been issued by a laboratory accredited for that purpose. Laboratories which have been appropriately accredited to NZS ISO/IEC 17025 by an internationally recognized accreditation organization are deemed to satisfy this requirement.

ASPIRATED SMOKE DETECTOR. A *smoke detector* having an aspirator mechanism to induce airflow via the pipe network into the detection chamber.

AUDIBLE ALARM. A sound signal indicating an alarm condition.

AUTOMATIC FIRE ALARM SYSTEM. A *fire alarm system* that can automatically initiate an alarm in response to a *fire*.

BASEMENT. Has the same meaning as in the New Zealand Building Code Handbook.

BUILDING. Has the same meaning as in the Building Act.

BUILDING CONSENT. Has the same meaning as in the New Zealand Building Code Handbook.

CO-LOCATED. Two pieces of equipment are *co-located* when they are separated by a distance of no more than 5 m and have common access.

COMBUSTIBLE. See *non-combustible*.

COMPLIANCE SCHEDULE. Has the same meaning as in the Building Act.

CONCEALED SPACE. Has the same meaning as in the New Zealand Building Code Handbook.

CONTROL UNIT (or ZONE CONTROL UNIT). A cabinet containing equipment for controlling the *fire alarm system* in one or more *zones*, and which may also incorporate an *indicating unit*.

DECLARED FUNCTIONAL REQUIREMENTS. The purpose or purposes, from those *listed* in this Standard, intended by the *owner* to be performed by the *fire alarm system*.

DEFECT WARNING. See *signals*.

DEMARCATION POINT. The place of first termination of a transmission circuit after entering a *building*, as designated by the telecommunications service provider.

DETECTOR. A device that operates automatically at predetermined conditions associated with *fire* and which initiates a *fire alarm*. See also *analogue detector*, *aspirated smoke detector*, *fixed temperature detector*, *flame detector*, *heat detector*, *line type detector*, *point type detector*, *rate of rise detector* and *smoke detector*,

NOTE – More than one definition can apply to a *detector*.

EMERGENCY WARNING AND INTERCOMMUNICATION SYSTEM (EWIS). A system which provides emergency warning incorporating *alerting devices* and loudspeaking voice facilities, and which may also incorporate an intercommunication feature.

ESCAPE ROUTE. Has the same meaning as in the New Zealand Building Code Handbook.

EVACUATION SCHEME. Refer to the Fire Safety and Evacuation of Buildings Regulations.

EXITWAYS. Has the same meaning as in the New Zealand Building Code Handbook.

FIRE. Has the same meaning as in the New Zealand Building Code Handbook.

FIRE ALARM. See section 204.

FIRE ALARM SIGNAL. See *signals*.

FIRE ALARM SYSTEM. An installation of apparatus, which performs specified *fire* related functions in response to the operation of a *detector*, *manual call point* or other input. It includes *manual call points*, *detectors* (optional), control and indication equipment, *alerting devices*, interconnections, fittings, labels and energy sources. Where the system is connected to a *remote receiving centre*, it will also include remote signalling devices.

FIRECELL. Has the same meaning as in the New Zealand Building Code Handbook.

FIRE DETECTION AND ALARM SYSTEM. See *fire alarm system.*

FIRE DOOR. Has the same meaning as in the New Zealand Building Code Handbook.

FIRE RESISTANCE RATING (FRR). Has the same meaning as in the New Zealand Building Code Handbook.

FIXED TEMPERATURE DETECTOR. A *detector* designed to operate when the temperature at the *detector* exceeds a predetermined value.

FLAME DETECTOR. A *detector* designed to operate in response to the occurrence of flame.

HEAT DETECTOR. A *detector* designed to operate when the temperature at the *detector* exceeds a predetermined value.

INDICATING UNIT. Equipment incorporating devices for indicating the *zone* (or *sector* on a *sector indicating unit*) where an alarm has originated. An *indicating unit* may incorporate a *zone index*, and may be integral to or separate from a *control unit*. A *fire alarm system* may have several *indicating units*.

NOTE – The principal Fire Service attendance point is designated the main *indicating unit*, and will incorporate a *zone index* and fire fighter's controls.

ISOLATE. See *signals*.

LATCHING. A *detector*, circuit or system state that is held in the operating condition until manually reset, even after the removal of the cause of operation.

LINE TYPE DETECTOR. A *detector* in which the sensitive element extends along its length.

LISTED. Equipment, components and materials that have been approved and *listed* for *fire* protection purposes by a recognized test and approval body, and which conform with the requirements of this Standard.

NOTE – The Fire Protection Association of New Zealand maintains a register of *listed* equipment, components and materials.

MANUAL CALL POINT. A manually operated device that initiates a *fire* alarm.

MANUAL FIRE ALARM SYSTEM. A *fire alarm system*, which initiates an alarm in response to the operation of a *manual call point*.

MANUFACTURER. Unless specifically stated otherwise the company which either manufactures or imports the *control unit* of a *fire alarm system*, and is responsible for designating types and makes of components which may be connected to the *control unit* and the correct method of connection.

MULTIZONE FIRE ALARM SYSTEM. A *fire alarm system* where *detectors* and/or *manual call points* are located in more than one *zone*.

NON-COMBUSTIBLE. Has the same meaning as in the New Zealand Building Code Handbook.

NON-LATCHING. A *detector*, circuit or system state that automatically resets on the removal of the cause of operation.

OWNER. Has the same meaning as in the New Zealand Building Code Handbook.

PERSON. Has the same meaning as in the New Zealand Building Code Handbook.

POINT TYPE DETECTOR. A *detector* in which the sensitive element is a compact unit of small area.

RATE OF RISE DETECTOR. A *detector* designed to operate when the rate of temperature rise at the *detector* exceeds a predetermined value.

RATED TEMPERATURE. The operational temperature of a *detector's* fixed temperature element as specified by the *detector manufacturer*.

REMOTE RECEIVING CENTRE. A monitoring centre for taking immediate action as a result of a *fire alarm* and/or other off-normal *signals*.

SECTOR. An area containing one or more *zones* and able to be covered by one *control unit*.

SECTOR INDICATING UNIT. A cabinet containing equipment for controlling two or more *sectors* and normally incorporating an externally visible display.

SIGNALS

DEFECT WARNING. A signal indicating an equipment fault condition.

FIRE ALARM. A signal indicating a *fire* condition.

ISOLATE. A signal indicating that the system is *isolated* from the *remote receiving centre*.

SINGLE ZONE FIRE ALARM SYSTEM. A limited type *fire alarm system* for use where all *detectors* and/or *manual call points* are located in only one *zone*.

SMOKE DETECTOR

(a) Ionization type responds to the presence of gaseous or invisible products of combustion causing a change in ionization currents within the *detector*;

(b) Photo-electric type responds to the scattering or absorption of light by suspended particles.

STAGED EVACUATION. The evacuation of *persons* from one part of a *building* to another part of the *building*, prior to outside the *building*, should that be necessary.

NOTE – Refer to the Fire Safety and Evacuation of Building Regulations and the Fire Service Act.

STAIRWAY. Has the same meaning as in the New Zealand Building Code Handbook.

TERRITORIAL AUTHORITY. Has the same meaning as in the Local Government Act.

VISUAL ALARM. A steady or flashing visual indication of an alarm condition.

ZONE. An area uniquely defined by the equipment to assist *fire* fighters in searching for a *fire* and controlling evacuation.

ZONE CONTROL UNIT. See *control unit*.

ZONE INDEX. A combination of diagrams, symbols and text forming part of an *indicating unit*, to identify the location of, and general access to individual *zones*.

NOTE – A *zone index* is often called a "mimic panel" (if located remotely from the *control unit*) or a "*fire alarm* panel" if integral with a *control unit*.

105 DECLARED FUNCTIONAL REQUIREMENTS

In order to establish which requirements of the Standard apply to a particular *fire alarm system*, the intended functions of that system shall be nominated by the *owner* as the system's *declared functional requirements* having regard to all regulatory, contractual, insurance or other obligations. The *declared functional requirements* should at least define the requirements in terms of the following:

(a) To transmit an alarm to summon New Zealand Fire Service assistance;

(b) To monitor, and signal to a remote location, the presence of faults;

(c) To automatically operate *alerting devices*;

(d) To indicate the *zone* of an operated *detector* or *manual call point*;

(e) To initiate certain ancillary *fire* related functions;

(f) To transmit an alarm to summon some other specified emergency *fire* related assistance;

(g) To detect heat, smoke, pre-combustion aerosols or other *fire* related phenomena. Such phenomena shall be characteristic of a *fire* and shall use appropriate design criteria to minimize the occurrence of unwanted alarms.

Where the *declared functional requirements* include item (a), the alarm system shall signal directly to a New Zealand Fire Service *remote receiving centre* (by means of a non-verbal message) in accordance with Appendix A.

NOTE – Where it is a declared functional requirement to facilitate *staged evacuation* as per the Fire Service Act Section 21A, it is strongly recommended that prior consultation be undertaken, and agreement be established in writing, between the *building owner* and the Fire Service to define the performance requirements necessary to gain *evacuation scheme* approval.

106 TYPES OF FIRE ALARMS

Types of *fire alarms* referred to in this Standard are described in Appendix B.

107 COMPLIANCE

107.1

Only *fire alarm systems*, which conform in every respect with this Standard, shall be deemed to comply with this Standard. The installation shall therefore:

(a) Be undertaken by competent and qualified personnel (see section 109) who have access to all relevant technical instructions published by the *manufacturer*;

(b) Be in conformity with the *manufacturer's* instructions;

(c) Be in conformity with all other requirements of this Standard;

(d) Use only *listed* equipment and components;

(e) Be certified as being compliant by an accredited inspection body that has been independently accredited by an internationally recognized accreditation body to AS/NZS ISO/IEC 17020 as competent to inspect to NZS 4512.

NOTE – It is the *territorial authority's* decision whether or not to accept the above certification as a Producer Statement.

107.2
Any addition to, or modification of, a *fire alarm system* originally installed to this Standard shall also comply with the requirements of this Standard and shall be compatible with the system originally installed.

107.3
It is necessary, for continued compliance with this Standard, that the *fire alarm system* installed in accordance with this Standard shall be inspected, tested, repaired and maintained in accordance with the requirements specified herein.

107.4
A *fire alarm system* installed in compliance with any Standard then current which subsequently was superseded by this Standard (e.g. pneumatic systems) may be deemed to comply with this Standard provided that:

(a) It remains in good working order;

(b) It is tested and maintained monthly, and annually surveyed in accordance with this Standard;

(c) Any deficiencies found as a consequence of 107.4 (b) are put right; and

(d) Any alterations to the *fire alarm system* comply with this Standard to the extent permitted by the technology of the original system.

In order to maintain compliance with this Standard, all *fire alarm systems* should, as far as possible, be inspected, tested, repaired and maintained in accordance with this Standard.

NOTE – Where full compliance with the current version is not possible, detailed *compliance schedule* requirements should be submitted to the *territorial authority* to replace the normal requirement.

107.5
Although it may be technically feasible to interchange components of one *manufacturer's fire alarm system* with those of another *manufacturer*, this is not permissible unless such options form part of the *manufacturer's* published instructions.

108 LEGISLATIVE REQUIREMENTS

Attention is drawn to the need to comply with all relevant legislative requirements including but not limited to:

(a) Building Act;

(b) New Zealand Building Code;

(c) Electricity Regulations;

(d) Radiocommunications Regulations;

(e) Fire Service Act; and

(f) Fire Safety and Evacuation of Buildings Regulations.

109 WORKMANSHIP AND COMPETENCY

All work relating to the design, manufacture, installation, commissioning and maintenance of *fire alarm systems* shall be carried out in a thorough and workmanlike manner in accordance with sound trade practice, and by appropriately competent and qualified personnel.

Personnel qualified to the applicable industry training programme recognized by the New Zealand Qualifications Authority shall be deemed to satisfy the requirement to be competent and qualified.

NOTE – An appropriate qualification for installation, commissioning and maintenance is the New Zealand Qualifications Authority National Certificate in Fire Detection and Alarms.

110 RELIABILITY

The construction of all built-up equipment shall be carried out with high inherent reliability as the major objective. *Fire alarm systems* operate continuously in a wide range of conditions and applications.

PART 2
DESIGN AND CONSTRUCTION – MULTIZONE FIRE ALARM SYSTEMS

NOTE – The equipment design requirements for *single zone fire alarm systems* are set out in Part 3.

201 TYPE AND FUNCTION

201.1
The intended function of any particular *fire alarm system* shall be that declared by the *owner* in accordance with the list of functional requirements in section 105.

202.2
Fire alarm systems are required to indicate automatically the existence of malfunctions *listed* in section 208.

201.3
Automatic fire alarm systems shall include *manual call points* to supplement the automatic *fire* detecting devices.

201.4
In addition, the alarm system may be used to initiate ancillary functions set out in 203.1.

201.5
The *fire alarm systems* required for *buildings* are:

(a) Those defined in the *building consent* issued by the *territorial authority* for the *buildings* in which they are installed; or

(b) Existing types of system in unaltered *buildings*.

202 ZONES
To assist in locating a *fire* or other cause of alarm initiation it is necessary to divide the *buildings* into *zones*. All the *detectors* and *manual call points* in one *zone* shall be associated with the appropriate indicator on the *control unit zone index*. All *alerting devices* in one *zone* shall operate together except as permitted in Type 5 systems (refer 406.11).

203 ANCILLARY SERVICES

203.1
The *control unit* may be designed so that, in addition to giving an alarm on the operation of a *detector* or *manual call point*, it will initiate but not power other *fire* related functions such as the actuation of ventilating systems, emergency lighting, lift control or other *building* services.

203.2
Such additional equipment shall be connected to the *fire alarm system* through a relay, relays or other similarly effective isolating devices and arranged so that the additional equipment cannot adversely affect the system or prejudice the performance of the system. Such equipment other than the isolating devices shall be contained in a separate compartment.

203.3
Voltages in excess of 32 V a.c. (r.m.s.) and 50 V d.c. associated with *ancillary services* shall not enter the *control unit*.

203.4
The monitoring of pressure switches or flow switches in ancillary *fire* safety systems, for the purpose of operating indicators on an index or summoning service in the event of a defect, may utilize a *fire alarm system* circuit or address provided the circuit or address is configured not to generate a *fire alarm*.

203.5
The *fire alarm system* shall not be used to monitor the functioning or failure of any element of the *ancillary services* not directly related to *fire* safety. Indicators in accordance with 210.5 and manual controls for *ancillary services* should be provided on or adjacent to the index (see 402.8.2).

204 FIRE ALARM

204.1
The operation of one or more *detectors* or *manual call points* shall result in a *fire alarm* being given by:

(a) *Alerting devices* in the *building*;

(b) A visual indication on the *indicating unit* for each *zone* in which a *detector* or *manual call point* device operates;

(c) Initiation of a *fire alarm signal* to a *remote receiving centre* where a communication link to such a centre is provided;

(d) The foregoing requirements shall be optional in respect of *detectors* installed additional to the basic coverage, to initiate supplementary actions and *smoke detectors* installed for local alarm, in compliance with 406.11. (See also Appendix C).

204.2
The *fire alarm* as given by 204.1(b) and (c) shall continue in operation until manually reset. The *fire alarm* initiated by additional *detectors* per 204.1(d) may reset automatically once the device originating the alarm is reset. Resetting facilities shall be in accordance with 206.2.

204.3
The visual signal specified in 204.1(b) shall also be given on any repeater *indicating unit*, which may be provided to suit Fire Service access.

204.4
When audible *alerting devices* incorporate voice facilities and are also used as part of a public address system, the *fire alarm* shall override any other signal except those which properly override the *fire alarm*. (See 218.8.)

204.5
The operation of a *manual call point* for a period greater than 1 second (s) shall cause the system to latch into the *fire alarm* condition.

NOTE – A short delay is desirable to prevent false alarms due to contact bounce caused by shock or vibration.

204.6
The delay in equipment response to a *detector* or *manual call point* operating shall not exceed 15 s. The system shall latch in the *fire alarm* condition after the delay period.

NOTE – Such delays should be minimized.

204.7
An alarm verification facility shall be provided whereby a point type *smoke detector* circuit shall operate twice before a *fire alarm* is signalled unless an analogue detection algorithm is used to provide an equivalent function. Upon the first operation, the *detector* circuit shall be held reset for a period not exceeding 15 s. During an ensuing period of not less than 90 s and not more than 120 s, further *detector* operation shall signal a *fire alarm* without further delay. In this instance, the time period of 204.6 is measured from the second operation. The accumulated delay of 204.6 and 204.7 shall not exceed 30 s.

204.8
A *fire alarm* shall not be given by an equipment defect external to the *control units* unless the condition exactly reproduces the effect of the operation of a *detector* or *manual call point*.

204.9
A *fire alarm* shall not be given by an open circuit (resistance greater than 50 kΩ) or a short circuit (resistance less than 50 Ω) on any *zone* circuit to a *detector* or *manual call point*.

204.10
A *fire alarm* shall not be cancelled by the operation of *detectors* or *manual call points* in another *zone*.

204.11
A *fire alarm* shall override any *defect warning* signal specified in section 208, to the extent that the nature of the defect does not prevent the signalling of the *fire alarm*.

204.12
The *fire alarm signal* to the *remote receiving centre* shall latch and shall not be overridden by any subsequent condition.

204.13
When remote transmission of a *fire alarm* is initiated, the switching of heavy loads (e.g. *alerting devices*) from the same power source shall be delayed for at least 2 s (but note 204.6).

205 SILENCING SWITCHES

205.1
The *fire alarms* as specified in 204.1(a) shall continue to operate until either the system is restored to normal or a silencing switch is operated.

205.2
Two silencing switches shall be incorporated, one inside and the other outside the *control unit* cabinet. Operation of the outside silencing switch shall result in a *defect warning*.

205.3
The switch inside the cabinet shall be so arranged that it is not possible to leave the *alerting devices* inoperative when the cabinet is closed and in the normal operational condition.

205.4
The switch outside the cabinet shall be operable by a “Bulgin 6083/C” patterned key and shall be clearly designated “SILENCE ALARMS. BRIGADE USE ONLY”. On restoration of this switch to the normal position, *fire alarms* from activated *zones*, *detectors* or *manual call points* shall be *isolated* from indicating and generating further *fire alarms* until the system is manually reset, and any remotely-signalled *fire alarm* shall be replaced by a defect signal. All non-isolated *zones* and devices shall continue to function as normal including the remote signalling of *fire alarms* and the activation of *alerting devices*. The key shall

not be removable in the silence position. Operation of this switch shall not prevent the operation of the *alerting devices* by any other source.

205.5
Any other system (e.g. sprinkler Fire Brigade Alarm (FBA)), which can actuate the *alerting devices*, shall incorporate on, or adjacent to its *control unit*, an external "Bulgin 6083/C" patterned key switch, clearly designated "SILENCE ALARMS. BRIGADE USE ONLY". Operation of this switch shall not prevent the operation of the *alerting devices* by any other source. In addition, operation of this switch shall not generate a *defect warning* via the *fire alarm system*.

206 MANUAL RESET FACILITIES

206.1
It shall not be possible to reset the system to normal without having first restored the operated *detectors* or *manual call points*.

206.2
Resetting shall be accomplished only by the operation of self-restoring type switches mounted inside the cabinet or by other devices fulfilling the same function.

207 EVACUATION AND ALERT SWITCHES

207.1
A key-operated switch, operable by a "Bulgin 6083/C" patterned key, shall be provided for manually activating all of the *alerting devices* in the *building* without initiating a call to a *remote receiving centre*. This shall be used for trial evacuation. The switch shall be labelled "EVACUATION".

207.2
Where a particular *building* has a *staged evacuation*, or where a *staged evacuation* is part of the *evacuation scheme*, a key operated switch, operable by a "Bulgin 6083/C" patterned key, shall be provided for manually activating the alert signal in the *building* without initiating a call to a *remote receiving centre*. This shall be used for trial alerting. The switch shall be labelled "ALERT".

207.3
Where there is provision for alerting by *zones* (*staged evacuation*), appropriate facilities should be provided to allow *fire* fighters to start the evacuation alarm in each *zone*.

208 DEFECT WARNING

208.1
A *defect warning* shall be given in the event of any of the following occurring:

(a) The average cell voltage (measured with quiescent load current and without assistance from the battery charger) falling below 2.03 V in an unsealed lead acid battery. For other battery types, this threshold voltage should equal the battery *manufacturer's* specified 50 % capacity value measured at the quiescent load.

NOTE – A typical *defect warning* voltage for a 12 V sealed lead acid battery is 12.2 V.

