



**NZS 4512:1994**  
Incorporating Amendment No. 1, 2, and 3

New Zealand Standard

# Fire alarm systems in buildings

Superseding NZS 4561:1973

**NZS 4512:1994**

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## NZS 4512:1994

### COMMITTEE REPRESENTATION

This Standard was prepared by the Fire Alarms in Buildings Committee (4512) for the Standards Council under the Standards Act 1988. The committee consisted of representatives of the following organizations:

Building Industry Authority  
Insurance Council of New Zealand  
New Zealand Fire Equipment Association  
New Zealand Fire Protection Association  
New Zealand Fire Protection Contractors Association  
New Zealand Fire Service  
New Zealand Local Government Association

In addition, the Chairman of the Fire Sprinklers Committee (Mr R.J. Estall) was co-opted to the committee.

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### AMENDMENTS

No	Date of issue	Description	Entered by, and date

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## **RELATED DOCUMENTS**

Reference is made in this document to the following:

### **NEW ZEALAND STANDARDS**

NZS 2139:1967	Heat actuated fire detectors
NZS 4561:1973	Manual fire alarm systems for use in buildings
NZS/BS 5252:1976	Framework for colour co-ordination for building purposes
NZS 6401:1973	PVC-insulated cables for electric power and lighting
NZS 7702:1989	Specification for colours for identification, coding and special purposes

### **AUSTRALIAN STANDARD**

AS 1939:1990	Degrees of protection provided by enclosures for electrical equipment
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### **BRITISH STANDARDS**

BS 2011:- - - -	Environmental testing
Part 2.1A:1990	Tests A. Cold
Part 2.1B:1977	Tests B. Dry heat
Part 2.1Ca:1977	Test Ca. Damp heat, steady state
Part 2.1Fc:1983	Test Fc. Vibration (sinusoidal)
BS 5445:- - - -	Components of automatic fire detection systems
Part 7:1984	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 5969:1981	Specification for sound level meters
BS 6221:- - - -	Printed wiring boards

### **UNDERWRITERS' LABORATORIES INC.**

UL 268:1981	Smoke detectors for fire-protective signalling systems
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### **NEW ZEALAND LEGISLATION**

Building Regulations 1992  
Electrical Wiring Regulations 1976  
Radio Interference Regulations 1958  
Fire Safety and Evacuation of Buildings Regulations 1992  
Testing Laboratory Registration Act 1972  
New Zealand Building Code 1992

The users of this Standard should ensure that their copies of the above mentioned New Zealand Standards or of overseas standards approved for use in New Zealand are the latest revisions or include the latest amendments. Such amendments are listed in the annual Standards New Zealand *Catalogue* which is supplemented by lists contained in the monthly magazine *Standards* issued free of charge to committee and subscribing members of Standards New Zealand.



## **NZS 4512:1994**

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### **FOREWORD**

This revised edition of NZS 4512 incorporates Amendments No. 1, 2 and 3 and supersedes the 1981 edition of the Standard including Amendments No. 1 and 2. It has been expanded to cover manual fire alarms and also supersedes NZS 4561:1973 *Manual fire alarm systems for use in buildings*.

The purpose of this Standard is to provide a specification for systems intended to be operated in the event of fire (whether manually or automatically) so as to:

- (a) Alert occupants of a building; and/or
- (b) Summon external assistance from the Fire Service or other emergency agency; and/or
- (c) Activate other systems or devices intended to protect life and property against the dangers of fire.

In order to fulfil such functions, the components, design and installation of such systems must be of high quality and reliability.

Furthermore, post installation, the system must be regularly tested and maintained in good working order.

Any person or organisation – whether a statutory body or otherwise – requiring that a system intended to comply with this Standard actually so complies, should arrange for inspections by a competent person, skilled and experienced in all issues relevant to this Standard, and independent of all who specified, supplied and/or installed the system.

The Standard has been prepared on the assumption that every fire alarm system will comprise only components either supplied by, or specifically approved by, the manufacturer of the control and indicating equipment, and that the components will be arranged, inter-connected and installed in accordance with that manufacturer's instructions or by persons approved by the manufacturer for that purpose.

In order for an individual fire alarm system installation to comply with this Standard the system must be installed and commissioned in accordance with the associated manufacturer's instructions and thereafter maintained and tested in accordance with the Standard.

Amendments 1, 2 and 3 are incorporated into this limited revision of the Standard and amendment No. 3 will not therefore be issued separately.

### **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 ALARM SYSTEMS IN BUILDINGS

### PART 1 GENERAL

#### 101 SCOPE

##### 101.1

This Standard applies to the design, installation, extension, modification, commissioning, testing and maintenance of fire alarm systems in buildings. Compliance with this Standard should ensure that warning of a fire is given at the earliest practicable moment so that appropriate emergency measures may be taken.

##### 101.2

This Standard provides for fire alarm systems of the following types:

- (a) Non-monitored manual;
- (b) Self-monitored manual;
- (c) Automatic.

Non-monitored manual systems are intended to supersede Type B to NZS 4561 and self-monitored manual systems are intended to supersede Type C to NZS 4561.

NOTE – These types of fire alarms correspond respectively with Type 1, Type 2 and Types 3, 4 and 5 of the NZ Building Code Approved Documents (i.e. C4 Appendix B and F7).

##### 101.3

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

#### 102 DEFINITIONS

##### 102.1

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

**ADDRESSABLE DETECTOR 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 wired on a common zone circuit.

**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.

**APPRAISAL CERTIFICATE.** A certificate, which confirms 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 accredited by a certification body which is itself accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) to operate a laboratory accreditation programme, are deemed to satisfy this requirement.

**AUDIBLE ALARM.** A sound signal produced by a bell, gong, siren, buzzer or similar device indicating an alarm condition.

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**AUTOMATIC FIRE ALARM SYSTEM.** A system which can automatically initiate an alarm in response to a fire and which includes detectors, manual call points, control and indicating equipment, alerting devices, and energy sources. Where the system is remote connected it will also include remote signalling devices.

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

**DETECTOR.** A device that operates automatically at predetermined conditions associated with fire and which initiates a fire alarm.

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

**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) Optical type responds to the scattering or absorption of light by suspended particles.

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

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

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

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

**NOTE** – More than one of the above definitions can apply to a detector.

**INDICATING UNIT.** Equipment incorporating devices for indicating the zone (or sector on a sector indicating unit) where an alarm has originated.

**MANUFACTURER.** 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.

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

**MANUAL FIRE ALARM SYSTEM.** A system for raising an alarm of fire in a building (including appurtenant grounds), in which the operation is originated by hand.

**SELF-MONITORED MANUAL FIRE ALARM SYSTEM.** A system which initiates an alarm in response to the operation of a manual call point, and is self monitored as to the integrity of the system. It includes power source, alerting devices, manual call points, control and indicating equipment and where the system is remote connected, remote signalling devices.

**NON-MONITORED MANUAL FIRE ALARM SYSTEM.** A system which can initiate an alarm by manual operation. It includes a power source, alerting devices and manual call points, and may operate on the open circuit principle.

**PNEUMATIC FIRE ALARM SYSTEM.** A fire alarm system operated by compressed air or other gases.

**REMOTE RECEIVING CENTRE.** A monitoring centre for taking immediate action as a result of a fire alarm.

**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.

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

**SPECIAL HAZARD PROTECTION SYSTEM.** A fixed system designed to automatically extinguish fire by the use of various extinguishants e.g. gas flood, foam, dry powder which may be triggered from systems designed in accordance with this Standard.

