

- → Essential Safety Measures Maintenance Manual
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The Building Commission is a professional, supportive, and forward-thinking body. It strives to create better

Foreword by the Building Commissioner

Essential safety measures are central to ensuring a safe and healthy built environment in Victoria, and their maintenance is vital for the life, safety and health of occupants over a building's lifetime.

To this end, the *Building Regulations 2006* regulate to ensure adequate levels of fire safety and protection of people in a building or place of public entertainment.

It is important that all those with responsibilities in owning, managing and operating buildings – large or small – are fully aware of, and understand, their responsibilities in the ongoing maintenance of the essential safety measures in their buildings.

It is the role of the Building Commission to ensure the safety, liveability and sustainability of Victoria's built environment, and the *Essential Safety Measures Maintenance Manual* sets out in detail what is required and within what parameters building owners and managers must work to meet their regulatory obligations.

This fourth edition of the manual has been designed to be easy-to-use: it is set out in four sections, within which comprehensive information is provided on each essential safety measure. It is also available in electronic form, with a CD-ROM in a plastic sleeve inside the folder.

It is not expected that owners or building property managers will need to read the entire manual. The four sections are clearly defined, enabling users to identify and read only those parts of the manual, including parts of individual safety measures, that are relevant to their building's essential safety measures needs.

It is important for all building owners and managers to be informed of their obligations regarding maintenance of the essential safety measures in their buildings. Good maintenance practice of buildings not only makes good sense from a health and safety point of view, it is also a good risk-management business decision.



Tony Arnel
Building Commissioner



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Introduction

WHAT IS CONTAINED IN THIS MANUAL?

The Essential Safety Measures Maintenance Manual is designed to aid building owners, building property managers and other persons interested in the regulatory requirements relating to maintenance of essential safety measures.

The manual provides detailed information on each essential safety measure listed in Part 12 of the *Building Regulations 2006*. It has been divided into four parts:

- **Part 0 – Building Code of Australia – Use of alternative solutions and their associated maintenance requirements**
- **Part 1 – Buildings constructed from 1 May 2004**
 - Building Fire Integrity
 - Means of Egress
 - Signs
 - Lighting
 - Fire-Fighting Services and Equipment
 - Air Handling Systems
 - Automatic Fire-Detection and Alarm Systems
 - Occupant Warning Systems
 - Lifts
 - Standby Power Supply Systems
 - Building Clearance and Fire Appliances
 - Other Measures
 - Building Use and Application
- **Part 2 – Buildings constructed between 1 July 1994 and 30 April 2004**
 - Egress and Access
 - Electrical Services
 - Fire-Detection and Suppression Equipment
 - Fire-Resistance
 - Mechanical Services
- **Part 3 – Buildings constructed prior to 1 July 1994**
- **Appendices**
 - Appendix A – Annual essential safety measures report
 - Appendix B – *Building Regulations 2006* Extract, Part 12 – Maintenance
 - Appendix C – Sample Log Sheets

This manual provides the following information:–

- Reference clause of the *Building Code of Australia (BCA) 1990* where applicable
- The performance requirement of *BCA 1996* and later published versions up to *BCA 2007*, including the deemed to satisfy clause where applicable
- The relevant Australian Standard for installation and maintenance (if applicable)
- A brief description of the purpose, equipment, requirements and method of operation
- Recommendations on maintenance programs and record-keeping.

Where a relevant building surveyor has approved the installation of an essential safety measure based on a performance requirement i.e. *BCA 2006* Volume 1 Performance Clause CP1, then he or she may specify on the occupancy permit or in writing where no occupancy permit is required, a differing or additional level of maintenance. Differing or additional maintenance may include additional maintenance procedures specific to that safety measure or prescribed maintenance to comply with another country's building codes or standards.

HOW TO USE THIS MANUAL

As noted above, the manual is set out in four sections in which comprehensive information is provided on each essential safety measure. It is not expected that owners or building property managers would need to read this manual from cover to cover. The manual is set out so that each part may be read individually or an owner or building manager may only read the relevant part for an individual essential safety measure without the need to read the entire section.

WHAT IS THE BUILDING LEGISLATION SYSTEM IN VICTORIA?

Victoria's building legislation system was set up under a Victorian Act of Parliament, the *Building Act 1993* (the *Act*). It has developed into a leading model for other Australian States and Territories, as well as for other countries.

The *Act* introduced major changes in building control to improve the Victorian building industry. Of particular note, the *Act* introduced the concept of building permit approvals by private building surveyors. It also introduced compulsory registration and insurance for builders and certain other categories of building practitioners.

These innovations have been designed to assist building owners, building surveyors and other industry practitioners to produce buildings that are safe, liveable and energy-efficient in a cost-effective and timely manner for all Victorians.

WHAT LEGISLATION GOVERNS BUILDING ACTIVITY?

All building work must comply with the *Act*, *Building Regulations 2006* (the *Regulations*) and the *Building Code of Australia* (the *BCA*) unless specifically exempted.

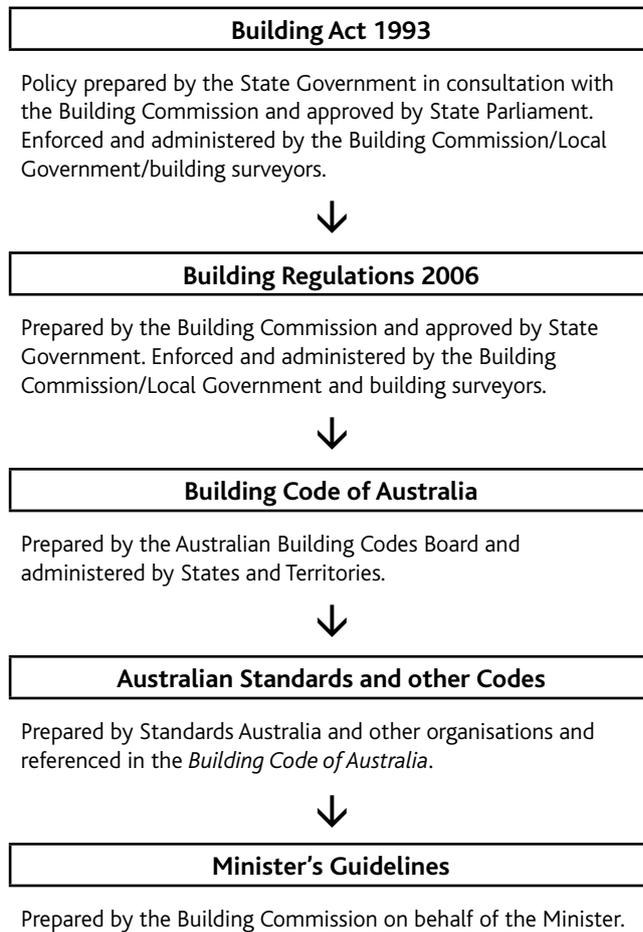
The *Act* sets out the legal framework for the regulation of construction of buildings, building standards and maintenance of specific building safety features in Victoria. The objectives of the *Act* include:–

- To establish, maintain and improve standards for the construction and maintenance of buildings
- To facilitate the adoption and efficient application of national uniform building standards and the accreditation of building products
- To enhance the amenity of buildings and protect the safety and health of people who use buildings
- To facilitate and promote the cost-effective construction of buildings
- To provide an efficient and effective system for issuing building and occupancy permits.

The *Regulations* are derived from the *Act* and contain, amongst other things, the requirements relating to building permits, building inspections, occupancy permits, enforcement of the *Regulations* and maintenance of buildings. The *Regulations* call up the *BCA* as a technical reference that must be complied with, giving it legal status.

The *BCA* is produced and maintained by the Australian Building Codes Board on behalf of the Commonwealth Government and each State and Territory Government. It is a uniform set of technical provisions for the design and construction of buildings and other structures. It is fully performance-based and includes minimal state variations. A performance-based approach defines the way of achieving a specified outcome without prescribing a particular method.

Hierarchy of building control documents



WHERE DOES THE BUILDING COMMISSION FIT IN?

The Building Commission was established on 1 July 1994 by the *Act* as a self-funded body to administer Victoria's building regulation system. Its charter is to serve industry and the community through the development and application of building law to provide for the cost-effective design, construction and maintenance of healthy, safe, habitable and energy-efficient buildings.

The Commission's functions include:

- Reviewing the efficiency and effectiveness of the *Act* and *Regulations*;
- Advising the Minister for Planning and the Victorian Government on building matters;
- Registering building practitioners;
- Monitoring the conduct and ability of registered building practitioners;
- Providing building product accreditation;
- Determining disputes and appeals arising from the *Act*;
- Monitoring a system of levy collection;
- Informing industry of changes to building legislation; and
- Providing comprehensive information on building activity.

The Commission also provides administrative support to four statutory bodies established by the *Act*:

The **Building Advisory Council** advises the Minister, through the Commissioner, on the administration and impact of the legislation and regulations on the building industry and the community, and issues relating to the building permit levy.

The **Building Appeals Board** comprises a chairperson and as many other people who have experience in the building industry or matters related to the industry as the Minister considers necessary. The role of the Board is to hear applications for modifications of the *Regulations*, hear any disputes or appeals arising from the *Act*, including adjoining owner disputes, determine alternative solutions and hear appeals arising from the Building Practitioners Board.

The **Building Practitioners Board** comprises building practitioners drawn from major professional organisations upon the recommendation of the Minister. It administers the regulation system for building practitioners and monitors their performance. It may also make recommendations to the Minister in relation to qualifications and insurance matters.

The **Building Regulations Advisory Committee** comprises the Commissioner, architects, builders, building surveyors, engineers, building owners, lawyers, consumers and representatives from the fire authorities, local government, State Government and the Melbourne City Council. The role of this Committee is to advise the Minister on draft regulations, accredit building products, systems construction methods, designs and components associated with building work.

PRIVATE SECTOR ALTERNATIVE

Private sector competition has been introduced as an alternative service to that which was exclusively undertaken by councils in the past. The *Regulations* set out how a private or municipal building surveyor carries out these functions. The *Act* places obligations on both municipal and private building surveyors in relation to their appointment, the extent of their responsibilities and imposes penalties for unprofessional conduct.

LIABILITY AND INSURANCE

The *Act* limits liability to a period of 10 years commencing from the date of issue of the occupancy permit or the certificate of final inspection. The *Act* also withdraws the common law doctrine of joint and current tortfeasor liability so that defendants will not pay more than their own share of liability. The *Act* also makes insurance compulsory for Registered Building Practitioners (which include engineers, building surveyors, commercial and domestic builders, and draftspersons). The *Act* also requires that an architect must be insured. This insurance is to be provided in accordance with the requirements set out in a Ministerial Order.

OPTIONS FOR COUNCILS

Although municipal councils maintain primary responsibility for administering the law, they now have a range of options for involvement in the building control system.

Building permit fees are de-regulated and local councils may charge fees that are competitive with the private sector.

WHAT OTHER SERVICES DOES THE BUILDING COMMISSION PROVIDE?

In addition to administering the statutory bodies, the Building Commission organises and conducts seminars for the building industry in relation to the development and amendment of the *BCA*, the *Act* and the *Regulations*.

The Building Commission also publishes a number of documents which cover items of general interest such as forthcoming seminars, proposed regulatory changes etc; Practice Notes, which provide clarification of particular issues relating to the *Regulations*; and Minister's Guidelines, which relate to fees charged and the functions of private and municipal building surveyors.

Building practitioners receive these publications as part of their registration fee. Other people interested in obtaining the Commission's publications should telephone (03) 9285 6400 or visit the Building Commission website at www.buildingcommission.com.au

WHERE CAN A COPY OF THE BUILDING LEGISLATION BE OBTAINED?

The *Act, Regulations* and other statutory publications are published in hard copy and electronically. They can be purchased from:

- Anstat Pty Ltd on (03) 9278 1144
- Information Victoria on 1300 366 356

An electronic copy of the *Act or Regulations* can be obtained by accessing the Statute Book on the Victorian Legislation and Parliamentary Documents homepage www.dms.dpc.vic.gov.au

The Minister's Guidelines are available from the Building Commission's website www.buildingcommission.com.au

The *BCA* can be obtained from CanPrint Communications on (02) 6295 4422 or email canprint@canprint.com.au

The Australian Standards can be purchased from Standards Australia on 1300 654 646 or www.saiglobal.com/shop

ESSENTIAL SAFETY MEASURES

WHAT ARE ESSENTIAL SAFETY MEASURES?

Essential safety measures are the fire, life safety and health items installed or constructed in a building to ensure adequate levels of fire safety and protection from such things as Legionella over the life of the building.

Essential safety measures include all traditional building fire services such as sprinklers and mechanical services etc., but also include passive fire safety such as fire doors, fire-rated structures and other building infrastructure items such as paths of travel to exits.

An essential safety measure, for the purpose of the *Regulations*, is provided for the safety of people in a building or place of public entertainment.

The term 'essential safety measure' has been defined in the *Regulations* as including:–

1. *Safety measures as listed in Table I1.1 to I1.11, excluding artificial lighting contained in Table I1.4, of the BCA Volume 1;*
2. *Mechanical ventilation systems, hot water or cooling systems;*
3. *Any other item listed as an essential safety measure (e.g. result of alternative solution); and*
4. *Essential service as defined under the Building Regulations 1994 (Previous Regulations).*

This definition of essential safety measure is self-explanatory and encompasses the industry practice of referring to all safety measures, essential services, safety fittings, and equipment under the one definition of essential safety measures. You will note that Table I1.12, I1.13 and artificial lighting under Table I1.4 of the *BCA* are not included.

WHY DO THEY NEED TO BE MAINTAINED?

The objective of maintenance is to ensure that every essential safety measure continues to perform at the same level of operation that existed at the time of commissioning and issue of the occupancy permit.

The maintenance of essential safety measures involves:–

- Ensuring the service is maintained at a level of performance specified by the relevant building surveyor (RBS) (usually to the *BCA* or an Australian Standard);
- Periodical inspections and checks in accordance with an Australian Standard or other specified method; and
- Maintaining a record of the maintenance inspections and checks in the form of an annual 'essential safety measures report'.

Reasons for ensuring maintenance of various services:–

- General wear and tear — i.e. electro-magnetic hold-open devices on fire doors, shut down of air conditioning system in fire situation, replacement of emergency lighting batteries and tubes;
- Reliability of a system operating — i.e. sprinkler system, mechanical ventilation system (used as a smoke hazard management system), early warning and intercommunication system;
- Faults after commissioning of a system — i.e. emergency power supply; and
- General housekeeping — i.e. ensure paths of travel to exits are not obstructed, fire-protective coverings are maintained, portable fire extinguishers remain in place.

WHAT BUILDINGS REQUIRE MAINTENANCE OF ESSENTIAL SAFETY MEASURES?

The maintenance of essential safety measures applies to Class 1b, 2, 3, 5, 6, 7, 8, and 9 buildings as defined in the *BCA Volume 1*. These classifications include multi-storey residential buildings, hotels/motels, offices, shops, warehouses, factories and hospitals/public buildings respectively.

Buildings are classified in the *BCA Volume 1* as follows:

Class 1: one or more buildings, which in association constitute:–

- (a) **Class 1a** – a single dwelling being –
 - (i) a detached house; or
 - (ii) one of a group of two or more attached dwellings, each being a building, separated by a fire-resisting wall, including a row house, terrace house, town house or villa unit; or
- (b) **Class 1b** – a boarding house, guest house, hostel or the like –
 - (i) with a total area of all floors not exceeding 300 m² measured over the enclosing walls of the Class 1b; and
 - (ii) in which not more than 12 persons would ordinarily be resident,

which is not located above or below another dwelling or another class of building other than a private garage.

Class 2: a building containing two or more sole-occupancy units, each being a separate dwelling.

Class 3: a residential building, other than a building of Class 1 or 2, which is a common place of long-term or transient living for a number of unrelated persons, including:–

- (a) a boarding-house, guest house, hostel, lodging-house or backpackers accommodation; or
- (b) a residential part of a hotel or motel; or
- (c) a residential part of a school; or
- (d) accommodation for the aged, children or people with disabilities; or
- (e) a residential part of a health-care building which accommodates members of staff; or
- (f) a residential part of a detention centre.

Class 4: a dwelling in a building that is Class 5, 6, 7, 8 or 9, if it is the only dwelling in the building.

Class 5: an office building used for professional or commercial purposes, excluding buildings of Class 6, 7, 8 or 9.

Class 6: a shop or other building for the sale of goods by retail or the supply of services direct to the public, including:–

- (a) an eating room, cafe, restaurant, milk or soft-drink bar; or
- (b) a dining room, bar, shop or kiosk part of a hotel or motel; or
- (c) a hairdresser's or barber's shop, public laundry, or undertaker's establishment; or
- (d) market or sale room, showroom, or service station.

Class 7: a building which is:–

- (a) **Class 7a** – a car park; or
- (b) **Class 7b** – for storage, or display of goods or produce for sale by wholesale.

Class 8: a laboratory, or a building in which a handicraft or process for the production, assembling, altering, repairing, packing, finishing, or cleaning of goods or produce is carried on for trade, sale, or gain.

Class 9: a building of a public nature:–

- (a) **Class 9a** – a health-care building, including those parts of the building set aside as a laboratory; or
- (b) **Class 9b** – an assembly building, including a trade workshop, laboratory or the like in a primary or secondary school, but excluding any other parts of the building that are of another Class; or
- (c) **Class 9c** – an aged-care building.

Class 10: a non-habitable building or structure:–

- (a) **Class 10a** – a non-habitable building being a private garage, carport, shed, or the like; or
- (b) **Class 10b** – a structure being a fence, mast, antenna, retaining or free-standing wall, swimming pool, or the like.

The maintenance provisions of Part 12 of the *Regulations* are divided into two divisions: Division 1 outlines the requirements for maintenance of essential safety measures and Division 2 outlines the maintenance and operation requirements for swimming pools and spas.

Division 1 is further divided into three subdivisions:–

- Subdivision 1 deals with the maintenance of essential safety measures, as determined by the relevant building surveyor, in buildings where building work is, or has been, carried out under the *Act* on or after 1 July 1994 and for Class 4 buildings after 14 June 2005.

Excluded from the application are smoke alarms to dwellings in Class 1b, 2, and 4 part of a building.
- Subdivision 2 outlines the maintenance of essential safety measures for buildings and places of public entertainment constructed before 1 July 1994.
- Subdivision 3 sets out the requirements for maintenance of exits and paths of travel relating to buildings or places of public entertainment.

OWNER'S RESPONSIBILITY

BUILDINGS BUILT ON AND AFTER 1 JULY 1994

Part 5 of the *Building Act 1993* (the *Act*) sets out the requirements for occupation of buildings and places of public entertainment. Among other things this Part specifically details when occupancy permits are required and the form and effect of those permits. This Part also details the decision-making responsibilities of the relevant building surveyor (RBS). Most importantly Section 40 of the *Act* requires that a person must not occupy a building in contravention of the occupancy permit. This also includes any conditions, such as the requirements of maintenance, that occupation may be subject to. There are substantial penalties which may be applied, such as 100 penalty units for a person and 500 penalty units for a body corporate, where contravention of the *Act* occurs.

The current regulations have made it mandatory for the RBS to list the required essential safety measures on the occupancy permit. The level of performance to which the service is to be maintained must also be specified on the occupancy permit. In the case of an essential safety measure being provided where no occupancy permit is required, the RBS must determine the level of performance which must be specified in writing and given to the owner.

The *Regulations* require that the owner:–

- (a) Display in an approved location a copy of an occupancy permit including any conditions required under regulation 1008;
- (b) Prepare an annual essential safety measures report in accordance with regulation 1209 before each anniversary of the date of occupancy permit or determination made under regulation 1204; and
- (c) Keep all annual essential safety measures reports and records of maintenance checks, service and repair work on the premises for inspection by the municipal building surveyor or chief officer at any time on request.

The carrying out of maintenance procedures is dependent on the complexity of the service and the experience of the person carrying out the inspection. Systems may be maintained where appropriate by the owner, service installer, maintenance contractor or internal maintenance personnel. Where the owner appoints a person to undertake the maintenance they must ensure that the person is appropriately qualified and competent to undertake the work.

It is the purpose of this manual to aid in the understanding, preparation and completion of an essential safety measures report. An example of an essential safety measures report is included in Appendix A.

Who is a competent person?

Owners may appoint a person in certain situations to undertake maintenance, testing, or preparation of the annual report. An owner must ensure that the person they appoint is suitably qualified and competent in the task that they are performing.

A competent person is a person who has acquired – through training, qualification or experience (or a combination of them) – the knowledge and skills enabling the person to perform the task correctly. In the context of this manual, that person would need to be competent in inspecting, testing and maintaining essential safety measures. Whoever is responsible for ensuring a particular task is carried out must determine that the person engaged to carry out that task is competent to do so.

In determining a person's competency, due consideration must be given to their qualifications, the training they have received relevant to the task at hand, and their previous experience in doing similar tasks. Some tasks, for example electrical or plumbing installation, inspection and testing, will require a particular competence, such as a formal qualification and/or licence. Therefore, a qualified and licensed person can only undertake such work. Where other tasks can be carried out by a 'competent person' who does not have formal qualifications, such a person must still be able to demonstrate they have the necessary training, qualification or experience, (or a combination of them), to carry out the inspecting and testing task in a competent manner.

BUILDINGS BUILT BEFORE 1 JULY 1994

The *Regulations* require the maintenance of safety equipment, safety fittings and safety measures within existing buildings built prior to 1 July 1994. These items are defined as essential safety measures, similar to those requirements for buildings built (issued with occupancy permits) on and after 1 July 1994.

The owner is responsible for ensuring that the safety equipment, safety fittings and safety measures are maintained in a state that enables them to fulfil their purpose.