(b) Abnormally high or low impedence condition (e.g. an open or short circuit) of the *zone* circuit to a *detector* or *manual call point* which would prevent that *detector* or manual callpoint from initiating a *fire alarm* as specified in section 204;

(c) Removal of any *detector* or *manual call point* from a circuit;

(d) Absence of any plug-in *zone* circuit board or relay that control the *alerting devices*;

(e) Operation of the silencing switch outside the *control unit* cabinet;

(f) Abnormally high or low impedance condition (e.g. an open or short circuit) on the circuit wiring to *alerting devices* (including wiring to loud speakers);

(g) Abnormally high or low impedance condition (e.g. an open or short circuit) on the connection to any evacuation switch (see section 207) remotely located from the *zone control unit*;

(h) Abnormally high or low impedance condition (e.g. an open or short circuit) on the connection to any *indicating units* remotely located from the *control unit*;

(i) Failure of an addressable device on an *addressable fire alarm system*, unless the condition exactly reproduces the effect of the operation of a *detector* or *manual call point*;

(j) Repeated failure of a watchdog to re-start a software program (see 224.1);

(k) Failure of a software configuration to pass the data check procedures (see 224.2);

(l) Failure of any monitored aspect of an *aspirated smoke detector* or system;

(m) A fault condition on an associated *emergency warning and intercommunication system (EWIS).*

A *defect warning* does not need to be given during a *fire alarm*.

208.2
A *defect warning* shall be given by a visual indicator on the *indicating unit* and by the initiation of a *defect warning* signal transmitted to the *remote receiving centre*. Where such a communication link is not provided, an audible warning shall be provided from a device situated within or external to the *control unit* (refer 208.5 and 402.7).

208.3
The delay in equipment response to the occurrence of a defect condition shall not exceed 60 s.

208.4
The *defect warnings* shall automatically cancel on removal of the defect.

208.5
The audible device specified in 208.2 used for giving a *defect warning* shall be distinctive and of a different character from the audible *fire alarm signal*.

208.6
Provision may be made for cancelling the audible *defect warning* by means of a monitored or self-restoring switch external to the *control unit*. Where such provision is made, the removal of the defect shall automatically reset the audible *defect warning* circuit.

209 MANUAL ISOLATION FROM REMOTE RECEIVING CENTRE
Facilities shall be provided for manually isolating the normal alarm functions of the system from the *remote receiving centre*. A mechanism shall also be incorporated to guard against the system inadvertently being left in the *isolate* mode. Isolating of the system shall initiate an *isolate* signal being transmitted to the *remote receiving centre*.

210 INDICATORS AND INDICATING UNITS

210.1
Indicators shall be lamps, shutters, light-emitting diodes (LEDs), liquid crystal displays (LCDs), message screens or other suitable devices appropriate to the system.

210.2
Where incandescent filament lamps are used for *fire* indication, each indicator shall consist of 2 lamps connected in parallel; the failure of either lamp shall be evident during routine testing.

210.3
The operation of one indicator shall not prevent the proper and separate operation of indicators of a minimum of 4 other *zones*.

210.4
The operation of any *alerting device* or the transmission of a signal to a *remote receiving centre* shall not be prevented by any incandescent lamp defect.

210.5 Indicating units

210.5.1
Indicating units shall incorporate:

(a) A *fire alarm* indicator for each *zone*, coloured red;

(b) A common *defect warning* indicator, coloured amber or yellow; and

(c) A common normal condition indicator, coloured green.

210.5.2
Supplementary alarm indicators from an associated system, when installed (e.g. sprinkler flow switch, sprinkler operated etc.) shall be coloured red.

210.5.3
Ancillary services operated indicators, where required, shall be coloured amber or yellow. Indicators associated with *fire* fighters' emergency services controls (e.g. air handling) may be coloured according to their function, provided they are clearly separated and distinctive from all other indicators.

210.5.4
All indicators shall be clearly labelled.

210.6 Indicators

210.6.1
Indicators on *indicating units*, whether forming part of a *control unit* or not, shall, when operated, clearly and unambiguously indicate their function at a viewing distance of up to 2 m, at any viewing angle up to 30° from the optical centre line, and when illuminated at an incident light level up to 3000 lux.

210.6.2
Where *indicating units* are physically separate from the *control unit*, the indicators on the *control unit* need not comply with the 2 m viewing requirement.

210.7

Where an alphanumeric display is provided for Fire Service use, it shall meet the following requirements:

(a) A display which is legible and readable in all light conditions (0-3000 lux minimum range);

(b) Letters and numerals with a minimum font height of 4.5 mm;

(c) A display capacity of at least one alarm;

(d) A single operation required to access the next alarm indication. The last indication shall be followed by the first;

(e) Alarm *signals* retained in chronological order of receipt;

(f) Alarm signal buffer storage with a capacity of not less than 99 alarms, or all possible alarms, whichever is the lesser. Alarms from *isolated zones* or *detectors* shall not reduce this requirement;

(g) A display service life expectancy of not less than 10 years;

(h) The following minimum information, clearly identified and simultaneously displayed:

(i) *Zone* location. A minimum of 23 characters shall be allocated for the description of the alarm *zone* location

(ii) *Zone* status (the condition of an alarm *zone*). Only the following terms (in full or abbreviated, case immaterial, as follows) shall be used: alarm, defect (Def) or fault (Flt), *isolated* (Isol), acknowledged (Ack'd or Ackd)

(iii) Alarm type (in full or abbreviated, case immaterial) as appropriate: e.g. smoke, heat, flame, carbon monoxide (CO), flow switch (FSW), *manual call point* (MCP), pressure switch (PSW), sprinkler (SPR)

(iv) Total number of *zones* in alarm.

NOTE – Additional information may be displayed such as *zone* number, alarm, sequence number, *detector* number and time.

(i) A display test facility;

(j) An acknowledgement facility which when operated shall cause the *zone* status indication to display an acknowledgment of the alarm signal displayed. The acknowledge function shall not cause any change of status of any output signal, e.g. *alerting device* or remote signalling.

211 ELECTRICAL SUPPLY

211.1

The supply to the control and indicating equipment shall consist of either a mains powered battery charger and a rechargeable battery or alternatively a non-rechargeable battery which may be provided with a mains supply unit. The mains powered supply or battery charger may be mounted within, or external to the equipment cabinet, but its wiring and construction shall provide adequate electrical safety protection for compliance with the Electricity Regulations even when the cabinet door is open. The voltage at which the control and indicating equipment operates shall not exceed 50 V d.c. or 32 V a.c.

NOTE – This is not intended to preclude the use of industry standard signalling voltages such as the 100 V line levels commonly used to drive loudspeakers. Where such voltages are used, attention is drawn to the need for the installation and servicing to comply with the Electricity Regulations.

211.2
Alerting devices and multi-point *aspirated smoke detector* systems may be powered either:

(a) From the same battery as the control and indicating equipment, or

(b) From an independent battery supply provided that each battery supply is independently monitored in accordance with section 208, and any rechargeable battery has its own charger in accordance with section 212.

Where the type of *alerting device* is not suited to being powered by either of the above means an alternative power source may be used. This shall be an independent source of equivalent reliability.

211.3
The electrical supplies to a *fire alarm system* shall be exclusive to the system.

211.4
The wiring from any battery shall be protected by overcurrent devices of appropriate rating.

211.5
The *fire alarm system* equipment shall perform all its required functions over the whole voltage range of the nominal battery voltage ±20 % and the standard mains voltage ±10 %.

NOTE – For the purposes of this Standard the nominal voltage is defined as 2 V for lead acid cells.

211.6
Complete failure of the electrical power supply of the *control unit* shall not initiate a *fire* signal.

NOTE – See A3 regarding power supplies for transmitting devices.

212 BATTERY CHARGER

212.1
The charger for a rechargeable battery shall be capable of restoring the capacity stated in 213.1 within a period of 24 hours (h) while carrying any non-alarm load normally supplied by that battery (see section 503 (f)).

NOTE – The non-alarm load is the sum of all quiescent current and *defect warning* equipment currents. The maximum alarm load is the sum of the load currents with all *zones* in alarm mode and all *alerting devices* operating.

212.2
The charger is not required to carry any of the alarm load.

212.3
Automatic output control shall maintain the charge within the levels specified by the battery *manufacturer*.

212.4
Automatic control shall also limit the output current to the maximum rated value of the unit when lead acid batteries discharged to 1.85 V per cell are connected to the system.

212.5
For lead acid batteries the 'float' voltage (with the system connected for normal usage) shall be maintained within 2.20 ±0.03 V per cell unless different voltages are specified by the battery *manufacturer*.

212.6
The battery charger current shall be automatically inhibited for a specific period at regular intervals to allow the battery voltage to be sampled without the assistance of the battery charger. A *fire alarm* shall not be given by a battery failure during these tests. Two tests shall be carried out as follows:

(a) A short duration test to check that the battery is connected. This test shall inhibit the battery charger current for a brief period so that a *defect warning* is given if the battery is disconnected or if the battery fuse is blown. A continuous *defect warning* shall be generated for the duration of the fault. The interval between the tests shall not exceed 30 s;

(b) An extended test period to check battery capacity. This test shall inhibit the battery charger current for a duration between 30 min and 90 min. The interval between these tests shall not be less than 20 h, nor greater than 72 h. A *defect warning* shall be given within 60 s should the battery voltage fall below the level specified by 208.1(a) and shall latch until the end of the extended test period. At the end of the test period the defect signal shall be unlatched.

213 RECHARGEABLE BATTERIES

213.1
The nominal capacity at 20 °C of any battery normally supplying a non-alarm load shall be sufficient to supply the non-alarm load for a period of at least 24 h when the system is connected to a *remote receiving centre* or 72 h when no such connection is made. Thereafter it shall be capable of supplying the maximum alarm load for at least 30 min (see section 503 (e)).

213.2
The nominal capacity of a battery which supplies alarm load shall be sufficient to supply that load for at least 30 min.

213.3
A battery which supplies alarm load only may be used as a back-up for a battery supplying non-alarm load but not vice-versa. No reduction in capacity is permitted.

213.4
The battery shall be suitable for continuous operation under float charge conditions and shall meet the requirements of section 220.

213.5
The battery shall be designed for stationary use and a minimum service life of 5 years.

213.6
For batteries with non-sealed cells, the level of electrolyte shall be readily and easily adjusted, and gas vents shall be designed to effectively prevent electrolyte loss.

214 NON-RECHARGEABLE BATTERIES
The nominal capacity of the non-rechargeable battery shall be sufficient to supply the non-alarm load for a period of at least 12 months. Thereafter it shall be capable of supplying the maximum alarm load for at least 30 min.

215 CONSTRUCTION OF CONTROL AND INDICATING EQUIPMENT

215.1 Construction

Cabinets shall be designed and constructed to meet the requirements of section 110 and provide:

(a) Adequate strength and rigidity;

(b) Protection from dust or other foreign materials which would adversely affect the operation of the equipment;

(c) Adequate access for maintenance purposes;

(d) Access by key. This key shall be common to all systems installed by a *manufacturer*;

(e) A means of preventing the resetting of *isolating* switches by inadvertent cabinet door closure. This may be by the use of door latches or other mechanisms appropriate to the system.

215.2 Manual controls

215.2.1
All manual controls shall be of robust construction, positive in operation, and designed and positioned to avoid accidental operation.

215.2.2
Controls for switching off part of the equipment, resetting or isolating shall not be accessible to unauthorized *persons*.

215.3 Internal wiring

215.3.1
Conductors shall have adequate current carrying capacity and mechanical strength.

215.3.2
All wiring shall be neatly run and firmly held in position.

215.3.3
Any wiring between hinged and fixed sections of the control and indicating equipment shall be carried out with stranded conductors in such a manner that hinged sections can be opened without impediment and without placing tension on the wiring, and so that wear to insulation of the wiring is minimized.

215.3.4
Wire-ways shall be smooth and free of sharp edges, burrs, moving parts and the like which could cause abrasion of the conductor insulation.

215.3.5
Holes in metal partitions through which insulated conductors pass shall have either smoothly rounded bushings or smooth well-rounded edges.

215.3.6
All connections shall be of a standard that meets the reliability requirements of section 110 (e.g. soldered, wire wrapped).

215.4 Electrical components

215.4.1
Lamps that have 2 filaments in 1 envelope shall not be used.

215.4.2
All friction contact surfaces shall be of a noble metal or its equivalent. If the surfaces are plated or flashed with gold, the coating shall have a minimum thickness of 0.004 mm. In any case the surface shall be sufficient to withstand normal maintenance and servicing requirements.

215.4.3
All contacts of relays and other electromechanical devices shall be fitted with dustproof covers.

215.5 Circuit design

215.5.1
Circuits shall be designed so that the control and indicating equipment will perform all its functions under the test requirements of section 220.

215.5.2
Equipment design shall ensure that the operating conditions of the components shall not exceed the limits specified by the component *manufacturer*.

215.6 Termination of external wiring

External wiring shall be terminated on purpose made connections suitably labelled and via entry-exit wire-ways of adequate size to prevent damage to the fully equipped *control unit*.

216 DETECTION SYSTEM

216.1
Point type *heat detectors* shall comply with Appendix D, UL 521, BS EN 54-5 or AS 1603.1.

216.2
Smoke detectors shall comply with AS 1603.2, AS 1603.8, AS 1603.7, UL 268, BS EN 54-7, BS EN 54-12 or BS 5445.7.

216.3
Flame detectors shall comply with BS EN 54-10 and/or shall be approved by Factory Mutual (FM) or Loss Prevention Certification Board (LPCB).

216.4
CO *detectors* shall comply with AS 1603.14 and/or shall be approved by UL (Underwriters Laboratories) or LPCB (Loss Prevention Certification Board) as suitable for Fire Detection.

216.5
All *detectors* shall provide a visual indication of operation. This indication shall latch in the alarm condition until manually reset from the *control unit*, unless the *detector* is used only for non-*latching* local alarm (e.g. 406.11).

216.6
Where a *detector* utilizes a mechanical contact to initiate a *fire alarm* that contact shall be closed in its normal condition, opening to initiate the *fire alarm*.

216.7
A *detector* shall not rely on the melting of a eutectic alloy to initiate a *fire alarm*, except as permitted under 101.4, 107.4 or where sprinkler heads are used as *detectors*.

216.8
With all *detectors* or allied devices connected to the *zone* terminals of the *control unit*, a 50 kΩ resistance placed across the circuit shall neither prevent a *fire* being signalled nor initiate a *fire* signal.

216.9
The detection system shall not initiate a *fire alarm* in response to a decrease in the ambient temperature of 1 °C per minute.

216.10
The detection system shall not initiate a *fire alarm* due to the cumulative effect of a number of *detectors* when these *detectors* are individually in the non-alarm condition.

216.11
Detectors for use in exposed conditions shall either have a degree of protection to IP54 of AS 1939 or be encapsulated to prevent the entry of water to any corrodible part of the *detector* including the field wiring terminations.

217 MANUAL CALL POINTS

Manual call points shall comply with the requirements of Appendix E.

218 ALERTING DEVICES

218.1
All devices shall be rated for a minimum 1 h continuous use. Electrical devices shall function satisfactorily within ± 20 % of the nominal battery voltage.

218.2
For positions exposed to the weather the devices shall have a degree of protection to IP24 of AS 1939.

218.3
Colour finishing of the visible sections of *alerting devices* shall either be red (approximating shade no. 537 of NZS 7702), or else the device or associated sounder grille shall be labelled “FIRE” in the same shade. (See also the readability requirements of 406.9.)

218.4
Visual *alerting devices* shall:

(a) Be either coloured red or incorporate a white strobe with the word “FIRE” coloured red illuminated;

(b) Be visible through at least 180°;

(c) Pulse or rotate at a rate between 0.5 Hz and 5 Hz.

218.5
Labelling shall be clear and permanent, and shall include details as follows:

(a) *Alerting device manufacturer’s* name, trade name or trademark, and type;

(b) Nominal electrical characteristics (e.g. the operating voltage and current).

218.6
Audible *alerting devices*:

(a) Shall produce a standardized evacuation signal (including verbal message) complying with Appendix F;

(b) May incorporate loud speaking voice facilities in order to provide opportunity for, or better means of, evacuation control and testing;

(c) Where they are able to provide an alert signal, shall produce a standardized alert signal (including verbal message) complying with Appendix F. Alternatively a pulsed version of the signal of 218.6 (a) with (non-pulsed) verbal message complying with Appendix F may be used.

Where an *EWIS* is used to provide the *alerting devices*, the equipment shall comply with AS 2220.1 provided that the d.c. power supply system and battery capacities also comply with this Standard (see sections 211 to 214), and the *alerting device signals* are as specified in 218.6 (a) and (c). The evacuation and brigade silence alarms switches (207.1 and 205.4) shall control the *EWIS.*

218.7
Where the audible *alerting devices* incorporate voice facilities, the devices may also be used for *ancillary services*, e.g. public address announcements.

218.8
If public address equipment is used as the *alerting device*, the following additional conditions shall be satisfied:

(a) The *fire alarm signal* shall be a standardized evacuation signal (including verbal message) complying with Appendix F, and shall be easily distinguishable from all management *signals*;

(b) The *fire alarm signal* shall be automatically transmitted over the public address system taking priority over, and overriding every other facility of, the public address system except as specified in 218.8 (c);

(c) The system may, if required, be fitted with an additional microphone for *fire* purposes designated as "fire microphone". This microphone shall only be operable after the *fire alarm system* has been activated and shall be fitted with a self restoring "press to talk" switch.

NOTE – This limitation on the availability of the *fire* microphone ensures that the initial transmission of the *fire alarm signal* cannot be inadvertently inhibited by use of the *fire* microphone for other purposes.

(d) The public address system shall use a monitored power supply to the requirements of 211.2;

(e) The circuit wiring to the system loud speakers shall be monitored for defects (see also 208.1 (f));

(f) During mains power failure the public address equipment is automatically restricted to the provision of an audible *fire alarm signal* and the use of the "fire microphone" if provided;

(g) The public address equipment shall be subjected to the environmental test requirements of section 220;

(h) The *fire alarm signal* shall not be used for any other purposes.

218.9

Any other *fire* protection system that complies in all respects with the requirements of the published technical standard for such systems (e.g. sprinkler, deluge, gas flooding) may be connected to operate the *alerting devices* without initiating a *fire alarm* from the *fire alarm system*, provided that evacuation of the *building* is an appropriate and prudent response to the activation of the other *fire* protection system. In such cases the interconnection between the 2 systems shall be supervised by the *fire alarm system*, and a *defect warning* shall be provided in the manner of 208.1(b) (see also Appendix C).

218.10

If the *alerting devices* are used for other purposes (e.g. school class change) the following additional conditions shall be satisfied:

(a) The *fire alarm signal* shall be easily distinguishable from all other *signals* (e.g. by sound character, cadence or continuous sound);

(b) The *fire alarm signal* shall take priority over and override all other *signals*;

(c) The battery charger and batteries shall be adequately sized to account for the additional working load.

219 ADDRESSABLE FIRE ALARM SYSTEMS

An input circuit of an *addressable fire alarm system* shall be permitted to be extended to cover more than one *zone* provided the following additional conditions are satisfied:

(a) The *control unit* shall divide the annunciation from the *detectors* or *manual call points* on the addressable circuit into *zones* no larger than the area required by this Standard;

(b) The addressable system design shall incorporate fault tolerance such that a single short circuit or break anywhere on the addressable circuit between the *control unit* and any *detector* or *manual call point* shall result in loss of coverage of no more than one *zone* as defined by this Standard;

(c) Any fault on an addressable circuit which would prevent a *detector* or *manual call point* from initiating a *fire alarm* as specified in section 204 shall result in a *defect warning* signal.

220 ENVIRONMENTAL TESTS

220.1 General

A sample of the control and indicating equipment shall be subjected to the following environmental tests made in accordance with BS 2011 or BS EN 60068-2. In order to take account of the conditions to which the equipment may be subjected in practice, the procedures specified in this Standard differ in certain respects from the procedures specified in BS 2011 or BS EN 60068-2. Where no specific information is given herein, the methods indicated in the appropriate Parts of BS 2011 or BS EN 60068-2 shall be followed.

220.2 Quiescent condition

The quiescent condition means that the control and indicating equipment is connected to its designated power supplies and all components such as lamps or switches are in the normal operating condition. All incoming and outgoing connections which are provided shall be connected to the appropriate equipment or dummy loads up to the maximum number or size specified by the *manufacturer*. Where alternative equipment is specified, that which imposes the greater load shall be used.

220.3 Preliminary test

In order to reduce the probability of a defective component failing during an environmental test and therefore being mistaken for a design error, the equipment shall be operated in its quiescent condition before starting the environmental test programme. At the end of a 20 h period of continuous operation in its quiescent condition, the equipment shall be subjected to the functional tests of 220.5. If, during a test of 220.5 the equipment functions incorrectly due to a defective component, any such component shall be replaced by one of the same type and manufacture, and the equipment repeatedly operated in its quiescent condition and tested as above until it has completed 20 h of continuous operation followed by correct functioning during the tests of 220.5.

220.4 Preconditioning and recovery procedure

Before and after each environmental test, the temperature of the control and indicating equipment shall be allowed to stabilize in an environment having any combination of temperature, humidity and pressure within the following limits:

Temperature	15	°C	–	25	°C
Relative humidity	45	%	–	65	%
Air pressure	860	mbar	–	1060	mbar

The ambient temperature and humidity shall be substantially constant during preconditioning, during recovery and while a functional test is carried out. Batteries used shall be allowed to become charged to their normal state.