**SYSTEM TYPE.** A generic description of a complete fire alarm system comprising a control unit and including the specific make and models of specialised components, types of common components, correct form of interconnection and installation and all other matters that are not unique to an individual installed system.

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

**ZONE CONTROL UNIT.** A cabinet containing equipment for controlling one or more zones and incorporating an externally visible display.

**102.2**

The following terms shall have the meanings as provided by the New Zealand Building Code.

Fire cell

Fire door

Fire resistance rating.

**102.3**

For the purposes of this Standard the word "shall" refers to practices which are mandatory for compliance with this Standard, while the word "should" refers to practices which are advised or recommended.

**103 DECLARED FUNCTIONAL REQUIREMENTS****103.1**

In order to establish which requirements of the Standard apply to a particular fire alarm system, the intended functions of that system as specified in (a) to (f) below, shall be nominated by the owner as the system's declared functional requirements having regard to all regulatory, contractual, insurance or other obligations:

- (a) To transmit an alarm to summon NZ 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 specified by the owner;
- (f) To transmit an alarm to summon some other specified emergency fire related assistance.

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.

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### **104 COMPLIANCE**

#### **104.1**

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, trained personnel, who have access to all relevant technical instructions published by the manufacturer. Design, installation and commissioning personnel qualified to the applicable industry training programme recognised by the New Zealand Qualifications Authority shall be deemed to satisfy the requirement to be competent and trained;
- (b) Be in conformity with the manufacturer's instructions;
- (c) Be in conformity with all other requirements of this Standard.

#### **104.2**

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.

#### **104.3**

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

#### **104.4**

Notwithstanding 104.1, any installed fire alarm system, being a fire alarm system only operable manually, that complied at the time of the coming into force of Amendment 3 of this Standard with the superseded Standard NZS 4561:1973, shall be deemed to comply with this Standard subject to:

- (a) The system being tested and maintained in accordance with this Standard; and
- (b) Any subsequent alternations being carried out so that the alterations conform to this Standard.

#### **104.5**

Although it may be technically feasible to interchange components of one system type with other components this is not permissible unless such options form part of the manufacturer's published instructions.

### **105 STATUTORY REGULATIONS**

#### **105.1**

Attention is drawn to the need to comply with all relevant statutory regulations, including the requirements of the Building Regulations, Electrical Wiring Regulations, the Radio Interference Regulations, the Fire Safety and Evacuation of Buildings Regulations and the By-laws of the local territorial authority within whose jurisdiction the building is located.

### **106 WORKMANSHIP**

#### **106.1**

All work relating to the manufacture and installation of fire alarm systems shall be carried out in a thorough and workmanlike manner in accordance with sound trade practice.

### **107 RELIABILITY**

#### **107.1**

The construction of all built-up equipment must be carried out with high inherent reliability as the major objective. Fire alarm systems operate continuously in wide temperature and humidity variations.

## **PART 2 DESIGN AND CONSTRUCTION – AUTOMATIC AND SELF-MONITORED MANUAL SYSTEMS**

### **201 TYPE AND FUNCTION**

#### **201.1**

The intended function of any particular automatic or self-monitored manual system shall be that declared by the owner from the list of functional requirements in 103.

#### **201.2**

Both types of system are required to indicate automatically the existence of those 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**

Additionally the alarm system may be used to initiate ancillary functions as explained in 203.1.

NOTE – The equipment design requirements for non-monitored manual systems are set out in Part 3.

### **202 ZONES**

#### **202.1**

To assist in locating a fire or other cause of alarm initiation it is necessary to divide the premises into zones. All the detectors and manual call points in one zone shall be associated with the one indicator on the zone control unit.

### **203 ANCILLARY SERVICES**

#### **203.1**

The zone 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 other 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 zone control unit 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 fire alarm system shall not be used to monitor the functioning or failure of any element of the ancillary services. Indicators in accordance with 210.5 and servicemen's isolate switches only are acceptable.



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### **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; and
- (b) A visual indication on the zone indicator unit for each zone in which a detector or manual call point device operates; and
- (c) Initiation of a fire alarm signal to a remote receiving centre where a communication link to such a centre is provided.

#### **204.2**

The fire alarm as given by 204.1(b) and (c) shall continue in operation until manually reset. Resetting facilities shall be in accordance with 206.2.

#### **204.3**

Facilities may be required to control alerting devices in only one part of the building for the purposes of alerting by zones. In such cases facilities must always be provided on the zone control unit to manually activate alerting of all zones.

#### **204.4**

The visual signal specified in 204.1(b) shall also be given on any repeater indicating unit which may be provided to suit fire brigade access.

#### **204.5**

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 the fire microphone. (See 218.7.)

#### **204.6**

The delay in equipment response to a detector operating shall not exceed 15 s. The system shall latch in the fire alarm condition after the delay period.

#### **204.7**

The momentary operation of a manual call point shall cause the system to latch into the fire alarm mode.

#### **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 cancelled by the operation of detectors or manual call points in another zone.

#### **204.10**

A fire alarm shall override any defect warning signal specified in Section 208, Defect warning.

#### **204.11**

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

### **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 in-operative when the cabinet is closed and in the normal operational condition.

## 205.4

The switch outside the cabinet shall be of the "break-glass" or key-operated design, shall be located on or adjacent to the cabinet and be clearly designated "SILENCE ALARMS. BRIGADE USE ONLY".

## 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 TRIAL EVACUATION

### 207.1

A key-operated switch shall be provided for manually activating all of the alerting devices in the building (see 204.1(a)) without initiating a call to the remote receiving centre. It shall be so connected that it overrides the two silencing switches referred to in 205.2 when they are individually or collectively in the silencing position.

## 208 DEFECT WARNING

### 208.1

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

- (a) When the average cell voltage (measured with quiescent load current and without assistance from the battery charger) falls below 2.03 V in the case of an unsealed lead acid battery and 1.2 V for a Leclanche cell. For other battery types the voltage should equal the 50 % capacity value measured at the quiescent load;
- (b) Abnormally high or low impedance condition (for example, an open or short circuit) of the zone circuit to a detector or manual call point unless the condition exactly reproduces the effect of the operation of a detector or call point;
- (c) Absence of any plug-in zone circuit board or relay that control the alerting devices;
- (d) Operation of the silencing switch outside the control unit cabinet;
- (e) Abnormally high or low impedance condition (e.g. an open or short circuit) on the alerting device circuit wiring;
- (f) Failure of an addressable device on an addressable detector system, unless the condition exactly reproduces the effect of the operation of a detector or manual call point.

### 208.2

A defect warning shall be given by a visual indicator on the zone indicator 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 the control unit.



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### **208.3**

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

### **208.4**

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.

### **208.5**

Provision may be made for cancelling the audible 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**

### **209.1**

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**

### **210.1**

Indicators shall be lamps, shutters or other suitable devices appropriate to the system.

### **210.2**

Where incandescent filament lamps are used for fire indication, each indicator shall consist of two lamps connected in parallel; the failure of either lamp must 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 four 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**

Zone control units shall incorporate:

- (a) A fire alarm indicator for each zone, coloured red; and
- (b) A common defect warning indicator, coloured amber; and
- (c) A common normal condition indicator, coloured green.

Ancillary-services-operated indicators, where required, shall be coloured white.

All indicators shall be clearly labelled.

### **210.6**

Indicators on indicating units, whether forming part of a zone control unit or not, shall when operated, clearly and unambiguously indicate their function at a viewing distance of 2 m. The minimum height for associated lettering shall be 3 mm. Where indicating units are physically separate from the zone control unit the indicators on the latter unit need not comply with the 2 m viewing requirement.