The safety equipment, safety fittings and safety measures that are to be maintained are the items installed or constructed in the building that were required by the *Regulations* at the time of construction. These will typically be similar to those listed as essential safety measures.

The *Regulations* require that the owner of a building built prior to 1 July 1994:–

- a) Prepare an annual essential safety measures report in accordance with regulation 1209 before each anniversary of the date of occupancy permit or determination made under regulation 1215; and
- b) Keep all annual essential safety measures reports and records of maintenance checks, service and repair work on the premises for inspection by the municipal building surveyor or chief officer at any time on request.

Maintenance of exits

Occupiers are also responsible for the maintenance of exits and paths of travel to exits. The exit paths must be “...*maintained in an efficient condition and kept readily accessible, functional and clear of obstruction so that egress from the building or place is maintained*”; that is, to ensure proper housekeeping of the paths of travel to exits and keep exit doors and door hardware functioning.

Maintenance and inspection records

The *Regulations* do not specify a level of documentation to be kept by the owner. It is recommended that records of maintenance should be completed and made available to the building owner or agent at the time of conducting the system and equipment maintenance.

It is recommended that records should contain the following information:

- a) Record reference.
- b) Name of building or site.
- c) Address of building or site.
- d) Date of maintenance/inspection.
- e) System or equipment identification and location (Possibly a location plan).
- f) Frequency of maintenance activity undertaken.
- g) Defects identified.
- h) Name of property owner or the agent.
- i) Name and signature of the service person.
- j) Date the record was completed.

Form of records

If a person, such as a building surveyor, has been used to inspect and nominate essential safety measures, that person should provide advice as to the level of record-keeping required to satisfy the level and frequency of maintenance, but as a minimum should include the information provided above.

Maintenance records may be electronically based. Hard copy records should be kept on site and be available at all times. Technology in regard to the preparation of maintenance records has advanced considerably in recent years with the advent of purpose-designed software. As a minimum, hard copy of records of maintenance are to be made available to organisations such as regulators, fire authorities, insurance surveyors, fire auditors, etc. at all times. However, the hard copy records required may be prepared utilising electronic recording systems and this manual acknowledges such technology is designed to deliver an accurate, accountable, consistent and timely level of service.

Maintenance records can be in the form of maintenance record tags (in the case of hydrant landing valves, hose reels, portable and wheeled fire extinguishers and fire blankets), or log books (in the case of sprinkler, pumpset, fire hydrant, detection, smoke and heat alarm, fire alarm monitoring, sound, intercom, gaseous, aerosol, water mist, passive fire and smoke and HVAC and evacuation systems).

The use of maintenance record tags or labels shall not preclude the need for a separate maintenance record system.

Where log books are used they shall have sequentially numbered pages in triplicate. Provision shall be made for the signatures of the building owner, occupier or agent, and the service person. The required distribution of copies shall be printed on each page as follows:–

- a) Original owner/occupier/agent
- b) Duplicate service person
- c) Triplicateretain in book

What happens if an owner doesn't comply?

The *Regulations* prescribe penalties for non-compliance for each breach of the *Regulations* and this enforcement can be undertaken by the Commissioner, municipal building surveyor or chief officer of the relevant fire brigade (Metropolitan Fire and Emergency Services Board (MFB) or the Country Fire Authority (CFA) and may issue a building infringement notice (on-the-spot-fine). This applies under Division 5 of Part 13 of the *Act* and Part 17 of the *Regulations* for an offence against:–

- Subdivision 1, regulations 1205, 1207, 1208, 1211; and
- Subdivision 2, regulations 1214, 1216 and 1217; and
- Subdivision 3, regulation 1218.

Where it is suspected that essential safety measures are not being maintained in accordance with the *Act* or the *Regulations*, an inspection may be carried out under Section 227E of the *Act*.

A building infringement notice may be issued as a consequence of this inspection. A building infringement notice must be issued in the form of a Form 8 for the purposes of Section 225(2) of the *Act*. The notice sets out the prescribed penalty to be paid and must also indicate the steps required, if any, to rectify the offence.

Offences under subdivision 1:

Inspections of the essential safety measures provided by the building or place of public entertainment may be carried out by the chief officer and the municipal building surveyor either jointly or separately under Section 227E of the *Act* to determine whether they are being maintained in accordance with subdivision 1 of Part 12. Failure to maintain an essential safety measure to the required standard is an offence under Section 40 of the *Act* and Part 12 of the *Regulations*.

Failing to complete the required documentation constitutes an offence under regulations 1205, 1207, 1208, 1209, 1211. This may include:–

- Failure to comply with a maintenance determination.
- Failure to make a maintenance schedule or determination available for inspection.
- Failure to complete an annual essential safety measures report (in accordance with regulation 1208) before each anniversary of the occupancy permit or relevant building surveyor's determination.
- Failure to keep all essential safety measure reports and records on the premises for inspection purposes.

Offences under subdivision 2:

Failure to maintain any safety equipment, safety fitting or essential safety measure in a state that allows it to fulfil its purpose constitutes an offence under regulations 1214, 1216 and 1217. Removal of any safety equipment, safety fitting or essential safety measure from its approved location unless for maintenance purposes in accordance with the *Regulations* constitutes an offence under regulations 1214, 1216 and 1217.

Offences under subdivision 3

Failure to ensure that exits and paths of travel are maintained in an efficient condition and kept readily accessible, functional and clear of obstruction so that egress from the building is maintained constitutes an offence under regulation 1218. An infringement notice issued under this subdivision is issued to occupier; however, it does not prevent infringement notices being issued on the owner for similar issues under subdivision 1 or 2.

However, the greatest concern for building owners is that if essential safety measures and other safety items are not maintained, then the risk of failure of the item when it is needed (i.e. in an emergency) increases significantly.

Regulatory requirements

The regulatory requirements relating to maintenance of essential safety measures are contained in Part 12 of the *Regulations*. An extract of Part 12 of the *Regulations* is provided in Appendix B.

Referenced documents

Throughout this manual, documents have been referenced to help owners, managers and the like understand the level of installation and the maintenance standards as a guide to the minimum requirements. This manual is not to be used as a stand-alone document and should be read in conjunction with the appropriate documentation for the safety measure, associated installation and maintenance standards. Owners should make available a copy of these standards or documents to ensure the relevant information is available to their agent, service installer, maintenance contractor or internal maintenance personnel.

Cooling towers

The *Building (Legionella) Act 2000* requires all cooling tower systems in Victoria to be registered with the Building Commission to help track potential sources of Legionnaires' disease. The *Building Act 1993* requires the registration of all cooling tower systems and the development of a Risk Management Plan (RMP) for each cooling tower system.

The *Building (Legionella Risk Management) Regulations 2001* specify the risks that an RMP must address. The *Health (Legionella) Regulations 2001* also prescribe maintenance, testing and associated record-keeping relating to a cooling tower and warm water system that a responsible person must comply with. The owner of the land on which a cooling tower system is located is required to register and renew the registration of that system on an annual basis. Once on the register, the application for renewal of registration will be sent to the owner before the current registration expires each year.

For further information on registering cooling towers, go to www.buildingcommission.com.au

For information on the Legionella Risk Management Project at the Public Health Division, Department of Human Services, go to www.health.vic.gov.au/environment/legionella

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Part 0 – Building Code of Australia

Use of alternative solutions and their associated maintenance requirements

SUMMARY

This Part considers issues relating to the performance-based *Building Code of Australia (BCA)*, assessing alternative solutions and examines the issues relating to maintenance. It also helps to provide owners who may not be familiar with performance-based building codes with an explanation in the use of performance-based alternative solutions.

The performance-based *BCA* significantly changed the way building regulations were expressed and applied, by introducing a mandatory performance compliance level.

Two processes can be used to achieve compliance: the traditional prescribed requirements i.e. deemed-to-satisfy provisions; or secondly, alternative solutions.

Where it is chosen to use an alternative solution, verification of compliance with the performance requirements is satisfied by appropriate use of assessment methods. This verification of compliance with the performance requirements also includes ensuring the appropriate level of maintenance and frequency of maintenance is nominated.

THE PERFORMANCE-BASED SYSTEM

The structure of the *BCA* comprises the following:

- a) The Objectives.
- b) The Functional Statements.
- c) The Performance Requirements to which all building solutions must comply.
- d) The Building Solutions.

The Objectives and the Functional Statements may be used as an aid to interpretation. These are informative only to aid in the interpretation and the intent of the Performance Requirements and the deemed-to-satisfy provisions. The Objectives set out the community expectations and the Functional Statements describe how it is proposed that the building will be designed and constructed to meet those expectations.

A performance-based approach defines the way of achieving a specified outcome, without prescribing a particular method.

ALTERNATIVE SOLUTIONS

In the *BCA*, any means of achieving compliance with the Performance Requirements that is not included in, or differs in any way from, a deemed-to-satisfy provision, is referred to as an 'alternative solution'. Designers, when formulating an alternative solution, may include the use of references such as:-

- The International Fire Engineering Guidelines published by the Australian Building Codes Board (ABCB).
- The Fire Brigade Intervention Model (FBIM) developed by the Australasian Fire Authorities Council (AFAC).
- An appropriate international standard or code.

When using an alternative solution, it is important to ensure that it complies with all relevant Performance Requirements in the *BCA*. No *BCA* provision can be considered in isolation. Any departure from the deemed-to-satisfy provisions for an alternative solution needs to be assessed against the relevant Performance Requirements within the relevant section of the *BCA*. Additionally, the proposed alternative solution may also impact on other Performance Requirements in other *BCA* sections. Therefore these additional Performance Requirements, including those for maintenance, need to be considered in relation to alternative solutions. It is important that a holistic approach is used when determining the appropriate Performance Requirements.

DETERMINING COMPLIANCE WITH THE PERFORMANCE REQUIREMENTS

The following points provide some guidance for the relevant building survey (RBS) and owners when considering the use of alternative solutions, the documentation required when determining compliance. It would also be prudent for building owners to retain this information:–

- Technical supporting evidence which may include drawings, fire engineering reports and technical documentation.
- Reasons why the deemed-to-satisfy provisions can or cannot be met, or why the designer/owner/builder feels they are or are not suitable. (This 'negative' request is probably necessary for assessment of the application, especially if using equivalence to deemed-to-satisfy.)
- The building owner's request/consent/approval for use of performance methodology and outcome.
- Statement as to whether design (or part of the design) has used the alternative solution or deemed-to-satisfy provision. (Without this, it may be difficult for the RBS to assess the application.)

Other points to consider:–

- Does this approval process and/or outcome impinge on owner/occupiers' occupational health and safety/workplace responsibilities?
- Do all the people involved (owner, other consultants, authorities, RBS etc.) understand the design methodology? (e.g. does it limit future uses of the building, or require additional maintenance provisions?)

CONSIDERATION OF ASSESSMENT METHODS, INCLUDING MAINTENANCE

Some reasons which, by themselves, may be inappropriate or insufficient to determine compliance with a Performance Requirement are:–

- Compliance too costly (e.g. cannot be considered equivalent to deemed-to-satisfy, unless tested to deemed-to-satisfy and testing is too expensive).
- Building Appeals Board or other approval body has previously approved a similar application.
- Method proposed has been used before.
- Supporting argument of compliance with other regulatory required items (e.g. stair has handrail, therefore riser height can be increased).
- Regulation not required in other States or Territories.
- Approval by expert judgement when Building Appeals Board/council or other approval body might not approve (e.g. access for people with disabilities, thermal insulation).
- Appropriate maintenance specified for the essential safety measures that relate to the alternative solution.

Other points for owners, designers and the RBS to consider are:–

- Does insurance and that of all others involved in the project allow design/approval to be exercised to the degree proposed?
- When considering building occupants, don't forget cleaners, maintenance staff, visitors, emergency services personnel, etc.
- Sensitivity analysis. (Has the alternative solution considered variations to the input data and the effect on the results?)
- Available redundancy. (Is there a heavy reliance on a single sub-system, such as sprinklers and the associated maintenance, so that a failure of that one sub-system may have significant consequences?)
- Are safety factors to be applied to any calculations (e.g. in egress calculations, a factor of safety of 2–3 might be applied)?

- Risk/consequences. (Is the consequence greater with the proposed solution than if the deemed-to-satisfy provisions were used?) If consequences are greater for the proposed alternative solution, then substantial re-checking and justification may be required.
- Maintenance of the essential safety measures impacted by the alternative solution.

CONSIDERATION OF MAINTENANCE

Where an alternative solution is proposed or used which requires measures other than those contained within this manual or which requires a varied order of maintenance than recommended by the manual, the owner/designer must specify as part of the application to the RBS the maintenance required to ensure that any essential safety measure assessed as part of the alternative solution is maintained. It is then the responsibility of the RBS, when assessing the alternative solution, to include an assessment on any maintenance proposed.

It is recommended that when the RBS assesses an alternative solution the designer is consulted to determine the appropriate maintenance requirements and frequency.

When an RBS issues an occupancy permit or a certificate of final inspection, they specify the essential safety measure and its maintenance appropriate to the alternative solution. Owners should note that the maintenance may not be to an Australian Standard, such as AS 1851, but rather to a specific requirement developed by the designer. An RBS must ensure that the owner of the building is provided with all the necessary documentation to carry out the maintenance of the essential safety measure. This may include:–

- Development of a maintenance regime in consultation with the designer.
- Input into the development of maintenance documentation.
- Use of other documentation such international standards and codes.
- Manufacturer-specific maintenance requirements.
- Development of specific frequencies of maintenance that may be required.
- Development of log sheets for owners.

Owners or maintenance personnel need to be made fully aware of any alternative solutions in a building and the maintenance requirements of the essential safety measures to ensure that the building always remains compliant with the alternative solution.

→ Part 1

Buildings constructed from 1 May 2004

- Building fire integrity
- Means of egress
- Signs
- Lighting
- Fire-fighting services and equipment
- Air handling systems
- Automatic fire-detection and alarm systems
- Occupant warning systems
- Lifts
- Standby power supply systems
- Building clearance and fire appliances
- Mechanical ventilation

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Part 1 – Buildings constructed from 1 May 2004

As part of the 2004 amendment to the *Building Code of Australia (BCA)* Volume 1, safety measures were defined and Part I introduced a list of safety measures to be maintained.

The intent of Part I of the *BCA* Volume 1 is to establish the minimum standard of performance that all safety measures in buildings must continually be able to achieve.

Part 1 of the *BCA* Volume 1 currently groups safety measures as follows:–

- Building fire integrity
- Means of egress
- Signs
- Lighting
- Fire-fighting services and equipment
- Air handling systems
- Automatic fire detection and alarm systems
- Occupant warning systems
- Lifts
- Standby power supply systems
- Building clearance and fire appliances
- Other measures
- Building use and application

Part 2 – Mechanical ventilation and hot water, warm water and cooling water systems.

Currently, the *Building Regulations 2006* (the *Regulations*) outline the relevant tables of Part 1 of the *BCA* Volume 1 applicable in Victoria as essential safety measures. The applicable essential safety measures are as listed in Tables 1.1 to 1.11, excluding artificial lighting contained in Table 1.4 and Table 1.12 of the *BCA*. This manual will only deal with those tables as listed above.

MAINTENANCE AND INSPECTION RECORDS

Records of maintenance shall be completed and made available to the building owner or agent at the time of conducting the system and equipment maintenance.

Records shall contain the following information:–

- a) Record reference.
- b) Name of building or site.
- c) Address of building or site.
- d) Date of maintenance/inspection.
- e) System or equipment identification and location (Possibly a location plan).
- f) Frequency of maintenance activity undertaken.
- g) Defects identified.
- h) Name of property owner or the agent.
- i) Name and signature of the service person.
- j) Date the record was completed.

FORM OF RECORDS

Maintenance records may be electronically-based. Hard copy records shall be kept on site and be available at all times. Technology in regard to the preparation of maintenance records has advanced considerably in recent years with the advent of purpose-designed software. As a minimum, hard copy records of maintenance should be made available to regulators, fire authorities, insurance surveyors, fire auditors, etc., at all times. However, the hard copy records required may be prepared utilising electronic recording systems, and this manual acknowledges such technology is designed to deliver an accurate, accountable, consistent and timely level of service.

Maintenance records shall be in the form of maintenance record tags (in the case of hydrant landing valves, delivery lay flat hose, hose reels, portable and wheeled fire extinguishers and fire blankets), or log books (in the case of sprinkler, pumpset, fire hydrant, detection, smoke and heat alarm, fire alarm monitoring, sound, intercom, gaseous, aerosol, water mist, passive fire and smoke and HVAC and evacuation systems).

The use of maintenance record tags or labels shall not preclude the need for a separate maintenance record system.

Where log books are used they shall have sequentially numbered pages in triplicate. Provision shall be made for the signatures of the building owner, occupier or agent, and the service person. The required distribution of copies shall be printed on each page as follows:-

- a) Original owner/occupier/agent
- b) Duplicate service person
- c) Triplicateretain in book

USE OF AS 1851-2005

Where an essential safety measure has been nominated as using AS 1851-2005 to provide maintenance within this manual, details of the level of records to be kept are incorporated in the maintenance schedules of Sections 2 to 19 of that Standard. Owners should develop log sheets using the maintenance tables provided in that Standard for each essential safety measure.

Where the essential safety measure nominated in this manual does not use AS 1851-2005 as a minimum level of maintenance, log sheets have been developed and are available in Appendix C of this manual.

It should be noted that building surveyors may specify a level of maintenance not using AS 1851. In this case, the building surveyor should provide advice as to the level of record-keeping required to satisfy the level and frequency of maintenance, but as a minimum should include the information provided above.

Building Fire Integrity

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1.1 BUILDING ELEMENTS REQUIRED TO SATISFY PRESCRIBED FIRE-RESISTANCE LEVEL

BCA: Part C, D1.12

PURPOSE

Certain elements and structures within a building must have a fire-resistance level to maintain structural ability during a fire and restrict the spread of fire.

REQUIREMENTS

A fire-resisting structure must:–

- a) Be provided with the fire-resistance level specified in the *Building Code of Australia*; and
- b) Have all openings protected with doors, windows, shutters, panels or other means rated to provide the required fire-resistance level.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of these structures. The owner may delegate this function to another person or body where necessary or appropriate.

To ensure the integrity and safety of fire-resisting structures, inspections should ensure:–

- a) No unauthorised penetration or attachment has occurred.
- b) Proper operation of devices protecting openings.
- c) No damage has occurred.

MAINTENANCE RECORDS

The following information must be recorded:–

- a) The dates the yearly inspection was carried out; and
- b) The name of the person conducting inspection; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date the rectification occurred; and
- f) Signature of the person conducting the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

1.2 MATERIALS AND ASSEMBLIES REQUIRED TO SATISFY PRESCRIBED FIRE HAZARD PROPERTIES

BCA: C1.10, C1.10a
Spec A2.4
References: AS 1530.3
AS 9239.1
AS ISO 9705
AS NZS 3837

PURPOSE

To indicate the suitability or otherwise, of building materials, assemblies, linings and surface finishes to have the ability to resist the spread of flame and generation of smoke.

REQUIREMENTS

General fire hazard properties provide a means of assessing building materials and components, using standard tests as outlined in AS 1530.3, for their performance according to:-

- a) Their tendencies to ignite.
- b) Their tendencies to propagate flame.
- c) The heat they release once ignition has occurred, and
- d) Their tendencies to release smoke.

Fire hazard properties for floors, ceilings and walls provide a means of assessing materials and components for their performance according to:-

- For floors; critical radiant heat flux provided by testing the material in accordance with AS 9239.1.
- For walls and ceilings; a group number determined by physical testing of the material in accordance with AS ISO 9705; or prediction in accordance with clause 3 of Specification A2.4 tested in accordance with AS/NZS 3837.

Using the above criteria, selection of suitable material can be made to fulfil a proposed class of building. Testing and selection of materials takes place prior to construction and finishing of new building work.

Building owners must ensure that any new material introduced to their premises conforms to the requirements of the *Building Code of Australia*.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor require an annual inspection of the building. This is to ensure that materials that do not conform to the fire hazard indices have been introduced or occur in the premises. The owner may delegate this function to another person or body where necessary or appropriate.

The manufacturer or supplier of these materials should be able to advise whether their product conforms.

MAINTENANCE RECORDS

To ensure compliance with the *Building Regulations 2006*, owners of buildings must record the details of their yearly inspections.

Details that must be recorded include:-

- a) Identification of the premises; and
- b) Site address; and
- c) Name of the building owner; and
- d) Date the inspection was carried out; and
- e) Any non-conforming materials identified; and
- f) Steps taken to remove or replace the non-conforming material; and
- g) Name and signature of the person carrying out the inspection.

A log sheet to record this information is included in Appendix C of this manual.

1.3 ELEMENTS REQUIRED TO BE NON-COMBUSTIBLE, PROVIDE FIRE-PROTECTION, COMPARTMENTATION OR SEPARATION

BCA: C2.5 to C2.14, C3.3, C3.11, D1.7, D1.8, E1.3, G3.4

PURPOSE

Certain elements within a building must have a resistance to fire, to provide fire-protection, compartmentation or separation to restrict the spread of fire and provide occupant safety.

REQUIREMENTS

A fire-resisting element must:–

- a) Be provided with the fire-resistance level specified in the *Building Code of Australia*; and
- b) Have all openings protected with doors, windows, shutters, panels or other means rated to provide the required fire-resistance level.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor require an annual inspection of these structures. The owner may delegate this function to another person or body where necessary or appropriate.

To ensure the integrity and safety of fire-resisting structures, inspections should ensure:–

- a) No unauthorised penetration or attachment.
- b) Proper operation of devices protecting openings.
- c) No damage has occurred.