220.5 Functional tests

These tests shall consist of the following operations made in the order in which they are *listed*:

(a) Operation of a *detector*, *manual call point* or electrical equivalent, to ensure that the control and indicating equipment functions correctly;

(b) Operation of "SILENCE ALARMS" switch to ensure correct functioning;

(c) In multizone control and indicating equipment, operation of another alarm circuit connected to a different *zone* from that in 220.5(a) to ensure that the equipment functions correctly;

(d) Operation of the switches which would *isolate* the *remote receiving centre* to ensure correct functioning;

(e) Operation of the reset controls to ensure correct functioning; and

(f) Removal of all energy supplies in order to ensure correct functioning of defect signalling (see 208.1(a), 211.6 and A3.4).

220.6 Inspection

At the conclusion of each environmental test, the control and indicating equipment shall be opened and inspected for damage consequential to that test.

220.7 Test procedure

For each environmental test specified in 220.8 the control and indicating equipment shall be subjected to the following tests in the order in which they are *listed*. At the beginning of each of 220.7 (a) to (g), the control and indicating equipment shall be in its quiescent condition:

(a) Preconditioning procedure;

(b) Functional tests;

(c) Preconditioning procedure;

(d) The appropriate test environment of the severity, and for the duration, stated;

(e) Functional tests made at the end of the environmental test period while in the test environment;

(f) Recovery procedure;

(g) Functional tests; and

(h) Inspection.

220.8 Test environments

The control and indicating equipment shall be subject to the following tests in the order in which they are *listed*. The interval between each test shall not be more than 3 days:

(a) Dry heat as in BS EN 60068-2-2. The equipment shall be introduced into a chamber which shall be at the ambient temperature of the laboratory. The chamber shall then be adjusted to a temperature of 40 ±2 ºC with an absolute humidity not exceeding 20 g of water vapour per cubic metre of air (corresponding approximately to 30 % relative humidity at 40 ºC). After temperature equilibrium in the chamber has been reached, the equipment shall be exposed to these conditions for 16 h continuously. While it is being adjusted the temperature in the chamber shall not change by more than 1 ºC per min averaged over a period of not more than 5 min.

(b) Damp heat as in BS 2011-2.1 Ca. The equipment shall be introduced into a chamber which shall be maintained at a temperature of 40 ± 2 ºC and a relative humidity of 90 % – 95 %. The equipment shall be exposed to these conditions for 4 days continuously.

(c) Cold as in BS EN 60068-2-1. The equipment, while being at the ambient temperature of the laboratory, shall be introduced into the chamber which shall also be at that temperature. The temperature within the chamber shall be adjusted to 0 ±2 ºC. While it is being adjusted, the temperature in the chamber shall not change by more than 1 ºC per min averaged over a period of not more than 5 min. The equipment shall be exposed to the low temperature conditions for a period of 2 h after temperature stability has been reached. The equipment shall remain in the chamber during the recovery period.

(d) Vibration operational test as in BS EN 60068-2-6. The equipment, mounted on a vibration table in its normal operating position and by its normal fastenings, shall be subjected to horizontal vibrations of peak displacement amplitudes corresponding to a constant peak acceleration of 0.98 m/s^2 over the frequency range 5 Hz – 60 Hz. One sweep of the frequency range shall be made at a rate of approximately 1 octave per min for each condition of the equipment in the functional tests described in 220.5.

220.9 Performance requirements
The equipment shall be considered satisfactory if:

(a) No maloperation occurs during the environmental test;

(b) The functional tests specified cause the equipment to respond correctly and no failures occur; and

(c) No damage which is a result of faulty design or workmanship is revealed.

221 OPERATIONAL TEST

221.1 Test procedure
Starting with the control and indicating equipment in its quiescent condition, each *zone* shall be operated in succession. *Zone* circuits shall not be reset between each operation but *audible alarms* shall be silenced between each operation.

221.2 Performance requirement
The performance of the equipment shall be considered satisfactory if the requirements specified in section 204 are met.

222 RADIATED RADIO FREQUENCY INTERFERENCE

222.1 Test procedure
The noise voltages produced by the control and indicating equipment during the functional tests (see 220.5) shall be measured. The equipment shall be considered satisfactory provided that the results of the tests comply with the relevant statutory requirements.

222.2 Radio frequency immunity
The control and indicating equipment shall be demonstrated to be immune to radio frequency interference according to the requirements of BS EN 50130-4 or IEC 61000-4-3 (80 MHz – 1000 MHz to test level 2).

223 MARKING

223.1
Control and indicating equipment shall be clearly and permanently marked with the name of the *manufacturer*, the *manufacturer's* type identification and the year of manufacture in addition to any markings specified by the relevant statutory regulations.

223.2
Components, sub-assemblies and terminals shall be clearly and adequately identified.

223.3
All manual controls shall be clearly labelled to indicate their functions.

224 SOFTWARE CONTROLLED EQUIPMENT

224.1 Program monitoring

224.1.1
The correct execution of the software by any processor of a *control unit* shall be supervised by a monitoring (watchdog) circuit. This watchdog shall monitor execution of the main functions of the program, and shall not be prevented from operation by the failure of a processor or its associated clock circuits.

224.1.2
If correct execution is not successfully established, a *defect warning* shall be given within 60 s of the occurrence of the failure.

224.2 Storage of software

224.2.1
All software necessary for the functions required by this Standard shall be held in solid-state memory.

224.2.2
The main operating software (firmware) shall be held in non-volatile, read-only memory, marked with a designation positively identifying its contents (e.g. program version).

Configuration data shall be safeguarded either as for firmware above or shall be:

(a) Modifiable only after access by lock or code at a level additional to that specified in 215.1(d);

(b) Changeable only then after a particular manual enabling action;

(c) Protected from corruption due to abnormal operation or program execution;

(d) Able to be clearly and unambiguously checked against hard copy documentation to reveal any undocumented or unauthorized alteration;

(e) Preserved (by design) in the event of system power failure for a period of at least 10 years.

Run-time data may be stored in volatile memory. The equipment shall re-start in a safe, operational and predictable manner after a failure of the power supply.

All firmware and configuration data shall be checked automatically (e.g. by “check-sum” procedure) at intervals not exceeding 72 h. A *defect warning* shall be given in the event of failure of these data checks.

PART 3
SINGLE ZONE FIRE ALARM SYSTEMS

NOTE – The equipment design requirements for *multizone fire alarm systems* are set out in Part 2.

301 FUNCTIONS, LIMITATIONS AND COMPONENTS

301.1
The intended function of any particular *single zone fire alarm system* shall be that declared by the *owner* in accordance with section 105.

301.2
A *single zone fire alarm system* shall not be used to protect more than a single *zone*.

301.3
Single zone fire alarm systems shall comply with all relevant requirements of Parts 1, 2, 4, 5 and 6 of this Standard except for the following:

(a) *Zone* division and indication as per section 202 and 204.1(b) is not required;

(b) Unless a *declared functional requirement*, initiation of a *fire alarm signal* to a *remote receiving centre* as per 204.1(c) and 204.12 is not required – in which case:

(i) Isolation facilities as per section 209 are not required

(ii) Functional tests of 220.5(d) and (f) are not applicable;

(c) The internal silencing switch required by 205.2 and 205.3 need not be provided;

(d) A *zone index* and *indicating unit* as defined by 402.8 and 403.1 are not required;

(e) The Fire Service access requirements of 403.2(a) are not applicable;

(f) The verbal message required by 218.6, 218.8(a) and 406.1 need not be provided.

PART 4
INSTALLATION

401 ZONES AND SECTORS

401.1

A *sector* shall be confined to a single *building* and shall cover no more than 11 000 m^2 in floor area (not including ceiling space). This may be extended to 22 000 m^2 in floor area where areas no greater than 5 500 m^2 can be separately *isolated*.

For two or more *buildings* which are contained on one site, and intended to be managed as one *building* with a common use and set of ownership arrangements, common access and a single Fire Service attendance point, then they may be covered by one *control unit* if the combined floor area is not greater than a total of 5 500 m^2 . Each *building* shall not be greater than two storeys, and the travel distance to the furthest entrance shall not be greater than 100 m from the common Fire Service attendance point.

NOTE –
(1) The Fire Service should be consulted at an early stage in the design to facilitate the approval of the proposed arrangement.
(2) The Fire Service may require flashing lights outside the *building* that is in alarm if the *buildings* are hard to define or locate on the complex.

401.2

401.2.1

Every part of each floor of the *building* shall be designated as part of a discrete *zone* except:

(a) An area of the top floor and the next floor down may form part of one *zone* provided that the only access to the highest area is from the floor immediately below;

(b) *Firecells* containing more that one level may be regarded as a single *zone*, provided *escape routes* are not shared with other *firecells*.

401.2.2

Every ceiling or roof space in the *building* required to have *detectors* shall designate as one or more unique *zones* except where the ceiling forming the space wholly comprises removable tiles. In this case, the space may form part of the corresponding *zone* of the floor below and in calculating the area of that *zone*, the ceiling space shall be ignored.

401.2.3

The maximum area per *zone* shall be 750 m^2 except where:

(a) There are only *manual call points* in the area, the *zone* area may be extended to 900 m^2;

(b) Unique *detector* and call point identification is readily accessible by the Fire Service from the Fire Service attendance point, the *zone* area may be extended to 2000 m^2. This identification may be located inside the *building* (e.g. liquid crystal display (LCD));

(c) Sprinklers are used as thermal *detectors*, the *zone* area may be extended to 2000 m^2.

401.2.4

Every separate residential *firecell* containing sleeping accommodation shall have their own *zone* or *zones*.

Separate *buildings* shall have separate *zones*, whether or not they are linked by covered walkways.

401.3
Where sprinklers are used as thermal fire *detectors*, they shall be provided with flow switches or other devices as necessary to provide *zone* indication in accordance with this Standard. In order to do so, they may be monitored by the *fire alarm system* as in 203.4.

401.4
In *buildings* of more than one floor level, the delineation of the *zones* on all floors shall be similar as far as possible with the usage and construction of the *building*.

401.5
The area defined by a *zone* is the nominated search area which is normally accessible from within the *zone*. Attached service rooms with external access may be included in the *zone* provided that:

(a) Their aggregated area does not exceed 25 m^2;

(b) They do not form part of another *firecell*; and

(c) They are not additional to the search area limit.

401.6
Each *zone* shall be so designated that the origin of the *fire alarm* can be readily and accurately located.

401.7
Where several *control units* are installed within the same *firecell* all *alerting devices* shall be operated simultaneously.

401.8
In addition to the *building* being protected throughout by a *fire alarm system* that fully complies with this Standard, a supplementary *fire alarm system* may be installed to cover a specific risk, and be connected to a separate *zone* on the *control unit*. In such instances, the *zone* area and boundaries requirements of 401.2.3 may be relaxed for the supplementary system provided the location and extent of the supplementary *fire alarm system* is readily identifiable on the *zone index*. The supplementary *fire alarm system* shall comply with all other requirements of this Standard. (See also Appendix C).

402 INSTALLATION PRACTICE

402.1
Cable shall comply with the requirements of NZS 6401 or AS/NZS 5000 and shall either be sheathed in polyvinyl chloride or installed in conduit. Conductors may be solid or stranded.

Attention is drawn to the need for all wiring associated with the *fire alarm system* to comply with the requirements of the Electrical Wiring Regulations for 230 volt systems. See also section 108.

402.2
Cable installation shall be in accordance with the following requirements:

(a) All outgoing and return conducting paths of any one circuit connected into each *detector* and *manual call point* of that circuit;

(b) Protected against damage where installed on the surface and within 2 m of floor level, passing through walls, or in such other positions where it is likely to be damaged;

(c) Outgoing and return conducting paths of *alerting devices*, including loud speakers, (which are required by 208.1(f) to be monitored) shall terminate on, or within each *alerting device*;

(d) Installed in conduit where it is necessary to bury the cables in concrete or plaster;

(e) Through-jointed only in suitable enclosed terminal boxes accessible for inspection and maintenance purposes;

(f) A separate sub-circuit connected to the mains electrical supply shall be used solely for the *fire alarm* supply including any alarm transmission device. The circuit, circuit breaker or fuse shall be clearly identified by a label, attached to the distribution board, marked in a permanent manner with the words "FIRE ALARM";

(g) Conductor cross-sectional areas shall be such that the voltage available at equipment shall be within the equipment rating and in no case less than 1 mm^2;

(h) Cables installed overhead between *buildings* shall be suitably protected from environmental conditions, adequately supported and relieved from stress;

(i) All *zone* circuit wiring external to the *control unit* shall be *isolated* from the *building* earth. Earth return circuits are not acceptable. Conduit or other metal sheathing of conductors shall not be used as any part of an electrical *fire alarm* circuit;

(j) The insulation resistance between individual conductors and between each conductor and earth shall be greater than 5 MΩ;

(k) All wiring external to the *control unit* shall be separate and distinct (normally red sheathed) and electrically separate from any other circuit;

(l) Notwithstanding the other requirements of this Standard, optical fibres are permitted provided that the integrity of the installation is equivalent to the requirements of this Standard and such circuits are dedicated to the *fire* protection functions of a *building*;

(m) The cabling of transmission circuits from a *control unit* to the telecommunications *demarcation point* for a *fire alarm system* connected to a *remote receiving centre* shall be run in a *fire* rated cable. The cable shall have a minimum 15 min integrity rating and shall comply with AS/NZS 3013 Classification WS11. Alternatively, the cable may be run in a *fire* rated conduit or a *fire* rated duct used solely for cabling and *non-combustible* services. The conduit, duct or wall cavity shall have minimum *fire resistance rating* of 15 min (FRR-/15/-). If the *demarcation point* is external to the *building*, that part of the cable run external to the *building* is not required to have a *fire resistance rating*;

(n) A wiring fault (e.g. an open or short circuit) shall not initiate a *fire* signal;

(o) A single wiring fault (e.g. an open or short circuit) shall not result in a loss of coverage of more than one *zone* as defined by this Standard;

(p) Where duplicated path or loop wiring is used to achieve the performance requirements of this Standard, this wiring shall be run diverse and not in the same route or conduit, or trunking, unless *fire* rated to the level required for transmission circuits in 402.2 (m).

402.3

Earthing and bonding of the installation shall be in accordance with the relevant statutory requirements.

402.4
Ancillary services as described in 203.1 shall be connected through isolating devices. The connection of this additional apparatus shall not adversely affect or prejudice the performance of the *fire alarm system*. Voltages in excess of 32 V a.c. and 50 V d.c. associated with remote control functions shall not enter the *control unit*.

402.5
The mounting shall be such that the *control unit* is not subjected to undue vibration or shock.

402.6
Fire alarm and *defect warning* indicators shall be labelled in accordance with 210.5 and 210.6.

402.7
Where an audible *defect warning* device is required (refer 208.2), this shall be located so as to be audible in a normally occupied part of the *building*. The audible warning device shall be labelled "FIRE ALARM FAULT – CONTACT SERVICE COMPANY".

402.8 Zone index

402.8.1
The location of the *zones* relative to the usual viewing position of the *indicating unit* shall be clearly defined by means of an index on the outside face of the unit.

402.8.2
The index shall include a diagram, complying with Appendix G, which is correctly oriented relative to the viewing position, on which shall be shown:

(a) The outline of the *building* or *buildings* by means of a solid line. The location of any *stairways* shall also be shown;

(b) The main Fire Service access into the premises and other ingress points, by means of triangles oriented to indicate direction of entry (see Appendix G). External stairs providing access to the *building* shall be shown;

(c) The location and approximate divisions between *zones* by means of a solid line where there is no access and a broken line where there is access;

(d) The location of any other systems connected to the alarm system (see 218.9 and 401.8);

(e) The location of the *indicating unit*, using the symbol of Appendix G, and the words "YOU ARE HERE";

(f) The location of any other *indicating units*;

(g) The type of *detector* installed in the *building* prominently displayed e.g. smoke, heat, manual etc;

(h) For a Fire Service connected system, the system's identifying number affixed to a bottom corner of the front and back of the *indicating unit* with a permanent grade adhesive sticker;

(i) *Zone* descriptors that are either the name of the area or a logical sequence of numerical and/or alphabetical characters, preferably arranged in a vertical configuration;

(j) Unprotected significant areas;

(k) Mezzanine levels and associated stair access;

(l) The location of internal stairs, lift shafts, ramps within the *building*;

(m) If the smoke detection component of a Type 5 is used, or *smoke detectors* do not call the Fire Service, these shall have separate indication on the *zone index* and shall be labelled "NOT CONNECTED TO FIRE SERVICE";

(n) A side elevation if a *building* has 5 or more levels or has unusual access. Levels of similar layout may have a single common diagram if accompanied with an appropriate legend.

Index lettering shall be 3 mm minimum height, upper case Arial font and arranged horizontally.

The diagram shall be approved by the Fire Service.

402.8.3
A diagram may not be required in the following circumstances:

(a) In a single *building* containing only one *zone* and in multi-storeyed *buildings* where the floor plan contains only one *zone* per floor, and the floor plan throughout the *building* is similar; and

(b) Where the ingress to the *building*, all floors and any special requirements are clearly apparent.

402.8.4
Where *manual call points*, heat or *smoke detectors* are in a common *zone*, separate indicators can be used but should be positioned together on the *zone index*.

402.9
Detectors and *manual call points* shall be connected in such a way that a *defect warning* is given in the event of the removal of any such devices from a circuit.

402.10
Terminals of electrical *detectors* shall be covered when installed.

402.11
Zone circuits shall be allocated an identifying symbol. Every *detector*, sampling point, *manual call point*, *alerting device*, junction box and end of line element shall be marked in a permanent manner in characters not less than 5 mm high with its *zone* symbol and the number indicating the numerical order in circuit beginning at the *control unit*. This marking shall be visible when the components are installed.

402.12
Where *detectors* or sampling points are mounted on movable tiles, adequate cable or tubing shall be left to allow for movement of tiles.

402.13
The *manufacturer's* finish on the surface of the sensing element of a *detector* shall not be painted or coated over.

402.14
In occupancies or situations likely to be subject to vandalism, interference or damage:

(a) *Alerting devices* and *detectors* shall be protected by a suitable guard; and

(b) Any exposed *alerting device* cabling shall be suitably protected.

402.15
Detectors, located in high roofs and other places that are difficult to access, shall be installed so as to be accessible for replacement.

402.16
Where exposed to the weather, or in locations subject to regular washing down, the detection system shall be resistant to false actuation due to the entry of water.

403 EQUIPMENT LOCATION

403.1 Indicating units

403.1.1
Indicating units shall be located to suit the Fire Service access requirements.

NOTE – Fire Service approval is required.

403.1.2
Indicating units shall be located as follows:

(a) With the readable part of the *indicating unit*, i.e. *building* plan and light-emitting diodes (LEDs) or index, centred at 1700 mm from ground level at the normal viewing position and with all indications and controls intended for Fire Service use contained within the limits of 750 mm and 1850 mm from floor or ground level (as applicable);

(b) With only clear annealed glass acceptable in front of the *indicating unit*. No internal fittings, (e.g. blinds, curtains etc.) or external objects (e.g. signs, vegetation, etc.) that may hinder visibility are permitted in front of the *indicating unit*;

(c) Clearly visible from the normal viewing position;

NOTE – To assist *fire* fighting personnel, the normal viewing position is usually external to the *building* (see also 406.10).

(d) To minimize the effects of direct sunlight. (See 210.6);

(e) With a minimum clearance of 1 m at the access doors for maintenance purposes;

(f) Such that the equipment can be serviced in a weather protected environment;

(g) To provide easy access to all control facilities; and

(h) To preclude malicious damage wherever practicable.

At least one evacuation switch (see section 207), one external silencing switch (see section 205), plus any other *fire* fighters' emergency services controls shall be provided at the main *indicating unit* (as agreed or approved by the Fire Service). These controls may also be provided at other indicating or *control units* or both.

NOTE – In special circumstances these controls may be required at other locations such as *building* management positions or the *building's fire* control room(s). Consultation with the Fire Service should be sought.

403.2
Control units not incorporating an *indicating unit* shall be located as follows:

(a) To suit the Fire Service access requirements, if including switches or other controls intended for *fire* fighter use;

NOTE – Fire Service approval is required.

(b) Contained within the limits of 700 mm and 2300 mm from floor level, and with all indications and controls intended for Fire Service use contained within the limits of 750 mm and 1850 mm from floor or ground level (as applicable);

(c) With a minimum clearance of 1 m at the access doors for maintenance purposes;

(d) Such that the equipment can be maintained in a weather protected environment;

(e) To provide easy access to all control facilities;

(f) To preclude malicious damage wherever practicable; and

(g) Within a *firecell* protected by a *fire alarm* or sprinkler unless situated on the exterior of the *building*.

NOTE – *Control units* should not penetrate a *fire* separation.