## 211 ELECTRICAL SUPPLY

### 211.1

The supply to the control and indicating equipment shall consist of either a mains powered battery charger and a secondary battery or alternatively a primary battery which may be provided with a mains supply unit to supply the non-alarm load.

### 211.2

Alerting devices 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 be independently monitored in accordance with Section 208, Defect warning, and any secondary battery shall have its own charger in accordance with Section 212, Battery charger.

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  $\pm 20\%$  and the standard mains voltage  $\pm 10\%$ .

NOTE – For the purposes of this Standard the nominal voltage is defined as 2 V for lead acid cells and 1.3 V for Leclanche cells.

### 211.6

The electrical supplies shall be enclosed within a locked cabinet or within secured premises.

### 211.7

Complete failure of the electrical power supply to the control unit shall initiate a fire signal. Fire shall be signalled when the voltage is less than 80 % of the nominal system operating voltage. (See Note in 211.5.)

NOTE – See clause A4 of Appendix A regarding power supplies for transmitting devices.

## 212 BATTERY CHARGER

### 212.1

The charger for a secondary battery shall be capable of restoring the capacity stated in 213.1 within a period of 24 h while carrying any non-alarm load normally supplied by that battery.

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.

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### **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  $2.20 \pm 0.03$  V per cell unless different voltages are specified by the 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 as required by 208.1(a). The interval between these tests shall not exceed 72 h, and the duration of the test period shall be between 30 and 90 min.

## **213 SECONDARY 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 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 30 min.

### **213.2**

The nominal capacity of a battery which supplies alarm load shall be sufficient to supply that load for 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 221, Environmental tests.

### **213.5**

The battery shall be designed for stationary use and a minimum service life of five 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 PRIMARY BATTERIES**

### **214.1**

The nominal capacity of the primary battery shall be sufficient to supply the non-alarm load for a period of 12 months. Thereafter it shall be capable of supplying the maximum alarm load for 30 min.

## **215 CONSTRUCTION OF CONTROL AND INDICATING EQUIPMENT**

### **215.1 Construction**

Cabinets shall be designed and constructed to meet the requirements of 107.1 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 107.1 (for example, soldered, wire wrapped).

## **215.4 Printed circuit boards**

Printed circuit boards shall be designed and manufactured in accordance with BS 6221.

## **215.5 Electrical components**

### **215.5.1**

Lamps having two filaments in one envelope shall not be used.

### **215.5.2**

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.

### **215.5.3**

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

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### **215.6 Circuit design**

#### **215.6.1**

Circuits shall be designed so that the control and indicating equipment will perform all its functions under the test requirements of section 221, Environmental tests.

#### **215.6.2**

Wire-wound resistors over 33 k $\Omega$  shall be continuously operated at not less than 10 % of the manufacturer's normal rating for power dissipation. Wet electrolytic capacitors shall be continuously operated at not less than 20 % of the manufacturer's working d.c. voltage rating. All other components shall be operated below 80 % of the manufacturer's maximum rating for power dissipation, voltage or current.

### **215.7 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 actuated detectors shall comply with NZS 2139.

### **216.2**

Smoke actuated detectors shall comply with UL 268 or BS 5445:Part 7.

### **216.3**

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

### **216.4**

With all detectors or allied devices connected to the zone terminals of the control unit, but without any building wiring, a 50 k $\Omega$  resistance placed across the circuit shall neither prevent a fire being signalled nor initiate a fire signal.

### **216.5**

The detection system shall not initiate a fire alarm in response to a decrease in the ambient temperature.

### **216.6**

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.

## **217 MANUAL CALL POINTS**

### **217.1**

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

## **218 ALERTING DEVICES**

### **218.1**

All devices shall be rated for 1 h continuous use. Electrical devices shall function satisfactorily within  $\pm 20$  % 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 alerting devices shall normally comply with shade No. 537 of NZS 7702 or colour 04 E 53 of NZS/BS 5252.

#### 218.4

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

- (a) Manufacturer's name, trade name or trademark and type;
- (b) Nominal electrical characteristics, for example the operating voltage and current.

#### 218.5

The audible alerting device may incorporate loud speaking voice facilities in order to provide opportunity for, or better means of, evacuation control and testing.

#### 218.6

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

#### 218.7

If public address equipment is used to provide the audible alerting signal, the following additional conditions shall be satisfied:

- (a) The fire alarm signal 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 (c);
- (c) The system may, if required, be fitted with an additional microphone for fire purposes designated as "fire microphones". 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. (This limitation on the availability of the fire microphones 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) 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;
- (f) The public address equipment shall be subjected to the environmental test requirements of Section 221, Environmental tests.

### 219 PNEUMATIC SYSTEMS

#### 219.1

Pneumatic systems shall comply with all other parts and clauses where relevant and shall also comply with the additional requirements of this Section.

#### 219.2

The gas storage vessel shall be of corrosion resistant construction and shall withstand a pressure test of twice normal working pressure.

#### 219.3

To facilitate routine testing, permanently connected pressure gauges shall be incorporated at the gas storage vessel and also at the manifold where these are not co-located.

#### 219.4

Systems shall be charged with clean, dry, non-flammable gas.

#### 219.5

The quantity of stored gas shall be not less than 85 L, plus 1 L for each zone, measured at normal temperature and pressure.



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### **219.6**

Means shall be incorporated whereby routine tests can be carried out to prove the satisfactory operation of the system functions.

### **219.7**

Tubing shall comply with the following requirements:

- (a) When wound on a mandrel of radius four times the tube inside diameter the tube diameter shall not be reduced by more than 20 % at 20 °C. The tube shall not exhibit visible cracking when subjected to this bend and shall withstand the pressure test of (b)
- (b) The tube shall withstand a pressure of test of three times the operating pressure of the system
- (c) The internal and external diameters of the tube shall be held to within  $\pm 20$  % of the nominated diameters.

### **219.8**

Pneumatic circuits shall be looped so that a single obstruction in any circuit with detectors or call points shall not prevent any detector or call point from initiating a fire alarm as specified in 204.1.

### **219.9**

The normal circuit pressure shall not exceed 300 kPa gauge and the system shall withstand a pressure test of twice normal working pressure.

### **219.10**

The operation of any detector or call point on a pneumatic circuit shall initiate a fire alarm within 15 s.

### **219.11**

The system shall initiate a fire alarm within 60 s when gas is allowed to escape via the full length of the circuit while the remainder of the system is in the normal working condition. For system evaluation test purposes the length of circuit shall be considered as 500 m with 25 detectors connected.

### **219.12**

A defect warning as specified in 208.1 shall be given when the quantity of stored gas is reduced to the 50 % point between the full storage capacity and the quantity (mass) at which the system signals fire. (See 219.13.)

### **219.13**

The system shall initiate a fire alarm when the quantity of stored gas is reduced to a level where the manifold pressure equals the fire alarm initiating pressure of the detection and call point circuit.

## **220 ADDRESSABLE DETECTOR SYSTEMS**

### **220.1**

A detector circuit of an addressable system shall be permitted to be extended to cover more than one zone provided the following additional conditions are satisfied:

- (a) The zone control unit shall divide the annunciation from the detectors 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 zone control unit and any detector shall result in loss of coverage of no more than one zone as defined by this Standard.
- (c) Any fault on an addressable circuit shall result in a defect warning signal, unless the condition exactly reproduces the effect of the operation of a detector or manual call point.



## 221 ENVIRONMENTAL TESTS

### 221.1 General

A sample of the control and indicating equipment shall be subjected to the following environmental tests made in accordance with BS 2011. 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. Where no specific information is given herein, the methods indicated in the appropriate parts of BS 2011 shall be followed.