MAINTENANCE RECORDS

The following information must be recorded:–

- a) The dates the yearly inspection was carried out; and
- b) The name of the person conducting the inspections; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date the rectification occurred; and
- f) Signature of the person conducting the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

1.4 WALL-WETTING SPRINKLERS

BCA: C3.4, C3.8, C3.11,
D1.7, D1.8 G3.8
Reference: AS 2118
AS 1851

PURPOSE

A wall-wetting sprinkler system is installed to provide a full-time automatic fire protection system, to protect a wall or opening in the event of a fire. Wall-wetting sprinklers may be internal or external. *The Building Code Australia* does not reference a specific Standard for the installation of wall-wetting sprinklers. However, AS 2118.2 may provide guidance on the installation of wall-wetting drencher systems.

REQUIREMENTS

A wall-wetting sprinkler system may include:–

- a) Wet pipe systems and sprinklers.
- b) Valve installations.
- c) Electric motor and compression-ignition engines and pumpsets.
- d) Fire brigade booster connections.
- e) Pre-action systems.
- f) Water storage systems.
- g) Alarms and interface with automatic fire alarm and detection systems where installed.

REQUIREMENTS OF THE SYSTEM

To provide the required protection, your wall-wetting sprinkler system must be:–

- a) An automatic fire sprinkler system complying with the principles:–
 - a. AS 2118
- b) Maintained in accordance with AS 1851-2005 Section 2 either by or under the direct supervision of personnel competent in sprinkler system maintenance.

METHOD OF OPERATION

To comply with AS 2118, the wall-wetting sprinkler system must have:–

- a) Provision for an adequate water supply; and
- b) A pumping system to pressurise the sprinkler system; and
- c) A distribution pipe system to deliver water to each sprinkler head; and
- d) Sprinkler heads to perform according to the risk they are protecting; and
- e) A local alarm facility to alert the operation of a sprinkler system; and
- f) A direct alarm connection to an approved monitoring service where required.

The sprinkler system is activated by a sprinkler head or heads responding to a rise in temperature inside the building or externally from adjoining buildings. Water flows through this head(s), lowering the residual water pressure, which causes the pump system to come into operation. Water flowing through the system drives the water-motor in the local alarm, sounding the alarm bell. Where fitted, a direct alarm is transmitted to a monitoring service that will notify the fire brigade.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor require that fire mains be maintained weekly to AS 1851-2005 Section 2. It should be noted that this is the lowest level of maintenance routines required by the Standards. More rigorous routines are also required by AS 1851-2005 Section 2 and are outlined below. The owner may delegate this function to another person or body where necessary or appropriate.

The sprinkler system maintenance program specified in AS 1851-2005 Section 2 and AS 1851-2005 Section 3 (for pumpset maintenance), provides for inspection, testing and maintenance at the following frequencies:–

- Weekly
- Monthly
- Six-monthly
- Yearly
- Three-yearly
- Twelve-yearly
- Twenty four-yearly

When a system is rendered partially or fully disabled due to maintenance or modifications, the following precautions are mandatory:–

- a) The building owner or his representative must be notified; and
- b) Monitoring service to which the system is connected, or the nearest fire station if there is no connection, must be notified before work commences and after work is completed.

The following additional precautions should be observed, as far as is practicable, whether the system is inoperative through an emergency or planned occurrence:–

- a) Under all circumstances, keep as much of the system fully operational as is practicable. If the necessary work is to extend over several days or weeks, re-instate the system as far as is practicable at the end of each working day.
- b) Where the system has to be left disconnected outside working hours, consideration should be given to employing a watchman while the system is disconnected.
- c) Whenever it is possible, disconnection of the system should be undertaken when production machinery is inoperative.
- d) While the system is down, smoking should be banned in the affected areas.
- e) Notify senior department personnel or tenants' representatives of the situation, so that fire-extinguishing appliances can be kept immediately available, with trained personnel on hand to use them if necessary.
- f) Notify the insurer or insurance broker of the situation.
- g) Have all necessary equipment and material available and do all the work possible prior to isolating the sprinklers.
- h) Hot cutting or welding should be avoided, where possible, in an area where the sprinkler system is not operational. This includes work on the sprinkler system.
- i) Avoid all sources of ignition.

Maintenance testing of these systems should be carried out in conjunction with the fire alarm system testing to assure that the systems are correctly interfaced.

Prior to and following this test, it is essential that the monitoring service that receives the alarm is advised of the imminent test, checked to see the test call was received, and advised when the system is re-set and operational.

MAINTENANCE RECORDS

Records of all maintenance routines must be in a log book kept at the sprinkler control valves.

It is recommended that log sheets to record the completion of the maintenance are developed from the tables as specified in AS 1851-2005 Section 2.

1.5 FIRE DOORS

BCA: C2.12 to C2.13,
C3.4 to C3.8,
C3.10,C3.11,
D1.7,D1.8, D1.12

PURPOSE

A fire door is installed across an opening in a fire wall to maintain the fire-resistance rating of that fire wall. This includes sliding fire doors, their associated warning systems and associated self-closing, automatic closing and latching mechanisms.

REQUIREMENTS OF THE SYSTEM

An approved fire-resistant doorset is one that is identical in assembly, construction and installation to a prototype of the door that has been submitted to the standard fire-resistance test, and has fulfilled all the relevant test requirements.

A fire door must be self-closing or close automatically on the operation of an approved sensing device or on the loss of power supply. Self-closing means equipped with a device that returns the door to the fully closed position immediately after each opening.

Each fire door must have a metal tag attached as required by AS 1905.1, and latch sets and closers should also be marked as required.

METHOD OF OPERATION

On receipt of a signal through the fire alarm system, the hold-open device of automatic closing doorsets must release the door. Alternatively, when electrical power to that area fails, the electro-magnetic hold-open device must then release the door. Once released, the fire door must close cleanly, and be unimpaired in its operation. It is essential that no unauthorised means is used to hold open a fire door.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor (RBS) should require that a fire door be maintained and inspected in accordance with AS 1851-2005 Section 17.

The Standard specifies the following maintenance intervals:–

- Three-monthly
- Six-monthly
- Yearly

The level of maintenance required by the Standard for the three-monthly, six-monthly and yearly checks is identical. The RBS should specify the minimum timeframe. The owner may delegate this function to another person or body where necessary or appropriate. It is recommended that where any corrective action involves repairs to the door leaf, such repairs should be carried out by the original manufacturer.

Before a fire door is rendered unserviceable for maintenance, the following precautions shall be taken by the repairer:–

- a) Advise the owner or occupier so that any necessary precautions can be taken; and
- b) Where the door is to be removed and cannot be re-installed within three hours, the nearest fire brigade and the monitoring service to which the alarm is connected, should be advised; and
- c) If the door protects an opening in a fire-isolated escape route or in a wall required to have a four-hour fire-resistance, permission should be obtained from the regulatory authority (building surveyor) as well as notice given to the monitoring service as in (b); and
- d) A fire door should not be rendered unserviceable for maintenance while any fire alarm or fire suppression system in the building is inoperative.

It is essential all fire doors are maintained in operational condition at all times.

MAINTENANCE RECORDS

To ensure a proper history of each fire door in the premises is retained, the following records must be available and maintained:–

1. A log book,
 - a) provided by the fire door supplier, showing:–
 - i) Identification of the building and its owner; and
 - ii) The supplier of the doorset; and
 - iii) The date(s) of commissioning of the fire doorsets in the building.
 - b) Identification of each doorset, showing:–
 - i) Its identification number; and
 - ii) The type of door, its dimensions and fire-resistance level; and
 - iii) The items of hardware installed on it, and where applicable, the markings on that hardware; and
 - iv) The items of door furniture fitted; and
 - v) Any subsequent repairs or replacement of any part of the doorset.

The pages of this log book must be numbered.

2. A numbered Certificate of Compliance, supplied by the supplier of the fire doorsets, giving written evidence that:–
 - a) The doorset is identical with a tested prototype; and
 - b) The door frame has been correctly installed; and
 - c) The installation complies with AS 1905.1.

It is recommended that log sheets to record the completion of the maintenance are developed from the tables for fire doorsets as specified in AS 1851-2005 Section 17.

1.6 FIRE WINDOWS

BCA: C3.4, C3.8, C3.11,
D1.7, D1.8

PURPOSE

To provide protection to openings by maintaining the integrity of fire separation and compartmentation. This also includes windows that are automatic or permanently fixed in the closed position.

REQUIREMENTS OF THE EQUIPMENT

Fire windows must be designed, constructed and installed to achieve the required fire-resistance level and may be an automatic closing or permanent closure.

METHOD OF OPERATION

Openable fire windows are operated automatically by a heat-sensing device incorporated in their design.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require that a fire door be maintained and inspected as per the details in AS 1851-2005 Section 17.

The Standard specifies the following maintenance intervals:

- Six-monthly
- Yearly

The owner may delegate this function to another person or body where necessary or appropriate.

MAINTENANCE RECORDS

The following information must be recorded:–

- a) The six-monthly check to ensure no obstruction to these items; and
- b) The annual inspection to ensure satisfactory operation of these items; and
- c) The date checks and inspections were carried out; and
- d) The name and signature of the person carrying out the checks and inspections; and
- e) Any problems identified during the checks and inspections.

It is recommended that log sheets to record the completion of the maintenance are developed from the tables for fire-rated glazing as specified in AS 1851-2005 Section 17.

1.7 FIRE SHUTTERS

BCA: C3.4, C3.5,
D1.7, D1.8
Reference: AS 1905.2-1997

PURPOSE

To provide protection to openings by maintaining the integrity of fire separation and compartmentation.

REQUIREMENTS OF THE EQUIPMENT

Fire shutters:–

- a) Must be designed, constructed and installed identical to a tested and approved prototype. A steel shutter must comply with AS 1905.2; and
- b) Must operate automatically and close at a rate of between 0.25 and 0.3 metres per second; and
- c) Must maintain their integrity for the time period as required by the *Building Code of Australia*.

METHOD OF OPERATION

Fire shutters are operated automatically by a heat-sensing device incorporated in their design.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require that a fire shutter be maintained and inspected in accordance with AS 1851-2005 Section 17.

The standard specifies the following maintenance intervals:

- Three-monthly
- Six-monthly
- Yearly

Details of the inspection and maintenance regime are contained within AS 1851-2005 Section 17 clause 17.4.5.

The owner may delegate this function to another person or body where necessary or appropriate.

MAINTENANCE RECORDS

The following information must be recorded:–

- a) The three-monthly check to ensure no obstruction to these items; and
- b) The annual inspection to ensure satisfactory operation of these items; and
- c) The date checks and inspections were carried out; and
- d) The name and signature of the person carrying out the checks and inspections; and
- e) Any problems identified during the checks or inspections.

It is recommended that log sheets to record the completion of the maintenance are developed from the tables for fire shutters as specified in AS 1851-2005 Section 17.

PURPOSE

A solid core door is installed across an opening in a fire-rated wall to maintain separation of sole occupancy units from public areas or other sole occupancy units.

REQUIREMENTS OF THE EQUIPMENT

An approved doorset is one that is of solid construction that not less than 35 mm thick and tight fitting (minimal gaps between door leaf and frame). The door must be self-closing or close automatically on the operation of an approved sensing device or on the loss of power supply. Self-closing means equipped with a device that returns the door to the fully closed position immediately after each opening.

METHOD OF OPERATION

On receipt of a signal through the fire alarm system, the hold-open device or automatic closing doorsets must release the door. Alternatively, when electrical power to that area fails, the electro-magnetic hold-open device must then release the door. Once released, the door must close cleanly and be unimpaired in its operation.

It is essential that no unauthorised means is used to hold open a door.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require that solid core doors be inspected annually.

The owner may delegate this function to another person or body where necessary or appropriate.

It is recommended that where any corrective action involves repairs to the door leaf, such repairs should be carried out by the original manufacturer.

Before a door is rendered unserviceable for maintenance, the following precautions shall be taken by the repairer:–

- Advise the owner or occupier, so that any necessary precautions can be taken; and
- Where the door is to be removed and cannot be re-installed within three hours, the nearest fire brigade, and the monitoring service to which the alarm is connected, should be advised; and
- If the door protects an opening in a fire-isolated escape route or in a wall required to have a four-hour fire-resistance, permission should be obtained from the regulatory authority (building surveyor) as well as notice given to the monitoring service as in (b); and
- A door should not be rendered unserviceable for maintenance while any fire alarm or fire suppression system in the building is inoperative.

It is essential all solid core doors located in fire-rated walls are maintained in operational condition at all times.

MAINTENANCE RECORDS

To ensure a proper history of each solid core door in a fire-rated wall separating public areas from sole occupancy units and doors separating sole occupancy units in the premises is retained, the following records must be available and maintained:-

A log book,

- a) showing:-
 - i. Identification of the building and its owner; and
 - ii. The supplier of the doorset; and
 - iii. The date(s) of commissioning of the doorsets in the building.
- b) Identifying of each doorset, showing:-
 - i. Its identification number; and
 - ii. The type of door and its dimensions; and
 - iii. The items of hardware installed on it and, where applicable, the markings on that hardware; and
 - iv. The items of door furniture fitted; and
 - v. Any subsequent repairs or replacement of any part of the doorset.

The pages of this log book must be numbered.

A log sheet to record this information is provided in Appendix C of this manual.

1.9 FIRE-PROTECTION AT SERVICE PENETRATIONS

BCA: C3.12, C3.13, C3.15

(Through elements required to be fire resisting with respect to integrity or insulation or to have a resistance to the incipient spread of fire)

PURPOSE

Maintain the integrity of a service penetration in a building element that has a fire-resistance level.

REQUIREMENTS

Where pipes or services penetrate fire-rated elements:–

- a) The opening must be neatly formed, cut or drilled; and
- b) Minimum clearances must be maintained from:–
 - i. other services; and
 - ii. combustible material; and
- c) The gap between the pipe or service and the floor, wall or ceiling must be fire-stopped with a material that will maintain the fire-resistance level of that element.

Where an item or service such as an electrical switch, outlet or socket is accommodated in an opening or recess in a wall, floor or ceiling:–

- a) The opening or recess must not:–
 - i. be within 300 mm horizontally and 600 mm vertically of any opening on the other side of that wall, or
 - ii. extend beyond half the thickness of the wall.
- b) The gap behind or between the service and the wall, floor or ceiling must be fire stopped.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require a six-monthly and yearly inspection of the penetrations. AS 1851-2005 Section 17 sets out the requirements for maintenance and inspection intervals of penetrations in fire resisting elements.

The owner may delegate this function to another person or body where necessary or appropriate.

Because of the role of these penetrations, it is essential that they be maintained in a condition that will not allow the passage of fire from one compartment to another.

To ensure this security, visual checks should be carried out after maintenance work that may have interfered with their integrity.

Any suspect area should be investigated further.

Any problems identified by these checks and inspections must be rectified as soon as is practicable, by either:–

- a) Referral back to the contractor who carried out the maintenance work; or
- b) By having maintenance staff or a contractor carry out the necessary repairs.

MAINTENANCE RECORDS

The following information must be recorded:–

- a) The dates the six-monthly maintenance and yearly inspections were carried out; and
- b) The name of the person conducting the inspections; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date rectification occurred; and
- f) Signature of the person conducting the inspection.

It is recommended that log sheets to record the completion of the maintenance are developed from the tables for service penetrations, as specified in AS 1851-2005 Section 17.

1.10 FIRE-PROTECTION ASSOCIATED WITH CONSTRUCTION JOINTS, SPACES AND THE LIKE

BCA: C3.16

(In and between building elements required to be fire-resisting with respect to integrity and insulation)

PURPOSE

These materials, when assigned to their particular applications, assist in maintaining the integrity of the fire separation between floors or fire compartments in the building, or provide protection to structural elements to retain their integrity in the event of fire.

REQUIREMENTS

To ensure these materials fulfil their function:–

- a) The material used must be identical to a prototype or sample of that material that has been submitted to and passed the appropriate fire test, as referred to in AS 1530.4 or
- b) The material used is listed in Table 1 of Specification A2.3 of the *Building Code of Australia*; and
- c) The material is applied or constructed in accordance with that Standard or that specification.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require a six-monthly and yearly inspection in accordance with AS1851-2005 Section 17.

The owner may delegate this function to another person or body where necessary or appropriate.

Maintenance checks are also recommended after maintenance work that may have damaged or removed a section of material. These checks should be carried out visually, with further investigation of any suspect areas.

Any problems identified should be rectified as soon as is practicable, by either:–

- a) Referral back to the contractor who carried out the maintenance work, or
- b) Having the owner's maintenance staff or contractors carry out the necessary repairs.

MAINTENANCE RECORDS

The following information must be recorded:–

- a) The dates the maintenance and inspections were carried out; and
- b) The name of the person conducting the inspections; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date the rectification occurred; and
- f) Signature of the person conducting the inspection.

It is recommended that log sheets to record the completion of the maintenance are developed from the tables for fire shutters as specified in AS 1851-2005 Section 17.

1.11 SMOKE DOORS

BCA Specification: C2.5, D2.6

(Including associated self-closing, automatic closing and latching mechanisms)

PURPOSE

Smoke doors are constructed in smoke walls to restrict the passage of smoke between smoke compartments or walls, or from within a smoke lobby.

REQUIREMENTS OF THE EQUIPMENT

Smoke doors must be constructed so that smoke will not pass from one side of the doorway to the other.

Smoke doors can be of one or two leaves and must:–

- a) Be side-hung to swing:–
 - i. in the direction of egress or
 - ii. in both directions; and
- b) Be capable of resisting smoke at 200°C for 30 minutes; and
- c) Have the leaves fitted with smoke seals; and
 - a. Have the leaves:–
 - i. normally closed or
 - ii. close automatically, with the closing initiated by smoke detectors or power failure; and
 - b. Have the leaves close fully after each manual opening; and
 - c. If made of glass, have the glazing identifiable by opaque construction.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor require that a fire door be maintained and inspected in accordance with AS 1851-2005 Section 17.

The standard specifies the following maintenance intervals:–

- Three-monthly
- Six-monthly
- Yearly

The owner may delegate the maintenance function to another person or body where necessary or appropriate.

To ensure smoke doors fulfil their designed function, check that:–

- a) The doors and associated equipment are in working order (seals undamaged, etc.).
- b) No unauthorised means have been incorporated to retain the doors open (wedges, cabin hooks, etc.).
- c) The automatic closing facilities work, i.e.:–
 - i. when the smoke detectors operate, or
 - ii. when power failure occurs.

These checks may be carried out in conjunction with the testing of the fire alarm system, in accordance with AS 1851-2005.

MAINTENANCE RECORDS

A log book must be maintained to record the inspections of each smoke door. This should show:–

- a) The date of each monthly inspection; and
- b) Any problems identified; and
- c) Measures taken to rectify problems identified; and
- d) Date problems rectified; and
- e) Name and signature of the person carrying out each inspection.

It is recommended that log sheets to record the completion of the maintenance are developed from the tables for smoke doors as specified in AS 1851-2005 Section 17.

PURPOSE

A proscenium wall (fire curtain) is provided in a theatre to prevent the passage of smoke and fire from the stage area to the audience area.

REQUIREMENTS OF THE EQUIPMENT

A fire curtain must be either:–

- a) Non-combustible, and fitted to inhibit smoke penetration around its perimeter when fully lowered; or
- b) A curtain with specified early fire hazard indices protected by a deluge sprinkler system across its total width.

Either type of curtain must be:–

- a) Capable of closing fully within 35 seconds; and
- b) Operated automatically by a heat-activated device, or manually from either the stage side or audience side.

METHOD OF OPERATION

A fire curtain must be operated by:–

- a) An automatic system of heat-activated devices.
- b) Manually operated devices, or
- c) By a push-button emergency release device.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor require an annual inspection of this facility to ensure no mechanical damage has occurred, or any interference exists that prevents its operation. The owner may delegate this function to another person or body where necessary or appropriate.

YEARLY CHECK

- Visual check of operating mechanism to ensure no physical damage or obstruction; and
- Visual check of curtain's condition; and
- Visual check of heat detection equipment and sprinkler heads (if provided); and
- After first isolating the fire alarm system and sprinkler system (if provided), test the operation of the curtain by:–
 - i) Activating the heat-sensing equipment.
 - ii) Activating the manual operating system.
 - iii) Activating the emergency push-button device.

MAINTENANCE RECORDS

A log book, included in Appendix C of this manual must be implemented to record:–

- a) The 12-monthly inspections and tests, and problems identified; and
- b) The date checks and inspections were carried out; and
- c) The name and signature of the person carrying out the checks and inspections.

Means of Egress

2.1	PATHS OF TRAVEL TO EXITS	2
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2.1 PATHS OF TRAVEL TO EXITS

BCA: D1.6

PURPOSE

Paths of travel to exits are to provide an unobstructed pathway for occupants travelling to an exit.

REQUIREMENTS

To provide a passage to an exit that is of a width and height as specified by the *Building Code of Australia*.

METHOD OF OPERATION

To ensure paths of travel to exits are operational and effective, they must not be obstructed or altered in any way.

It is the responsibility of the owner to ensure that all paths of travel to exits are maintained in an efficient condition and kept functional and clear of obstruction at all times.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require a three-monthly inspection of this facility. The owner may delegate this function to another person or body where necessary or appropriate.

It is recommended that in carrying out the required inspections, the following points be covered:–

- a) Ensure no obstruction of any nature encroaches on or into the designated paths of travel; and
- b) Check that the integrity of the fire-isolation requirements on or in the relevant sections of the path of travel have not been breached or compromised; and
- c) Check that no unauthorised alteration has been carried out on these sections.

MAINTENANCE RECORDS

A log book must be kept to record:–

- a) The date the inspection was carried out; and
- b) Any problems encountered during the inspection; and
- c) The name, designation and signature of the person carrying out the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

2.2 DISCHARGE FROM EXITS

BCA: D1.7, D1.9 to D1.11,
D2.12,
G4.3, G4.6, G4.7

(Including paths of travel from open spaces to the public roads to which they are connected)

PURPOSE

Discharge from exits is to provide an unobstructed pathway for occupants travelling to a road or open space.