403.3
Battery chargers, batteries and the mains power supply switch shall be housed in a cabinet or cabinets constructed in accordance with 215.1(a), (b), (c) and (d). Adequate ventilation and protection from the corrosive effects of electrolyte shall be provided.

403.4
Alphanumeric displays used to provide supplementary information for the Fire Service may be located in a readily accessible position within the *building*.

404 MANUAL CALL POINT LOCATIONS

404.1
Manual call points shall be located on each *escape route* and at the main exit doors. Where there are multiple exit doors, one common *manual call point* may be used provided not more than a 5 m travel path deviation is required to reach the *manual call point* from each door. Additional *manual call points* shall be located elsewhere to ensure there is not more than 30 m travel to the nearest *manual call point*. In multilevel *buildings* there shall be a *manual call point* located on the *escape route* at each full floor landing.

404.2
Each *manual call point* shall be at all times clearly visible, readily accessible and positively identifiable. It shall be securely mounted with its centre at a height of 1.2 m to 1.5 m above floor level and a clear space of at least 0.6 m shall be preserved in all directions.

404.3
Where the occupancy of the premises can result in repetitive malicious *fire alarms*, the *manual call points* may be located where they are under the direct control of supervisory staff or apartment occupants.

404.4
Manual call points may be located in yard areas between *buildings* or on *isolated* structures provided that the cabling is run in such a manner as to be protected against damage. Where the system is connected to the Fire Service and the site is at times unattended such *manual call points* shall only be permitted if the site is secured against unauthorized access.

405 DETECTOR SELECTION, LOCATION, POSITION, SPACING AND COVERAGE

405.1 Selection of detectors

405.1.1

The *firecell* shall be covered by *listed detectors* and, in particular, respond to the normal phenomena arising at an early stage in a *fire*. However the selected *detector* shall not respond to ambient and environmental conditions typical of the location. Specialized *detectors* responding to phenomena other than heat or smoke should be used with caution and shall only be used in addition to a comprehensive heat or *smoke detector* coverage. *Detector* selection shall be consistent with the *detector manufacturer's* instructions. See also Appendix H.

405.1.2

The temperature rating of *heat detectors* shall be at least 15 ^{o}C above the highest normally-expected temperature.

NOTE –
(1) In areas where the ambient temperatures are higher than normal, *heat detectors* should be selected to respond at 40 ^{o}C to 50 ^{o}C above the expected average ambient temperature.
(2) *Heat detectors* that conform to Appendix D are colour coded according to D8.2.

405.1.3

To reduce unwanted alarm activations, *smoke detectors* may be replaced by *heat detectors* (or sprinklers – see 405.2.2 (h)) in the following areas:

(a) At the top of *stairways*, hoists and lift wells, service ducts, chutes, above rope or belt openings, and in skylights;

(b) Under loading dock canopies, over occupiable covered balconies and under external *building* appendages;

(c) In cleaners' cupboards and understair cupboards;

(d) Within 5 m horizontally of any fixed cooking apparatus;

(e) Within bathrooms or other wet areas where steam is likely to be generated in sufficient quantity to be the cause of spurious alarms;

(f) In toilet spaces;

(g) In roof or ceiling spaces with difficult access to clean *detectors*;

(h) In any other area where the activity occurring in that area may be the cause of spurious *smoke detector* alarms, except that under no circumstances may substitution of *smoke detectors* be permitted in the following areas:

(i) Spaces used for sleeping

(ii) Corridors used for escape from sleeping spaces

(iii) Corridors used for escape from places of crowd activity

(iv) Any *exitways* internal to the *building*.

NOTE – If substituting *heat detectors* (or sprinklers) for *smoke detectors*, there are differing requirements for spacing (see 405.3.1).

Refer Appendix H for further information.

405.2 Detector location and position

405.2.1

Detectors shall be installed in locations as follows:

(a) All areas of the *building*, including rooms, halls, corridors, storage areas, *basements*, other subdivisions and accessible spaces;

(b) Each subdivision where a space is subdivided by walls, partitions or storage racks reaching within 300 mm of the ceiling except water closets which comply with the requirements of 405.2.2(e);

(c) At the top of *stairways*, hoists and lift wells, service ducts, chutes, above rope or belt openings, and skylights if used for ventilation or if having a volume greater than 3 m^3;

(d) On the floor landings of all *stairways*;

(e) Within 1.5 m of a *fire door* where detection is not provided on both sides of the door;

(f) In other cases of unusual roof or ceiling geometry, *detectors* shall be installed in positions that approximate to that shown in the relevant diagrams of figure 1;

(g) Under fixed decks, ventilation ducts, mezzanine floors or landings which are more than 1.5 m wide;

(h) Under loading dock canopies and over occupiable covered balconies, provided in each case there is no dimension less than 1.5 m. Under other external appendages where *combustible* material is stored or a vehicle can be parked and where there is no dimension less than 1.5 m;

(i) Under ducted hoods over cooking apparatus, with any dimension greater than 1.5 m, located adjacent to the extract point(s);

(j) Within 500 mm of the apex of a roof or ceiling;

NOTE – A roof or ceiling with a slope of less than 5º (1 in 11.43) may be deemed to be flat (refer to 405.3.6).

(k) Not less than 1 m from air delivery points of air conditioning plant or ducting;

(l) Not less than 200 mm from a wall;

(m) Where solid open joists, beams, purlins, girders, trusses or the like are surmounted by roofs, floors or ceilings, in sufficient quantities to meet the following minimum requirements (see also figure 2):

(i) Supports for beams or joists that run at angles to other beams or joists may be ignored if the tops of the supports are spaced 100 mm or more from the ceiling

(ii) Where the beam or joist depth is less than 100 mm, *detectors* may be mounted either on the ceiling or on the bottom of the beams or joists, and the spacing requirements of 405.3 shall apply

(iii) Where beams or joists of depth 100 mm or more are spaced at centre-to-centre or centre-to-wall intervals of 900 mm or less, *detectors* shall be mounted on the bottom of the beams or joists and the spacing of *detectors* in the direction perpendicular to the beams or joists shall be two-thirds of the requirements of 405.3

(iv) Where the beam or joist depth is greater than 460 mm and the beams or joists are spaced at intervals exceeding 2400 mm centre-to-centre or centre-to-wall, each beam or joist shall be treated as a wall and the spacing requirements of 405.3 shall apply

(v) Where the beam or joist depth is less than 300 mm, and the beams or joists are spaced at centre-to-centre or centre-to-wall intervals of 2400 mm or less, but more than 900 mm, spacing of *detectors* in the direction perpendicular to the beams or joists shall be two-thirds of the

requirements of 405.3. *Detectors* may either be mounted on the bottom of the beams or joists or on the ceiling (unless 405.3.1(a) applies)

(vi) In all other cases, *detectors* shall be mounted on the ceiling and the spacing of the *detectors* in the direction perpendicular to the beams or joists shall be two-thirds of the requirements of 405.3

(vii) Where the beams or joists are at angles to each other (i.e. cross-hatched), the two-thirds spacing requirements of 405.2.1(m)(iii), (m)(v) and (m)(vi) shall be applied in both perpendicular directions

(viii) In *concealed spaces*, the requirements of items 405.2.1(m)(i) to (m)(vii) shall apply except for *concealed spaces* less than 2 m high where the two-thirds spacing requirements of 405.2.1(m)(iii), (m)(v) and (m)(vii) may be ignored

(ix) In all cases where *detectors* are mounted on the ceiling, they shall be stagger-spaced to evenly cover all inter-beam and inter-joist spaces as much as possible without resorting to additional *detectors*.

(n) The distance the sensing element is below the roof or ceiling underface is:

(i) In areas with up to 10 m ceiling height

(A) For *heat detectors*, not less than 25 mm and not greater than 100 mm

(B) For point type *smoke detectors*, not less than 25 mm and not greater than 250 mm

(C) For beam type *smoke detectors*, not less than 300 mm and not greater than 600 mm.

(ii) In areas with ceiling 10 m to 20 m height, according to the *manufacturer's* data sheets

(iii) In areas with ceilings exceeding 20 m in height, *detector* selection, location and spacing shall be in accordance with specific *fire* engineering design that demonstrates detection equivalence, for a given *fire* size, as that provided on the *manufacturer's* data sheets for situations lower than 20 m.

NOTE – Additional *detectors* at intermediate levels will generally be required in areas exceeding 20 m in height.

(o) Such that the correct operation is not prejudiced or delayed by ambient conditions such as corrosion, dampness, high ambient temperature, vibration, stratification, cool air currents, ventilation systems or the like;

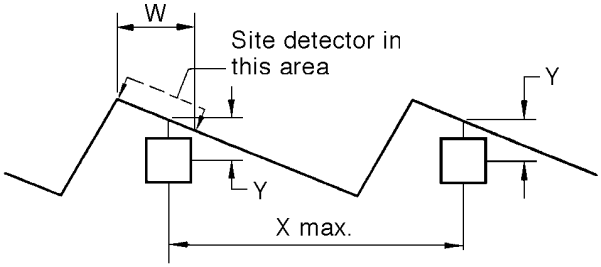
(p) All cleaners' and understair cupboards (refer also to figure 3);

(q) All wardrobes greater than 6 m^3 and those which are smaller and not vented by an orifice greater than 0.02 m^2 (refer also to figure 3);

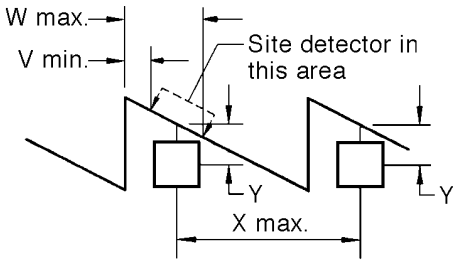
(r) Cupboards having a capacity exceeding 1.5 m^3 and containing electrical switchboards, distribution boards, or in which electrical or gas fired appliances are used in situ (refer also to figure 3);

(s) Other cupboards that have a capacity of over 3 m^3 unless vented at the top into the room by an orifice of not less than 0.02 m^2; this exemption shall not apply to cupboards greater than 6 m^3 (refer also to figure 3).

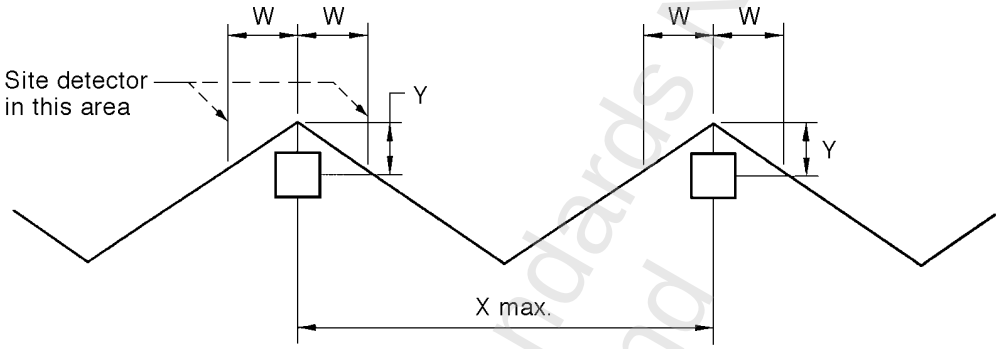
NOTE – The location requirement given for *detectors* in 405.2.1(p), (q), (r) and (s) may occasionally be greater than recommended by the Approved Documents for the New Zealand Building Code for cupboards and wardrobes. The cost consequence of full compliance with this Standard is minimal on the few occasions when these spaces are larger than already exempted by this Standard.



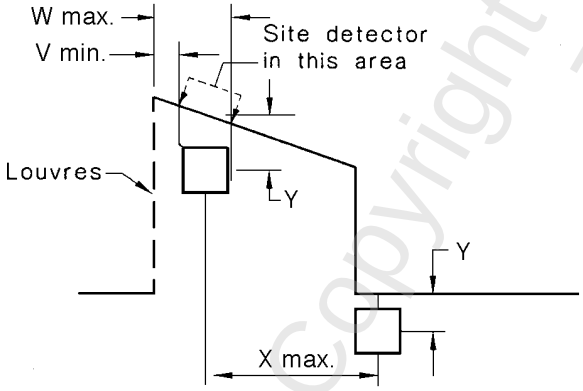
(a) Unequal sloping surface



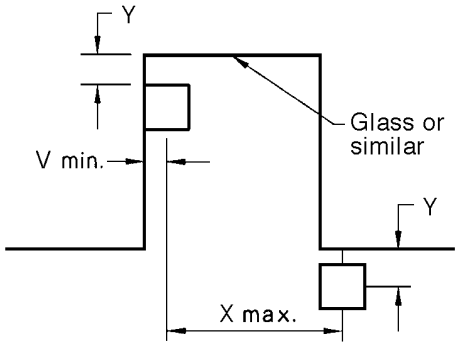
(b) Sawtooth ceiling, roof or surface



(c) Equal sloping surface



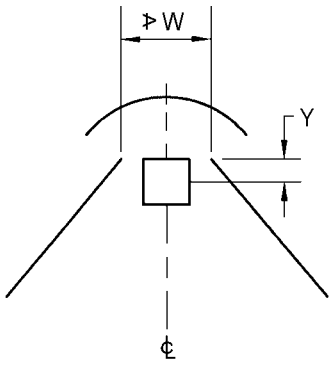
(d) Louvred ceiling or roof with louvred riser



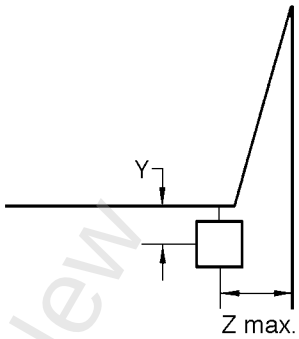
(e) Ceiling, roof or surface with skylight

V = Minimum distance from wall as per 405.2.1(l)
W = Maximum distance from apex as per 405.2.1(j)
X = *Detector* spacing as per 405.3
Y = Distance from ceiling or roof as per 405.2.1(n)
Z = Spacing from wall or partition as per 405.3

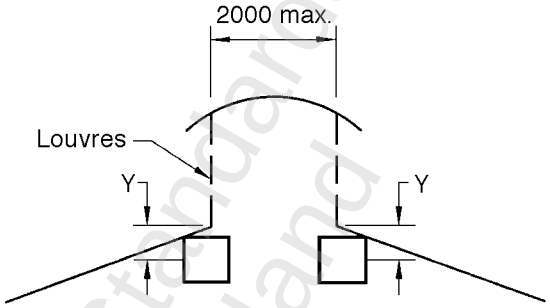
Figure 1 – Typical detector locations at apex of ceiling, roof or surface



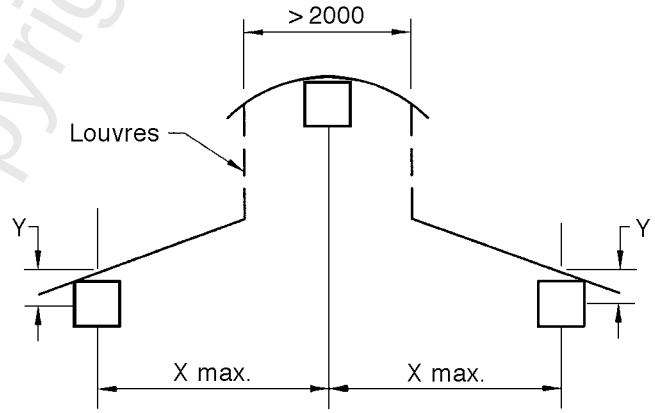
(a) Ventilated ridge



(b) Narrow apex



(c) Ventilated ridge (greater than W)



(d) Ventilated ridge (greater than 2000 mm)

NOTE –
(1) *Detector* is always on the side with least slope.
(2) Refer 405.2.1(f).
(3) All dimensions are in millimetres.

Figure 1 – Typical detector locations at apex of ceiling, roof or surface (continued)

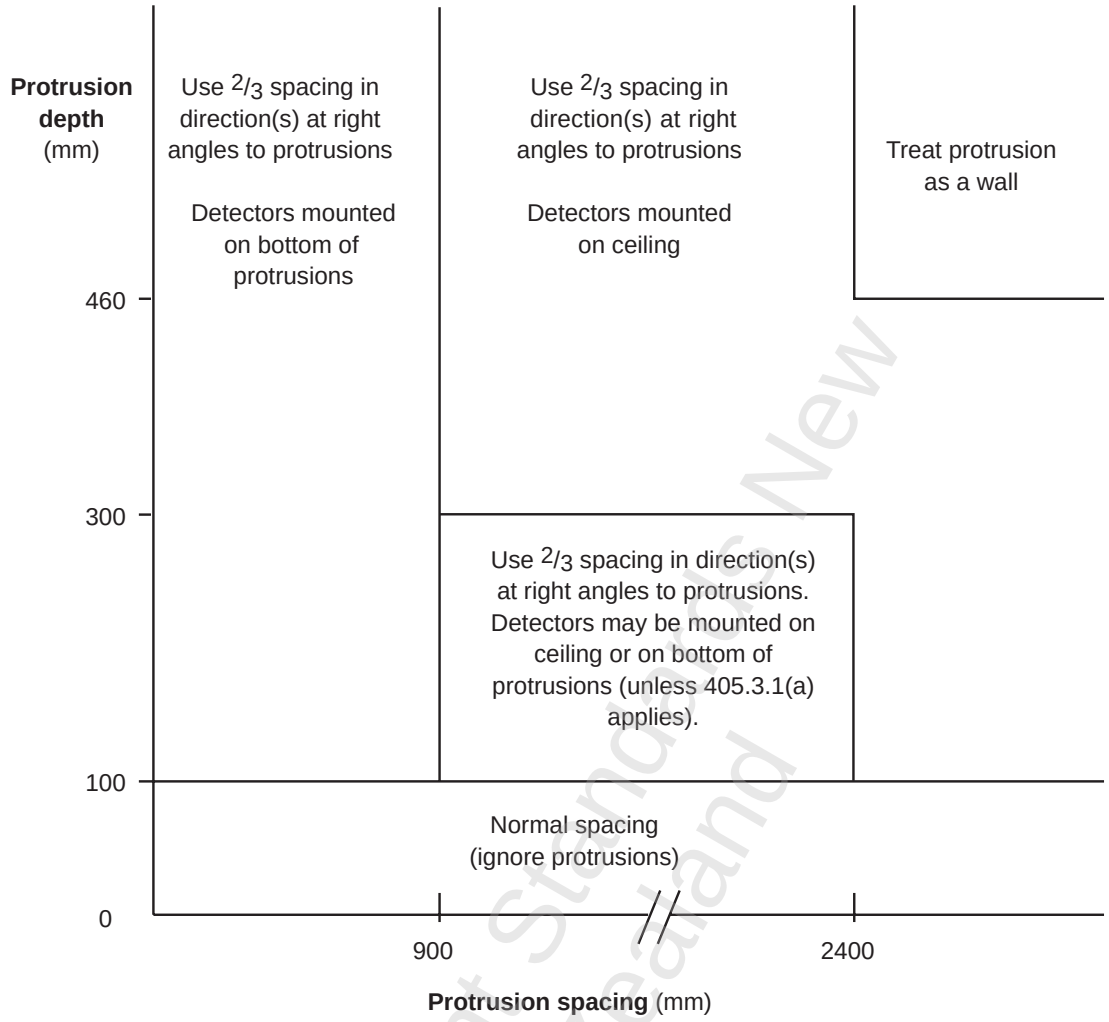


Figure 2 – Effect of protrusions (beam, joist, purlin etc.) on detector location and spacing

NOTE – Refer 405.2.1(m).