### 221.2 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.

### 221.3 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 221.5. If, during a test of 221.5 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 221.5.

### 221.4 Preconditioning and recovery procedure

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

Temperature	15 to 25 °C
Relative humidity	45 to 65 %
Air pressure	860 to 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.

### 221.5 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 multi-zone control and indicating equipment, operation of another alarm circuit connected to a different zone from that in (a) above 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 fire signalling.

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### 221.6 Inspection

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

### 221.7 Test procedure

For each environmental test specified in 221.8, the control and indicating equipment, in its quiescent condition, at the beginning of each of (a) to (g) shall be subjected to the following in the order in which they are listed:

- (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.

### 221.8 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 three days:

- (a) Dry heat as in BS 2011 Part 2. 1B. 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  $40 \pm 2$  °C with an absolute humidity not exceeding 20 g of water vapour per cubic metre of air (corresponding approximately to 30 % relative humidity at 40 °C). 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 °C per min averaged over a period of not more than 5 min.
- (b) Damp heat as in BS 2011 Part 2. 1Ca. The equipment shall be introduced into a chamber which shall be maintained at a temperature of  $40 \pm 2$  °C and a relative humidity of 90 to 95 %. The equipment shall be exposed to these conditions for four days continuously.
- (c) Cold as in BS 2011 Part 2.1A. 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  $0 \pm 2$  °C. While it is being adjusted the temperature in the chamber shall not change by more than 1 °C 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 2011 Part 2.1Fc. 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  $0.98 \text{ m/s}^2$  over the frequency range 5 to 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 221.5.

**221.9 Performance requirements**

The equipment shall be considered satisfactory if:

- (a) Normal-operation occurs during the environmental test; and
- (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.

**222 OPERATIONAL TEST****222.1 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.

**222.2 Performance requirement**

The equipment shall be considered satisfactory if the requirements specified in Section 204, Fire alarm, are met.

**223 RADIO INTERFERENCE****223.1 Test procedure**

The noise voltages produced by the control and indicating equipment during the functional tests (see 221.5) shall be measured.

**223.2 Performance requirement**

the equipment shall be considered satisfactory provided that the results of the tests comply with the relevant statutory requirements.

**224 MARKING****224.1**

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

**224.2**

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

**224.3**

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

## PART 3 DESIGN AND CONSTRUCTION – NON-MONITORED MANUAL SYSTEMS

### 301 COMPONENTS AND FUNCTION

#### 301.1

The intended function of any particular non-monitored manual system shall be that declared by the owner in accordance with 103.

#### 301.2

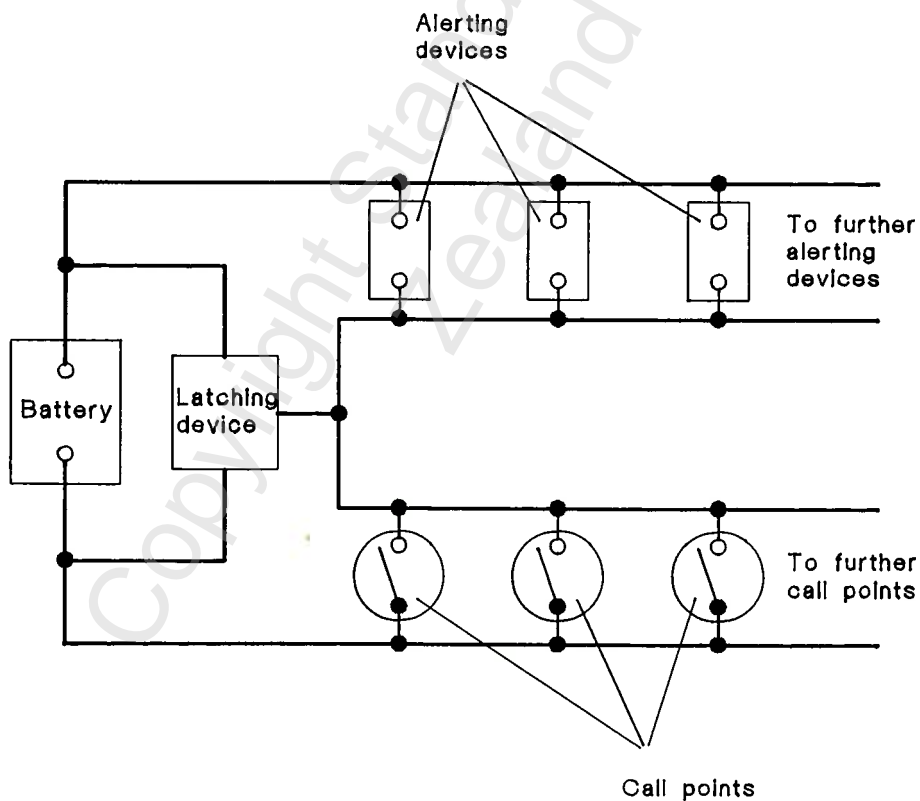
Electrical systems may be installed on the open circuit principle, as shown in Figure 1.

#### 301.3

The operation of any call point shall activate all sounders which shall continue to sound until manually reset.

#### 301.4

It shall not be possible to silence or reset the sounders by operation or restoration of a call point. A resetting device shall be provided in the system.



**Figure 1 – Electrical (open circuit) system for a non-monitored manual fire alarm system**

## 302 LIMIT OF APPLICATION

### 302.1

Non-monitored manual systems shall not be installed in buildings of more than one storey and a total area greater than 750 m<sup>2</sup>.

NOTE – This reflects the inherent potential for undetected faults.

## 303 CALL POINTS

### 303.1

Call points shall comply with the requirements of Appendix B excepting B4 and B8.

## 304 BATTERY SUPPLY

### 304.1

The operating voltage shall not be more than 50 V d.c.

### 304.2

The operating voltage shall be supplied either by a mains powered battery charger and secondary battery or alternatively a primary battery. Such batteries shall be of a sufficient rating to supply the maximum alarm load.

### 304.3

At all times primary batteries shall have sufficient capacity and shelf life for a period of at least 12 months, and be capable of supplying the maximum alarm load for at least 30 minutes.

### 304.4

Secondary batteries shall have sufficient capacity and charge life to remain energised without charging for the maximum period between tests, and thereafter be capable of supplying the maximum alarm load for at least 30 minutes.

### 304.5

The battery shall be housed in a suitable cabinet fixed in an accessible position for servicing. Cabinets for non-sealed batteries shall be ventilated.

## 305 BATTERY CHARGER

### 305.1

The battery charger shall comply with Section 212 except for 212.6.

## 306 SECONDARY BATTERIES

### 306.1

Secondary batteries shall comply with 213.4, 213.5 and 213.6.

## 307 POWER SUPPLY

### 307.1

Power supply shall comply with 402.2(e).

## 308 ALERTING DEVICES

### 308.1

Alerting devices shall comply with Sections 218 and 406.

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### **309 INSTALLATION**

#### **309.1**

Installation shall, where applicable, comply with the requirements of Part 4.

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## **PART 4 INSTALLATION**

### **401 ZONES**

#### **401.1**

All areas of the building shall be included in the designation of zones. Each zone shall be limited to a total area of 750 m<sup>2</sup> and shall be confined to one floor or section thereof except that detectors on the top floor and next floor down, or alternatively on the top floor and the concealed roof space above, may be connected as one zone provided that the only access to the highest area is from the floor immediately below.

#### **401.2**

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

#### **401.3**

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<sup>2</sup>; and
- (b) They do not form part of another fire cell; and
- (c) They are not additional to the search area limit.