REQUIREMENTS

Barriers, such as bollards, must be installed if they are necessary to prevent vehicles blocking access to, or discharge from, an exit.

To provide a passage for occupants travelling to a road or open space, the width of the path must be at least that of the exit as specified by the *Building Code of Australia*, and in no case less than one metre.

The link between the exit and road or open space must be open to the sky for its length.

METHOD OF OPERATION

To ensure discharges from exits are operational and effective, they must not be obstructed or altered in any way.

It is the responsibility of the owner to ensure that all discharges and paths of travel to road or open space are maintained in an efficient condition and kept functional and clear of obstruction.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require a three-monthly inspection. The owner may delegate this function to another person or body where necessary or appropriate.

It is recommended that in carrying out the required inspections, the following points be covered:–

- a) Ensure no obstruction of any nature has encroached on or into the designated paths of travel to road or open space; and
- b) Ensure that exits have not been blocked and bollards are in place; and
- c) Check that no unauthorised alteration has been carried out on these sections.

MAINTENANCE RECORDS

A log book must be kept to record:–

- a) The date the inspection was carried out; and
- b) Any problems encountered during the inspection; and
- c) The name, designation and signature of the person carrying out the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

2.3 EXITS

(Including fire-isolated stairways and ramps, non-fire isolated stairways and ramps, stair treads, balustrades and handrails associated with exits, and fire-isolated passageways)

BCA: D2.2 to D2.3,
D2.8 to D2.11
D2.13, D2.16,
D2.17, D2.23

PURPOSE

Fire-isolated passageways, ramps and stairs are to provide occupants with safe egress from a building.

REQUIREMENTS

These elements must be of fire-resistant construction at a level specified in the *Building Code of Australia*.

At the entrance point to these elements, fire doors are provided. Fire doors are to be of a specified fire-resistance level, that are either self-closing or have automatic closing facilities linked to smoke or heat detectors or to a fire alarm or sprinkler system installed in the building.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of these facilities. The owner may delegate this function to another person or body where necessary or appropriate.

It is essential to ensure:–

- a) No unauthorised alterations have been made that could compromise the integrity of the fire-resistance level; and
- b) No obstruction has occurred by stacking of goods or equipment within these areas which may obstruct the door swing; and
- c) No tampering or interference with the self-closing or automatic operation of the fire doors.

Relevant details for the testing and inspection of fire doors are provided in Section 1.5 – Fire doors of this manual.

MAINTENANCE RECORDS

The following information must be recorded:–

- a) The dates that monthly and yearly inspections were carried out; and
- b) The name of the person conducting the inspections; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date rectification occurred; and
- f) Signature of the person conducting the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

PURPOSE

Smoke lobbies to fire-isolated exits are to provide occupants with safe egress from a building and prevent smoke entering a stair.

REQUIREMENTS

These elements are constructed to prevent the passage of smoke at a level specified in the *Building Code of Australia*.

Around the entrance point to the exit, smoke lobbies may be provided. Smoke lobbies are constructed to prevent the passage of smoke, into the area and are fitted with smoke doors that are either self-closing or have automatic closing facilities linked to smoke or heat detectors, or to a fire alarm or sprinkler system installed in the building.

The smoke lobby may also be pressurised if the required exit stair is required to be pressurised under the smoke hazard management provisions.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of smoke lobbies. The owner may delegate this function to another person or body where necessary or appropriate.

It is essential to ensure:–

- a) No unauthorised alterations have been made that could compromise the integrity of the smoke lobby; and
- b) No obstruction has occurred by stacking of goods or equipment within these areas; and
- c) No tampering or interference has occurred with the self-closing or automatic operation of the smoke doors.

Details for the testing and inspection of smoke doors are provided in Section 1.11 of this manual.

Details for the testing and inspection of pressurisation systems are provided in Section 6.1 of this manual.

MAINTENANCE RECORDS

The following information must be recorded:–

- a) The dates that monthly and yearly inspections were carried out; and
- b) The name of the person conducting the inspections; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date rectification occurred; and
- f) Signature of the person conducting the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

2.5 OPEN ACCESS RAMPS OR BALCONIES FOR FIRE-ISOLATED EXITS

BCA: D2.5

PURPOSE

Open access ramps and balconies are to provide occupants with safe egress from a building.

REQUIREMENTS

Where open access ramps or balconies are provided to meet the smoke hazard management requirements of the *Building Code of Australia* they must:–

- a) Have ventilation openings to outside air which:–
 - i. Have a total unobstructed area not less than the floor area of the ramp or balcony; and
 - ii. Are evenly distributed along the open sides of the ramp or balcony; and
- b) Not be enclosed on the open side above a height of one metre except by an open grille or the like having a free air space of not less than 75% of its area.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of the ramps or balconies. The owner may delegate this function to another person or body where necessary or appropriate.

It is essential to ensure:–

- a) No unauthorised alterations have been made that could compromise the integrity of the ventilation requirements; and
- b) No obstruction has occurred by stacking of goods or equipment within these areas.

MAINTENANCE RECORDS

The following information must be recorded:–

- a) The dates that monthly and yearly inspections were carried out; and
- b) The name of the person conducting the inspections; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date rectification occurred; and
- f) Signature of the person conducting the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

2.6 DOORS

BCA: D1.6, D2.19 to D2.21,
D2.23

(Other than fire or smoke doors in a required exit, forming part of a required exit or in a path of travel to a required exit, and associated self-closing, automatic closing and latching mechanisms)

PURPOSE

To provide a means of egress from any part of a building.

REQUIREMENTS OF THE EQUIPMENT

To provide sufficient and safe egress from a building, with a minimum of effort and delay, and to present a minimum of obstruction in an exit path.

METHOD OF OPERATION

An exit door must be capable of simple operation to fulfil its designed purpose. An exit door may be a swinging door or could be a sliding door. Sliding doors may be manually operated or power operated.

Swinging doors must be able to be opened readily without a key, from the side facing a person seeking their way out, by a single-handed downward or pushing action on a single device located between 900 mm and 1.2 m above the floor.

It could be fitted with a fail-safe device that unlocks the door automatically when any sprinkler, smoke or heat detector system is activated in the building.

Sliding doors must be able to be opened manually under a force of not more than 110N and if power operated:–

- Must be able to be opened manually under a force of not more than 110N if there is a malfunction or failure of the power source; and
- If they lead directly to road or open space they must open automatically if there is a power failure to the door or on the activation of a fire or smoke alarm anywhere in the fire compartment served by the door.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require exit doors to be inspected every three months. The owner may delegate this function to another person or body where necessary or appropriate.

Maintenance checks should be carried out to ensure that exit doors comply as follows:–

Swinging Doors:

- Intact
- Operational
- Fitted with hardware that conforms to the requirements of the *Building Code of Australia*, Section D (the hardware necessary to enable operation as outlined above).

Sliding doors:

- Open doors manually and confirm doors can be opened under a force of not more than 110N; and
- If power operated:–
 - Simulate power failure and open doors manually. Confirm door can be opened under a force of not more than 110N.
 - If they lead directly to road or open space:–
 - Simulate fire alarm within the fire compartment and confirm that doors open automatically.

MAINTENANCE RECORDS

A log sheet to record the maintenance and inspections carried out is included Appendix C of this manual.

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→ Signs



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Signs

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3.1 EXIT SIGNS (INCLUDING DIRECTION SIGNS)

BCA Specification: D1.12, E4.5, E4.6, E4.8
Reference: AS/NZS 2293.1,
AS 22293.2, AS 2293.3

PURPOSE

Exit signs are provided to aid occupant identification of exits and paths of travel to exits.

REQUIREMENTS OF THE EQUIPMENT

Exit signs must be:-

- a) Installed to AS/NZS 2293.1; and
- b) Clearly visible at all times to persons having legal right of entry to the building, approaching an exit; and
- c) Located in positions where exits are not readily apparent, i.e. corridors, hallways and lobbies, with directional arrows indicating the direction to an exit; and
- d) Located on, above, or adjacent to each door providing egress (as detailed in *BCA E4.5*); and
- e) Clear and legible pictograms as required by AS 2293.3; and
- f) Provided with emergency illumination in the event of normal power supply failure.

METHOD OF OPERATION

Exit signs must be set up to operate as follows:-

- Be illuminated at all times by mains power supply or by being a self-contained unit; and
- Be either internally or externally illuminated; and
- Have a provision for emergency power supply in the event of failure of the normal power source.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require maintenance to be carried out at least every six months to AS 2293.2. It should be noted that this is the lowest level of maintenance required by the Standard and other routines are also required on a yearly basis. The owner may delegate this function to another person or body where necessary or appropriate.

The testing procedures of exit signs are detailed in AS 2293.2. These procedures must be available to your designated tester in a hard bound A4-size maintenance folder. This folder must be provided by the installer of your system.

MAINTENANCE RECORDS

A manufacturer's log book, or an alternative system (this would include this manual) is recommended for the recording of maintenance information.

Log sheets for this purpose are included in the log book provided in Appendix C of this manual.

3.2 SIGNS WARNING AGAINST THE USE OF LIFTS IN THE EVENT OF FIRE

BCA: E3.3

PURPOSE

Signage is provided to warn occupants against the use of lifts in the event of a fire in a building.

REQUIREMENTS

To provide signage adjacent to a lift as specified by the *Building Code of Australia*.

METHOD OF OPERATION

To ensure signs are operational and effective, they must not be obstructed or altered in any way.

It is the responsibility of the owner to ensure that all signage is maintained in an efficient condition and kept functional and clear of obstruction.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of signage. The owner may delegate this function to another person or body where necessary or appropriate.

It is recommended that in carrying out the required inspections, the following point should be covered:–

- Ensure no obstruction or removal of the signage has occurred.

MAINTENANCE RECORDS

A log book must be kept to record:–

- a) The date the inspection was carried out; and
- b) Any problems encountered during the inspection; and
- c) The name, designation and signature of the person carrying out the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

3.3 WARNING SIGNS ON SLIDING FIRE DOORS AND DOORS TO NON-REQUIRED STAIRWAYS, RAMPS AND ESCALATORS

BCA: C3.6,
Specification: D1.12

PURPOSE

Signage is provided to alert occupants to the operation of sliding doors and the operation of non-required stairs, ramps and escalators in the event of a fire in the building.

REQUIREMENTS

Signage must be installed to a sliding fire door on each side of the door over the opening stating: **Warning – Sliding Fire Door**, in lettering not less than 50 mm high in a colour contrasting to the background.

A warning sign must be provided where it can be readily seen to non-required stairways, ramps and escalators which states:–

DO NOT USE THIS STAIRWAY IF THERE IS A FIRE (in 20 mm high lettering)

Or

Do not use this stairway if there is a fire (in 16 mm high lettering)

METHOD OF OPERATION

To ensure signs are operational and effective, they must not be obstructed or altered in any way.

It is the responsibility of the owner to ensure that all signage is maintained in an efficient condition and kept functional and clear of obstruction.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of signage. The owner may delegate this function to another person or body where necessary or appropriate.

It is recommended that in carrying out the required inspections, the following point should be covered:–

- Ensure no obstruction or removal of the signage has occurred.

MAINTENANCE RECORDS

A log book must be kept to record:–

- a) The date the inspection was carried out; and
- b) Any problems encountered during the inspection; and
- c) The name, designation and signature of the person carrying out the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

3.4 SIGNS, INTERCOMMUNICATION SYSTEMS, OR ALARM SYSTEMS

BCA: D2.22

(On doors of fire-isolated exits stating that re-entry to a storey is available)

PURPOSE

Signage is provided to alert occupants that re-entry is available to a storey from within a fire-isolated exit.

REQUIREMENTS

Doors in a fire-isolated exit must not be locked from the inside, unless on at least every fourth storey, doors are not able to be locked and a sign is fixed on such doors stating that re-entry is available or;

An intercommunication system, audible or visual alarm is fixed adjacent to the door and signage explaining the purpose and method of operation.

METHOD OF OPERATION

To ensure signs, intercommunication device, or alarm are operational and effective, they must not be obstructed or altered in any way.

It is the responsibility of the owner to ensure that all signage, intercommunication devices or alarms are maintained in an efficient condition and kept functional and clear of obstruction.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of signage, intercommunication device or alarm system. The owner may delegate this function to another person or body where necessary or appropriate.

It is recommended that in carrying out the required inspections, the following point should be covered:–

- Ensure no obstruction or removal of the signage has occurred.

MAINTENANCE RECORDS

A log book must be kept to record:–

- a) The date the inspection was carried out; and
- b) Any problems encountered during the inspection; and
- c) The name, designation and signature of the person carrying out the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

3.5 SIGNS ALERTING PERSONS THAT THE OPERATION OF DOORS MUST NOT BE IMPAIRED

BCA: D2.23

PURPOSE

Signage is provided to warn occupants that the operation of certain doors must not be impaired.

REQUIREMENTS

Signage requirements apply to a fire door providing direct access to a fire-isolated exit, a fire door in a horizontal exit, and doors leading from a fire-isolated exit, except a door providing direct egress from a sole occupancy unit in a Class 2 or 3 or Class 4 part and required smoke doors and smoke doors that swing in both directions.

Signage must be in capital letters not less than 20 mm high in a colour contrasting with the background and state:–

For an automatic door held open by a hold open device:

FIRE (SMOKE) DOOR – DO NOT OBSTRUCT

For a self-closing door:

FIRE (SMOKE) DOOR

DO NO OBSTRUCT

DO NOT KEEP OPEN or;

For a door discharging from a fire-isolated exit:

FIRE SAFETY DOOR – DO NOT OBSTRUCT

METHOD OF OPERATION

To ensure signs are operational and effective, they must not be obstructed or altered in any way.

It is the responsibility of the owner to ensure that all signage is maintained in an efficient condition and kept functional and clear of obstruction.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of signage. The owner may delegate this function to another person or body where necessary or appropriate.

It is recommended that in carrying out the required inspections, the following point should be covered:–

- Ensure no obstruction or removal of the signage has occurred.

MAINTENANCE RECORDS

A log book must be kept to record:–

- a) The date the inspection was carried out; and
- b) Any problems encountered during the inspection; and
- c) The name, designation and signature of the person carrying out the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

3.6 SIGNS REQUIRED ON DOORS, IN ALPINE AREAS, ALERTING PEOPLE THAT THEY OPEN INWARDS

BCA: G4.3

PURPOSE

Signage is provided to warn occupants to the operation of certain doors in alpine areas.

REQUIREMENTS

A door fitted to an external doorway within a building in the alpine regions may be subject to the build-up of snow.

The doors must only be capable of opening inwards and be fitted with signage with **OPEN INWARDS** in lettering not less than 75 mm high in a colour contrasting with the background and installed on the inside face of the door.

METHOD OF OPERATION

To ensure signs are operational and effective, they must not be obstructed or altered in any way.

It is the responsibility of the owner to ensure that all signage is maintained in an efficient condition and kept functional and clear of obstruction.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of signage. The owner may delegate this function to another person or body where necessary or appropriate.

It is recommended that in carrying out the required inspections, the following point should be covered:–

- Ensure no obstruction or removal of the signage has occurred.

MAINTENANCE RECORDS

A log book must be kept to record:–

- a) The date the inspection was carried out; and
- b) Any problems encountered during the inspection; and
- c) The name, designation and signature of the person carrying out the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

3.7 FIRE ORDER NOTICES REQUIRED IN ALPINE AREAS

BCA: G4.9

PURPOSE

A fire order notice is provided to alert occupants to the method of operation of the alarm system, location of fire-fighting equipment, location of exits, and the procedures for evacuation of the building.

REQUIREMENTS

Every Class 2, 3 or 9 building within an alpine area must display a notice that is clearly marked **FIRE ORDERS** in a suitable location near main entrances and on every storey.

A fire order must include information on:–

- Operation of fire alarm system
- Location of fire-fighting equipment
- Location of exits
- Procedures for evacuation of the building.

METHOD OF OPERATION

To ensure notices are operational and effective, they must not be obstructed or altered in any way.

It is the responsibility of the owner to ensure that all signage is maintained in an efficient condition and kept functional and clear of obstruction.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of signage. The owner may delegate this function to another person or body where necessary or appropriate.

It is recommended that in carrying out the required inspections, the following point should be covered:–

- Ensure no obstruction or removal of the signage has occurred.

MAINTENANCE RECORDS

A log book must be kept to record:–

- a) The date the inspection was carried out; and
- b) Any problems encountered during the inspection; and
- c) The name, designation and signature of the person carrying out the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

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→ Lighting



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4.1 EMERGENCY LIGHTING

BCA: E4.2, E4.4
Reference: AS 22939

PURPOSE

To safeguard occupants from injury by providing sufficient lighting to allow safe occupant evacuation in an emergency.

REQUIREMENTS OF THE EQUIPMENT

An emergency lighting system must:–

- a) Be installed to AS 2293.1; and
- b) Be automatic in operation in the event of failure of power supply to the main lighting system; and
- c) Provide a level of luminance appropriate to: -
 - i. The use and size in floor area of the building; and
 - ii. The distance required to reach exits.

METHOD OF OPERATION

CENTRAL LIGHTING SYSTEM

This type of system will be set up to operate in one of two modes:–

- Where the emergency lighting is energised at all times when the building is occupied; or
- Where the emergency lighting is energised only when power to the normal lighting system fails.

SINGLE POINT LIGHT SYSTEM

Each unit 'stands alone' and illuminates when normal lighting fails. Power is supplied from a built-in battery which is continuously under charge while normal lighting operates.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require maintenance at least every six months. It should be noted that this is the lowest level of maintenance required by the Standard and more rigorous routines are also required as noted below. The owner may delegate this function to another person or body where necessary or appropriate.

CENTRAL LIGHTING SYSTEM

Checks should be undertaken on the following elements of the system:–

- Batteries.
- Battery chargers.
- Inverters.
- Distribution and control equipment.
- Lights and exit signs.
- The complete system.

SINGLE POINT LIGHTING SYSTEM

SIX-MONTHLY PROCEDURES

- a) Operate the self-contained emergency lights from their battery supply by turning off the normal lighting power supply.
- b) The lights must remain alight for at least 90 minutes.
- c) Replace any faulty lamps.
- d) Turn on the normal lighting power supply and check that the battery charger indicator functions properly.

Record the test and correct operation of the system.

Record the replacement of faulty lamps.

TWELVE-MONTHLY PROCEDURES

- a) Carry out the six-monthly procedures; and
- b) Clean down all light emitting and reflecting surfaces.

Record the testing and cleaning.

SIX-MONTHLY TEST

Batteries

- a) Lead-acid batteries – using a hydrometer and referring to the maintenance manual, test randomly selected cells for:–
 - i. Electrolyte density.
 - ii. State of charge.

Record the result of this test.

- a) All batteries, including lead-acid batteries.
 - i. Visually check electrolyte level of each cell.
Record those cells that require topping up.
 - ii. Visually inspect all cell containers for electrolyte leakage. Have leaking cells repaired or replaced by a qualified person.

Record any repairs or replacement.

Battery chargers

- a) Visually inspect the unit.
- b) Clean unit and cubicle of dust and dirt.
- c) Check battery voltage reading is within normal limits.
- d) Check all connections are tight. Record the carrying out of these checks.

Record battery voltage reading.

Inverters

- a) Visually inspect all components.
- b) Record the inspection.
- c) Record D.C. input voltage and current.
- d) Record A.C. output voltage and current.

Distribution and control equipment

- a) Visually inspect relays, contactors, circuit breakers and fuses. Record inspection and any problems identified.
- b) Check all connections for tightness. Record the check.
- c) Remove any dust and dirt accumulated within the distribution and control equipment enclosures. Record the cleaning.
- d) Check that sensing equipment operates the system when isolated from A.C. mains supply. Record the check and any problems identified.

Emergency lights and exit signs

- a) Check all lights and exit signs for correct operation.
- b) Replace any faulty lamps. Record the check and any lamps replaced.

Total system

- a) Check for correct operation when battery charger turned off and mains failure simulated.
- b) Check satisfactory operation of the charger-failure alarm while carrying out above check.
- c) Record these checks and any problems identified.

Restore the system to normal operation, and check correct charging of batteries.

TWELVE-MONTHLY TEST

Batteries – for any battery requiring maintenance of electrolyte above a specified level.

Lead-acid batteries only – for each cell

Using a hydrometer and referring to the maintenance manual,

- a) Check electrolyte density.
- b) Check state of charge.

Record the results of these checks.

All types of batteries – (including lead-acid)

- a) Visually check electrolyte level in all cells. Record level for each cell.
- b) Visually inspect all cells for electrolyte leakage. Mop up and neutralise any spilt liquid using baking powder dissolved in water. Record the inspection and any faults found.
- c) Inspect all cell connections for corrosion and tighten any loose joints.
- d) Treat all exposed metal surfaces with petroleum jelly or other recognised battery terminal preservative. Record the inspection and treatment.
- e) Measure overall battery voltage and individual cell voltages, using a finely calibrated voltmeter. Record any cell with a voltage difference from average of more than + 0.03 volts.

Battery charger

- a) Carry out tests required in six-monthly test.
Record the test.
- b) Check voltmeter calibration.
Record the check and result.
- c) Check satisfactory operation of battery earth-fault detection system, if fitted.
Record the check.
- d) Check satisfactory operation of the battery low-voltage alarm, if fitted.
Record the check.

Inverter

- a) Carry out tests on items required in six-monthly test.
Record the tests.
- b) Check voltmeter calibration.
Record the check and result.

Lights and exit signs

- a) Carry out all checks required in the six-monthly test.
Record the tests.
- b) Clean all light emitting and reflecting surfaces.
Record the cleaning.