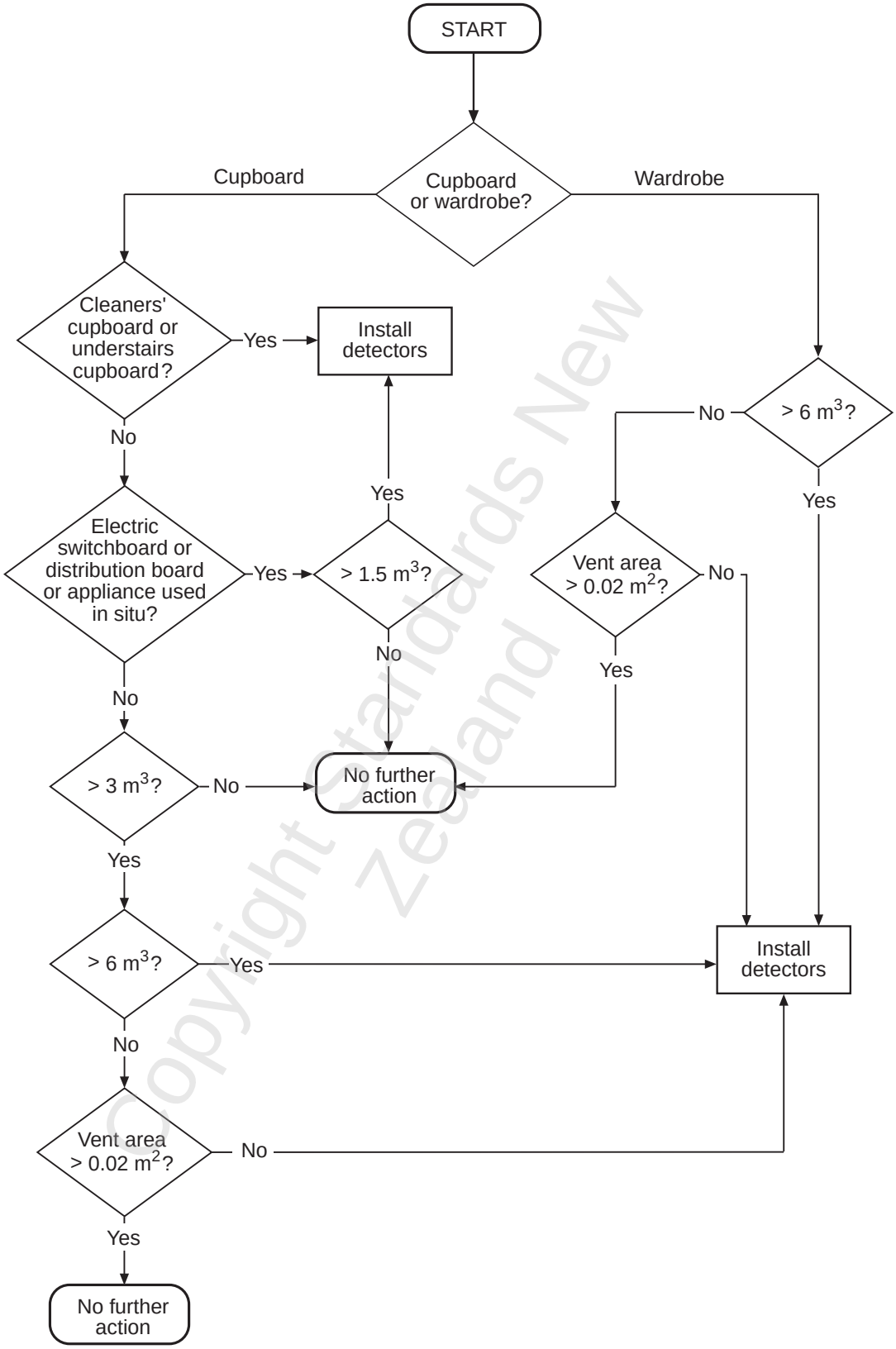


Figure 3 – Protection of wardrobes and cupboards flowchart

NOTE – Refer 405.2.1 (p), (q), (r) and (s).

405.2.2
Partial coverage of a *building* (or *firecell*) is not permitted with the exception that *detectors* may be omitted from the following spaces:

(a) *Concealed spaces* which are *fire isolated* with a minimum *fire resistance rating (FRR)* of 15/15/15 and which do not include *combustible* construction, materials, services or equipment;

(b) *Concealed spaces* between the lowest floor and ground which do not contain equipment or stores, and to which there is no access;

(c) *Concealed spaces* less than 0.8 m deep between false ceilings and *fire* resisting slabs above, and which do not contain any *combustible* material.

NOTE – Flush-mounted light fittings, small air conditioning dampers, fans and associated wiring, and timber framing construction in such *concealed spaces* are not regarded as "*combustible*" for the purposes of this Standard.

(d) That part of *concealed spaces* under roofs which are neither formed of, nor contain *combustible* materials, and which are less than 0.8 m deep (see also 405.2.3);

(e) Individual water closets which open off a protected room, and where the doors or walls or both are not full height;

(f) Adjacent *firecells* (unless required by the New Zealand Building Code or the *declared functional requirement)*;

(g) Where there is a false ceiling of a perforated type and the open area, consisting of individual holes each at least 625 mm^2 in area, exceeds 50 % of the total area, it is sufficient to locate *detectors* on the main ceiling above the false ceiling;

(h) Where sprinkler heads of a fully compliant NZS 4515 or NZS 4541 sprinkler system are installed, *heat detectors* may be omitted from that space.

405.2.3
If the roof pitch means that the width of the space which is less than 0.8 m deep is greater than 3 m, then the first line of *detectors* shall coincide with the line at which the depth of the roof space is 0.8 m and the maximum area of coverage per *detector* shall still apply.

405.3 Spacing

405.3.1
Point type *heat detectors* shall be spaced and located in the optimum position for exposure to the flow of hot *fire* gases during a *fire* and as follows:

(a) Located at the highest point of the low side pocket formed by beams or other members which project more than 100 mm from ceilings when the ceiling slope is more than 5^o (1 in 11.34). The heat collector shall not project below the bottom of the beam;

(b) Not exceeding 6 m centres in general areas and 9 m in corridors;

(c) Not exceeding 3 m from any wall or partition in general areas, and 4.5 m in corridors; and

(d) Not less than one *detector* for each 30 m^2 of floor area.

405.3.2
Line type *heat detectors* shall be spaced as follows:

(a) In accordance with the conditions of 405.2 in so far as they are applicable and appropriate;

(b) Lines shall be so disposed throughout the *building* that adjacent lines are not more than 6 m apart and all walls are within 3 m of a line;

(c) Mounted within 500 mm of the apex of each apex type roof.

405.3.3
Point type *smoke detectors* shall be spaced as follows:

(a) Not exceeding 10 m between *detectors*;

(b) Not exceeding 5 m, and not less than 0.2 m from any wall or partition;

(c) Such that no point in the room is more than 7 m from the nearest *detector*;

(d) Not exceeding 0.5 m from the apex of a ceiling sloping more than 5^{o} (1 in 11.43).

405.3.4
Beam type *smoke detectors* shall be spaced and positioned as follows:

(a) With their projected beams normally parallel to the ceiling and in accordance with the *manufacturer's* instructions;

(b) In accordance with the conditions of 405.2 as applicable;

(c) Located throughout the *building* so that adjacent beams are not more than 14 m apart and all walls are within 7 m of a beam;

(d) Mounted within 600 mm of the apex of each apex type roof.

405.3.5
Aspirating smoke detection sampling points for room protection shall be spaced so as to comply with 407.2 but shall not be at greater spacing than the requirements for point type *smoke detectors* in 405.3.3.

405.3.6
For sloping ceilings, the *detector* spacing distances shall be based on the horizontal projection of the ceiling. A roof or ceiling with a slope of less than 5^{o} (1 in 11.43) may be deemed to be flat.

405.4 Indicators
Detectors shall be installed such that the indication of their operation is readily apparent to a *person* standing beneath the *detector* under normal conditions of illumination.

Unless a *zone* uniquely defines all the *detectors* located in a ceiling or *concealed space*, indication of their operation shall be given by means of an easily-discernible, labelled indicator situated in an adjacent normally-accessible space.

406 ALERTING DEVICES

406.1
Audible *alerting devices* used throughout a *fire alarm system* shall produce the evacuation signal of Appendix F (including verbal message) except as permitted in 406.5, 406.7 and 406.11, or as follows:

(a) Where audible *alerting devices* are added as part of an extension to an existing system the additional devices installed may produce the existing sound type (without verbal message) or alternatively, all *alerting devices* may be upgraded to produce the evacuation signal of Appendix F (including verbal message);

(b) Where an additional system is installed on a site with an existing uniform, site-wide evacuation sound, the audible *alerting devices* on the additional system may produce the existing sound type, but must also include a verbal message complying with Appendix F.

Notwithstanding, the audible *alerting devices* shall produce identical evacuation *signals* throughout the *building*.

406.2
Verbal messages forming part of the audible signal shall provide clear and readily understandable instructions. The verbal evacuation message shall be consistent with the *building's evacuation scheme*, and should include the word "evacuate" as well as the word "*fire*" or "emergency" or both (refer F4).

406.3
At any location within the signal reception area, the A-weighted sound pressure level of the audible *alerting devices* measured by a meter to BS EN 60651, with the time weighting "F" (fast) shall exceed by a minimum of 5 dBA, the noisiest background sound pressure level averaged over a period of 60 s except that where voice facilities are used for evacuation purposes, the sound pressure shall exceed the noisiest background sound pressure level by at least 10 dBA. The sound pressure level of the audible *signals*, however, shall be not less than 65 dBA and not more than 100 dBA measured at any normally accessible point in the room at a height of 1.8 m. In *buildings* providing accommodation, the minimum sound shall be 75 dBA at the bedhead unless 406.5 or 406.7 apply. Sound pressure levels (SPL) shall be measured with all doors closed.

406.4
Where visual *alerting devices* are used, the intensity and the location of the visible signal shall be such as to ensure perception by the occupants.

Where required by the *declared functional requirements*, or the *ambient noise level* exceeds 90 dBA or where ear protectors are worn, visual *alerting devices* shall be provided.

406.5
Where audible *alerting devices* could cause occupants distress in areas of *buildings*, or where such devices would preclude proper conduct of critical or emergency functions, other suitable means of quickly alerting occupants shall be permissible in those areas as follows:

(a) In care or detention facilities in which there are on-duty staff available on a 24 h basis, low level audible and/or visual devices shall be provided so as to alert all such staff wherever they may be located and whatever normal duties they may be undertaking;

(b) In other areas, low level audible or visual devices or both, to alert all occupants.

The character of the sound is not required to comply with 406.1.

In both cases, provision may be made for a responsible *person* to silence (after they have operated) the

sounders of audible or visual warning devices or both, in that *person's* area of responsibility. All visual devices shall continue to operate.

406.6
A minimum of 2 *alerting devices* per system shall be installed.

406.7
The type of *alerting devices* in hospital wards or other areas where care is provided may be a combined pulsing light and low noise level sounder that is common to all such areas where 406.1 is not complied with. Such devices shall have:

(a) A visual *alerting device* (refer section 218);

(b) An audibility level of no less than 5 dBA above *ambient noise level*. If the sounder is pulsed, then it shall pulse at the same rate as the pulsing light;

(c) The sound character of such devices is not required to comply with 406.1.

406.8
An *emergency warning and intercommunication system (EWIS)* installed so as to comply with AS 2220.2 may be used as the *alerting device*.

406.9
The label required by 218.3 shall be located on or adjacent to the *alerting device* and sized to be readable when installed from a point 1800 mm above the floor.

406.10
Where the position of the *indicating unit* is not readily visible from the point of Fire Service attendance, an *alerting device* (visual or audible) shall be located on the exterior of the *building* in such a position so as to draw attention to the location of the *indicating unit*.

406.11
Where a *firecell* is protected by a Type 5 *fire alarm system*, the *smoke detectors* within that dwelling unit may generate a *non-latching* alarm signal within the *firecell* only. Where a management response is available, a local signal shall be communicated to the management. See section 105(f).

The character of the sound is not required to comply with 406.1.

406.12
Where *staged evacuation* is approved by the appropriate authority, the system should signal the evacuation alarm of 406.1 in the *zone(s)* or *firecell(s)* from which the alarm has originated, and sound the audible alert signal of 218.6 (c) in all other *zones* or *firecells* unless otherwise specified in the approved *evacuation scheme*.

407 MULTI-POINT ASPIRATED SMOKE DETECTORS

407.1
Multi-point *aspirated smoke detectors* may be used to provide conventional room protection in compliance with 405.2.1(a), where installed in accordance with 407.2 to 407.14.

Where the *declared functional requirement* is for detection of very low levels of smoke or of pre-combustion aerosols in specified items of equipment or, in certain areas, multi-point *aspirated smoke detectors* may be used if installed in accordance with 407.4, 407.5, 407.7, 407.9, 407.10 and 407.11. This shall be either as an adjunct to general coverage by other forms of *detector* or on a stand alone basis according to the tenor of the *declared functional requirements*.

407.2
The requirements of AS 1603.8, in respect to installation of multi-point *aspirated smoke detectors*, shall be complied with where these do not conflict with the requirements of this Standard.

NOTE – AS 1603.8 contains installation-dependent requirements for system design, components and performance.

407.3
The total system design shall ensure that the system has a sensitivity equal to or greater than equivalent point type *smoke detectors* covering the same area.

407.4
The air-sampling network design shall be such that the amount of airflow drawn from the penultimate sampling point is at least 50 % of that drawn from the sampling point nearest the *detector*.

NOTE – *Manufacturer's* design tool calculations showing the network design according to the above criteria should be provided as a means of demonstrating compliance.

407.5
The installation and alignment of any part of the system shall be such that it can be easily maintained. The sampling point orientation shall not jeopardize the long term reliability and performance of the system.

407.6
Each sampling point shall have an orifice sized to facilitate the correct operation of the system in accordance with the system design data. Each single compartment or room in excess of 15 m^2 shall have a minimum of 2 sampling points.

407.7
Sampling points shall not be painted or coated with any substance that will reduce the size of the opening. Sampling points shall be de-burred internally.

407.8
The location of the sampling point shall be marked in a contrasting colour.

407.9
Aspirating network pipes shall be installed in accordance with NZECP 28 or AS/NZS 3000 requirements for flexible conduit or rigid non-metallic conduits (as appropriate). All joints shall be airtight.

407.10
Capillary tubes used to branch from the main sampling pipe shall be fixed at both ends so that the joints have a withdrawal force of not less than 10 N.

407.11
Capillary tubes shall not restrict the airflow by changes of direction or reduction in cross-sectional areas. Non-metallic capillary tube materials shall comply with the relevant requirements of AS/NZS 4130.

407.12
Where the system piping is concealed, the air-sampling points attached to the capillary tubes shall be clearly identifiable by a label reading "FIRE DETECTION SYSTEM – DO NOT PAINT".

407.13
Sampling points for room protection shall be not more than 300 mm or less than 25 mm from the ceiling.

NOTE – The lower limit of the mounting position of the sampling point may be changed to suit individual applications as determined by smoke tests.

407.14
Where the *aspirating smoke detection* system is capable of providing a range of alarm levels, those used to generate *fire alarms* shall be sufficiently high to prevent false alarms.

408 DELAY TIMERS

408.1
Delay timers may be used to enable investigation of *fire alarm* activation where processes or the environment may cause false alarms, and where a proper management process can be instituted to establish the cause of the *fire alarm*. However, delay timers should not generally be used to delay remote signalling or a general activation of the *alerting devices*.

408.2
Delay timers shall not be used as a substitute for proper system engineering to prevent false alarms due to environmental conditions (see 405.1.1).

408.3
Delay timers shall only be used in consultation with the *building's fire* engineer, regulatory authority, and/or the Fire Service regarding the *building's fire* evacuation procedure.

408.4
Delay timers shall not be used to delay alarms from *manual call points* or *heat detectors*.

408.5
Where a *building consent* requires a Type 2, 3, 4, 5 or 7 *fire* system (except *smoke detectors* in the case of Type 5 or 7), timers shall not be used to delay the Fire Service response and general operation of the *alerting devices*.

408.6
Any time delay period before remote signalling or general *building* evacuation should be kept to an absolute minimum.

409 OWNER ISOLATION FACILITIES

409.1
Owner isolation facilities may be provided to prevent a remote alarm being signalled from *smoke detectors* on Type 7 systems (or where a remote connection is not required) due to predictable false alarms from specific occupant activities (e.g. manufacturing processes).

409.2
Owner isolation facilities shall only be used on Type 7 systems or where a remote connection is not required.

409.3
Owner isolation facilities shall only be used in consultation with the *building's fire* engineer, regulatory authority, and/or the Fire Service regarding the *building's fire* evacuation procedure.

409.4
Owner isolation facilities shall not be used to inhibit alarms from *manual call points* or *heat detectors*.

409.5
Owner isolation facilities should not generally be used to inhibit a general activation of the *alerting devices*.

409.6
Where provided, *owner* isolation facilities shall be accessible from the outside of the *control unit* and secured against unauthorized use. Positive indication shall be given whenever devices are *isolated*.

PART 5
COMMISSIONING

501 GENERAL

501.1
Each completed system shall be inspected to ensure compliance with the requirements of this Standard. The relevant inspection and testing requirements of this Part shall be carried out for all *multizone fire alarm systems* and, where applicable, for *single zone fire alarm systems*.

501.2
Emergency warning and intercommunication systems (EWIS) shall be commissioned in accordance with AS 2220.2.

501.3
Where the maintenance of any part of a *fire alarm system* is inadequately covered by Part 6, the designer shall compile a draft *compliance schedule* to provide maintainers with guidance on those parts of the system. The installer shall attach any draft *compliance schedule* clauses to the certificate of completion and submit a copy to the *territorial authority* for their consideration as a part of the *building's compliance schedule*.

502 VISUAL EXAMINATION

502.1
A visual examination of the system as a whole shall be made, checking in particular the following:

(a) Wiring of the control and *indicating units*;

(b) Where connected, the type of signalling equipment is compatible with the *remote receiving centre* equipment;

(c) Electrical supply, including batteries, battery accommodation and wiring;

(d) Cable;

(e) Location and area of coverage of *detectors*;

(f) *Manual call point* location;

(g) *Alerting device* locations;

(h) The log book and documentation specified in section 505 has been supplied;

(i) The marking is in accordance with sections 223 and 402.11;

(j) The *zone* control and *indicating units* have been located correctly in relation to the Fire Service attendance points;

(k) That *zones* have been correctly designated;

(l) That indicators and legends, when operated, clearly indicate their function at a viewing distance of 2m.

503 TESTS ON ELECTRICAL EQUIPMENT

Carry out tests on all the electrical equipment as follows:

(a) Using an insulation tester operating at not less than 250 V, measure the leakage resistance from conductors in each cable to earth. No reading shall be less than 5 MΩ;

(b) Verify that the electrical wiring is in accordance with the requirements of the relevant statutory regulations for 230 volt installations;

(c) Verify that the time delay from operation of a *detector* or *manual call point* to the *fire alarm signal* operation does not exceed 15 s and that a 1 s operation of a *manual call point* latches the system (refer 204.5);

(d) Where *ancillary services* are connected to the system, verify that the voltages do not exceed the limits specified in 203.3;

(e) Verify that each battery complies with sections 213 or 214, as appropriate.

To comply with section 213, the rated capacity of a battery shall be greater than the minimum, calculated as follows:

For a remotely-connected system: $Ah = (I_Q \times 24) + I_A$

For a non-remotely-connected system: $Ah = (I_Q \times 72) + I_A$

where:

Ah = the minimum rated battery capacity, in ampere hours at the 10 h rate

I_Q = the non-alarm current from that battery (charger off) in amps

I_A = the alarm current drawn from that battery (charger off) in amps.

NOTE – A times 2 derating factor has been applied to the alarm capacity to compensate for battery conversion inefficiencies.

(f) Verify that the output of any battery charger complies with the requirements of section 212.

The minimum allowable output rating for a battery charger shall be calculated as follows:

$A = I_Q + (Ah/24)$

where:

A = the minimum allowable battery charger output rating, in amps

I_Q = the non-alarm current drawn from that charger (battery disconnected) in amps

Ah = the minimum rated battery capacity calculated in 503 (e), in ampere hours at the 10 h rate.

504 TESTS TO VERIFY CORRECT OPERATION AND FUNCTION

504.1
Carry out tests to verify the correct operation and function of the system as follows:

(a) All *detectors* are in circuit;

(b) *Manual call point* operation, except those designed for once only operation;

(c) *Alerting devices*, as per 406.3;

(d) Control and switching facilities;

(e) Visual indicators, and also that the correct *zone* is indicated;

(f) The removal of a *detector* from a circuit results in a signal being indicated;

(g) The removal of a *manual call point* from a circuit results in a signal being indicated;

(h) *Defect warning* facilities by simulating the appropriate defect condition in accordance with 208.1;

(i) Where connected to a *remote receiving centre*, and with the complete system in the normal operational condition, the operation of a *zone* circuit results in a *fire alarm signal* being received;

(j) With the complete system in the normal operational condition, the operation of a *zone* circuit results in the appropriate *alerting devices* operating;

(k) Where facilities are provided for evacuating by *zones*, a test shall be carried out to check that all *alerting devices* operate when the controls are in the total evacuation mode;

(l) Perform appropriate testing of multi-point *aspirated smoke detection* systems to ensure that the design objectives for sensitivity, proportion of air and transport time have been achieved.

504.2
Perform sample testing of *detectors* as per 603.3. Particular care should be taken to select a representative sample.

NOTE – *Smoke detector* sensitivity testing is vital for detecting initial contamination due to construction work.

505 DOCUMENTS

In addition to a log book for test and survey records required per 602.9 and 603.13, adequate documentation shall be provided and maintained with the system detailing:

(a) All equipment installed, its location, interconnection and intended function, and including battery and battery charger capacity calculations to demonstrate compliance with sections 212, 213 and 214 of this Standard;

(b) Any special requirements for maintenance or replacement of system components;

(c) Software versions and site-specific configuration data;

(d) All subsequent additions, alterations and amendments to the system, its components and configuration.

NOTE – SAA HB 20:1996 is recommended for use as a source of symbols used in layout and interconnection drawings.