#### **401.4**

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

#### **401.5**

Where several zone control units are installed within the same fire cell all alerting devices shall be operated simultaneously.

### **402 INSTALLATION PRACTICE**

#### **402.1**

Cable shall comply with the requirements of NZS 6401 and shall either be sheathed in polyvinyl chloride or installed in conduit.

#### **402.2**

Cable installation shall be in accordance with the following requirements:

- (a) With 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) Installed in conduit where it is necessary to bury the cables in concrete or plaster;
- (d) Through-jointed only in suitable enclosed terminal boxes accessible for inspection and maintenance purposes;
- (e) A separate sub-circuit connected to the mains electrical supply shall be used solely for the fire alarm supply. The connection shall either be permanently wired or enclosed within a locked cabinet or within secured premises. The circuit shall be clearly identified by a label, attached to the distribution board, marked in a permanent manner with the words "FIRE ALARM";



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- (f) 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<sup>2</sup>;
- (g) Cables installed overhead between buildings shall be suitably protected from environmental conditions, adequately supported, and relieved from stress;
- (h) 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) Each zone circuit external to the control unit shall be separate and distinct, shall protect a definite section of the building, and shall be electrically separate from any other circuit.

### 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 210.6.

### 402.7 Zone index

#### 402.7.1

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.

#### 402.7.2

The index shall include a diagram on which shall be shown:

- (a) The outline of the building by means of a solid line;
- (b) The main fire brigade access into the premises as an arrow across the outline or a gap in the outline;
- (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) Location of any special hazard protection systems connected to the alarm system, e.g., gas flooding;
- (e) The location of the indicating unit, using the following symbol and the words "YOU ARE HERE".



The diagram shall be approved by the New Zealand Fire Service.

#### 402.7.3

The requirement for the diagram may be dispensed with in the following circumstances:

- (a) In a building containing only one zone per floor and where the floor plan throughout is similar; and
- (b) Where the ingress to the building, all floors, and any special requirements are clearly apparent.

#### 402.8

When the system is in the fire alarm mode the index shall be illuminated, so as to be clearly visible from the normal viewing position.

#### 402.9

Detectors and manual call points shall be connected in such a way that a signal 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, manual call point, 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 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

Any detector likely to be subject to interference or damage shall be protected by a suitable guard.

#### 402.15

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

#### 402.16

Pneumatic systems shall comply with all other relevant parts and clauses and shall also comply with the following:

- (a) Excepting for fully welded joints, through-joints in tubing shall be enclosed in boxes accessible for inspection and maintenance purposes;
- (b) Tubing supports shall be corrosion resistant and spaced at intervals not exceeding 250 mm;
- (c) Tubing shall be protected against damage where installed on the surface and within 2 m of floor level, where passing through walls, or in other positions where it is likely to be damaged;
- (d) Tubing installed underground shall be suitably protected from mechanical damage;
- (e) Tubing installed overhead between buildings shall be suitably protected from environmental conditions, adequately supported, and relieved of stress;
- (f) Tubing shall be installed in conduit where it is necessary to bury the tubing in concrete or plaster;

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- (g) The energy storage vessel shall be enclosed in a cabinet constructed in accordance with 215.1(a), (b), (c) and (d);
- (h) The standard of workmanship and materials shall be such that the leakage rate shall not exceed that specified in 504.1(d);
- (j) Tubing shall not be installed with bends of radius less than six times the tube inside diameter.

### **403 EQUIPMENT LOCATION**

#### **403.1**

Indicating units shall be located as follows:

- (a) To suit the fire brigade access arrangements;
- (b) Contained within the limits of 700 mm and 2300 mm from floor level;
- (c) Clearly visible from the normal viewing position;
- (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;
- (h) To preclude malicious damage wherever practicable.

#### **403.2**

Control units not incorporated with indicating units shall be located as follows:

- (a) To suit the fire brigade access arrangements;
- (b) Contained within the limits of 700 mm and 2300 mm from floor level;
- (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.

#### **403.3**

Battery chargers and batteries 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.

### **404 MANUAL CALL POINT LOCATIONS**

#### **404.1**

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 to 1.5 m above floor level and a clear space of 0.6 m shall be preserved in all directions. Manual call points shall be situated at exit doors on exit routes. It shall not be necessary to travel more than 30 m to operate a manual call point.

**404.2**

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.

**404.3**

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 unauthorised access.

**405 DETECTOR SELECTION, LOCATION, POSITION, SPACING AND COVERAGE****405.1 Selection**

The protected premises shall be covered by detectors that are simple, reliable, and in particular respond to the normal phenomena arising at an early stage in a fire, that is, heat or smoke. Specialized detectors responding to other phenomena should be used with caution and shall only be used in addition to a comprehensive heat or smoke detector coverage.

**405.2 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, and above rope or belt openings;
- (d) On the floor landings of all stairways;
- (e) Cupboards that have a capacity of over 3 m<sup>3</sup> unless vented at the top by an orifice of not less than 0.02 m<sup>2</sup>;
- (f) Cupboards having a capacity exceeding 1.5 m<sup>3</sup> and containing electrical switchboards, distribution boards;
- (g) Within 1.5 m of a fire door where detection is not provided on both sides of the door, except that detection is not required in a fire-resistant strong room;
- (h) Under fixed decks, ventilation ducts, mezzanine floors or landings which are more than 1.5 m wide;
- (j) Within 500 mm of the apex of a roof or ceiling;
- (k) Not less than 1 m from air delivery points of air conditioning plant or ducting;
- (m) Not less than 200 mm from a wall;
- (n) Where open joists or beams are surmounted by floors or ceilings, detectors shall be placed between the joists or beams in sufficient quantity to meet the following requirements:
  - (1) Where the beam depth is less than 250 mm the spacing requirements of 405.3.1 and 405.3.2 shall apply;
  - (2) Where the beam depth is 250 to 600 mm the spacing shall be two thirds of that required by 405.3.1 and 405.3.2;

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- (3) Where the beam depth is greater than 600 mm, detectors shall be placed between each beam no more than 22 m apart along the axis parallel to the beam length. Detectors in adjacent spaces to be stagger spaced;

Where the pattern of beams is of a cross-hatched type, the spacings of 405.3.1 and 405.3.2 shall apply but the detectors shall be mounted at the bottom of the beam without protruding below the beam.

- (o) Such that the sensing element is not less than 25 mm or more than 100 mm below the roof or ceiling underface;
- (p) Such that the correct operation is not prejudiced by special conditions such as corrosion, dampness, high ambient temperature, vibration, cool air currents or the like;
- (q) All cleaners' cupboards;
- (r) All wardrobes not vented by an orifice greater than 0.02 m<sup>2</sup>.

### 405.2.2

Partial coverage of a building by detectors is not a practice acceptable to this Standard excepting that the following spaces need not be protected:

- (a) Concealed spaces which are fire isolated with a minimum fire resistance rating of 30/30/30 and which do not contain 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 0.75 m deep between false ceilings and fire resisting slabs above, and which do not contain any combustible material;

NOTE – Flush-mounted light fittings and associated wiring in such concealed spaces are not regarded as "combustible" for the purposes of this Standard.

- (d) Fire-resistant strong rooms;
- (e) Individual water closets which open off a protected room and where the doors or walls or both are not full height;
- (f) Fire cells;
- (g) Where there is a false ceiling of a perforated type and the open area, consisting of individual holes each at least 625 mm<sup>2</sup> in area, exceeds 50 % of the total area, it is sufficient to locate detectors on the main ceiling above the false ceiling.