Total system

1. Check battery voltage on completion of discharge test, by the following method:–
 - a. Turn off battery charger.
 - b. Simulate mains failure (turn off power).
 - c. Using all the installed emergency lighting, test discharge for at least 90 minutes.

Record battery voltage on completion of this test. If battery voltage is below acceptable limits after completion of this test, re-service or replace the battery.

Record re-service or replacement.

2. Measure the time taken for the battery charger to change over automatically to the 'float charge' mode, after;
 - Disconnecting the load,
 - Turning on the battery charger,
 - Manually selecting 'boost charge' mode.

Record the time taken.

The above testing procedures are detailed in AS 2293.2. These procedures must be available to the designated tester. This information must be provided by the installer of the system.

MAINTENANCE RECORDS

A manufacturers' hard bound log book, or an alternative system (this would include this manual), is recommended for the recording of maintenance information.

Sheets for this purpose are included in the log book provided in Appendix C of this manual.

Fire-Fighting Services and Equipment

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5.1 FIRE HYDRANT SYSTEM (INCLUDING ON-SITE PUMPSET AND FIRE SERVICE BOOSTER CONNECTION)

BCA: E1.3
Reference: AS 2419

PURPOSE

A fire hydrant system is installed to provide fire-fighting personnel a supply of water for fire-fighting purposes.

REQUIREMENTS OF THE EQUIPMENT

To fulfil its purpose, a hydrant system must:-

- a) Be installed to AS 2419.1; and
- b) Be located to provide coverage to every part of the building or site requiring coverage; and
- c) Provide a specified minimum flow of water at all times; and
- d) Be readily accessible to fire-fighting personnel.

METHOD OF OPERATION

The supply of water to the hydrant system must be provided automatically, once a hydrant valve is opened or, in some systems, once a fire alarm has been activated.

Any pump incorporated into the system must be powered by a motor that will enable operation regardless of primary electrical mains failure.

The water supply must be acquired from a source that will provide adequate water for a specified period of time.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor (RBS) should require that fire hydrants and fire main systems be maintained monthly to AS 1851-2005 Section 4. It should be noted that this is the lowest level of maintenance routines required by AS 1851-2005. More rigorous routines are also required and are outlined below. The owner may delegate this function to another person or body where necessary or appropriate.

Maintenance work, involving inspections, testing and servicing, has been specified in AS 1851-2005 at the following frequencies:-

- Monthly
- Six-monthly
- Yearly
- Five-yearly

Note: For fire hydrant pumpsets, the frequency of inspection and testing shall be carried out weekly as per the requirements of AS 1851- 2005 Section 4 clause 4.3.2 see Table 4.4.1 and Table 4.4.2 unless the provisions AS 1851- 2005 Section 3.2.1 have been satisfied.

Before maintenance work is carried out, the following precautions must be taken:-

- a) Whenever maintenance work will render the system inoperative, or will activate the fire alarm system, notify the monitoring service, the fire brigade and the owner of the building, or his agent, before any action is taken. If the fire brigade attends unnecessarily, you could be charged for their attendance; and
- b) Before turning off the water, a thorough check of the whole premises must be made, to ensure safety from a threat of fire as much as possible; and
- c) Ensure all other fire suppression equipment is fully operational.

After this work is completed, the hydrant system must be tested to ensure it operates at its designed performance level, and the monitoring service and the fire brigade must be notified that the system is again operational.

Whenever the system is disabled for maintenance or modifications, special precautions should be implemented as detailed in AS 1851-2005 Section 1 Clause 1.14.

Street Hydrants

Where the RBS has approved the use of a street hydrant to achieve the hydrant coverage requirement of AS 2419 – 2005 for the building, owners should be aware that they do not have a right to maintain the hydrant. Section 165 (4) of the *Water Act 1989* identifies that the relevant water authority is responsible for the maintenance, identification and provisions of water to street hydrants.

However, the building owner should, as a minimum, undertake the following precautions for street hydrants:–

- Verify and document the presence of the street hydrant on a six-monthly basis.
- Ensure that the street hydrant is appropriately identified.
- If the hydrant becomes unavailable for use the building owner must notify the chief officer of the relevant fire brigade without delay.

MAINTENANCE RECORDS

The maintenance records must record:–

- a) All the inspections, testing and servicing procedures required under AS 1851-2005 Section 4; and
- b) Details of defects found and unscheduled repairs carried out; and
- c) Details of any remedial action taken.

All these details must be systematically entered in the log book established for the hydrant system. This log book should be maintained by a person responsible for it, and must be available for inspection when required. In addition, AS 1851-2005 Section 4 requires that each hydrant must have a tag attached to it, showing the dates on which the six-monthly, yearly and five-yearly procedures were carried out.

It is recommended that log sheets to record the completion of the maintenance are developed from the tables for fire hydrant system as specified in AS 1851-2005 Section 4.

5.2 FIRE HOSE REEL SYSTEM

BCA: E1.4
Reference: AS 2441

PURPOSE

Fire hose reels are provided to enable occupants to undertake initial fire extinguishment.

REQUIREMENTS OF THE EQUIPMENT

Fire hose reel systems must:-

- Provide sufficient hose reel length to enable every part of the floor or storey on which it is installed to be reached by laying the hose along normal lines of access throughout that floor; and
- Be provided with a water supply rate of at least 0.33 litres/second for 19 mm hose (AS 2441).
- Be provided with a water supply rate of at least 0.41 litres/second for 25 mm hose (AS 2441).

METHOD OF OPERATION

The occupants of the premises should be able to operate the system:-

- By locating any fire hose reel within the building.
- By following the operating instructions displayed on the fire hose reel.

It is essential that all staff personnel on the premises are trained in the safe and efficient operation of fire hose reels

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require that fire hose reels be maintained at six-monthly intervals to AS 1851-2005 Section 14.

Note: Where a pump set is installed to supply the required water pressure to the fire hose reel system, the frequency of inspection and testing shall be carried out weekly as per the requirements of AS 1851-2005 Section 3.

Maintenance work involving inspections, testing and servicing, has been specified by AS 1851-2005 at the following frequencies:-

- Six-monthly
- Yearly
- When defects are detected

The maintenance and inspection may be carried out by the owner. The owner may delegate this function to another person or body where necessary or appropriate.

It is essential that the hose is rewound in even layers, the nozzle re-engaged correctly in the interlock, the valve shut off, and the hose de-pressurised by opening the discharge nozzle. Close the nozzle when de-pressurised.

Any defects found should be reported to management and the necessary repairs or replacement carried out as soon as possible, to ensure the equipment is ready for use if needed. In addition, a label showing the date of service and a description of the fault should be attached to the side plate of the faulty fire hose reel.

Whenever the system is disabled for maintenance or modifications, special precautions should be implemented as detailed in AS 1851-2005 Section 1 Clause 1.14.

MAINTENANCE RECORDS

A log book, showing the location and identifying marks or numbers for each fire hose reel on the premises, must be established. In addition, AS 1851-2005 Section 4 requires each hydrant to have a tag attached to it, showing the dates on which the six-monthly, yearly and five-yearly procedures were carried out.

The following information must be recorded:–

- a) The date of each inspection carried out; and
- b) Any defects found; and
- c) On the tag attached to each fire hose reel, the date of each inspection.

It is recommended that log sheets to record the completion of the maintenance are developed from the tables for fire hose reel system as specified in AS 1851-2005 Section 4.

5.3 SPRINKLER SYSTEM

BCA: E1.5, H1.2, G3.8
Reference: AS 2118

PURPOSE

A sprinkler system is installed to provide a full-time automatic fire suppression system, with the ability to summon the fire brigade automatically.

SYSTEMS AND EQUIPMENT

Automatic sprinkler systems may include:–

- Wet pipe systems and sprinklers;
- Valve installations;
- Electric motor and compression-ignition engines and pumpsets;
- Fire brigade booster connections;
- Pre-action systems;
- Water storage systems;
- Alarms and interface with automatic fire alarm and detection systems where installed.

REQUIREMENTS OF THE EQUIPMENT

To provide the required protection, the sprinkler system must be:–

- a) An automatic fire sprinkler system complying with:– AS 2118 subject to *Building Code of Australia* Specification E1.5; or
- b) Maintained in accordance with AS 1851-2005 Section 2, either by or under the direct supervision of personnel competent in sprinkler system maintenance.

It should be noted that AS 1851-2005 Section 2 only specifies maintenance for sprinkler systems designed in accordance with the AS 2118 series. Other sprinkler systems, such as NFPA 13R systems, are specialised systems and require specific maintenance. Further details on maintaining specialised sprinkler systems are provided later in this section.

METHOD OF OPERATION

To comply with AS 2118, the sprinkler system must have:–

- a) Provision for an adequate water supply; and
- b) A pumping system to pressurise the sprinkler system; and
- c) A distribution pipe system to deliver water to each sprinkler head; and
- d) Sprinkler heads to perform according to the risk they are protecting; and
- e) A local alarm facility to alert the operation of a sprinkler system; and
- f) A direct alarm connection to the monitoring service (where required).

The sprinkler system is activated by a sprinkler head or heads responding to a rise in temperature. Water flows through the head(s), lowering the residual water pressure, which causes the pump system to come into operation. Water flowing through the system drives the water-motor in the local alarm, sounding the alarm bell. Where fitted, a direct alarm is transmitted to the monitoring service.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor require that fire mains be maintained weekly to AS 1851-2005. It should be noted that this is the lowest level of maintenance routines required by the Standards. More rigorous routines are also required by AS 1851-2005 Section 2 and are outlined below. The owner may delegate this function to another person or body where necessary or appropriate.

The sprinkler system maintenance program is specified in AS 1851-2005 Section 2. For fire pump sets the frequency of inspection and testing shall be carried out weekly as per the requirements of AS 1851- 2005 Section 4.3.2 and Table 4.4.1 and 4.4.2 unless the provisions AS 1851- 2005 Section 3.2.1 have been satisfied.

Maintenance work, involving inspections, testing and servicing, have been specified by AS 1851-2005 at the following frequencies:–

- Weekly
- Monthly
- Six-monthly
- Yearly
- Three-yearly
- Twelve-yearly
- Twenty four-yearly

The detail for these routines are detailed in table form in AS 1851 – Section 2.

Whenever the system is disabled for maintenance or modifications, special precautions should be implemented as detailed in AS 1851-2005 Section 1 Clause 1.14.

The following additional precautions should be observed, as far as is practicable, when your system is inoperative through an emergency or planned occurrence:–

- a) Under all circumstances, keep as much of the system fully operational as is practicable. If the necessary work is to extend over several days or weeks, re-instate the system as far as is practicable at the end of each working day.
- b) Where the system has to be left disconnected outside working hours, consideration should be given to employing a watchman while the system is disconnected.
- c) Whenever it is possible, disconnection of your system should be undertaken when production machinery is inoperative.
- d) While the system is down, smoking should be banned in the affected areas.
- e) Notify senior department personnel or tenants' representatives of the situation, so that fire-extinguishing appliances can be kept immediately available, with trained personnel on hand to use them if necessary.
- f) Notify the insurer or insurance broker of the situation.
- g) Have all necessary equipment and material available and do all the work possible prior to isolating the sprinklers.
- h) Hot cutting or welding should be avoided, where possible, in an area where the sprinkler system is not operational. This includes work on the sprinkler system.
- i) Avoid all sources of ignition.

Maintenance testing of these systems should be carried out in conjunction with the fire alarm system testing to assure that the systems are correctly interfaced.

Prior to and following this test, it is essential that the monitoring service that receives the alarm shall be advised of the imminent test, checked to see the test call was received, and advised when the system is re-set and operational.

Combined Sprinkler and Hydrant System

Maintenance for combined sprinkler and hydrant systems shall be carried out in accordance with AS 1851-2005 Clauses 2.4.1 to 2.4.1.4 for sprinklers and Clauses 4.4.1 to 4.4.4 for hydrant systems.

Specialised Sprinkler Systems

Maintenance of sprinkler systems that have been designed for specific purposes, such as Early Suppression Fast Response (ESFR), NFPA 13R systems or FM Global designed requirements, should be specified by the designer of the system. It is imperative that the designer of the system provide an appropriate maintenance schedule for the sprinklers, pumpsets and fire mains in the building. Engineers may specify documents such as NFPA 25 – 'maintenance of sprinkler systems' as part of a maintenance regime. It is therefore important that owners obtain copies of the documentation for their records.

MAINTENANCE RECORDS

Records of all maintenance routines must be in a log book kept at the sprinkler control valves.

It is recommended that log sheets to record the completion of the maintenance are developed from the tables for sprinkler systems as specified in AS 1851-2005 Section 2.

5.4 PORTABLE FIRE EXTINGUISHERS

BCA: E1.6
Reference: AS 2444

PURPOSE

Portable fire extinguishers provide occupants with an appliance with which to attack a fire in its initial stages.

REQUIREMENTS OF THE EQUIPMENT

Fire extinguishers must contain an extinguishing agent suitable for the fire hazard likely to be encountered. Fire extinguishers complying with Australian Standards are marked with a fire classification and rating, determined in accordance with AS/NZS 1850, which indicates the class and size of fire for which they have been successfully tested.

Each extinguisher must be located in the approved location that must be a conspicuous and readily accessible position. AS 2444 sets out the types and locations required for portable fire extinguishers, the locations being indicated by the appropriate signage.

METHOD OF OPERATION

A fire extinguisher is put into operation by transporting the extinguisher close to the fire and following the operating instructions clearly displayed on the extinguisher.

It is essential that all staff members are suitably trained in the correct use of fire extinguishers located on the premises.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require that fire extinguishers be maintained six-monthly to AS 1851-2005 Section 15. It should be noted that this is the lowest level of maintenance routines required by AS 1851-2005. More rigorous routines are also required and are outlined below. The owner may delegate this function to another person or body where necessary or appropriate.

The intervals of inspection and service are detailed in AS 1851-2005 Section 15:–

- Six-monthly
- Yearly
- Five-yearly
- After use of the extinguisher

A comprehensive maintenance schedule is detailed in AS 1851-2005 Section 15 for all types of fire extinguishers. All maintenance work must be carried out by experienced personnel, observing recognised safety procedures.

MAINTENANCE RECORDS

For the purpose of maintaining service records, clause 15.2.15 in AS 1851-2005 outlines:–

- a) Each extinguisher in the premises must have a unique site identification mark.
- b) If more than 10 extinguishers are located in or on the premises, a site plan showing the location of each extinguisher and its identification, type, size and rating, must be provided.
- c) A maintenance record tag must be attached to each extinguisher.
- d) A report on the correct provision and location of extinguishers must be provided by the service agency or personnel.

It is recommended that log sheets to record the completion of the maintenance are developed from the tables for portable fire extinguishers as specified in AS 1851-2005 Section 15.

5.5 FIRE CONTROL CENTRES (OR ROOMS)

BCA: E1.8

PURPOSE

A fire control centre is provided as an area from which fire-fighting operations or emergency procedures can be directed or controlled.

REQUIREMENTS

The fire control centre or room must:–

- a) Contain the controls, panels, telephones, furniture and equipment associated with the required fire services in the building; and
- b) Only be used for fire-fighting and other reasons concerning the safety or security of the building occupants; and
 - a. Be accessible via two ways:–
 - i. from the front entrance of the building; or
 - ii. direct from outside the building; and
 - b. Have the following as detailed in Spec E1.8 of the *Building Code of Australia*:–
 - i. sufficient floor area for its proper functioning; and
 - ii. adequate ventilation; and
 - iii. suitable power supply; and
 - iv. emergency lighting; and
 - v. a sign on the outside of the door identifying it as the 'Fire Control Centre'; and
 - vi. low noise level with all fire safety equipment operating.

MAINTENANCE CHECKS

To ensure the fire control centre is operational, it is recommended that maintenance be carried out as follows:–

YEARLY

It is recommended that the relevant building surveyor should require an annual inspection of this facility. The owner may delegate this function to another person or body where necessary or appropriate.

It is also recommended that an exercise be held at least yearly to ensure this facility is workable.

This exercise could be held in conjunction with:–

- a) The fire authority serving the area.
- b) An evacuation exercise for the premises.

MAINTENANCE RECORDS

The following information must be recorded:–

- a) The dates the monthly and yearly inspections were carried out; and
- b) The name of the person conducting the inspections; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date this rectification occurred; and
- f) Signature of the person conducting the inspection.

Information relating to the conduct of an evacuation exercise could also be recorded.

A log sheet to record this information is provided in Appendix C of this manual.

PURPOSE

Suitable additional provisions must be made if special fire-fighting problems could arise from the nature or quantity of materials stored, displayed, used in a building or stored on the allotment.

The location of the building in relation to available water supply for fire-fighting purposes may also require special equipment to be installed in the building.

REQUIREMENTS

The application of the special provisions for fire-fighting purposes should be identified early in the project by the designer of the building in conjunction with the services designers. Input may also be sought from the relevant building surveyor (RBS) at that time. The requirement for the level and frequency of maintenance for the special provisions must be listed on the building's occupancy permit or part of a determination on a certificate of final inspection.

MAINTENANCE CHECKS

To ensure the special fire-fighting systems remain operational, it is recommended that the designer of the system outline the maintenance required. As the system is specific to the building, the maintenance may be outside the ordinary requirements of such standards of AS 1851-2005. It is important that owners ensure that they are aware of any special maintenance requirements listed on an occupancy permit or determination that may affect their building.

MAINTENANCE RECORDS

Designers should at a minimum require the following information to be recorded:–

- a) The dates the monthly and yearly inspections were carried out; and
- b) The name of the person conducting the inspections; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date this rectification occurred; and
- f) Signature of the person conducting the inspection.

A log sheet is not provided in this manual for special provisions. It is recommended that owners seek advice of the system designer and/or the RBS on the appropriate level of documentation required.

- → Air handling systems
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Air Handling Systems

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6.1 SMOKE HAZARD MANAGEMENT SYSTEMS

BCA: E2.2
BCA Specification: E2.2
Reference: AS 1668

PURPOSE

Smoke hazard management systems ensure that, under fire and smoke conditions, occupants have sufficient time to evacuate before the evacuation route becomes untenable. Smoke and heat vents are installed to assist the discharge of smoke and heat generated by a fire.

This section does not apply to air conditioning, mechanical ventilation or natural ventilation systems that are not required to operate in fire and smoke control mode except if that system is required to shut down in fire mode.

This section has been separated into two parts. The first part deals with mechanical systems installed in accordance with AS 1668, and the second specifically details the maintenance of smoke and heat vents.

FIRE AND SMOKE CONTROL FEATURES OF HVAC SYSTEMS

REQUIREMENTS OF THE EQUIPMENT

To fulfil its purpose, the system must:–

- a) Be installed in accordance with *Building Code of Australia (BCA)* Specification E2.2 and AS 1668.1 – 1998; and
- b) Respond to automatic heat or smoke-sensing equipment; and
- c) Remove smoke from the fire affected area to the outside atmosphere or, if required, provide a pressurised atmosphere in fire isolated exits to prevent entry of smoke from the fire compartment; and
- d) Have fire and smoke dampers installed where penetrations occur.

METHOD OF OPERATION

Air conditioning and mechanical ventilation systems modes of operation are typically classified as Normal and Fire Mode:–

Normal Mode

Systems operate in this mode to maintain acceptable indoor air quality when the building is occupied. Controls may be either manual or automatic.

Fire Mode

In the event of a fire being detected or reported via the fire alarm system, air conditioning and mechanical ventilation systems are required to change over to fire mode operation. In fire mode the systems provide a purging or zoned smoke control strategy. Purging strategies discharge air from the smoke zone to outside whilst providing adequate relief air. Zoned control systems aim to maintain the non-fire affected fire compartment at a positive pressure relative to the fire compartment.

Older systems installed prior to the introduction of AS 1668 may simply shut down on fire mode to reduce the propagation of smoke through the building.

An automatic air handling system must be provided with manual override operation.

Automatic operation can be accomplished by:–

- Time clock switching
- Thermostat-controlled switching
- Atmospheric contaminant monitoring

The smoke control system must:-

- a) Respond to an automatic sensing of a fire condition; and
 - a. Automatically activate the appropriate equipment to:-
 - i. Vent smoke to the atmosphere; and
 - ii. Introduce outside air to either within the same fire affected compartment or to the non-fire affected compartments; and
 - iii. Develop a positive air pressure in the fire-isolated stairwells (where required); and
 - iv. Have a manual override facility to enable fire-fighting personnel to control the system.

The systematic reaction of the various components in the smoke and air handling systems will have been programmed into this equipment during the design, installation and commissioning of the equipment in the building. Checks and maintenance of an air handling system are recommended to be carried out in conjunction with the fire alarm system testing to assure that the systems are correctly interfaced.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor (RBS) should require that maintenance and inspection of smoke control measures and stairwell pressurisation measures be carried out monthly to AS 1851-2005 Section 18.

Periodic testing and inspection is recommended by AS 1851-2005 Section 18 to be implemented:-

- Monthly
- Quarterly
- Six-monthly
- Yearly
- Five-yearly

The owner may delegate these functions to another person or body where necessary or appropriate.

To ensure full compliance with this requirement, a maintenance program must be prepared, including:-

- a) All data relevant to the smoke control system; and
- b) A formal strategy and recording system for effective management of a series of maintenance procedures.

Implementation

The maintenance program must be implemented in accordance with the information and requirements of the maintenance routines set down in Section 18 of AS 1851-2005. Any follow-up action must be implemented as required in Section 1 of that Standard.

MAINTENANCE RECORDS

Maintenance records should contain the following information:-

- a) Date, item of plant, equipment or system and nature of service performed; and
- b) Details of defects found and rectification procedures undertaken; and
- c) The name of the person or company performing the service.