506 CERTIFICATE OF COMPLETION

A certificate of completion shall be provided by an accredited inspection body (see 107.1(e)) to confirm that the installed system agrees with the intent of this Standard. The required certificate of completion is included in Appendix J. The certification of completion shall be held with other documents (see section 505). This requirement shall also apply to extensions to systems where additional *zones* are added and or the *zone control unit* is upgraded or replaced.

PART 6
MAINTAINING SYSTEMS IN COMPLIANCE AND GOOD WORKING ORDER

601 GENERAL

601.1
Fire alarm systems shall be maintained in compliance with this Standard and in good working order at all times.

601.2
Tests, inspections, other routine maintenance and reporting specified in this Part shall be carried out at the intervals specified. Deficiencies identified by such work shall be remedied immediately.

601.3
Any defect or previously unnotified *isolate* warnings generated by the *fire alarm system* shall be immediately investigated and remedial action, as appropriate, implemented.

601.4
Fire alarm systems which are in "*Fire*" alarm condition shall be restored to normal as soon as possible following completion of appropriate checks and servicing functions to ensure the system remains in good working order.

601.5
To ensure that the foregoing will occur, there shall be at all times a suitable contract in force that will ensure the regular, and in emergency prompt, attendance of personnel who are competent and qualified. (See section 109).

Where the actions described in 601.1 to 601.4 are performed by appropriately qualified *persons*, then the requirements of this Part of the Standard are deemed to have been met.

602 MONTHLY CHECKS AND TESTS

602.1
Monthly checks and tests shall be carried out as specified in this Part by an appropriately qualified person as defined in 601.5.

602.2
The float voltage across any rechargeable battery shall be checked to ensure that the voltage per cell is maintained within the limits listed in 212.5.

602.3
Where appropriate, the specific gravity and electrolyte level of each cell of any rechargeable battery shall be checked to ensure that it is correct. Check that the voltage of any non-rechargeable cell is above the *defect warning* level specified in 208.1(a).

602.4
The battery cabinet and battery terminals shall be checked to ensure they are maintained in a clean serviceable condition.

602.5
Correct operation of the system, including all indicators, shall be tested by using the test facilities in *zone* circuits with the system in the test or *isolate* mode. The system shall be reset to normal after completion of the tests. Test the *alerting devices* to ascertain they operate satisfactorily, as witnessed from the *control unit*.

NOTE – An acceptable method of testing the *alerting devices* is where the evacuation switch is operated at a set time and wardens in each *zone* report *alerting devices* which do not operate. During this test the system may give a *defect warning* signal.

602.6
Where connected to a *remote receiving centre*, and with the system in the appropriate test mode, a test of the device for signalling shall be made to ensure that the correct *signals* are generated and received.

602.7
The battery shall be tested for 10 s at not less than the 5 h discharge rate. During this test the battery voltage shall not fall below 80 % of its nominal voltage. The battery under test shall not receive any assistance from any other power source.

602.8
Each battery shall be marked with its installation date and any battery which exceeds the service life specified by its *manufacturer* shall be replaced.

602.9
A test report shall be completed and the results entered in the *owner's* log book. The report shall be copied to the *owner* and to any authority or agency required to receive one.

603 ANNUAL CHECKS AND TESTS

603.1
Annual checks and tests shall be as in section 602, and additionally as specified in this section.

603.2
The warning facilities shall be checked to ensure they are operating correctly for the following conditions:

(a) Failure or disconnection of the battery;

(b) Failure or disconnection of the leads to a *detector* or *manual call point*;

(c) Absence of any plug-in *zone* circuit board.

603.3
The operation of all *manual call points* shall be tested in situ.

Automatic *fire detectors* shall be tested according to the following:

(a) *Heat detectors* shall be sample tested in situ by applying a safe heat source to a minimum of 2 % of the *detectors*. If any *detector* fails to operate, a further sample of 10 % of all *detectors* shall be heat tested. If a further failure occurs, 100 % of the *detectors* shall be inspected to determine the cause of the failure or identify other potentially defective *detectors* or both. Appropriate remedial action shall be carried out to all affected *detectors*. Any *detectors* destroyed during these tests (e.g. eutectic alloy type) shall be replaced using types of current manufacture and compatible with the system; ➤

(b) *Smoke detectors* shall be sample tested by checking the sensitivity of a minimum of 20 % of the *detectors*. These *detectors* shall then be cleaned in accordance with the *manufacturer's* instructions for routine maintenance, and given an in situ test by applying test smoke, or other phenomena which directly simulate the *fire* products being detected. If any *detector* fails to operate, or if the calibration of any *detector* falls outside the *manufacturer's* recommended limits, a further sample of at least 40 % of all *detectors* shall be tested. If a further failure occurs, 100 % of the *detectors* shall be inspected to determine the cause of failure or identify other potentially defective *detectors* or both. Appropriate remedial action shall be carried out on all affected *detectors*. Where a *smoke detector* is able to signal a maintenance request when its calibration falls outside the *manufacturer's* recommended limits, the requirements for cleaning above may be omitted providing the smoke entry of the *detector* is externally clean. The sensitivity of all *aspirated smoke detectors* shall be tested. At least 20 % of sampling points shall be given an in situ test as above;

(c) Other *detector* types shall be tested by means appropriate to that *detector* type;

(d) All *detectors* and sampling points in the system shall be tested in rotation. A log shall be kept detailing the tested *detectors* and sampling points to ensure that all *detectors* and sampling points are systematically tested;

(e) A minimum of one *detector* per *zone* shall be tested.

The in situ test shall be of a simple "go/no go" nature and shall check that both the device and *zone control unit* operate correctly.

603.4
The operation of each *zone* circuit from either the end of line element, or the most remote *detector* or *manual call point*, to the output of the *control unit* signalling device shall be checked.

603.5
A thorough visual examination shall be made of the general condition of all components of the system.

603.6
All aspirated system pipe work shall be cleaned using alternating vacuum or positive pressure to remove internal dust build-up. All *aspirated smoke detector* filters shall be cleaned or replaced as per *manufacturer's* instructions.

NOTE – In dirty environments this may need to be performed more often.

603.7
The entire premises shall be checked to ensure that all areas are protected and that any *building* alterations, or changes in usage of any area, have not reduced the effectiveness of the system.

603.8
Indicators and legends shall be checked to ensure that they are still current and that they clearly indicate their function at a viewing distance of 2 m.

603.9
The correct operation and function of the *defect warning* facilities shall be checked by simulating the appropriate condition in accordance with 208.1.

NOTE – Tests for defect conditions 208.1(i), (j) and (k) may be omitted if the equipment does not allow practical field testing of these conditions.

603.10
The interface shall be checked between the *fire alarm system* and any *ancillary service* forming part of the *building's fire* safety system (e.g. smoke control system, lift override etc.).

NOTE – This test may only check that the relay has operated. It is not a functional test of the ancillary equipment connected via the relay. Any ancillary equipment which operates as a result of the *fire alarm* operation needs to be checked by the service provider who maintains the ancillary devices, as these devices or equipment may be a separate *compliance schedule* item.

603.11
An insulation tester operating at not less than 250 V shall be used to test the insulation resistance of cables as follows:

(a) Where electronic devices are not connected, measurements shall be made between conductors and from each conductor to earth;

(b) For all other wiring, measurements shall be made from each conductor to earth.

Measured values shall not be less than 0.5 MΩ.

603.12
Initiation of a *fire alarm* within 90 s of the introduction of suitable test smoke or gas into the penultimate hole of each branch of an aspirated sampling network shall be checked.

603.13
A test report shall be completed which records the results of all tests and inspections together with a list of non-complying features and corrective measures necessary to return the system to compliance with this Standard. The report shall be copied to the *owner*, with a copy lodged as required by any *compliance schedule* issued in respect of the Building Act.

603.14
Testing and inspection shall be carried out to ensure correct operation of all *alerting devices* and that the *building* is adequately covered as defined in 406.3. All necessary measurements, adjustments and repairs shall be included to ensure the correct functioning of all *alerting devices*. All tests and results shall be recorded.

NOTE – The annual test and inspection described may be combined with any mandatory trial evacuation tests (e.g. as required by the Fire Safety and Evacuation of Buildings Regulations).

604 EMERGENCY WARNING AND INTERCOMMUNICATION SYSTEMS (EWIS): ADDITIONAL REQUIREMENTS

The checks and tests as specified in sections 601 to 603 inclusive shall be carried out for *emergency warning and intercommunication systems (EWIS)* where applicable and, in addition, the checks and tests specified in AS 1851.10 shall be undertaken.

PART 7
PRECAUTIONS TO BE TAKEN WHEN A FIRE ALARM IS RENDERED INOPERATIVE

701 GENERAL

Fire alarms may be rendered inoperative from time to time to effect maintenance, repairs or alterations. The contractor shall follow the procedures and the *owner* shall take the precautions specified in this Part of the Standard.

NOTE – Where the system being *isolated* is a necessary part of the *fire* safety requirements for the *building* under a *building consent*, the *building* should not be occupied in the affected areas during the period of isolation unless compensatory *fire* precautions are taken. Refer to Appendix K.

702 NOTIFICATION

702.1

Before the alarm system is rendered inoperative, oral notification of the extent and effect of the impairment shall be given to the authorized representative of the *owner* or occupier, or *person* in charge of the *building*. If an emergency compels immediate action to render the system inoperative, such notification shall be given as soon as possible thereafter.

702.2

Oral notification shall be confirmed promptly in writing.

702.3

Notification to the *owner* shall be given on a notification form, a sample of which is provided in Appendix K. This form also gives precautions which the *owner* should take during the period the alarm system is inoperative.

703 PERMANENT DISCONNECTION

The contractor shall notify the Fire Service and *territorial authority* in writing when an alarm system is rendered permanently inoperative.

704 AUTHORIZATION

Except in emergency, the system shall not be rendered inoperative until the *owner* or the *owner's* representative has authorized the work by signing the notification form in Appendix K.

APPENDIX A
SIGNALLING TO A REMOTE RECEIVING CENTRE

(Normative)

A1 Types of connection

The need for signal transmission ("connection") to a *remote receiving centre* should be determined by reference to the *declared functional requirements* of the system pursuant to section 105, and connection will be required as follows:

Declared functional requirement	**Acceptable type of remote receiving centre**	
	NZ Fire Service	Other
(a) To transmit an alarm to summon NZ Fire Service assistance – as per section 105 (a)	Yes	No
(b) To transmit an alarm to summon some other specified emergency *fire* related assistance – as per section 105 (f)	No	Yes
(c) To monitor and signal to a remote location the presence of faults – as per section 105 (b), where:		
105 (a) applies – as in (a) above	Yes	No
105 (f) applies – as in (b) above but NOT (a)	No	Yes

A2 Means of connection

Signalling to a *remote receiving centre* shall be achieved by:

(a) A dedicated signal path from each *control unit*;

(b) A signal path common to more than one *control unit*; or

(c) An *alarm transport system*.

NOTE – In all cases, the characteristics of the receiving equipment need to be established.

A3 Functional requirements

A3.1

Each *control unit* shall be connected to a *co-located* or integral transmitting device which shall communicate continuously with the remote receiving equipment.

A3.2

Each *control unit* shall be separately identifiable by the Fire Service *alarm transport system*.

A3.3
The ability of the transmitting device to transmit a signal shall not be dependent on the energy supply from the *control unit*.

A3.4
Where the transmitting device cannot be powered from the remote receiving equipment, a separate supply shall be provided, integrated with the transmitting device and with the capacity to ensure that a defect signal can be transmitted on complete failure of the electrical supply to the *control unit*.

A3.5
The separate supply shall be supervised to give a *defect warning* as required by this Standard and shall have sufficient capacity to signal in event of the main system battery failure.

A3.6
Failure of the communications link between the transmitting device and the *remote receiving centre* shall not result in a *fire* signal at the receiving centre.

A3.7
Failure of the communications link between the transmitting device and the *remote receiving centre* unit shall result in an appropriate signal at the receiving centre.

A4 Sector indicating unit

A4.1
Where multiple *control units* are located in one *building* or on one site, a *sector indicating unit* may be required by the Fire Service at the attendance point.

A4.2
The location of the individual *control units* relative to the usual viewing position of the *sector indicating unit* shall be clearly defined on the *sector indicating unit*. See figure A1.

A4.3
Where both *sector* and *zone* indicators are provided on one unit, clear differentiation shall be made between the two functions.

A4.4
The *sector indicating unit* needs to provide *fire* indication only.

A4.5
No *sector indicating unit* is required if all *zone indicating units* are *co-located*.

A4.6
The *sector indicating unit* shall be located near the main entrance point so that, in order to reach a *control unit*, the *fire* appliance is not required to return along roads already traversed.

A4.7
If there is more than one main entrance point, it may be necessary to have repeating *sector indicating units* located at the other main entrance points.

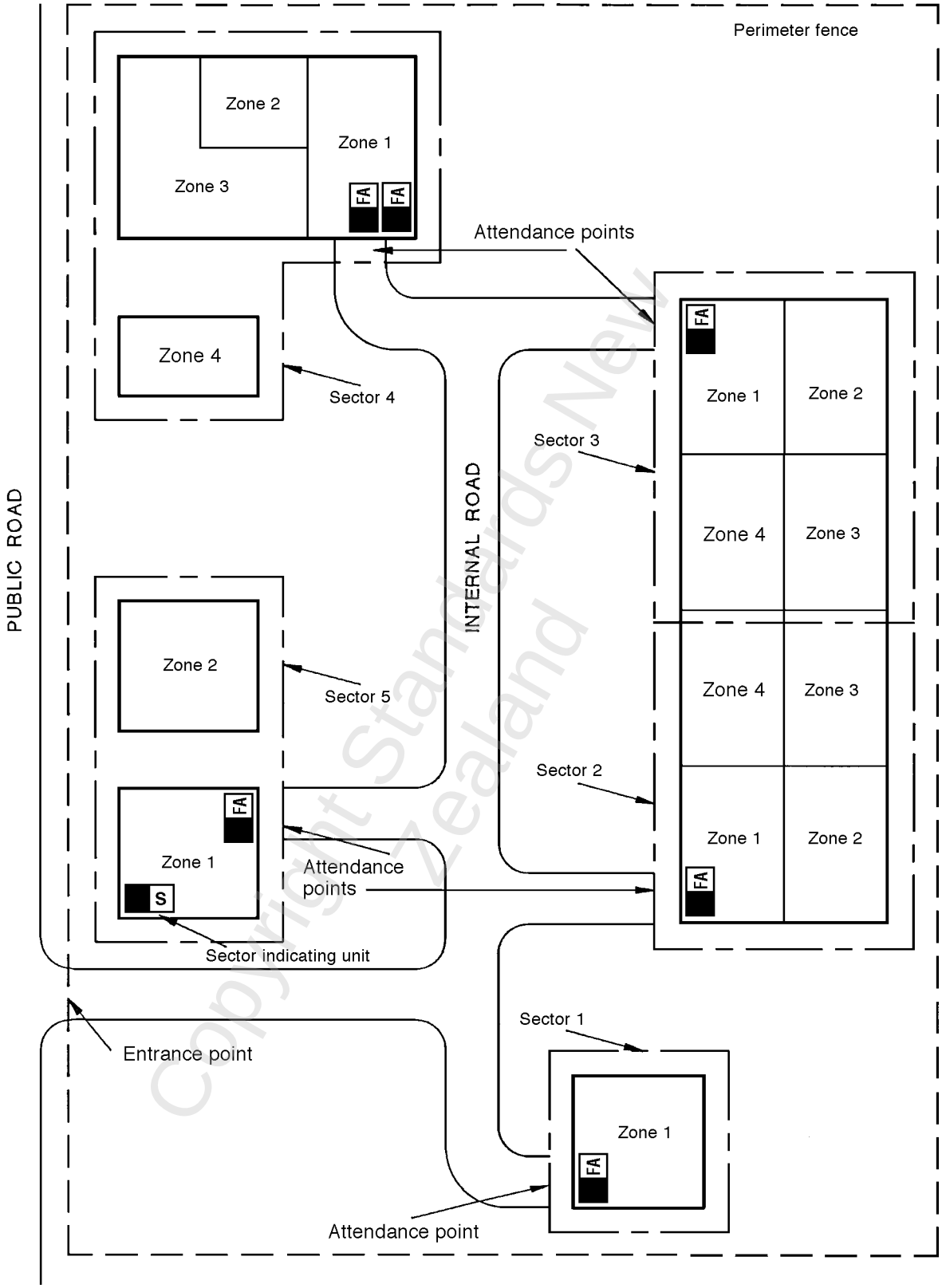


Figure A1 – Example layout of zones and sectors

A5 Power supplies

A5.1
The power supply for *sector indicating units* shall meet the requirements of sections 211, 212, 213 and 403.3.

A5.2
The *sector indicating unit* may share a power supply with repeating *sector indicating units* but shall not share a power supply with any other *control units*.

A6 Installation

A6.1
The installation of *sector indicating units* shall meet the requirements of Part 4 as applicable.

A6.2
All *zones* shall be included in the designation of *sectors*.

A7 Commissioning

A7.1
The commissioning of *sector indicating units* shall meet the requirements of Part 5 as applicable.

A7.2
Checks shall also be made that *sector indicating units* have been located correctly in relation to the Fire Service attendance points and that *sectors* have been correctly designated.

A8 Regular inspection and testing

A8.1
The inspection and testing of *sector indicating units* shall meet the requirements of Part 6 as applicable.

A8.2
The *sector indicating units* shall be tested to ensure correct operation.

APPENDIX B
TYPES OF FIRE ALARMS

(Informative)

B1
For the purposes of this Standard, the equipment needed for the various types of *fire alarms* defined in the Approved Documents for NZBC Fire Safety Clauses is usually as follows.

NOTE – Refer to the Approved Documents for NZBC Fire Safety Clauses for the full description of the various types.

B2 Type 2
A single or multizone *manual fire alarm system* with automatic signalling to a *remote receiving centre*.

B3 Type 3
An *automatic fire alarm system* activated by *heat detectors* and *manual call points* with automatic signalling to a *remote receiving centre*.

NOTE – Sprinkler coverage to NZS 4541 or NZS 4515 may be allowed to be substituted for all or part of a Type 3 system.

B4 Type 3b
The suffix "b" indicates that in *firecells* where only a single *escape route* is available, a Type 4 or Type 6 alarm is required.

B5 Type 4
An *automatic fire alarm system* activated by *smoke detectors* and *manual call points* with automatic signalling to a *remote receiving centre*.

NOTE – In some circumstances, *heat detectors* may be allowed to be substituted for *smoke detectors* where the ambient conditions of a space are not suitable for *smoke detectors*.

B6 Type 4e
The suffix "e" allows the optional use of a Type 5 system.

B7 Type 5
A Type 5 alarm system is a variation of a Type 4 alarm system that allows the Type 4 smoke detection in specified *firecells* to sound a local alarm only, provided that in addition those specified *firecells* are provided with heat detection that results in the alerting of all building occupants.

B8 Type 6
An automatic *fire* sprinkler system with automatic signalling to a *remote receiving centre* plus a Type 2 *manual fire alarm system*.

B9 Type 7
An automatic *fire* sprinkler system with automatic signalling to a *remote receiving centre* plus a Type 4 *smoke detection* system.

NOTE – It is optional for *smoke detectors* to automatically signal the *remote receiving centre*.

B10 Type 7e
The suffix "e" allows the Type 4 alarm system component of a Type 7 system to be a Type 5 system.

B11 Sub Type f
The suffix "f" indicates a direct connection to the Fire Service is not required provided a telephone is installed and freely available at all times to enable “111” calls to be made.

APPENDIX C
SUPPLEMENTARY DETECTORS AND SYSTEMS

(Informative)

	Category of *detector* or system supplementary to the main *fire alarm system*:		
	Supplementary (additional) detectors (refer 204.1d) e.g. in-duct *smoke detectors*, *heat detectors* in lift shaft, *escape route smoke detectors*	**Supplementary *fire alarm systems* (refer 401.8) e.g. supplementary high sensitivity smoke detection, linear heat sensing cable, in-cabinet smoke detection**	**Other *fire* protection systems (refer 218.9) e.g. sprinkler system, gas flood system, deluge system, restaurant suppression system**
Is full *building* coverage required before considering?	Yes	Yes	Yes
May the supplementary *detector* or system operate the main *fire alarm system's alerting devices*?	Optional. (Via a *zone* circuit of the main *fire alarm system*). May reset automatically (refer 204.2).	Yes. Either via a *zone* circuit of the main *fire alarm system*, or directly (as right).	Optional. Must connect directly. Must have its own silence alarms switch (refer 205.5). Interconnection must be supervised by the main *fire alarm* (refer 218.9).
May it operate a main *fire alarm system zone* indicator? (must be red, refer 210.5)	Optional. (Recommended if the *detectors* operate *alerting devices* or signal remotely).	Yes.	Recommended if the other system is remote connected. (refer 402.8.2 (d), 210.5)
May the supplementary *detector* or system signal *fire* or defect remotely?	Optional. (Via a *zone* circuit of the main *fire alarm system*).	Optional. (Via a *zone* circuit of the main *fire alarm system*).	Optional. *Fire* must not signal via the main *fire alarm system* (refer 203.4), but some defects may do so (refer 203.4 and 205.5).
Is a zonal relaxation permitted for the supplementary *detector* or system?	Not applicable.	Yes	Not applicable.
What Standard is the supplementary *detector* or system required to comply with?	NZS 4512	NZS 4512	Whatever technical standard is applicable to the other system.