## 405.3 Spacing

### 405.3.1

Point type heat actuated 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 1 in 22. 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; and
- (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<sup>2</sup> of floor area.

**405.3.2**

Line type heat actuated detectors shall be spaced as follows:

- (a) In accordance with the conditions of 405.2 insofar as they are applicable and appropriate;
- (b) Lines shall be so disposed throughout the building that no two lines are 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**

Smoke actuated detectors shall be spaced as follows:

- (a) Not exceeding 12 m in general areas and 18 m in corridors;
- (b) Not exceeding 6 m from any wall or partition in general areas and 9 m in corridors;
- (c) Not less than one detector for each 90 m<sup>2</sup> of floor area.

**406 ALERTING DEVICES****406.1**

The audible signal produced by the alerting devices shall be easily distinguishable against the ambient noise and shall be of a character distinguishable from other signals. Audible devices used throughout a system shall produce identical alerting signals.

**406.2**

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 5969, with the time weighting "F" (fast) shall exceed by a minimum of 5 dB 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 10 dB. The sound pressure level of the audible signals, however, shall be not less than 65 dBA and not more than 100 dBA. In buildings providing accommodation the minimum sound shall be 75 dB(A) at the bedhead with all doors closed.

**406.3**

When the ambient noise level exceeds 90 dB(A), or where ear protectors are worn, visual alerting devices shall also be provided. The number and disposition of visual alerting devices and the intensity of the visible signal shall be such as to ensure perception by the occupants.

**406.4**

Where audible devices are prohibited because of the possibility of panic in places such as hospitals, other suitable means of warning shall be permissible.

**406.5**

A minimum of two alerting devices per system shall be installed.



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### **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 automatic and self-monitored manual systems and, where applicable, for non-monitored manual systems.

#### **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) That 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 and tubing;
- (e) Location and area of coverage of detectors;
- (f) Manual call point location;
- (g) Alerting device locations;
- (h) That the log book specified in 506.1 has been supplied;
- (i) That the marking is in accordance with 224 and 402.11;
- (k) That the zone control and indicating units have been located correctly in relation to the fire brigade attendance points;
- (m) That zones have been correctly designated;
- (n) That indicators and legends, when operated, clearly indicate their function at a viewing distance of 2 m.

#### **503 TESTS ON ELECTRICAL EQUIPMENT**

##### **503.1**

Carry out tests on all the electrical equipment as follows:

- (a) Using an insulation tester operating at not less than 250 V, test the insulation of cables to ensure that the values are not less than 5 MΩ. To avoid damage to items of equipment, this test may be carried out with the equipment disconnected;
- (b) Verify that the electrical wiring is in accordance with the requirements of the relevant statutory regulations;
- (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 momentary operation of a manual call point latches the system;



- (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 213, or 214, as appropriate;
- (f) Verify that the output of any battery charger complies with the requirements of 212.

## **504 TESTS ON PNEUMATIC EQUIPMENT**

### **504.1**

Carry out tests on all pneumatic equipment as follows:

- (a) Allow gas to escape via the full length of the circuit to verify 219.11;
- (b) Verify that the operation of a detector or manual call point in each circuit results in the operation of the fire alarm indicator within 15 s (see 219.10);
- (c) Verify that when gas is allowed to escape from the supply a defect signal arises initially (see 219.12), and degrades into fire when the quantity of gas is reduced below the level required to signal fire condition (see 219.13);
- (d) Verify that the gas leakage rate as measured between the gas storage vessel and the pneumatic system does not exceed 5 ml/min or 1 ml/min per zone, whichever is the greater, at normal working pressure.

## **505 TESTS TO VERIFY CORRECT OPERATION AND FUNCTION**

### **505.1**

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;
- (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;
- (j) 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;
- (k) With the complete system in the normal operational condition the operation of a zone circuit results in the appropriate alerting devices operating;
- (m) 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.

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### **506 DOCUMENTS**

#### **506.1**

A bound logbook shall be provided to contain a complete record of the results of all tests, all alarms (genuine, practice or false), and all defects.

### **507 CERTIFICATE OF COMPLIANCE**

#### **507.1**

A certificate of compliance shall be provided on satisfactory completion of the commissioning tests. A typical certificate is shown in Appendix C.

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## **PART 6 REGULAR INSPECTION AND TESTING**

### **601 GENERAL**

#### **601.1**

The relevant inspection and testing requirements of this Part shall be carried out at the specified intervals for all automatic and self-monitored manual systems, and where applicable, for non-monitored manual systems. Testing and maintenance shall be carried out by competent, trained personnel. Inspection and testing personnel qualified to the applicable industry training programme recognised by the New Zealand Qualifications Authority shall be deemed to satisfy the requirement to be competent and trained.

### **602 MONTHLY CHECKS AND TESTS**

#### **602.1**

Monthly checks and tests shall be carried out as specified in this section.

#### **602.2**

Check the float voltage across any secondary battery to ensure that the voltage per cell is maintained within the limits listed in 212.5.

#### **602.3**

Check that (where appropriate) the specific gravity and electrolyte level of each cell of any secondary battery is correct. Check that the voltage of any primary cell is above the defect warning level specified in 208.1(a).

#### **602.4**

Check that the battery cabinet and battery terminals are maintained in a clean serviceable condition.

#### **602.5**

Test to ensure correct operation of the system, including all alerting devices and indicators, by using the test facilities in zone circuits with the system in the isolate mode. The system shall be reset to normal after completion of the tests.

NOTE – An acceptable method of testing the alerting devices is where the trial 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 the level set for signalling fire. The battery under test shall not receive any assistance from any other power source. (See 211.7)

#### **602.8**

A test report shall be completed and the results entered in the owner's logbook. 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 602, Monthly checks and tests, and additionally as specified in this section.

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### **603.2**

Check that the warning facilities 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**

Test in situ the operation of all manual call points. A minimum of 2 % of the detectors should also be tested. When a system contains less than 50 detectors one per annum should be tested. The tests shall be of a simple "go/no go" nature and shall check that both the detector and the zone control panel operate correctly. Test methods appropriate to the type of detector shall be used.

All detectors in the system should be tested in rotation.

Detectors which fail to operate shall be replaced immediately and the cause of failure investigated and remedied.

NOTE – The test quantity of 2 % of detectors is a minimum figure only. Depending on the system type, size and environment it may be desirable to test a larger number.

### **603.4**

Check 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 zone control unit signalling device.

### **603.5**

Make a thorough examination, cleaning, repair or replacement of all components as necessary to ensure that the system is fully operative in every respect.

### **603.6**

Check the entire premises 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.

### **603.7**

Check that indicators and legends are still current and that they clearly indicate their function at a viewing distance of 2 m.

### **603.8**

Check the correct operation and function of the defect warning facilities by simulating the appropriate condition in accordance with 208.1.

### **603.9**

Using the insulation tester operating at not less than 250 V to test the insulation resistance to earth and between conductors of the installed cables, ensure that the values are not less than 0.5 MΩ. To avoid damage to equipment this test may be carried out with the equipment disconnected.

### **603.10**

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.

## **604 PNEUMATIC SYSTEMS: ADDITIONAL REQUIREMENTS**

### **604.1**

The checks and tests as specified in Sections 601 to 603 inclusive shall be carried out for pneumatic systems where applicable and in addition the checks and tests specified in this Section are required.

**604.2**

Annual tests shall be made on each zone circuit to ensure that a fire alarm is initiated within 60 s when gas is allowed to escape via the full length of the circuit while the remainder of the system is in the normal working condition (i.e., with all restricted feeds connected).