The Standard also requires the provision of operating and maintenance manuals, a maintenance schedule, a plant register and a plant history record.

Further details for all the information in this section are available in AS 1851-2005 Section 18 Clause 18.2.4.

It is recommended that log sheets to record the completion of the maintenance are developed from the tables as specified in AS 1851-2005 Section 18.

SMOKE AND HEAT VENTS, SMOKE CURTAINS

REQUIREMENTS OF THE EQUIPMENT

A smoke venting system is made up of the following components:–

- a) Vents and their operating mechanism.
- b) Draught curtains.
- c) Inlet ventilation.

This system must be designed and installed in accordance with AS 2665.

METHOD OF OPERATION

The system:–

- a) Contains the smoke/heat within the confines of the smoke curtains.
- b) Activates the vents, using the rising temperature, releasing the trapped smoke/heat to atmosphere.
- c) Assists the ventilation process by introducing air to replace the rising smoke/heat column.

Operation of the system must be automatic, with a manual control in addition.

MAINTENANCE CHECKS

It is recommended that the RBS should require maintenance to be carried out at least every six months to AS 1851-2005 Section 18 Clause 18.4.1.7 for smoke and heat vents and Clause 18.4.1.8 for smoke curtains. The owner may delegate this function to another person or body where necessary or appropriate.

Periodic testing and inspection is recommended by AS 1851-2005 to be implemented:–

- Six-monthly
- Yearly
- Five-yearly

MAINTENANCE RECORDS

Records must be developed and maintained to record the following:–

- a) Date of the inspection, test or maintenance; and
- b) Name of the person carrying this out; and
- c) Details of any faults detected; and
- d) Action taken to rectify any faults detected; and
- e) Date on which any faults were rectified.

It is recommended that log sheets to record the completion of the maintenance are developed from the tables as specified in AS 1851-2005 Section 18.

SMOKE AND FIRE DAMPERS

REQUIREMENTS OF THE EQUIPMENT

Smoke and fire dampers are installed within the ducting of HVAC systems to maintain the fire and/or smoke integrity of wall and floors where those elements are required to resist the spread of fire or smoke.

Fire and smoke dampers must be designed and installed in accordance with AS 1682.

METHOD OF OPERATION

- a) Fire dampers are activated by using the rising temperature within the HVAC ducting; and
- b) Smoke dampers are activated by the detection of smoke within the HVAC ducting; and
- c) The system contains the smoke/heat within the confines of the area of origin.

Operation of fire and smoke dampers must be automatic.

MAINTENANCE CHECKS

It is recommended that the RBS should require maintenance at least every five years to AS 1851-2005 Section 18 Clause 18.4.1.3 for fire dampers and Clause 18.4.1.4 for smoke curtains. The owner may delegate this function to another person or body where necessary or appropriate.

Periodic testing and inspection is recommended by AS 1851-2005 to be implemented:–

- Five-yearly

Note: 20% of dampers should be inspected annually so that all dampers have been inspected by the fifth year. Tagging, labelling or a log book may be necessary for verification.

MAINTENANCE RECORDS

Records must be developed and maintained to record the following:–

- a) Date of the inspection, test or maintenance; and
- b) Name of the person carrying this out; and
- c) Details of any faults detected; and
- d) Action taken to rectify any faults detected; and
- e) Date on which any faults were rectified.

It is recommended that log sheets to record the completion of the maintenance are developed from the tables as specified in AS 1851-2005 Section 18.

6.2 CAR PARK MECHANICAL VENTILATION SYSTEM

BCA: F4.11
E2.2
Reference: AS1668.1, AS1668.2

PURPOSE

To ensure that car fumes are adequately removed and under fire and smoke conditions within a car park area, occupants have sufficient time to evacuate before the evacuation route becomes untenable.

Note: This section does not apply to an open deck car park because such car parks are provided with adequate permanent natural ventilation.

REQUIREMENTS OF THE EQUIPMENT

To fulfil its purpose, a car park ventilation system must:-

- a) Be installed in accordance with AS 1668.2 1991, E2.2 or be provided with adequate natural ventilation; and
- b) Respond to automatic heat or smoke sensing equipment; and
- c) Be such that supply air ventilation system shuts down on detection of fire or smoke; and
- d) Continue to operate in the event of fire in the car park.

METHOD OF OPERATION

Car park ventilation systems modes of operation are typically classified as Normal Mode and Fire Mode:

Normal Mode

Systems operate in normal mode to maintain acceptable air quality when the car park is occupied. Controls may be either manual or automatic.

Fire Mode

In the event of a fire being detected or reported via the fire alarm system, car park ventilation systems are required to change over to fire mode operation. In fire mode the systems provide a purging control strategy. The purging strategy of car park ventilation is to discharge air from the car park to outside.

An automatic air handling system must be provided with manual override operation.

Automatic operation can be accomplished by:-

- Time clock switching; or
- Thermostat controlled switching; or
- Atmospheric contaminant monitoring.

A car park ventilation system shall also be provided with the following in accordance with AS 1668.1 Clause 5.5:-

- **Fire isolation** – Any mechanical components of the ventilation system located outside the car park fire compartment and within another fire compartment shall be isolated from that fire compartment with construction to maintain the required FRL (Fire Resistance Level).
- **Control** – To enable manual control by authorised fire personnel, each fan shall be provided with an ON-AUTO-OFF control device installed in the FFCP (Fire Fan Control and Indication Panel).
- **Smoke detectors** – Smoke detectors shall be installed in the supply air system in accordance with Clause 4.10.5(b) of AS 1668.1.
- **Operation** – Exhaust air systems shall continue to operate in the event of fire in the car park. Where the system incorporates variable airflow rates, it shall automatically switch to its full capacity on activation of any fire alarm or sprinkler system in the car park. Supply air systems shall shut down upon the receipt of a fire alarm signal from the supply air detector.

The systematic re-action of the various components in the car park ventilation will have been programmed into this equipment during the design, installation and commissioning of the equipment into your building. Checks and maintenance of a ventilation system are recommended to be carried out in conjunction with the fire alarm system testing to assure that the systems are correctly interfaced.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require that maintenance and inspection of car park ventilation measures be carried out monthly to AS 1851-2005 Section 18. The owner may delegate these functions to another person or body where necessary or appropriate.

To ensure full compliance with this requirement, a maintenance program must be prepared, including:–

- a) All data relevant to the car park ventilation system; and
- b) A formal strategy and recording system for effective management of a series of maintenance procedures.

The maintenance program must be implemented in accordance with the information and requirements of the maintenance routines set down in Section 18 of AS 1851-2005. Any follow-up action must be implemented as required in Section 1 of that Standard.

MAINTENANCE RECORDS

Maintenance records should contain the following information:–

- a) Date, item of plant, equipment or system and nature of service performed; and
- b) Details of defects found and rectification procedures undertaken; and
- c) The name of the person or company performing the service.

AS 1851-2005 also requires the provision of operating and maintenance manuals, a maintenance schedule, a plant register and a plant history record.

Further details for all the information in this section are available in Section 18 of the Standard.

It is recommended that log sheets to record the completion of the maintenance are developed from the tables as specified in AS 1851-2005 Section 18.

6.3 ATRIUM SMOKE CONTROL SYSTEM

BCA: G3.8
BCA Specification: G3.8

PURPOSE

Smoke and fire control systems within atriums ensure that occupants have sufficient time to evacuate before the evacuation route becomes untenable. The reason for these additional requirements is that there is an additional fire hazard associated with atriums and for the occupants evacuating them.

REQUIREMENTS OF THE EQUIPMENT

A fire and smoke control system within an atrium is made up of the following components:–

- a) Installation of a sprinkler system in every building which contains an atrium in accordance with Specification E1.5 of the *Building Code of Australia (BCA)*; and
- b) A mechanical air handling system including the installation of a smoke exhaust system; and
- c) A fire detection and alarm system; and
- d) An emergency warning and intercommunication system; and
- e) A standby power system; and
- f) A system for excluding smoke from fire-isolated exits.

METHOD OF OPERATION

Sprinkler systems

In addition to Specification E1.5 and AS 2118 to comply with *BCA* Specification G3.8, the sprinkler system must also have the following:–

- Sprinkler heads must protect both the supporting structure and the roof membrane. The operating temperature of the sprinkler heads must be within the range of 79°C – 100°C; and
- The floor of the atrium must be protected with sprinkler heads either sidewall and overhead as dictated by the atrium; and
- If the atrium is separated from the remainder of the building by walls or doors incorporating glazing, wall-wetting sprinklers are to be installed; and
- Appropriate water supply for the building and the atrium sprinkler system must be provided; and
- Stop valves for the atrium sprinklers must be provided.

Smoke control system

A mechanical air handling system in a building containing an atrium must comply with AS/NZS 1668.1 and be varied so that a system serving the atrium is designed to operate as follows:–

- Maintain a tenable atmosphere in all paths of travel along balconies to required exits; and
- Smoke exhaust fans only operate when smoke enters the atrium; and
- Central plant systems do not use the atrium as a return air path; and
- Activation of the smoke control system must be activated by:–
 - Operation of the automatic fire alarm; or
 - Operation of the a sprinkler system; or
 - A manual start switch.

- All controls for the smoke control system must be:–
 - Located in the fire control room or emergency control centre; or
 - Adjacent to the sprinkler control valves; or
 - Incorporated in the Fire Indicator Board.
- A smoke exhaust system must be specifically design to meet the requirements of Specification G3.8 clause 3.4 and 3.5, suitable to the size of fire and height of the smoke plume; and
- Smoke exhaust fans must be capable of continuous and required operation for a period of not less than one hour when handling exhaust gasses of 200°C; and
- Smoke and heat vents in lieu of exhaust fans may be used; and
- Make up air to the atrium must be provided from the outside and relief air from non-fire storeys.

Fire detection and alarm systems

Automatic fire detection and alarm systems must be provided within the atrium and must comply with AS1670.1 except where varied by Specification G3.8.

Emergency Warning and Intercommunication System (EWIS)

A building that contains an atrium must be provided with an EWIS that complies with AS1670.4 and AS 4428.4 and must also incorporate a visible warning sign, which, upon the 'action' signal, displays the words 'EVAC AREA'. The lettering must comply with the requirements of the provisions of *Building Code of Australia* Part E4 for exit signs.

Standby power systems

If a required path of travel to an exit is within an atrium, a suitable alternative power supply must be provided to operate required safety systems including sprinkler systems, fire hydrant pumps, air handling systems alarms, warning and communication systems and emergency lighting circuits.

System for excluding smoke from fire-isolated exits

Where a fire-isolated exits serves an atrium, the exit must be provided with a pressurisation system in accordance with AS/NZS 1668.1, commonly known as a stair pressurisation system.

MAINTENANCE CHECKS

Maintenance of the above systems should be included as part of the overall building maintenance. Each system has its own maintenance details as provided within this manual:–

- | | |
|---|--------------|
| • Sprinklers – | Section 5.3 |
| • Air Handling systems – | Section 6.1 |
| • Fire-Detection and Alarm Systems – | Section 7.3 |
| • Emergency Warning and Communication-systems – | Section 8.1 |
| • Standby Power – | Section 10.1 |
| • System for Excluding Smoke from Fire-Isolated Exits – | Section 6.1 |

Owners should ensure that where systems include specific provisions for atriums that the maintenance of those essential safety measures is included.

MAINTENANCE RECORDS

As per the appropriate section of this manual for each of the services.

Automatic Fire-Detection and Alarm Systems

7.1	SMOKE AND HEAT ALARM SYSTEM	2
7.2	SMOKE AND HEAT-DETECTION SYSTEM	3
7.3	ATRIUM FIRE-DETECTION AND ALARM SYSTEMS	4

7.1 SMOKE AND HEAT ALARM SYSTEM

BCA: Clause 3 of
Specification E2.2a
Reference: AS 3786

PURPOSE

A smoke alarm system is installed to sense and provide warning of a fire in its initial development stage. Proper operation of this system will afford the building occupants the maximum amount of time to seek safe refuge.

REQUIREMENTS OF THE EQUIPMENT

A smoke alarm system must be installed and operate as follows:–

- a) Sense the presence of a fire and advise its location; and
- b) Advise the fire brigade; and
- c) Connected to consumer mains; and
- d) In a building in which sprinklers are not installed, be connected to a building occupant warning system.

In kitchens and other areas where the use of the area is likely to result in a smoke alarm causing spurious signals, heat alarms may be installed in lieu of smoke alarms or an alarm acknowledgement facility may be installed. If the kitchen or other area is sprinkled then heat alarms need not be installed.

METHOD OF OPERATION

Alarms are installed throughout a building to comply with AS 3786. This Standard does not designate the location of where the alarm is to be installed. In a building that is not protected with a sprinkler system the location must be in accordance with the requirements for smoke detectors in AS 1670.1.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require the facilities to be inspected monthly. It should be noted that this is the lowest level of maintenance routines required by AS 1851-2005 Section 7. More rigorous six-monthly and yearly routines are also required and are detailed in the Standard. The owner may delegate the maintenance function to another person or body where necessary or appropriate.

MAINTENANCE RECORDS

It is recommended that log sheets to record the completion of the maintenance are developed from the tables as specified in AS 1851-2005 Section 7.

7.2 SMOKE AND HEAT-DETECTION SYSTEM

BCA: Clause 4 of
Specification E2.2a
Reference: AS 1670

PURPOSE

A smoke-detection and alarm system is installed to sense and provide warning of a fire in its initial development stage. Proper operation of this system will afford the building occupants the maximum amount of time to seek safe refuge.

REQUIREMENTS OF THE EQUIPMENT

A smoke-detection system must automatically:–

- a) Sense the presence of a fire and advise its location; and
- b) Advise the fire brigade if required; and

If installed:–

- a) Switch the air handling system into the smoke ventilating mode; and
- b) Activate the closure of smoke and fire-isolating doors; and
- c) Activate necessary fire pumps.

In kitchens and other areas where the use of the area is likely to result in smoke detectors causing spurious signals, heat detectors may be installed in lieu of smoke alarms or an alarm acknowledgement facility may be installed. If the kitchen or other area is sprinklered then heat alarms need not be installed.

In addition to these automatically activated functions, the alarm system may have a manual means of activation.

METHOD OF OPERATION

Detectors of differing types are installed throughout the building to comply with AS 1670. The Standard designates the location and the suitable detector type to be installed.

A signal from a detector is relayed to the control and indicating equipment in the system, which activates the various responses listed above.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require the facilities to be inspected monthly. It should be noted that this is the lowest level of maintenance routines required by AS 1851-2005 Section 6. More rigorous routines are also required and are outlined below. The owner may delegate this function to another person or body where necessary or appropriate.

The intervals of inspection and service are detailed in AS 1851-2005 Section 6:–

- Monthly
- Six-monthly
- Yearly
- Five-yearly

MAINTENANCE RECORDS

It is recommended that log sheets to record the completion of the maintenance are developed from the tables as specified in AS 1851-2005 Section 6.

7.3 ATRIUM FIRE-DETECTION AND ALARM SYSTEMS

BCA: Clause 4 of
Specification G3.8
Reference: AS1670.1

PURPOSE

A fire-detection and alarm system installed within an atrium is to sense and provide warning of a fire in its initial development stage. The *Building Code of Australia (BCA)* includes variations to AS 1670.1. The reason for these additional requirements is there is an additional fire hazard associated with an atrium and for the occupants evacuating them.

REQUIREMENTS OF THE EQUIPMENT

A fire-detection and alarm system must be installed in accordance with AS 1670.1 with the following additions for atriums:–

- a) Smoke-detection within an atrium:
 - a. Must be provided within all outside air intakes and at individual floor return air intakes of all air handling systems to initiate automatic fire mode operation, and where applicable, comply with the restart facilities in AS/NZS 1668.1; and
 - b. Must operate at an obscuration level not greater than 0.5% per metre with compensation for external airborne contamination as necessary; and
 - c. Must sample air within the atrium and in storeys where the bounding wall is set back more than 3.5 m from the atrium well; and
 - d. Must be calibrated to compensate for smoke dilution where sampling occurs within return air path common to more than one room; and
 - e. May incorporate beam type detectors to sense smoke in an atrium in a Class 5, 6, 7 or 8 building with an effective height of not more than 25 m if:
 - i. the beam detectors are located at intervals of not more than three storeys; and
 - ii. arranged to scan at 90 degrees orientation to adjacent beam units.
- b) Smoke-detection systems must be located at all return and relief air openings associated with the building air handling systems and be:
 - a. Of the sampling type system; or
 - b. The point type optical smoke detector.
- c) Alarm systems must include the following:
 - a. A break-glass fire alarm point must be provided at each door to a fire-isolated stairway, fire-isolated ramp, or fire-isolated passageway.
 - b. A staged alarm must be provided where an air sampling type smoke detection system is provided for the atrium, and must operate as follows:
 - i. Alert building management when abnormal smoke levels of 0.03% obscuration per metre are detected; and
 - ii. Initiate a second alarm to management and start all smoke control systems including pressurisation of escape routes when smoke levels of 0.07% obscuration per metre are detected; and
 - iii. Automatically call the fire brigade, activate the emergency warning and intercommunication systems, and de-activate all plant not necessary for fire safety within the building when smoke levels of 0.09% obscuration per metre are detected.
 - c. Beam and point type smoke detectors required must simultaneously operate all functions referred to above and activate at the level set out in AS/NZS 1668.1.

METHOD OF OPERATION

The method of operation has been detailed in Section 7.2 of this manual except where noted above.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require the fire-detection and alarm system within an atrium to be maintained in accordance with the provisions of AS 1851-2005 Section 6. It is recommended that the provisions for fire-detection and alarm systems in atriums be maintained in conjunction with smoke detection systems as detailed in Section 7.2 of this manual. The owner may delegate this function to another person or body where necessary or appropriate.

The intervals of inspection and service are detailed in AS 1851-2005 Section 6:–

- Monthly
- Six-monthly
- Yearly
- Five-yearly

MAINTENANCE RECORDS

It is recommended that log sheets to record the completion of the maintenance are developed from the tables as specified in AS 1851-2005 Section 6.

Occupant Warning Systems

8.1	EMERGENCY WARNING AND INTERCOMMUNICATION SYSTEM	2
8.2	BUILDING OCCUPANT WARNING SYSTEM	4

8.1 EMERGENCY WARNING AND INTERCOMMUNICATION SYSTEM

BCA: E4.9
Clause 6 of
Specification G3.8
Reference: AS 1670.4

PURPOSE

An emergency warning and intercommunication system (EWIS) is installed in a building to alert occupants in the event of an emergency and enable an orderly evacuation of the building.

REQUIREMENTS OF THE EQUIPMENT

To fulfil its function, the EWIS must have the following facilities:–

- a) A master emergency control panel (MECP); and
- b) Any necessary additional emergency control panels (ECP); and
- c) The necessary distribution system to transmit a warning signal to each evacuation zone in the building; and
- d) A warden intercommunication point (WIP) located on each floor or in each evacuation zone; and
- e) A notice at each ECP giving clear instructions on how to operate this equipment correctly; and
- f) An interconnection with the building fire alarm system.

To ensure the system fulfils its purpose, it is essential that all staff/personnel located in the building are given training in identification of the 'alert' and 'evacuation' signals, both audible and visible, and take part in an evacuation exercise.

METHOD OF OPERATION

A key requirement for this system is the appointment of a house warden and a zone warden for each evacuation zone in the building.

These people should be appointed and trained to fulfil their respective roles.

In addition, each member of staff should be advised of the house and zone wardens appointed, their duties, and the authority designated to these wardens.

On activation of the fire alarm system, the EWIS shall transmit the 'alert' signal until manual control of the system is established. If manual control is not established in the pre-determined time for the system, the 'evacuate' signal is automatically transmitted.

The 'alert' signal must also be capable of manual initiation from each ECP and WIP.

If manual control is established, the house warden:–

- Attends the MECP; and
- Gathers information on the incident; and
- Makes a decision on evacuation; and
- Advises the zone wardens of his decision; and
- Supervises the evacuation if ordered; and
- Becomes the focal point of contact with responding emergency services.

MAINTENANCE CHECKS

The maintenance routines in AS 1851-2005 Sections 9 and 10 require testing and checking of the system:–

- Monthly
- Six-monthly
- Yearly
- Five-yearly

Full details of the required monthly, six-monthly and yearly maintenance routines and the maintenance checks are detailed in AS 1851-2005 Sections 9 and 10.

These regular checks provide an opportunity to ensure the system is fully operational and to ensure all personnel are familiar with the warning system.

Before carrying out a simulated fire call to test the EWIS, the monitoring service receiving the alarm system shall be notified of the impending test. The building owner could be charged for the fire brigade's attendance at a false alarm.

Any necessary corrective action must be carried out as soon as practicable, to ensure the system is fully operational at all times.

MAINTENANCE RECORDS

The following documents, required under AS 1670.4, must be provided for an EWIS by the suppliers of the system:-

- a) Operator's manual – this must give the necessary instruction on how to make the system work; and
- b) An as-installed drawing showing the whole system; and
- c) A bound log book, with numbered pages, showing the following information:-
 - i. Identification of the building; and
 - ii. Description of the system components and their location; and
 - iii. All commissioning data needed for future maintenance, including:
 1. All the necessary discharge rates and charging information for the batteries; and
 2. Location and items of equipment not at the ECP; and
 3. Maximum audio power available for each evacuation zone; and
 4. The actual audio power required for each evacuation zone; and
 5. Date of commissioning; and
 6. Pages to record the results of the monthly, six-monthly and yearly maintenance routines.

It is recommended that log sheets to record the completion of the maintenance are developed from the tables as specified in AS 1851-2005 Sections 9 and 10.