NOTE – This table is intended as a ready reference for some aspects of the relevant clauses. It is not a substitute for a full understanding of them.

APPENDIX D
SPECIFICATION FOR HEAT ACTUATED FIRE DETECTORS

(Normative)

D1 General

D1.1
This Appendix specifies performance testing for electrical and electronic *detectors*. Alternative technologies that do not comply with the specific requirements, but give equivalent performance, are not necessarily prohibited. In such cases, appraisal testing will need to demonstrate this to the satisfaction of the relevant authority.

D1.2
Attention is drawn to the general requirements for *detectors* contained elsewhere in this Standard. In particular, the requirement for mechanical alarm contacts to be normally closed (216.6), the requirement for *detectors* to have visual operation indication (216.5), and the prohibition on use of eutectic alloys for heat detection (216.7).

D2 Materials, design and construction

D2.1
The selection and application of materials, and the design and construction of the *detector* shall ensure that, under normal conditions of installation and use, and taking into account any depreciating factors which may be reasonably anticipated, there is no risk of mechanical or electrical failure and reliability of operation is maintained.

D2.2
Detectors shall be made of corrosion resistant material, or plated or otherwise suitably treated to resist the particular atmosphere likely to be met in service.

D2.3
The base on which live parts are mounted and the insulating material, if any, between current and non-current carrying parts shall consist of strong, moisture-resistant, insulating material of low flammability.

D2.4
Any plastic material used in the *detector* shall meet the requirements of the test specified in D7.2.

D2.5
Any sealing compound used in a *detector* shall not fail to perform its intended function at any temperature less than 20 ºC above the *detector's rated temperature*.

D3 Mounting facilities

D3.1
Detectors shall be provided with a suitable means for their secure mounting. This mounting shall be designed so that it has sufficient strength to resist any distortion which may affect the operation of the *detector* where fixed to an uneven surface.

D3.2
The means of mounting *detectors* shall be such that they are supported independently of their connecting leads, and provision shall be made for accommodating this wiring by means of a mounting recess or connection box.

D4 Connecting facilities

D4.1
Terminals shall be so designed that the conductors connected to them are rigidly and effectively clamped between metal surfaces and that a connection shall not slacken or overheat under normal conditions of use. Screws shall be made of non-ferrous materials.

D4.2
The terminals shall be capable of taking at least two conductors each of 1.5 mm^2 of cross-sectional area. Soldered joints shall be made without use of fluxes containing corrosive substances.

D4.3
Each terminal shall be marked, either by colouring, lettering, or otherwise as may be necessary, to indicate the correct manner of connecting it to the circuit conductors. The marking shall remain legible during the service life of the *detector*. No identification marking shall be placed on screws, washers or other parts which may be removed when conductors are being connected.

D4.4
Where pillar-type terminals are used, the screw shall be of sufficient length to extend to the far side of the terminal hole and shall have a diameter approximately equal to that of the hole. The ends of the screws shall be rounded or chamfered to prevent damage of the conductors, and the side of the hole against which the screw bears shall be smooth and unbroken.

D4.5
Binding-screw type terminals shall be designed to retain the strands of the conductor, and if the connection is made under the head of a screw or bolt, a cup shaped washer or equivalent device suitable for repeated use shall be provided.

D4.6
Screw threads shall comply with an appropriate specification. The terminal screws shall engage at least two full threads in metal and shall be capable of passing the torque test requirements given in AS/NZS 3100. During, and as a result of this test, the threads of the screwed component and its fixing shall not strip, insulating material shall not crack and there shall be no other failure that would render the screwed component non-reusable.

D4.7
Detectors intended for use in areas prone to higher corrosion than normal shall have their electrical connections encapsulated or otherwise protected to prevent the ingress of moisture.

D5 Internal conductors

All internal conductors of an electrical *detector* shall be provided with a minimum of 250 V grade insulation or equivalent insulating sleeving, apart from short lengths adequately and permanently spaced from non-current-carrying metal parts.

D6 Contacts

D6.1
Contacts shall have surfaces of suitable material such as silver or other metal or alloy of equivalent characteristics. For any application where hydrogen sulphide or other corrosive gas may be present, contacts shall be made of palladium or similar corrosion resistant metal.

D6.2
Electrical contacts and other moving parts of a *detector* shall be enclosed in a manner that shall afford protection against moisture, dust, insects and other foreign matter which may adversely affect their normal operation.

D6.3
Any adjustment affecting the operation of the *detector* shall be a factory adjustment, and shall be effectively and permanently sealed to prevent tampering or movement under normal conditions of installation and use.

D7 Tests

D7.1 *General*

D7.1.1
Sufficient samples shall be supplied for appraisal testing to enable a minimum of five *detectors* to be subjected to each test.

D7.1.2
Unless otherwise stated, all tests shall be initiated and conducted with the test apparatus, sample *detector*, and air stream or test liquid stabilized at a temperature of 23 ± 2 °C.

D7.1.3
Unless otherwise stated, all tests shall be initiated and conducted with the sample *detector* connected in the normal way to a compatible *zone control unit* (or equivalent), in normal operational orientation. The control and indicating equipment shall be reset as necessary after each *detector* operation.

D7.1.4
A suitable airflow oven for carrying out the tests of D7.5.1(c) and D7.5.2 shall satisfy the rate of rise of temperature requirements, and have a minimum air velocity of 0.15 m/s at the point where the test sample is situated.

D7.1.5
The actual (measured) fixed operating temperature of individual *detectors* may be used for performance testing instead of the *rated temperature*. In these cases, the *detector's* actual operating temperature shall be established as per D7.7.

D7.1.6
During the airflow oven tests of D7.5.1(c) and D7.5.2, the rear of the sample shall be covered or sealed so as to prevent any air flow through the sample that is not characteristic of a normal installation.

D7.2 *Heat resisting test*
The enclosure, base and the insulating material between current- and non-current-carrying parts shall be subjected to a ball pressure test by means of the apparatus shown in figure D1. The surface of the part for test shall be placed in a horizontal position and a steel ball of 5 mm diameter shall be pressed against this surface with a force of 20 N. The test shall be made in a heating cabinet at the *detector's rated temperature* plus 20 ±5 °C. After 1 hour, the ball shall be removed and the diameter of the impression measured. This diameter shall not exceed 2 mm.

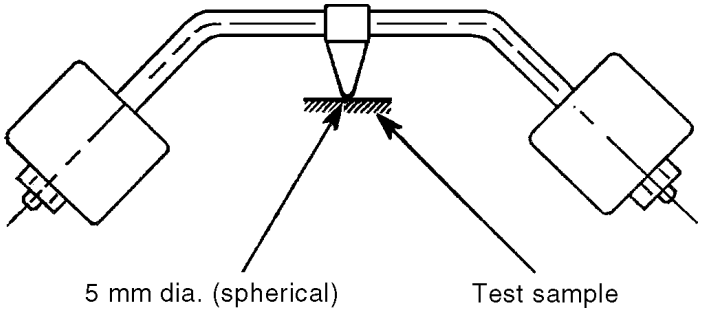


Figure D1 – Ball pressure apparatus

D7.3 *Resistance to shock test*

D7.3.1

A *detector* shall be capable of withstanding a test for resistance to shock by means of the test arrangement shown in figure D2. The *detector* shall be mounted on a piece of 100 mm by 50 mm hardwood timber fixed on edge on supports of the same material spaced 900 mm apart (centre to centre). The test shall be made with the *detector* in the following positions:

(a) At the mid-point on the horizontal underside;

(b) At the mid-point on the vertical side (tested at the four different orientations shown).

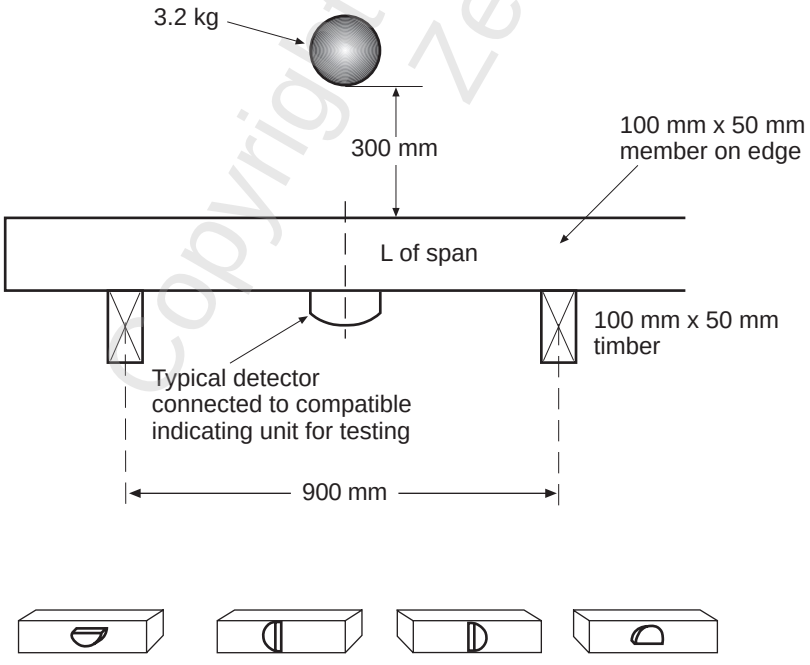


Figure D2 – Resistance to shock test

D7.3.2
A metal sphere weighing 3.2 kg shall be dropped on to the mid-point of the timber from a height of 300 mm above the horizontal face of the timber.

D7.3.3
The *detector* shall be considered satisfactory if:

(a) No operation of the *detector* is indicated as a result of the shock;

(b) No failure of any component occurs during the test; and

(c) The response time of the *detector* lies within the limits specified in D7.5.1(c) or D7.5.2(d) (as applicable) after the shock test.

D7.4 *Vibration test*

D7.4.1
A *detector* shall be attached in its normal operating orientation to a vibrating table. It shall then be subjected to a vertical sinusoidal vibration of amplitude 0.127 mm peak to peak for a period of 5 min at each of the following frequencies:

10, 15, 20, 25, 30, 35, 40, 45, 50, 55 and 60 Hz.

D7.4.2
Operation of the *detector* or resonance of any component shall be noted. If resonance occurs the *detector* shall be vibrated at the resonant frequency for a period of 60 min. If no resonance occurs, the *detector* shall be vibrated at 50 Hz for 60 min.

D7.4.3
The *detector* shall be considered satisfactory if:

(a) No operation of the *detector* is indicated during vibration;

(b) No failure of any component occurs during the test; and

(c) The response time of the *detector* lies within the limits specified in D7.5.1(c) or D7.5.2(d) (as applicable) after vibration.

D7.5 *Performance tests*

D7.5.1
Fixed temperature detectors shall sequentially pass the following tests:

(a) The heat collector or sensitive element of the *detector* shall be immersed in oil. The temperature of this liquid shall then be raised to 5.5 ±1 °C below the *detector's rated temperature*. This temperature shall be maintained for 24 h during which the *detector* shall not operate;

(b) The heat collector or sensitive element of the *detector* shall be immersed in oil which has been pre-heated and maintained at 5.5 ±1 °C above the *detector's rated temperature*. The *detector* shall operate within 60 s of immersion; and

(c) The heat collector or sensitive element of the *detector* shall be placed in a suitable heated airflow testing oven. When the air temperature is raised at a rate of 5.5 °C per min the *detector* shall operate not later than 3 min after the air temperature reaches the *detector's rated temperature*.

D7.5.2
Rate of rise detectors shall pass all of the following tests:

(a) The heat collector or sensitive element of the *detector* shall be placed in a suitable heated airflow testing oven. The temperature of the heated air shall be raised at several different rates of rise and as evenly as possible. During this test the *detector* shall operate within the minimum or maximum response curves shown on the graph in figure D3;

(b) *Rate of rise fire detectors* shall include in their construction a limiting mechanism or *fixed temperature detector*. After the performance tests in heated air described in D7.5.2(a) above, the following additional tests shall be made to ensure the stability of the *detector* and the fixed temperature limit;

(c) The heat collector or sensitive element of the *detector* shall be immersed in oil or other suitable liquid (or placed in a suitable heated airflow testing oven) and raised to a temperature of 5.5 ±1 °C below the *detector's rated temperature*. This temperature shall be maintained for 24 h during which the fixed temperature device shall not operate, nor shall the rate of rise response device operate once it has stabilized in the elevated temperature;

(d) The heat collector or sensitive element of the *detector* shall be placed in a suitable heated airflow testing oven. When the air temperature is raised at a rate of 2 °C per minute the fixed temperature device shall operate not later than 7.5 min after the air temperature reaches the *detector's rated temperature*, whether or not the rate of rise device has operated.

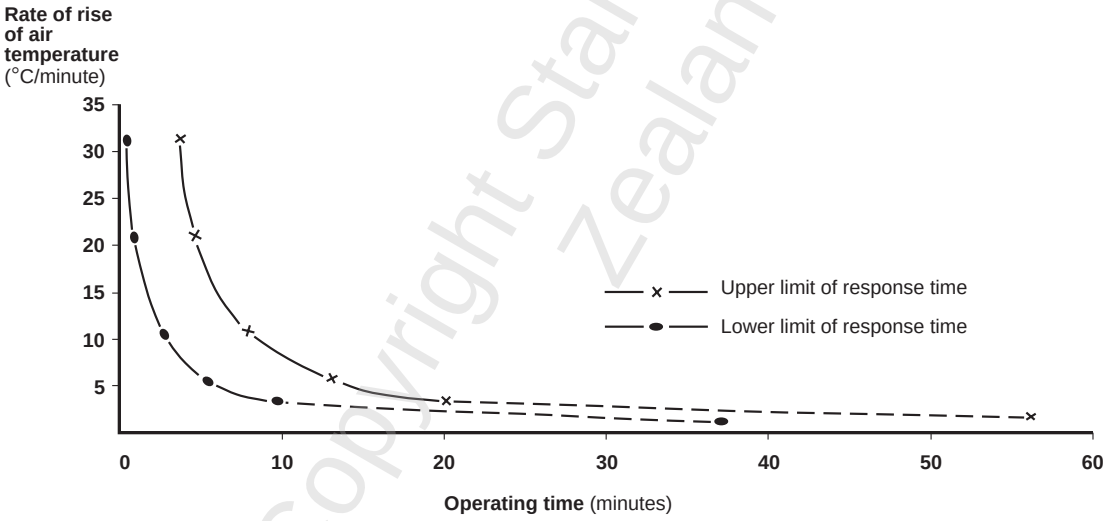


Figure D3 – Rate of rise heat-actuated fire detectors

D7.6 *Corrosion test*

D7.6.1
Upon satisfactory completion of the performance tests of D7.5.1(c) or D7.5.2(d) (as applicable), *detectors* shall be subjected to a 16 day exposure to an atmosphere of neutral salt spray (fog).

D7.6.2
The procedure and equipment used for salt spray shall follow those described in ASTM B117.

D7.6.3
A *detector* shall be considered satisfactory if:

(a) Normal use of the *detector* is possible after salt spray exposure;

(b) No significant structural failure of any component occurs during the salt spray exposure; and

(c) On subsequent re-test to D7.5.1(c) or D7.5.2(d) (as applicable), the *detector's* response time is no greater than 1.25 times the applicable limit.

D7.7 *Determination of fixed operating temperature (option with requirements)*

D7.7.1
As permitted in D7.1.5, the actual (measured) fixed operating temperature of individual *detectors* may optionally be used in performance testing instead of the *rated temperature*.

D7.7.2
The heat collector or sensitive element of the *detector* shall be immersed in oil or other suitable liquid. The temperature of this liquid shall then be raised at a rate less than 0.5 °C per minute until the fixed temperature element of the *detector* operates. This temperature shall be recorded as the (measured) fixed operating temperature of the *detector*.

D7.7.3
The (measured) fixed operating temperature of the *detector* shall be within ±3 °C of the *detector's rated temperature*.

D8 Temperature classification

D8.1
All *detectors* shall be classified according to their *rated temperature* (at which the fixed temperature element is set).

D8.2
The colour code for each temperature classification shall be as follows:

Range within:

54 °C	–	61 °C	..... Blue
62 °C	–	71 °C	..... Red
72 °C	–	80 °C	..... Yellow
81 °C	–	105 °C	..... Green
106 °C	–	121 °C	..... White
> 121 °C			..... Black

D9 Marking

D9.1
The following information shall be clearly and permanently marked on all *detectors*:

(a) The *manufacturer's* name or registered trade mark;

(b) Colour code to indicate the fixed element temperature classification. This shall be visible when the *detector* is fixed in place;

(c) The *detector's rated temperature* (see section 104);

(d) Identification of *detectors* for use in corrosive atmospheres.

NOTE – The information in D9.1(a), (c) and (d) is not required to be visible when the *detector* is fixed in place.

D9.2
Where a *detector's rated temperature* is determined remotely (e.g. an analogue addressable device), the colour code and *rated temperature* markings of D9.1(b) and (c) may be replaced by a type or model identification, provided the actual *rated temperature* selected is readily verifiable by other means.

APPENDIX E
SPECIFICATION FOR MANUAL CALL POINTS

(Normative)

E1

Manual call points shall be of a strong, rigid construction. The method of operation shall be the breaking of a frangible element followed by the manual operation of a switch.

E2

The method of operation shall be clearly indicated by a concise inscription, displayed on or adjacent to each *manual call point* as shown in figure E1. Minimum dimensions shall be 115 mm by 100 mm, and the colour of the shaded area shall be red (approximating shade no. 537 of NZS 7702). Boxes and frame black.

Figure E1 – Notice to be displayed on, or adjacent to, each manual call point

NOTE – Method of operation and telephone no. of Fire Service or other site emergency number to be inserted in the appropriate boxes.

E3

The construction shall provide safeguards against accidental operation. The breaking of a frangible cover shall not in itself operate the alarm.

E4

All *manual call points* shall provide a visual indication of operation. This indication shall latch in the alarm condition until manually reset from the *control unit*.

E5
Connection arrangements shall be such that it is not possible to remove a *manual call point* from the circuit without initiating a *defect warning* or *fire alarm signal*.

E6
The frangible material shall comply with the test requirements of BS 5839.2 or BS EN 54-11.

E7
Manual call points exposed to the weather or other damp locations (e.g. wash down areas or manufacturing processes) shall have a degree of protection to IP54 of AS 1939.

E8
Colour finish of the outside shall be red (approximating shade no. 537 of NZS 7702) on at least 50 % of the exposed surface.

E9
Where a *manual call point* utilizes a mechanical contact to initiate a *fire alarm*, that contact shall be closed in its normal condition, opening to initiate the *fire alarm*.

E10
Where the occupancy of the premises can result in repetitive malicious false alarms of *fire*, a hinged cover, with or without a *non-latching* audible device to identify that the cover has been opened, may be incorporated in the *manual call point* provided, in addition to complying with E2, that:

(a) The cover is labelled “COVER ONLY”; and

(b) The cover does not impair easy activation of the *manual call point*.

APPENDIX F
AUDIBLE ALERTING SIGNALS

(Normative)

F1

Unless otherwise specified in this Standard, audible alerting *signals* shall comply with the following requirements, as applicable.

F2 Evacuation signal

F2.1

The evacuation signal shall be emitted in cycles of 24 s nominal duration. Each cycle shall consist of 4 identical bursts of a frequency-modulated square wave tone uniformly increasing from 500 Hz to 1200 Hz, followed by two identical verbal messages, in accordance with figure F1.

F2.2

Where required by the particular application, the total length of the verbal evacuation message may be extended to a maximum of 20 s per cycle, and the message repetition may be omitted, however the four tone bursts per cycle shall remain.

F3 Alert signal

F3.1

The alert signal shall be a repetitive interrupted square wave tone of 420 Hz having equal on-off duration of 0.625 s each.

F3.2

Upon assignment of an alert signal to an evacuation *zone*, the first tone burst may be 50 dB below the maximum output, in which case each successive tone burst shall have an amplitude of 10 dB above that of the previous one until the maximum is reached at the sixth tone burst. All subsequent tone bursts after the sixth shall have the maximum output.

F3.3

A graphical representation of the initial character of the alert signal (with the optional amplitude escalation) is given in figure F2.