**604.3**

Annual tests shall be made to verify that the leakage rate specified in 504.1(d) is not exceeded.

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## APPENDIX A SIGNALLING TO A REMOTE RECEIVING CENTRE

### A1 DEFINITIONS

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

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

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

**SECTOR.** An area containing one or more zones and able to be covered by a single zone control unit. A sector shall be confined to a single building except that separate small buildings covered by not more than one zone readily accessible from the attendance point of the zone control unit, and not more than 25 m from the main building may be covered by that control unit. (see fig. A1).

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

### A2

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 103, 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 103.1(a)	Yes	No
(b) To transmit an alarm to summon some other specified emergency fire related assistance – as per 103.1(f)	No	Yes
(c) To monitor and signal to a remote location the presence of faults – as per 103.1(b),  where:  103.1(a) applies – as in (a) above  103.1(f) applies – as in (b) above but NOT (a)	Yes	No
	No	Yes

### A3

Signalling to a remote receiving centre shall be achieved by:

- (a) A dedicated signal path from each zone control unit; or
- (b) A signal path common to more than one zone control unit; or
- (c) An alarm transport system.

NOTE – In all cases the characteristics of the receiving equipment must be established.



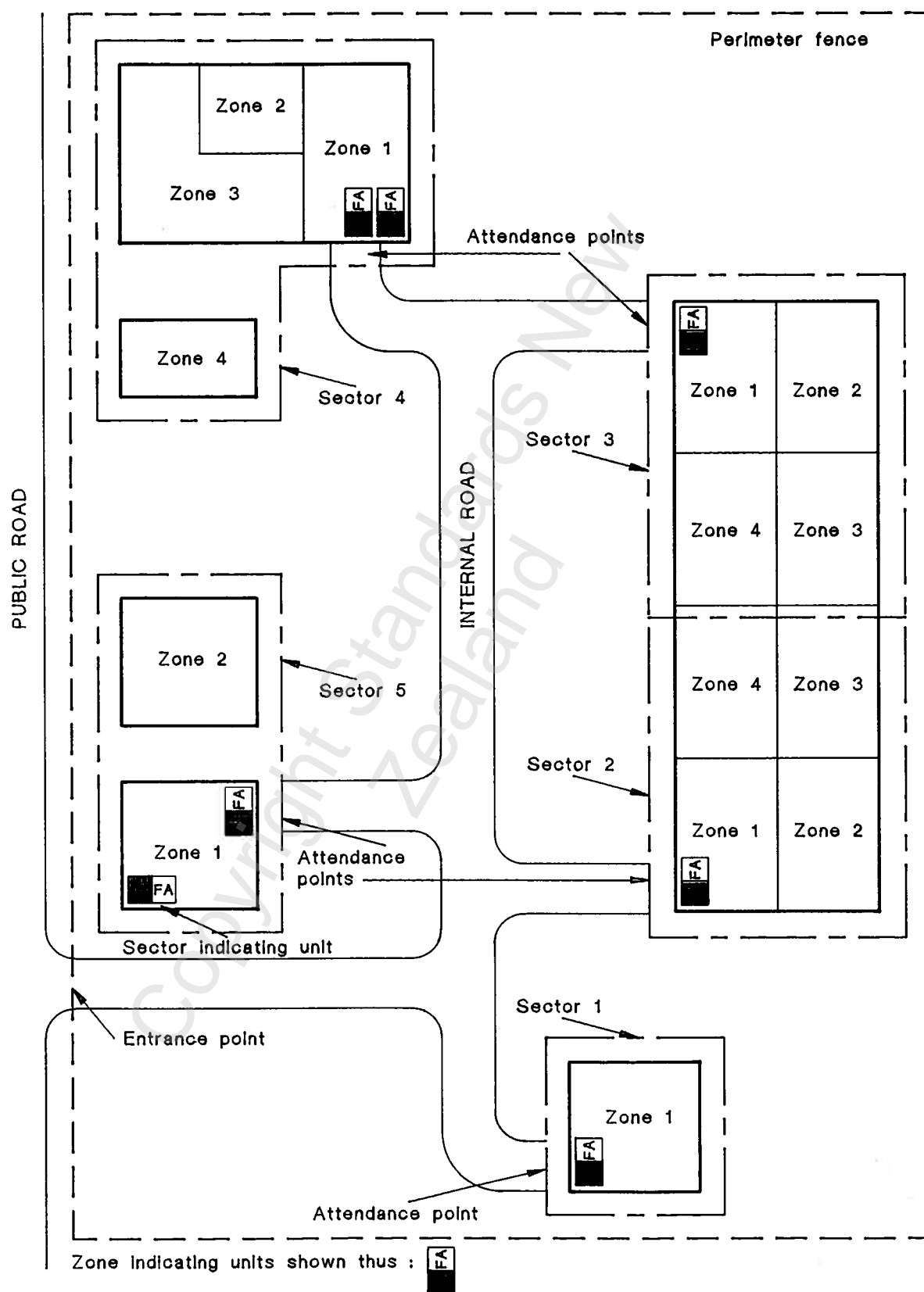


Figure A1 – Example layout of zones and sectors

**A4**

**A4.1**

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

**A4.2**

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

**A4.3**

Where the transmitting device cannot be powered from the remote receiving equipment or the sector control unit, a separate supply shall be provided integrated with the transmitting device and with the capacity to ensure that the fire alarm signal be transmitted on complete failure of the electrical supply to the fire alarm control unit in compliance with 211.7.

**A4.4**

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

**A4.5**

Failure of the communications link between the transmitting device and the remote receiving centre or sector control unit shall not result in a fire signal at the receiving centre or sector control unit.

**A4.6**

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. Failure of the communications link between the transmitting device and sector control unit shall result in a defect signal at the sector control unit.

**A5**

In the case of a common signal path (see A3(b)) the subsequent clauses of this Appendix shall apply.

**A6**

The design of sector control units shall meet the design requirements of Part 2 excepting Sections 202, 205, 207, 216, 217 and 218. Sector control units shall also include the following facilities:

- (a) Externally visible indicators of fire alarm and defect warning for individual sectors;
- (b) A monitored energy supply having a sufficient capacity to supply the normal load of the sector control unit for 24 h and then the maximum alarm load for 4 h;
- (c) A short or break in the circuit between a sector control unit and a zone control unit, or an isolate signal from a zone control unit, shall generate a defect warning signal;
- (d) A fire alarm signal received by the sector control unit shall override any defect warning signal received by the sector control unit;
- (e) Signals to the remote receiving centre shall not be latching within the sector control unit;
- (f) A single short circuit or break in the communication link between a transmitting device and the sector control unit, shall result in loss of signalling from the transmitting devices in no more than one sector.

**NOTE** – One sector may contain more than one transmitting device (e.g. automatic fire alarm and fire sprinkler system covering the same area).

**A7**

Where zone control units are co-located with the sector control unit the requirements of A6(c) need not apply but the following shall be required:

- (a) A break in the circuit shall generate either a defect warning or a fire alarm signal;
- (b) The circuit wiring shall be to NZS 6401.

**A8 SECTOR INDICATING UNIT**

**A8.1**

The location of the individual zone control units relative to the usual viewing position of the sector control unit shall be clearly defined on the sector indicating unit.

**A8.2**

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

**A8.3**

The sector indicating unit need provide fire indication only.

**A8.4**

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

**A8.5**

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

**A8.6**

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.

**A9 POWER SUPPLIES**

**A9.1**

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

**A9.2**

The sector control and indicating unit may share a power supply with repeating sector indicating units but shall not share a power supply with any zone control equipment.