8.2 BUILDING OCCUPANT WARNING SYSTEM

BCA: Clause 8 of
Specification E1.5,
Clause 6 of
Specification E2.2a

Reference: AS 1670.4

PURPOSE

A building occupant warning system is installed in a building to alert occupants in the event of an emergency and enable an evacuation of the building.

REQUIREMENTS OF THE EQUIPMENT

To fulfil its function, the building occupant warning system must have:–

- a) A sound system for emergency purposes in accordance with AS 1670.4, initiated by the fire-detection system. The fire alarm system shall monitor the sound system for fault signals required by AS 1670.4; or
- b) Electronic sounders, or amplified sound systems producing the evacuation signal (with or without verbal message); or
- c) The evacuation signal shall operate simultaneously throughout the building. At all places where warning signals are conveyed to building occupants, the A-weighted sound pressure level during the 'on' phases of the audible emergency evacuation signal, measured with the time-weighting characteristic F (fast) (see AS 1259.1), shall comply with the following:
 - a. The requirements of ISO 8201; and
 - b. Exceed by a minimum of 10 dB the ambient sound pressure level averaged over a period of 60 sec, not be less than 65 dB(A) and not more than 105 dB(A).

It is recommended that the default evacuation signal complying with ISO 8201 consists of a uniformly increasing frequency during the 0.5 sec on phase of the signal. Other signals may be more appropriate for use where the ambient noise will mask the signal.

Measurement should be taken in the normal standing positions on the floor of coverage.

Additional visual and tactile signals shall be provided to augment the audible emergency evacuation signal if the averaged A-weighted sound pressure level of the background noise is higher than 95 dB. If the audible evacuation signal in the building is intended to arouse sleeping occupants, the minimum A-weighted sound pressure level of the signal shall be 75 dB at the bed head, with all doors closed.

NOTE: 75 dB(A) may not be adequate to awaken all sleeping occupants. Where occupants, such as patients in hospital wards, must not be subject to possible stress imposed by loud noises, the sound pressure level and message content shall be arranged to provide warning for the staff and minimise patient trauma. The signal path to electronic sounders or speakers shall be supervised for open and short circuit conditions.

To ensure the system fulfils its purpose, it is essential that all staff/personnel located in the building are given training in identification of the 'alert' and 'evacuation' signals, both audible and visible, and take part in an evacuation exercise.

METHOD OF OPERATION

A key requirement for this system is the appointment of a house warden and a zone warden for each evacuation zone in the building.

These people should be appointed and trained to fulfil their respective roles.

In addition, each member of staff should be advised of the house and zone wardens appointed, their duties, and the authority designated to these wardens.

On activation of the fire alarm system, the building occupant warning systems shall transmit the 'alert' signal. In the pre-determined time for the system, the 'evacuate' signal is automatically transmitted.

The 'alert' signal must also be capable of manual initiation from each Emergency Control Panel (ECP) and Warden Intercom Phone (WIP).

MAINTENANCE CHECKS

The maintenance routines in AS 1851-2005 Section 9 require testing and checking of the system:–

- Monthly
- Six-monthly
- Yearly
- Five-yearly

Full details of the required maintenance routines and maintenance checks are detailed in AS 1851-2005 Section 9.

These regular checks provide an opportunity to ensure the system is fully operational, and to ensure all personnel are familiar with the warning system.

Before carrying out a simulated fire call to test the building occupant warning system, the monitoring service receiving the alarm system, if required to be monitored, shall be notified of the impending test. The building owner could be charged for the fire brigade's attendance at a false alarm.

Any necessary corrective action must be carried out as soon as practicable, to ensure the system is fully operational at all times.

MAINTENANCE RECORDS

The following documents must be provided by the suppliers of the system:–

- a) Operator's manual – this must give the necessary instruction on how to make the system work; and
- b) An as-installed drawing showing the whole system; and
- c) A bound log book, with numbered pages, showing the following information:
 - i) identification of the building; and
 - ii) description of the system components, and their location; and
 - iii) all commissioning data needed for future maintenance, including:
 - a) all the necessary discharge rates and charging information for the batteries; and
 - b) location and items of equipment not at the ECP; and
 - c) maximum audio power available for each evacuation zone; and
 - d) the actual audio power required for each evacuation zone; and
 - iv) date of commissioning; and
 - v) pages to record the results of the monthly and six-monthly maintenance routines.

It is recommended that log sheets to record the completion of the maintenance are developed from the tables as specified in AS 1851-2005 Section 9.

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→ Lifts



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Lifts

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9.1 STRETCHER FACILITIES IN LIFTS

BCA: E3.2
AS 1735

PURPOSE

To provide adequate dimensions in a lift car to allow the use of a stretcher when a person is injured in a building where ambulance personnel may be required to evacuate them.

REQUIREMENTS OF THE EQUIPMENT

In addition to the normal requirements for safe operation, the emergency lift must:–

- a) Be installed in accordance with AS 1735.2; and
- b) Have the following minimum clear space dimensions – 600 mm wide x 2000 mm long x 1400 mm high; and
- c) Must be able to accommodate a raised stretcher with a patient on it horizontally.

MAINTENANCE CHECKS

Under the requirements of the *Occupational Health and Safety (Plant) Regulations 1995*, Clause 902 Part 2, an employer having control or management of a lift is required to ensure any risk to people travelling in the lift or associated with its use must be eliminated or reduced as far as is practicable.

AS 1735.2 Appendix E requires periodic inspection and testing of every installation at intervals of not more than one year and regular maintenance of installations at more frequent intervals. Maintenance should be carried out in accordance with the manufacturer's instructions and the periodic testing shall be carried out in accordance with AS 1735.10.

As well as the above requirement for maintaining the lift the yearly inspection must include a check of the minimum required clear space dimensions.

It is the owner's responsibility to ensure a maintenance program is carried out effectively.

MAINTENANCE RECORDS

Records of periodic maintenance should be maintained and provided by your maintenance contractor.

A record of the yearly inspection must record:–

- a) Dates the yearly inspections occurred; and
- b) Name of the person conducting the inspections; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date the rectification occurred; and
- f) Signature of the person conducting the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

9.2 EMERGENCY LIFTS

BCA: E3.4
Reference: AS 1735

PURPOSE

To enable emergency services personnel to access any floor of the building normally serviced by the lift and carry out emergency procedures and assist in occupant evacuation.

REQUIREMENTS OF THE EQUIPMENT

In addition to the normal requirements for safe operation, the emergency lift must: -

- a) Be installed in accordance with AS 1735.2; and
- b) Be provided with a fire service control on the nominated floor, to enable exclusive control of the lift; and
- c) Be provided with a fire service control switch inside the lift car; and
- d) Be provided with signs saying 'fire service', at the switch on the nominated floor and in the lift car; and
- e) Have minimum dimensions suitable to accommodate a person on a stretcher if required; and
- f) Have an identification label 'special fire lift' on the mains supply switch for this lift.

MAINTENANCE CHECKS

Under the requirements of the *Occupational Health and Safety (Plant) Regulations 1995*, Clause 902 Part 2, an employer having control or management of a lift is required to ensure any risk to people traveling in the lift or associated with its use must be eliminated or reduced as far as is practicable.

AS 1735.2 Appendix E requires periodic inspection and testing of every installation at intervals of not more than one year and regular maintenance of installations at more frequent intervals. Maintenance should be carried out in accordance with the manufacturer's instructions.

It is the owner's responsibility to ensure a maintenance program is carried out effectively.

MAINTENANCE RECORDS

Records of periodic maintenance should be maintained and provided by the maintenance contractor.

A record of the yearly inspection must record:-

- a) Dates the yearly inspections occurred; and
- b) Name of the person conducting the inspections; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date the rectification occurred; and
- f) Signature of the person conducting the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

9.3 PASSENGER LIFT FIRE SERVICE CONTROLS

BCA: E3.7
Reference: AS 1735

PURPOSE

In a passenger lift designed in accordance with AS 1735 Part 1 or 2, all lift cars serving any storey above an effective height of 12 m must be fitted with fire service controls.

REQUIREMENTS OF THE EQUIPMENT

In addition to the normal requirements for safe operation, a lift fitted with fire service controls must:–

- a) Be installed in accordance with AS 1735.2; and
- b) Be provided with a fire service control on the nominated floor, to enable exclusive control of the lift; and
- c) Be provided with a fire service control switch inside the lift car; and
- d) Have signs saying 'fire service', at the switch on the nominated floor and in the lift car.

MAINTENANCE CHECKS

The fire service controls should be included as part of the yearly maintenance and inspection of the lift facility as set out in Sections 9.1 and 9.2.

It is the owner's responsibility to ensure a maintenance program is carried out effectively.

A log sheet to record this information is provided in Appendix C of this manual.

Standby Power Supply Systems

10.1 STANDBY POWER SUPPLY SYSTEM

BCA: E3.4, Clause 6 of
Specification G3.8

PURPOSE

An emergency power supply is required to ensure the operation of required safety systems in the event of mains power failure.

REQUIREMENTS OF THE EQUIPMENT

An emergency power supply must:–

- a) Be connected automatically if the normal power supply fails; and
- b) If located within the building, be separated from the remainder of the building by an enclosure with the required fire-resistance rating; and
- c) Be connected to the required safety systems by suitable fire-resisting cabling.

The power supply can be provided by one of the following:–

- a) Two separate cables feeding into the substation; or
- b) Two or more separate supplies coming from separate substations outside the building; or
- c) Supplied from a generating set capable of starting and taking the necessary electrical load within 30 seconds of failure of the mains supply.

METHOD OF OPERATION

On failure of the main electrical supply, the system must:–

- a) Automatically switch over to the alternate supply, providing power to at least the required safety systems.
- b) If provided by a generating set:–
 - Start the engine; and
 - Bring the engine up to full operating speed; and
 - Provide power to at least the required safety systems, within 30 seconds of mains failure.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require that emergency power supplies be tested six-monthly. The owner may delegate this function to another person or body where necessary or appropriate.

Where the alternative supply is provided externally to the premises by the power supply authority, it is recommended that the power supply authority is contacted, to request that it test the automatic changeover switching facility, which in most cases is part of its supply equipment.

If the building surveyor has a generating set, maintenance routines are recommended to be carried out at the following intervals:–

- Weekly
- Monthly
- Six-monthly

Generating set:

WEEKLY

1. Check water and oil levels. Top up if necessary; and
2. Check required spares are on hand – belts, filter cartridges, engine oil; and

3. Where batteries are installed, check batteries and charger for:–
 - a) Freedom from corrosion on terminals and in battery compartment; and
 - b) Correct electrolyte level, top up if necessary; and
 - c) Voltage per cell – using a voltmeter, ensure voltage is not less than 2 volts for lead-acid, batteries, 1.5 volts for nickel-cadmium (If voltage is less, have charger checked by a qualified person).
4. Start the engine by simulating a power failure (turn off monitoring circuit), run engine for at least 10 minutes, then check for the following:–
 - a) Visually check for water, oil or fuel leaks, loose fittings or ancillary equipment; and
 - b) Visually check belt drives; and
 - c) Correct operation of battery charging alternator or generator (check volt meter); and
 - d) Battery charger power-failure alarm, if fitted; and
 - e) Excessive vibration or heat; and
 - f) Correct running speed; and
 - g) After running and shutting down:
 - i) Check water, oil and fuel levels. Top up if necessary; and
 - ii) Ensure any strainer or filter, if fitted, on the engine water cooling system, is checked and cleaned; and
 - iii) Ensure the engine 'stop' mechanism automatically returns to the start position.

MONTHLY

1. Start the engine using the manual control, run the engine at rated speed for at least 30 minutes, and check for correct operating temperature; and
2. Carry out the weekly procedures.

SIX-MONTHLY

1. Carry out the weekly and monthly procedures.
2. Check, clean and replace, if necessary, engine-fuel sludge and sediment trap, fuel, oil and air filters.
3. Change lubricating oil, if advised by engine manufacturer at this frequency (If not, change at least yearly).

MAINTENANCE RECORDS

The following records are required:–

Six-monthly test

The following information must be entered in your log book:

- a) The date of test and time conducted.
- b) Execution of test-satisfactory or otherwise.
- c) Any maintenance work required.
- d) Name of person carrying out test.
- e) Signature of person carrying out test.

Log book sheets for this purpose are included in Appendix C of this manual.

Building Clearances and Fire Appliances

11.1	OPEN SPACE AROUND LARGE ISOLATED BUILDINGS	2
11.2	VEHICULAR ACCESS AROUND LARGE ISOLATED BUILDINGS	3

11.1 OPEN SPACE AROUND LARGE ISOLATED BUILDINGS

BCA: C2.3 to C2.4

PURPOSE

Where a building is permitted to be constructed in excess of the floor area requirements of the *Building Code of Australia*, open space is required around the building.

REQUIREMENTS

Open space must:–

- a) Be wholly within the allotment; and
- b) Include emergency vehicle access; and
- c) Not be used for storage or processing materials; and
- d) Not be built upon except for guardhouses and service structures such as electricity substations and pump houses.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of this facility to confirm open space is maintained and no encroachment has been made into this area. The owner may delegate this function to another person or body where necessary or appropriate.

MAINTENANCE RECORDS

The following information must be recorded:–

- a) The date of the check or inspection; and
- b) The name and status of the person carrying out the task; and
- c) Any problems identified; and
- d) Date these problems were rectified; and
- e) Signature of the person inspecting.

Log sheets for this purpose are provided in Appendix C of this manual.

11.2 VEHICULAR ACCESS AROUND LARGE ISOLATED BUILDINGS

BCA: C2.3 to C2.4

PURPOSE

Where a building is permitted to be constructed in excess of the floor area requirements of the *Building Code of Australia*, vehicular access is required around that building for emergency services.

REQUIREMENTS

Vehicular access must:–

- a) Be capable of providing emergency vehicles access from a public road; and
- b) Have a minimum unobstructed width of six metres, with no part of this six metres further than 18 metres from the building, built upon, or used for any purpose other than vehicle or pedestrian movement; and
- c) Provide reasonable pedestrian access to the building from the vehicular access; and
- d) Have load-bearing capability and unobstructed height to allow passage and operation of fire-fighting vehicles.

If a public road adjoining the building fulfils these requirements, it may be used to serve this purpose.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of this facility to confirm access is maintained and no encroachment has been made into this access area. The owner may delegate this function to another person or body where necessary or appropriate.

MAINTENANCE RECORDS

The following information must be recorded:–

- a) The date of the check or inspection; and
- b) The name and status of the person carrying out the task; and
- c) Any problems identified; and
- d) Date these problems were rectified; and
- e) Signature of the person inspecting.

Log sheets for this purpose are provided in Appendix C of this manual.

Mechanical Ventilation

12.1	AIR CONDITIONING SYSTEMS	2
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12.3	WARM WATER SYSTEMS	8

12.1 AIR CONDITIONING SYSTEMS

BCA: E2.2,
Reference: AS 1668.2, AS3666

PURPOSE

A mechanical air handling system must safeguard occupants from illness or loss of amenity due to lack of air freshness.

SYSTEM AND EQUIPMENT

The following systems and equipment are included within the scope of this section:–

- Air conditioning systems, including air handling systems and thermal plant systems incorporating condenser water systems.
- Ventilation systems, including car park, evaporative cooling systems and general exhaust systems.
- Smoke spill and smoke control systems including stair pressurisation systems.
- Kitchen exhaust systems.
- System components including fire dampers, humidifiers, electric duct heaters, etc.

REQUIREMENTS OF THE EQUIPMENT

A mechanical air handling system must:–

- a) Be installed in accordance with AS 1668.1, 2 and AS/NZS 3666.1 and 2; and
- b) Deliver adequate amounts of outdoor air and provide sufficient circulation; and
- c) Remove contaminants present in the compartment or building to maintain an acceptable air quality.

METHOD OF OPERATION

Air conditioning and mechanical ventilation system mode of operation are typically classified as Normal Mode and Fire Mode.

Normal Mode

Systems operate in this mode to maintain acceptable indoor air quality when the building is occupied. Controls may be either manual or automatic.

Fire Mode

In the event of a fire being detected or reported via the fire alarm system, air conditioning and mechanical ventilation systems are required to change over to fire mode operation. Systems required to shut down in fire mode shall be proven to shut down in accordance with AS 1851-2005 Clause 18.4.2.

An automatic air handling system must be provided with manual override operation.

Automatic operation can be accomplished by:–

- Time clock switching; or
- Thermostat-controlled switching; or
- Atmospheric contaminant monitoring.

MAINTENANCE CHECKS

To ensure the ongoing efficiency of an air handling system after installation, AS 3666.2 sets out minimum maintenance requirements to ensure health standards are not compromised.

The maintenance of these systems is an ongoing responsibility. This is a requirement of the *Regulations* and AS 3666.2

Maintenance of an air handling system can be carried out by the owner or this function can be delegated to another person or body where necessary or appropriate.

To ensure full compliance with this requirement, a maintenance program must be prepared, including:–

- a) All data relevant to the air handling system; and
- b) A formal strategy and recording system for effective management of a series of maintenance procedures.

The maintenance program must be implemented in accordance with the information and requirements of the maintenance routines set down in of AS/NZS 3666.2 Section 2. A full description of the requirements for the maintenance of air handling systems, heated water systems and cooling water systems is included and involves routines to be carried out monthly, quarterly, six-monthly and annually.

Systems, which include devices such as automatic air quality monitoring systems for car park ventilation systems and the like, are covered in Appendix M of AS 1668.2. Owners should also refer to Section 6 for the maintenance requirements of air handling systems that are used for smoke control.

Operating and maintenance manuals must be available for all equipment in the system.

OTHER MATTERS TO CONSIDER – COOLING TOWERS

The *Building Act 1993* requires the registration of all cooling tower systems and the development of a Risk Management Plan (RMP) for each cooling tower system.

The *Building (Legionella Risk Management) Regulations 2001* specify the risks that an RMP must address. The *Health (Legionella) Regulations 2001* also prescribe maintenance, testing and associated record-keeping relating to cooling tower and warm water systems that a responsible person must comply with. 'Responsible person' means the person who owns, manages, or controls the cooling tower system or warm water system.

COOLING TOWER MAINTENANCE

The responsible person must ensure that any cooling tower system that the responsible person owns, manages or controls is maintained and tested in the manner set out in the *Health (Legionella) Regulations 2001*, unless the system is shut down, or is otherwise not in use, and is completely drained of water.

Water quality and treatment

- a) Ensure that the water of the cooling tower system is maintained in a clean condition.
- b) Ensure that the water of the cooling tower system is continuously treated with:–
 - a. one or more biocides to effectively control the growth of micro-organisms, including Legionella; and
 - b. chemicals or other agents to minimise scale formation, corrosion and fouling.

Disinfection, cleaning and re-disinfection

- a) Ensure that a chlorine-compatible bio-dispersant is added to the recirculating water of the cooling tower system, and that the system is then disinfected, cleaned and re-disinfected:–
 - a. immediately prior to initial start-up following commissioning, or any shut-down period of greater than one month; and
 - b. at intervals not exceeding six months.

Routine inspections and testing

- a) Ensure that the cooling tower system is inspected at least once each month to check that the system is operating without defects; and
- b) Ensure that at least once each month a sample of the recirculating water of the cooling tower system is taken and is delivered to a laboratory for testing and reporting on for heterotrophic colony count.

High heterotrophic colony count detected in cooling tower system

- a) Within 24 hours of receiving a report that any sample of water taken from the cooling tower system has a heterotrophic colony count exceeding 100 000 colony forming units per millilitre, the responsible person must ensure that the following procedure is implemented:–
 - a. the water of the system must be manually treated with additional quantities of biocide, or with an alternative biocide; and
 - b. the water treatment program, tower operation and maintenance program of the system must be reviewed; and
 - c. any faults must be corrected and any changes necessary to prevent a re-occurrence of those faults must be implemented.
- b) Between two and four days ensure that a further sample of the recirculating water of the system is taken and is delivered to a laboratory for testing and reporting on for heterotrophic colony count.
- c) Within 24 hours of receiving a report that a sample taken has a heterotrophic colony count exceeding 100,000 colony forming units per millilitre, the responsible person must ensure that the water of the cooling tower system is disinfected, cleaned and re-disinfected.
- d) Between two and four days after the water has been re-disinfected, the responsible person must ensure that a further sample of the recirculating water of the cooling tower system is taken and is delivered to a laboratory for testing and reporting on for heterotrophic colony count.
- e) If, after following the above procedures, the heterotrophic colony count still exceeds 100,000 colony forming units per millilitre, the responsible person must:–
 - a. ensure that the steps are repeated until the heterotrophic colony count does not exceed 100,000 colony forming units per millilitre in two consecutive water samples taken approximately one week apart; or
 - b. close the cooling tower system until the problem has been remedied.

What if Legionella is detected in cooling tower system?

- a) Within 24 hours of receiving a report that Legionella has been detected in a water sample taken from a cooling tower system that is not associated with any suspected or known case of legionellosis, the responsible person must ensure that the following procedure is implemented:–
 - a. the cooling tower system must be disinfected; and
 - b. the water treatment program, tower operation and maintenance program of the system must be reviewed; and
 - c. any faults must be corrected and any changes necessary to prevent a re-occurrence of those faults must be implemented.
- b) Between two and four days after the disinfection has been completed, the responsible person must ensure that a further sample of the recirculating water of the system is taken and is delivered to a laboratory for testing and reporting on for Legionella.
- c) Within 24 hours of receiving a report that Legionella has been detected in a sample taken, the responsible person must ensure that the water of the cooling tower system is disinfected, cleaned and re-disinfected.
- d) Between two and four days after the disinfection has been completed, the responsible person must ensure that a further sample of the recirculating water of the system is taken and is delivered to a laboratory for testing and reporting on for Legionella.
- e) If Legionella is still detected, the responsible person must:–
 - a. ensure that the steps above are repeated until Legionella is not detected in two consecutive water samples taken approximately one week apart; or
 - b. close the cooling tower system until the problem has been remedied.