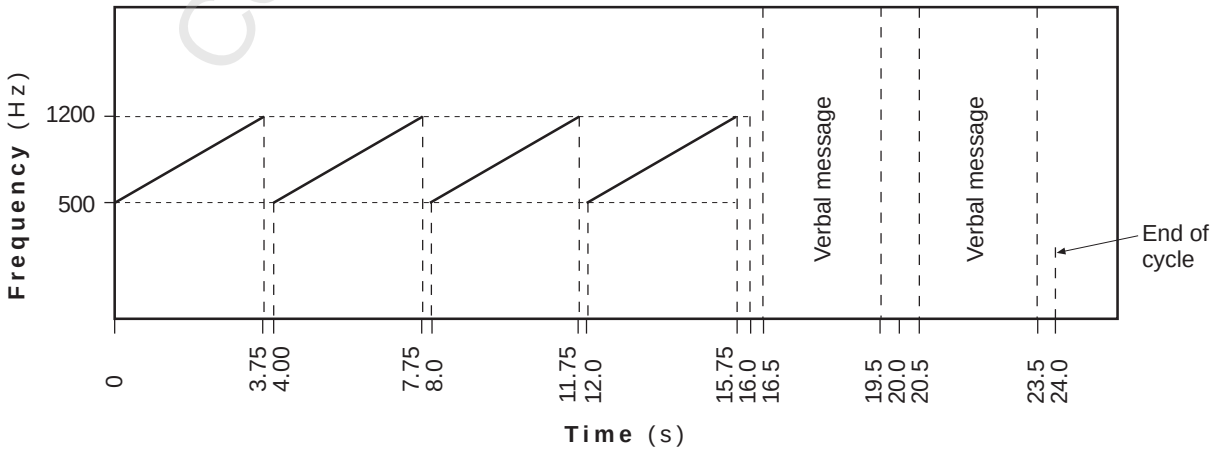


Figure F1 – Evacuation signal

F3.4
A verbal message shall be interspersed with the alert signal, provided that between 15 s and 24 s of alert tone cadence is produced between messages. The verbal alert message should have a maximum total length of 20 s.

F4 Verbal messages

F4.1
Verbal messages shall be either digitally stored or use voice synthesized techniques. All messages shall be clear and intelligible, without heavy accent. The signal shall have a minimum operational band width of 300 Hz to 4 kHz.

F4.2
Each verbal message shall be in a form consistent with the particular *building's evacuation scheme*, and shall provide clear and readily understandable instructions.

F4.3
The verbal evacuation message should include the word "evacuate" as well as the word "*fire*" and/or "emergency".

F5 Tolerances

The frequencies and durations for audible *signals* specified may vary within ±5 %, over the full operating temperature range, including anticipated long-term ageing effects. Amplitudes specified in F3 may vary within ±5 dB. Digitally generated, frequency stepped increments shall not exceed 4 %.

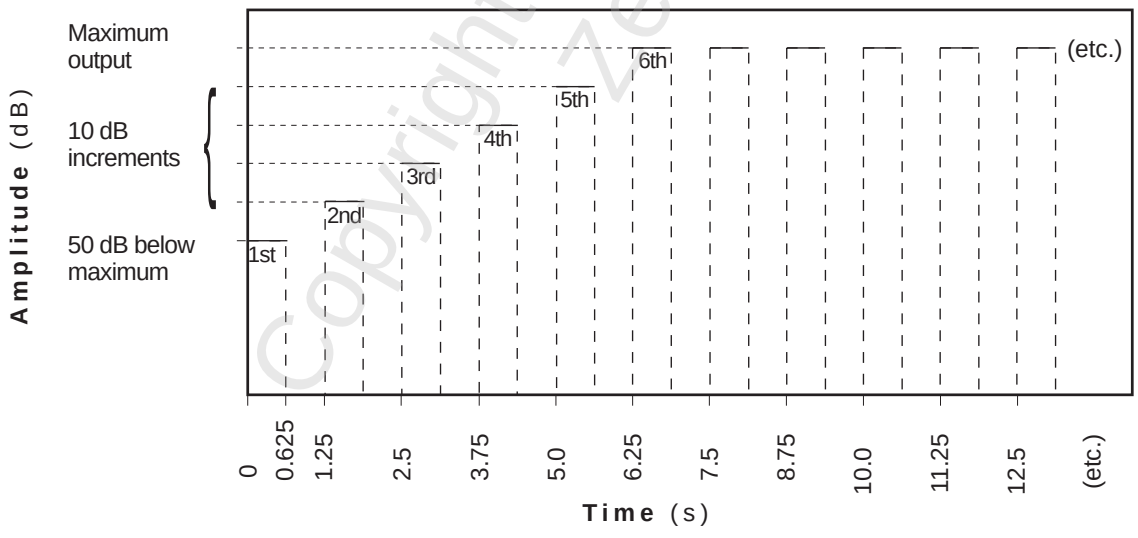
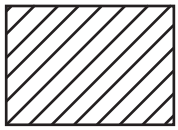
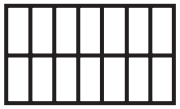


Figure F2 – Alert signal

APPENDIX G
STANDARD ZONE INDEX SYMBOLS

(Normative)

Table G1 – Symbols

Symbol	Usage	Colour
	*Building* outline (bold)	Black
	Internal walls with no through access. May also be *zone* demarcation.	Black
	Zone demarcation with access available between *zones*	Black
	Projection line to a plan view of a hidden area e.g. mezzanine, *basement*	Black
	Area of special *fire* protection or ancillary system coverage	Amber
	Accessway between levels – stairs, escalators, travelators, ramps	Black
	Lift	Black
"**YOU ARE HERE**"	Reader orientation title (upper case)	Red
	Directional arrow indicating a location	Black
	*Building* access point. Placed outside *building* outline and oriented appropriately.	Black
	Main *indicating unit* (*fire alarm* panel)	Black
	*Sector indicating unit*	Black
	Repeater *zone index* (mimic panel)	Black
FSI	*Fire* sprinkler inlet	Red
CV	Sprinkler control valves (if not *co-located* with FSI) (CV location can also be written adjacent to "sprinkler operated" light-emitting diode (LED))	Red

The font shall be upper case Arial, and a minimum size of 3 mm.

All lettering shall be positioned to read horizontally. Vertical alignment is not permitted.

Use of a legend is only required when additional non-standard symbols are required and their meaning is not clearly discernible.

APPENDIX H
SELECTION AND LOCATION OF FIRE DETECTORS

(Informative)

H1 General

H1.1
Fire detectors are designed to respond at an early stage to one or more of the four major characteristics of combustion, that is, heat, smoke, flame or gas.

H1.2
No single type of *fire detector* is suitable for all types of premises, situations or types of *fires*, but some *detector* types are better suited to detect certain types of *fire* than others, and each *detector* type is prone to different sources of spurious activation. Refer to table H1 for general recommendations of suitable and unsuitable *fire detectors* for various applications.

H1.3
Detectors should be chosen for the best response to the effects of *fire* without spurious activation caused by ambient conditions. The best results may be obtained by installing a mixture of *detector types*.

H1.4
Detectors should be located where detection is most likely in the early stages of a *fire*. The smoke produced by a smouldering *fire* is likely to be moved about in a room by the general air movement. As soon as flaming combustion starts, convection will lift the smoke and heat to the ceiling, and spread it horizontally. Therefore standard practice is to locate *detectors* at regular intervals on the ceiling.

H1.5
Heating, ventilation and air conditioning systems (HVAC), high or glass roof ceilings, or other *building* characteristics may significantly impair the effectiveness of *detectors*, as the smoke or heat may not reach the *detector*. In such cases, alternative locations and/or additional *detectors* may be necessary.

H1.6
There is no substitute for good engineering practice, and the selection of the *detector* most suitable for the environment and for the characteristics of the *fires* that may occur.

NOTE – The Approved Documents for NZBC Fire Safety Clauses only recognize heat and *smoke detectors* (and sprinklers), and have specific requirements for their selection and installation. The use of any other *detector* type for basic coverage is an Alternative Solution, and will need to be supported by specific *fire* engineering design.

H2 Heat detectors

H2.1
Heat detectors respond to the temperature rise associated with a *fire*.

H2.2
A *fixed temperature heat detector* is designed to operate when the temperature at the *detector* exceeds a predetermined value. A *rate of rise detector* is designed to operate when the rate of temperature rise at the *detector* exceeds a predetermined value.

H2.3
Smoke detectors should be preferred to *heat detectors* where detection of visible smoke or smouldering *fires* is required. *Rate of rise detectors* should be avoided where rapid temperature fluctuations are expected.

H3 Ionisation smoke detectors

H3.1
Ionisation *smoke detectors* respond to very small smoke particles.

H3.2
Ionisation *detectors* have a wide range of response. They are most sensitive to hot fast burning *fires*, and less sensitive to slow, smouldering *fires*. They contain a small amount of radio-active material which may present disposal problems.

H3.3
Ionisation *smoke detectors* should be avoided in cooking areas, in areas subject to high air velocity or wind gusts, near sources of steam, or anywhere combustion exhaust may be present.

H4 Photo-electric smoke detectors

H4.1
Photo-electric *detectors* measure the scattered light from smoke particles. They are most sensitive to larger, cooler, smoke particles typical of smouldering *fires* and *fires* involving plastics. They are sometimes called “optical” or “photo-optical” *detectors*.

H4.2
Photo-electric *detectors* should be avoided where steam or dust may occur. They can be used in locations where motor vehicles operate.

H4.3
As the combustion products from alcohol and some chemical *fires* are generally invisible, they may not be detected by this type of *detector*.

H5 Linear beam smoke detectors

H5.1
Linear beam *smoke detectors* measure the reduction of intensity of a beam of light due to the presence of smoke particles. They have a broad response to a wide range of smoke types, and are particularly useful for detection applications in large spaces.

H5.2
They are very sensitive to misalignment of, or interference with the light beam, and therefore require careful installation. Specific adverse influences include: *building* occupant activity, thermal expansion, wind and seismic deformation and strong light sources.

H5.3
Specific *fire* engineering is strongly recommended for glazed, sloping or high ceiling applications to ensure correct placement.

H6 Aspirated smoke detectors

H6.1
Aspirated smoke detectors use high sensitivity detection elements connected via an aspirating system (suction fan) to a pipe network, with air sampling points located similarly to point style *smoke detectors*.

H6.2
Careful engineering design of the aspirating pipe network is necessary to ensure their effective use.

H7 Flame detectors

H7.1
Flame detectors respond to the heat radiation emitted by a *fire*. They must be aimed at the *fire*, so it is normally necessary to use several *detectors* to cover one area. Careful engineering design is needed to ensure their effective use.

H7.2
Flame detectors are most suitable for detecting very fast growing *fires* such as flammable liquid *fires*, and are also useful for detecting flaming *fires* in large open spaces.

H8 Carbon monoxide (CO) fire detectors

H8.1
CO *fire detectors* respond to the presence of carbon monoxide (CO) gas which is characteristic of *fires* involving carbon-based materials.

H8.2
Carbon monoxide is produced when incomplete combustion occurs during slow or smouldering *fires*. CO is generally present in indoor *fires* where mixed materials burn.

H8.3
CO *detectors* are unsuitable for detecting clean burning *fires* where complete combustion is accomplished and should also be avoided anywhere combustion exhaust gases may be present. Due to CO *fire detectors* being a relatively new technology, they are currently only recommended for use as part of a specific *fire* engineering design.

H9 Combination detectors

H9.1
Combination (sometimes known as “multiple criterion” or “multi-sensor”) *detectors* combine two or more of the above detection techniques in a single device.

H9.2
The most common combination *detectors* are the photo-electric and heat devices. Combining the heat sensor and the photo-electric *detector* increases the device’s response to faster flaming *fires* that produce less visible smoke. Such *detectors* can achieve a similar response to ionisation *detectors* across a broader range of *fires* but without the same spurious activation characteristics.

H9.3
Manufacturers have also introduced other combinations of sensors in their *detectors* with the objective of achieving a broader response to genuine *fires* and increased immunity to spurious alarms.

H10 Cleaning of smoke detectors

H10.1
Smoke detectors should only be cleaned in accordance with the *detector manufacturer’s* instructions. Careful checking should always be carried out during site inspections or surveys to ensure that no *smoke detectors* are clogged in their grilles with dust or dead insects.

Table H1 – Recommended fire detectors for different applications

Location	Ionisation smoke	Photoelectric smoke	Linear beam smoke	Aspirated smoke	Carbon monoxide (CO)	Fixed temperature Thermal	Rate of rise thermal	Flame	Specific fire engineering
Bedrooms/sleeping areas	✓	✓	OK	OK	✓	OK	OK	OK	OK
Offices, shops	✓	✓	OK	OK	✓	✓	OK	OK	OK
Auditoriums/clubs (theatrical smoke)	x	x	x	x	✓	✓	OK	OK	✓
Autoclave/sterilizer areas	x	x	x	x	✓	✓	x	OK	OK
Bathrooms/laundries	x	x	x	x	OK	✓	x	OK	OK
Boiler/furnace rooms	x	x	x	x	x	✓	x	x	OK
Car parking [1]	x	x	OK	x	xx	✓	✓	OK	OK
Ceiling or roof voids with access	OK	OK	OK	OK	OK	✓	OK	OK	OK
Ceiling or roof voids difficult access	x	x	OK	OK	x	✓	OK	OK	✓
Cleaners'/understair cupboards	x	x	x	x	x	✓	✓	OK	OK
Cool rooms/freezers [2]	x	x	x	OK	x	OK	✓	OK	✓
Electrical risers	✓	✓✓	x	OK	x	✓	OK	OK	OK
Electrical switchrooms/cupboards	✓	✓✓	OK	OK	x	✓	OK	OK	OK
Flammable liquid hazard areas [3]	✓✓	✓	OK	OK	x	✓	OK	✓	OK
Forced air flow/draughts	x	✓	OK	OK	OK	✓	OK	OK	✓
Fume cupboards [3]	x	x	x	x	x	✓	✓	OK	✓
High/difficult access ceilings	OK	OK	✓✓	✓	✓	OK	OK	OK	✓
HVAC duct sampling	OK	✓	OK	OK	x	x	x	x	✓
Ice rinks [1]	OK	x	OK	OK	OK	✓	✓	OK	OK
Kitchens	x	x	x	x	OK	✓	x	x	OK
Kitchen extract ducts [1]	xx	xx	xx	xx	x	✓	x	x	OK
Paint spray booth(s) [3]	x	x	x	x	x	✓	OK	OK	OK
Service shafts	✓	✓	x	OK	✓	OK	OK	OK	OK
Stables [1]	x	x	OK	x	✓	✓	OK	OK	OK
Warehouse with vehicles and/or non-electric forklift	xx	✓	OK	OK	xx	✓	OK	OK	OK
<1.8 m from rooms containing bath, shower, or steam source	x	x	x	OK	✓	✓	x	OK	✓

KEY – ✓✓ strongly recommended ✓ recommended OK may be used
x not advised xx do not use

NOTE –
(1) Environmental protection may also be required.
(2) Cold rooms and freezers can be difficult to reliably protect and will usually need special engineering including heaters to prevent ice build-up on *detectors*, *manual call points* and *alerting devices*.
(3) Hazardous area.

APPENDIX J
CERTIFICATE OF COMPLETION FOR FIRE ALARM SYSTEM

(Normative)

Front side

FIRE ALARM SYSTEM CONSTRUCTION REVIEW PRODUCER STATEMENT

Building consent No. ..... Certificate No. .....

1. Building .....
2. Location .....
3. Nearest fire station .....
4. Name/Address of owner .....
5. Name/Address of installation agent .....
6. Details of system: automatic/manual/single zone/multizone
   - (a) The declared functional requirements .....
   - (b) Equipment manufacturer .....
   - (c) Equipment appraisal certificate no. .....
   - (d) General description – occupancy .....
   - (e) Detail of any remote connection .....
7. Details of ancillary services connected to the system .....
   .....
8. Date of completion .....
9. Commissioning details on reverse this sheet completed YES / NO
10. Battery load calculations attached YES / NO
11. Index plan attached YES / NO
12. System documentation provided YES / NO

I hereby certify that the above system has been inspected and tested by an accredited inspection body in accordance with NZS 4512, and on the basis of the results, this system complies with the Standard.

Installer:	*Accredited inspection body:*
Signed	Signed .....
Capacity of signatory	Capacity of signatory .....
Date	Date .....
Company	Company .....
Address	Address .....
.....	.....
.....	.....

(Reverse side)

Record of commissioning tests required for fire alarm system

Building	Address	City
System make		Type 2, 3, 4, 5, 7, other

Zone	Electrical Tests			Operational tests			Number of call points	Total points on zone	Location of EOLR	EVAC monitor tested	Number of alerting devices
	Loop resistance ohms	Insulation resistance megohms		Number of detectors							
	R – B	R – B	R+B – E	Smoke	Heat	Other					
1											
2											
3											
4											
5											
6											
7											
8											
9											
0											
Evac.1											
Evac.2											

Technician _____ Date _____

APPENDIX K
NOTIFICATION FORM – FIRE ALARM ISOLATION

(Normative)

NOTE – Where the system being *isolated* is a necessary part of the *fire* safety requirements for the *building* under a *building consent*, the *building* should not be occupied in the affected areas during the period of isolation unless compensatory *fire* precautions are taken.

FAX BACK FORM

From: Date:

To: Customer:

Attention: No / Pages:

Phone No.: Fax Number:

Fire protection system shutdown

Instructions

NZ Standards 4541 & 4515 (Sprinkler Systems) require "OWNER'S APPROVAL " and notification to NZ Fire Service (AFA), Insurance Council (FPIS) and building insurers prior to a fire sprinkler shutdown. NZ Standard 4512 (Fire detection and alarm systems) requires "OWNERS APPROVAL", and for the Owners to notifiy their insurers if the systems are isolated for more then 12 hours.

"OWNERS" Please "sign" your approval of this shutdown in Section B of this form and return to fax:

AFA/NZFS/FPIS/ICONZ FAX 0800 271 000 Date Other Date

Section A Fire system / Site detail

(Contractor to fill in)

PFA No:

System Site name:

Address:

Fire system: Sprinkler NZS 4541 ☐ Sprinkler NZS 4515 ☐ Fire Alarm NZS 4512 ☐ Riser NZS 4510 ☐

Area affected:

Shutdown Shutdown date: Shutdown time: Reinstated daily: ☐

Reinstatement date: Reinstatement time: Continuous shutdown: ☐

Work to be completed during system shutdown.

Alterations ☐ Damage to system ☐ Maintenance Work ☐

Other:

Owner's actions

Please use this form to notify your "BUILDING INSURERS " of both the shutdown and reinstatement of the system.

Section B Owner's approval

(Owner to fill in)

Name:

Insurers notified? Yes ☐ No ☐

Signature : Date: Time:

NOTE – Failure by the owner to notify insurers may void insurance cover.

Owner safety precautions for fire system shutdown

- Forbid smoking in the area affected by the fire system shutdown.
- Stop hazardous processes.
- Where sprinklers are installed ensure they are operative.
- Ensure all smoke stop doors are closed.
- Ensure Alarm Company can re-establish evacuation sounders if required.
- Where other systems (lifts, air conditioning etc.) are affected by shutdown, manual controls need to be checked.
- Arrange to notify others who may use the building during the period of isolation.
- Ensure building occupiers know to dial "111" for FIRE.
- Detail "FIRE WARDENS " to patrol affected area. (One person per 1000 m^2).
- No "HOT WORK " by any parties whilst the fire system is shutdown.
- If your building has smoke detectors beware that dust, heat and fumes from building work may activate your fire alarm.

Service company name ..... Phone ..... Fax .....

Any queries, please contact (Name)..... Phone ..... Cell phone .....

APPENDIX L
OTHER STANDARDS FOR FIRE PROTECTION

(Informative)

NOTE – See also related documents.

New Zealand Standards

NZMP 9:1989	Fire properties of building materials and elements of structure
NZS 4232:1988	Performance criteria for fire resisting enclosures (superseded in part by AS/NZS 1905.1)
NZS 4501:1972	Code of practice for location marking of fire hydrants
NZS 4503:1993	Code of practice for the distribution, installation and maintenance of hand operated fire fighting equipment for use in buildings
NZS 4505:1977	Specification for fire-fighting waterway equipment
NZS 4511:1979	Specification for bucket pump fire extinguishers

Joint Australian/New Zealand Standards

AS/NZS 1221:1997	Fire hose reels
AS/NZS 1841:- - - -	Portable fire extinguishers
Part 1:1997	General requirements
Part 2:1997	Specific requirements for water type extinguishers
Part 3:1997	Specific requirements for wet-chemical type extinguishers
Part 4:1997	Specific requirements for foam type extinguishers
Part 5:1997	Specific requirements for powder type extinguishers
Part 6:1997	Specific requirements for carbon dioxide type extinguishers
Part 7:1997	Specific requirements for vaporizing-liquid type extinguishers
Part 8:1997	Specific requirements for non-rechargeable type extinguishers
AS/NZS 1850: 1997	Portable fire extinguishers – Classification, rating and performance testing
AS/NZS 1851:- - - -	Maintenance of fire protection equipment
Part 13:1995	Wheeled fire extinguishers
AS/NZS 1905:- - - -	Components for the protection of openings in fire-resistant walls
Part 1:1997	Fire-resistant doorsets
AS/NZS 3504:1995	Fire blankets
AS/NZS 4353:1995	Portable fire extinguishers – Aerosol type

INDEX

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