**A10 INSTALLATION**

**A10.1**

The installation of sector control and indicating units shall meet the requirements of Part 4, Installation, excepting 402.1, 402.2(a), (f) and (k), and 402.7.

**A10.2**

Earth return input circuits are not acceptable. Conduit or other metal sheathing of conductors shall not be used as any part of the input circuits.

**A10.3**

All zones shall be included in the designation of sectors.

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### **A10.4**

Zone circuits shall not terminate at sector control units.

### **A10.5**

The output from the zone control units shall go only to the sector control unit.

### **A10.6**

A sector control unit shall not be connected to an input of another sector control unit.

## **A11 COMMISSIONING**

### **A11.1**

The commissioning of sector control and indicating units shall meet the requirements of Part 5, Commissioning, excepting 503.1(a).

### **A11.2**

Checks shall also be made that sector control and indicating units have been located correctly in relation to the fire brigade attendance points and that sectors have been correctly designated.

## **A12 REGULAR INSPECTION AND TESTING**

### **A12.1**

The inspection and testing of sector control and indicating units shall meet the requirements of Part 6, Regular Inspection and testing, excepting 602.4, 603.2(b), 603.3, 603.4 and 603.9.

### **A12.2**

Test to ensure the correct operation of the sector control and indicating units, including indicators, by using the test facilities in input circuits with the system in the isolate mode.

## **APPENDIX B**

### **SPECIFICATION FOR MANUAL CALL POINTS**

#### **B1**

Manual call points shall be of a strong, rigid construction and shall be simple to operate.

#### **B2**

The method of operation shall be clearly indicated by a concise inscription, including the word "FIRE" displayed on or adjacent to each manual call point as shown in figure B1.

#### **B3**

The construction shall provide safeguards against accidental operation and shall also provide positive indication that the device has been operated. The breaking of a frangible cover shall not of itself operate the alarm.

#### **B4**

For automatic and self-monitored manual systems, connection arrangements shall be such that it is not possible to remove a manual call point from the service without initiating a defect warning or fire alarm signal.

#### **B5**

The frangible element of frangible cover type manual call points shall have an exposed area of not less than 5500 mm<sup>2</sup>. The maximum dimension shall not be greater than 1.5 times the minimum dimension. Such frangible material shall comply with the test requirements of BS 5839 Part 2, Appendix A.

#### **B6**

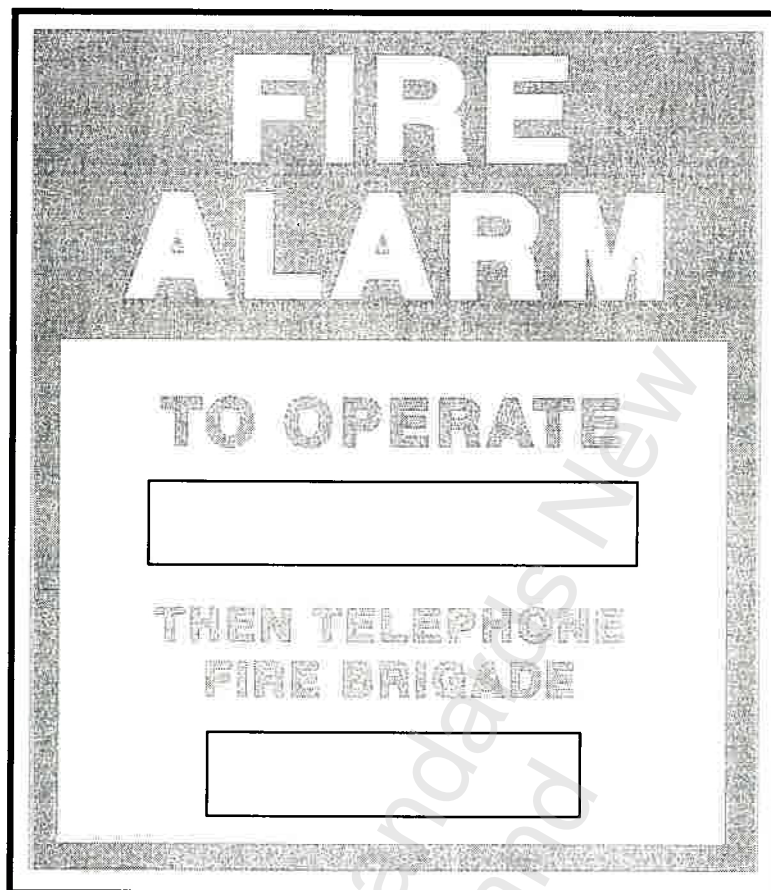
Manual call points exposed to the weather shall have a degree of protection to IP24 of AS 1939.

#### **B7**

Colour finish of the outside shall comply with shade No. 537 of NZS 7702 or colour 04 E 53 of NZS/BS 5252 on at least 50 % of the exposed surface.

#### **B8**

For automatic and self-monitored manual systems where a manual call point utilizes a mechanical contact to initiate a fire alarm that contact must be closed in its normal condition, opening to initiate the fire alarm.



Minimum dimensions 115 mm by 100 mm

**NOTE –**

- (1) Method of operation and telephone no. of fire brigade to be inserted in the appropriate boxes
- (2) Colour of shaded area to be No. 537 of NZS 7702 or 04 E 53 of NZS/BS 5252. Boxes and frame black

**Figure B1 – Notice to be displayed on, or adjacent to, each manual call point**



## APPENDIX C

### CERTIFICATE OF COMPLIANCE FOR FIRE ALARM SYSTEM

Front side

#### CERTIFICATE OF COMPLIANCE FOR FIRE ALARM SYSTEM

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/self-monitored manual/non-monitored manual
  - (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. Index plan attached YES / NO

I hereby certify that the above system has been inspected and tested in accordance with NZS 4512 and on the basis of the results this system complies with the Standard.

Installer	Inspector
Signed .....	Signed .....
Capacity of signatory .....	Capacity of signatory .....
Date .....	Date .....
Company .....	Company .....
Address .....	Address .....
.....	.....
.....	.....
.....	.....

## APPENDIX C (reverse side)

[illegible]

**NOTE** – Includes alerting device circuits

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**Other New Zealand Standards for Fire Protection**

NZMP 9:1989	Fire properties of building materials and elements of structure
NZS 2139:1967	Heat actuated fire detectors
NZS 4232:1988	Performance criteria for fire resisting enclosures
NZS 4501:1972	Code of practice for location marking of fire hydrants
NZS 4503:1993	The distribution, installation and maintenance of hand operated fire fighting equipment for use in buildings
NZS 4504:1981	Fire hose reels
NZS 4505:1977	Fire-fighting waterway equipment
NZS 4506:1978	Portable fire extinguishers of the water, foam and dry powder types
NZS 4507:1978	Fire testing and rating of portable fire extinguishers
NZS 4508:1979	Portable carbon dioxide fire extinguishers
NZS 4510:1978	Code of practice for risers mains for fire service use
NZS 4511:1979	Bucket pump fire extinguishers
NZS 4514:1989	The installation of smoke alarms
NZS 4515:1994	Residential fire sprinkler systems
NZS 4516:1991	Fire blankets
NZS 4521:1974	Boxes for fire brigade connections
NZS 4541:1987	Automatic fire sprinkler systems
NZS 4551:1974	Portable fire extinguishers of the halogenated hydrocarbon type

## NOTES

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#### THE NEW ZEALAND STANDARD CERTIFICATION MARK SCHEME

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Manufacturers may obtain particulars of the conditions of licensing from the Certification Services Sector, Standards New Zealand, Private Bag 2439, Wellington 6020.

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