- f) If, while following the procedure of this part, Legionella is detected in three consecutive water samples taken from the same system, the responsible person must notify the Secretary to the Department of Human Services of the detection of the presence of that organism:–
 - a. immediately by telephone; and
 - b. by notice in writing within three days of the detection of the organism on the third occasion.

MAINTENANCE RECORDS

To ensure proper control of the maintenance program, the following documentation should be provided:–

Operating and maintenance manuals should be provided for all plant, equipment and systems that are the subject of this Standard. Operating and maintenance manuals shall include at least the following:

- a) Physical details of the plant, equipment and systems; and
- b) Recommendations on maintenance, including water treatment maintenance and management; and
- c) Recommended cleaning, disinfection and emergency decontamination procedures; and
- d) Start-up, operating and shut-down procedures; and
- e) Particulars of the maintenance management program.

Maintenance records shall contain at least the following information:

- a) Date, item of plant, equipment or system and nature of service performed; and
- b) Details of defects found and rectification procedure undertaken; and
- c) The name of the person or company performing the service.

Log sheets to record the completion of the maintenance routines are included in Appendix C of this manual.

Log sheets for the testing of cooling towers should be developed in accordance with the requirements of the *Health (Legionella) Regulations 2001*.

12.2 HOT WATER SYSTEMS

Reference: AS 3500
AS 3666

PURPOSE

A hot water system must safeguard occupants from illness or loss of amenity due to the effect of microbial factors.

Hot water systems are defined as systems that maintain a water temperature above 60 degrees Celsius.

SYSTEM AND EQUIPMENT

The following systems and equipment are included within the scope of this section:–

- a) Water treatment units.
- b) Water tanks and vessels.
- c) Valves – the following temperature control valves:
 - i. Temperature/pressure-relief valves.
 - ii. Expansion-control valves.
 - iii. Thermostatic mixing valves.
 - iv. Tempering valves.
 - v. Other associated valves/devices.

REQUIREMENTS OF THE EQUIPMENT

A hot water system must be installed in accordance with AS 3500.4 and AS/NZS 3666.1 and 2.

MAINTENANCE CHECKS

To ensure the ongoing efficiency of a hot water system after installation, AS 3666.2 sets out minimum maintenance requirements to ensure health standards are not compromised.

Maintenance of a hot water system should be carried out by a person or body where necessary or appropriate with experience in microbial control and should include the following items:–

- a) Water treatment units – Where installed, water treatment units shall be inspected periodically to ensure proper operation.
- b) Vessels and tanks – All vessels and tanks shall be inspected and cleaned periodically.
- c) Valves – The following temperature control valves shall be inspected periodically to ensure proper operation.
 - i. Temperature/pressure-relief valves.
 - ii. Expansion-control valves.
 - iii. Thermostatic mixing valves.
 - iv. Tempering valves.
 - v. Other associated valves/devices

To ensure full compliance with this requirement, a maintenance program must be prepared, including:–

- a) All data relevant to the hot water system; and
- b) A formal strategy and recording system for effective management of a series of maintenance procedures.

The maintenance program must be implemented in accordance with the information and requirements of the maintenance routines set down in of AS/NZS 3666.2. This Standard recommends that maintenance must be undertaken in accordance with the provisions of AS3500.4.

In order to ensure maximum performance and length of operation, AS 3500.4 requires that water heaters shall be periodically inspected in accordance with the manufacturer's instructions.

MAINTENANCE RECORDS

To ensure proper control of the maintenance program, the following documentation should be provided:–

Operating and maintenance manuals should be provided for all systems. These manuals shall include at least the following:–

- a) Physical details of the systems; and
- b) Recommendations on maintenance, including water treatment maintenance and management; and
- c) Recommended cleaning, disinfection and emergency decontamination procedures; and
- d) Start-up, operating and shut-down procedures; and
- e) Particulars of the maintenance management program.

Maintenance records shall contain at least the following information:

- a) Date, item of plant, equipment or system and nature of service performed; and
- b) Details of defects found and rectification procedure undertaken; and
- c) The name of the person or company performing the service.

Log sheets to record the completion of the maintenance routines should be developed from the manufacturer's information provided for the hot water system.

12.3 WARM WATER SYSTEMS

Reference: AS 3500
AS 3666

PURPOSE

A warm water system must safeguard occupants from illness or loss of amenity due to the effect of microbial factors. Warm water systems are defined as systems that maintain a water temperature between 30 and 60 degrees Celsius.

SYSTEM AND EQUIPMENT

The following systems and equipment are included within the scope of this section:–

- a) Water treatment units.
- b) Water tanks and vessels.
- c) Valves – the following temperature control valves;
 - a. Temperature/pressure-relief valves.
 - b. Expansion-control valves.
 - c. Thermostatic mixing valves.
 - d. Tempering valves.
 - e. Other associated valves/devices.

REQUIREMENTS OF THE EQUIPMENT

A warm water system must be installed in accordance with AS 3500.4 and AS/NZS 3666.1 and 2.

MAINTENANCE CHECKS

To ensure the ongoing efficiency of a hot water system after installation, AS 3666.2 sets out minimum maintenance requirements to ensure health standards are not compromised.

Where necessary or appropriate, maintenance of warm water systems should be carried out by a person or body with experience in microbial control.

Owners should also note that the *Health (Legionella) Regulations 2001* also prescribe maintenance, testing and associated record-keeping relating to warm water systems that a responsible person must comply with. 'Responsible person' means the person who owns, manages, or controls the cooling tower system or warm water system.

To ensure full compliance with this requirement, a maintenance program must be prepared, including:–

- a) All data relevant of the warm water system; and
- b) A formal strategy and recording system for effective management of a series of maintenance procedures.

The *Health (Legionella) Regulations 2001* prescribe the following maintenance:–

Start-up following commissioning

Ensure that the warm water system is disinfected by heat or chlorination and cleaned immediately prior to initial start-up following commissioning, or any shut-down period of greater than one month.

Routine disinfection

Ensure that the warm water system is disinfected by one or more of the following methods—

- a) At least once each month by heat or chlorination; or
- b) Continuously by means of automatic low level chlorination; or
- c) Continuously by means of ultra-violet light treatment.

Routine testing

If the method of disinfection of a warm water system is by ultra-violet light treatment, ensure that a sample of the water of the system is taken and is delivered to a laboratory for testing and reporting on for Legionella:–

- a) At intervals not exceeding one month for a period of 12 months; and
- b) If Legionella is not detected in any sample taken and delivered to a laboratory for testing during the previous 12 months, at intervals not exceeding three months for so long as Legionella remains undetected in the system; and
- c) If Legionella is detected in any sample taken and delivered to a laboratory for testing during the previous 12 months, then according to the intervals specified in paragraph (a).

Additional testing for premises where overnight accommodation and health or welfare services are provided

- a) If a warm water system serves premises where overnight accommodation and health or welfare services are provided, ensure that samples of the water are taken from different outlets of the system and delivered to a laboratory for testing and reporting on for Legionella;
- b) If the method of disinfection is by heat or chlorination or low level chlorination:–
 - i. at intervals not exceeding three months for a period of 12 months; and
 - ii. if Legionella is not detected in any sample taken and delivered to a laboratory for testing during the previous 12 months, at intervals not exceeding six months for so long as Legionella remains undetected in the system; and
 - iii. if Legionella is detected in any sample taken and delivered to a laboratory for testing during the previous 12 months, then according to the intervals specified in sub-paragraph (i).
- c) If the method of disinfection is by ultra-violet light treatment or by a method approved under regulation 17(d) of *Health (Legionella) Regulations 2001*, according to the intervals specified in regulation 18 of those regulations;
- d) If the system is disinfected at least each month, the samples must be taken just prior to the disinfection.

Warm water outlets

- a) Ensure that at least once during each week all outlets of the warm water system not in use for seven days or more are flushed at full flow.
- b) The period of flushing must be sufficient to remove all stagnant water leading to the outlet, and until the temperature at which the system is set is reached at the outlet.

Thermostatic mixing valves

The responsible person must ensure that all thermostatic mixing valves of warm water systems are cleaned and maintained at least once in each calendar year.

MAINTENANCE RECORDS

To ensure proper control of the maintenance program, the following documentation should be provided:–

Operating and maintenance manuals should be provided for all systems. Operating and maintenance manuals shall include at least the following:

- a) Physical details of the systems; and
- b) Recommendations on maintenance including water treatment maintenance and management; and
- c) Recommended cleaning, disinfection and emergency decontamination procedures; and
- d) Start-up, operating and shut-down procedures; and
- e) Particulars of the maintenance management program.

Maintenance records shall contain at least the following information:

- a) Date, item of plant, equipment or system and nature of service performed; and
- b) Details of defects found and rectification procedure undertaken; and
- c) The name of the person or company performing the service.

Log sheets to record the completion of the maintenance routines should be developed from the manufacturer's information provided for the warm water system.

→ Part 2

Buildings constructed
between 1 July 1994
and 1 May 2004

- Egress and access
- Electrical services
- Fire-detection and suppression equipment
- Fire-resistance
- Mechanical services

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Part 2 – Buildings Constructed between 1 July 1994 and 1 May 2004

The *Building Regulations 2006* and Part 11 of the *Building Regulations 1994* (the *Regulations*) prescribe the requirements for maintenance of buildings built on and after 1 July 1994.

Any essential safety measure in Class 1b, 2, 3, 5, 6, 7, 8 and 9 buildings and places of public entertainment must be maintained, by the owner, to a working condition that enables them to fulfil their purpose and meet the expectations of inspecting authorities.

The *Regulations* make it mandatory for the building surveyor to list the required essential services on the issuing of the occupancy permit. The level of performance to which the service is to be maintained must also be specified on the occupancy permit. In the case of an essential service being provided where no occupancy permit is required, then the relevant building surveyor must determine the level of performance that must be specified in writing and given to the owner.

The *Regulations* list essential safety measures as:

Air conditioning systems	Fire mains
Emergency lifts	Fire-protective coverings
Emergency lighting	Fire-rated access panels
Emergency power supply	Fire-rated control joints
Emergency warning and intercommunication systems	Fire-rated materials applied to building element
Exit doors	Fire-resisting shafts
Exit signs	Fire-resisting structures
Fire brigade connections	Fire shutters
Fire control centres	Fire windows
Fire control panels	Lightweight construction
Fire curtain	Mechanical ventilation systems
Fire dampers	Paths of travel to exits
Fire detectors and alarm systems	Penetrations in fire-rated structures
Fire doors	Smoke alarms
Fire extinguishers (portable)	Smoke control measures
Fire hose reels	Smoke doors
Fire hydrants	Smoke vents
Fire indices for materials	Sprinkler systems
Fire-isolated lift shafts	Stairwell pressurization systems
Fire-isolated passageways	Static water storage
Fire-isolated ramps	Vehicular access for large isolated buildings
Fire-isolated stairs	Warning systems associated with lifts

USE OF AS 1851.1 TO AS 1851.10 - MAINTENANCE OF FIRE PROTECTION EQUIPMENT

Where an essential safety measure has been nominated as using AS 1851 to provide maintenance within this part, details of the level of records to be kept are incorporated in the relevant maintenance sections and schedules of that standard. It is noted that over time this version of AS 1851 may no longer be available and as such log sheets have been provided for AS 1851.1 to AS 1851.10 for historical purposes and to maintain consistency with previous versions of this manual. These log sheets are available in Appendix C of this manual.

It should be noted that where the essential safety measures nominated in this manual do not use AS 1851 as a minimum level of maintenance, log sheets in Appendix C may be modified to suit.

Egress and Access

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1.1 EMERGENCY LIFTS

BCA 1990: E3.4
BCA 1996: EP3.2 (E3.4)
Reference: AS 1735.2
OH&S (Plant)
Regulations. 1995

PURPOSE

To enable emergency services personnel to access any floor of the building normally serviced by the lift and carry out emergency procedures and assist in occupant evacuation.

REQUIREMENTS OF THE EQUIPMENT

In addition to the normal requirements for safe operation, the emergency lift must:-

- a) Be installed in accordance with AS 1735.2; and
- b) Be provided with a fire service control on the nominated floor, to enable exclusive control of the lift; and
- c) Be provided with a fire service control switch inside the lift car; and
- d) Have signs saying 'fire service' at the switch on the nominated floor and in the lift car; and
- e) Have minimum dimensions suitable to accommodate a person on a stretcher; and
- f) Have an identification label 'special fire lift' on the mains supply switch for this lift.

MAINTENANCE CHECKS

Under the requirements of the *Occupational Health and Safety (Plant) Regulations 1995*, Clause 902 Part 2, an employer having control or management of a lift is required to ensure any risk to people travelling in the lift or associated with its use must be eliminated or reduced as far as is practicable.

AS 1735.2 requires periodic inspection and testing of every installation at intervals of not more than one year and regular maintenance of installations at more frequent intervals. Maintenance should be carried out in accordance with the manufacturer's instructions.

It is the owner's responsibility to ensure a maintenance program is carried out effectively.

MAINTENANCE RECORDS

Records of periodic maintenance should be maintained and provided by the maintenance contractor.

A record of the yearly inspection must show:-

- a) Date the yearly inspection occurred; and
- b) Name of the person conducting the inspection; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date the rectification occurred; and
- f) Signature of the person conducting the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

1.2 EXIT DOORS

BCA 1990: Section D
BCA 1996: DP4 (Section D)

PURPOSE

To provide a means of egress from any part of a building.

REQUIREMENTS OF THE EQUIPMENT

To provide sufficient and safe egress from a building, with a minimum of effort and delay and to present a minimum of obstruction in an exit path.

METHOD OF OPERATION

An exit door must be capable of simple operation to fulfil its designed purpose.

It must be able to be opened readily without a key, from the side facing a person seeking their way out, by a single-handed downward or pushing action on a single device located between 900 mm and 1.2 m from the floor.

It could be fitted with a fail-safe device which unlocks the door automatically when any sprinkler, smoke or heat detector system in the building is activated, or open automatically if fitted with a door which is power operated upon malfunction or failure of the power source.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require exit doors to be inspected every three months. The owner may delegate this function to another person or body where necessary or appropriate.

Maintenance checks should be carried out to ensure the exit door is:-

- a) Intact
- b) Operational
- c) Fitted with hardware that conforms to the requirements of the *Building Code of Australia*, Section D (the hardware necessary to enable its operation as outlined above)

MAINTENANCE RECORDS

A sheet to record the maintenance and inspections carried out is included Appendix C of this manual.

1.3 FIRE DOORS

BCA 1990: Spec C3.4
BCA 1996: CP8 (Spec C3.4)
Reference: AS 1905.1
AS 1851.7

PURPOSE

A fire door is installed across an opening in a fire wall to maintain the fire-resistance rating of that fire wall.

REQUIREMENTS OF THE EQUIPMENT

An approved fire-resistant doorset is one that is identical in assembly, construction and installation to a prototype of this door that has been submitted to the standard fire-resistance test, and has fulfilled all the relevant test requirements.

A fire door must be self-closing or close automatically on the operation of an approved sensing device or on the loss of power supply.

Each fire door must have a metal tag attached as required by AS 1905.1, and latchsets and closers should also be marked as required.

METHOD OF OPERATION

On receipt of a signal through the fire alarm system, the hold-open device of automatic closing doorsets must release the door.

Alternatively, when electrical power to that area fails, the electro-magnetic hold-open device must then release the door.

Once released, the fire door must close cleanly and be unimpaired in its operation.

It is essential that no unauthorised means is used to hold open a fire door.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require that a fire door be inspected monthly. It should be noted that this is the lowest level of maintenance required by the Standard and more rigorous routines are also required as indicated below. The owner may delegate this function to another person or body where necessary or appropriate.

Under AS 1851.7, two levels of inspections are required:-

MONTHLY

- a) A visual and physical inspection of the door and its functions.

This inspection must be carried out by the owner or occupier of the premises, or by a suitably qualified representative (i.e.: Maintenance Manager, Fire and Safety Officer).

YEARLY

- a) The routine required for the monthly inspections.
- b) Comparison of each fire doorset with the appropriate specification in the installation log book supplied with the door.
- c) The inspection items specified in Appendix A of AS 1851.7, pages 6 to 8.

This inspection should be carried out or supervised by a person competent and experienced in the field of fire doors.

It is recommended that where any corrective action involves repairs to the door leaf, such repairs should be carried out by the original manufacturer.

The procedures for the monthly and yearly inspections are contained in AS 1851.7.

Before a fire door is rendered unserviceable for maintenance, the following precautions shall be taken by the repairer:-

- a) Advise the owner or occupier so that any necessary precautions can be taken; and
- b) Where the door is to be removed and cannot be re-installed within three hours, the fire brigade nearest to you and the fire station to which the alarm is connected shall be advised; and
- c) If the door protects an opening in a fire-isolated escape route or in a wall required to have a four-hour fire-resistance, permission shall be obtained from the regulatory authority (building surveyor) as well as notice given to the fire brigade as in (b); and
- d) A fire door shall not be rendered unserviceable for maintenance while any fire alarm or fire-suppression system in the building is inoperative.

It is essential all fire doors are maintained in operational condition at all times.

MAINTENANCE RECORDS

To ensure a proper history of each fire door in the premises is retained, the following records must be available and maintained:-

1. A log book,
 - a) Provided by the fire door supplier, showing:
 - a. Identification of the building and its owner; and
 - b. The supplier of the doorset; and
 - c. The date(s) of commissioning of the fire doorsets in the building.
 - b) Identifying each doorset, showing:
 - a. Its identification number; and
 - b. The type of door, its dimensions, and fire-resistance level; and
 - c. The items of hardware installed on it, and where applicable, the markings on that hardware; and
 - d. The items of door furniture fitted; and
 - e. Any subsequent repairs or replacement of any part of the doorset.
 - c) Pages to record the results of Type 1 (monthly) maintenance routines as called for in AS 1851.7; and
 - d) Triplicate pages to record the results of Type 2 (yearly) maintenance routines specified in AS 1851.7; and

The pages of this log book must be numbered.

2. A numbered Certificate of Compliance, supplied by the supplier of the fire doorsets, giving written evidence that:-
 - a) The doorset is identical with a tested prototype; and
 - b) The doorframe has been correctly installed; and
 - c) The installation complies with AS 1905.1.

All details of the required maintenance records, and the required inspection and reporting procedures, are provided in AS 1851.7.

1.4 FIRE ISOLATED PASSAGeways, RAMPS AND STAIRS

BCA 1990: Section C
BCA 1996: Section D

PURPOSE

Fire-isolated passageways, ramps and stairs are to provide occupants with safe egress from a building.

REQUIREMENTS OF THE EQUIPMENT

These elements must be of fire-resistant construction at a level specified in the *Building Code of Australia*.

At the entrance point to these elements, fire doors are to be provided. Fire doors are to be of a specified fire-resistance level, that are either self-closing or have automatic closing facilities linked to smoke or heat detectors, or to a fire alarm or sprinkler system installed in the building.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of these facilities. The owner may delegate this function to another person or body where necessary or appropriate.

It is essential to ensure:-

- a) No unauthorised alterations have been made that could compromise the integrity of their fire-resistance level.
- b) No obstruction has occurred by stacking of goods or equipment within these areas.
- c) No tampering or interference with the self-closing or automatic operation of the fire doors.

Details for the testing and inspection of fire doors is provided in Section 1.3 Fire doors of this Part.

MAINTENANCE RECORDS

The following information must be recorded:-

- a) The dates that monthly and yearly inspections were carried out; and
- b) The name of the person conducting the inspections; and
- c) Any problems identified in the inspections; and
- d) Actions taken to rectify problems identified; and
- e) Date rectification occurred; and
- f) Signature of the person conducting the inspections.

A log sheet to record this information is provided in Appendix C of this manual.

1.5 SMOKE DOORS

BCA 1990: C2.5
Spec C3.4
BCA 1996: CP3 (C2.5, Spec C3.4)
Reference: AS 1851.7
AS 1851.8

PURPOSE

Smoke doors are constructed in smoke walls to restrict the passage of smoke between smoke compartments or walls, or from within a smoke lobby.

REQUIREMENTS OF THE EQUIPMENT

Smoke doors must be constructed so that smoke will not pass from one side of the doorway to the other.

Smoke doors can be of one or two leaves and must:-

- a) Be side-hung to swing:
 - a. in the direction of egress; or
 - b. in both directions; and
- b) Be capable of resisting smoke at 200°C for 30 minutes; and
- c) Have the leaves fitted with smoke seals; and
- d) Have the leaves:
 - a. normally closed; or
 - b. close automatically, with the closing initiated by smoke detectors or power failure; and
- e) Have the leaves close fully after each manual opening; and
- f) If made of glass, have the glazing identifiable by opaque construction.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require maintenance to be carried out monthly to AS 1851.7. It should be noted that this is the lowest level of maintenance required by the Standard and more rigorous routines are also required. The owner may delegate the maintenance function to another person or body where necessary or appropriate

To ensure smoke doors fulfil their designed function, the following is recommended:-

- a) The doors and associated equipment are in working order (seals undamaged, etc.).
- b) No unauthorised means have been incorporated to retain the doors open (wedges, cabin hooks, etc.).
- c) The automatic closing facilities work, i.e.:
 - i) when the smoke detectors operate; or
 - ii) when power failure occurs.

These checks may be carried out in conjunction with the testing of the fire alarm system, as per AS 1851.8.

MAINTENANCE RECORDS

A log book must be maintained to record the inspections of each smoke door. This should show:-

- a) The date of each monthly inspection; and
- b) Any problems identified; and
- c) Measures taken to rectify problems identified; and
- d) Date problems rectified; and
- e) Name and signature of the person carrying out each inspection.

Log sheets for this purpose have been provided for in Appendix C of this manual.

1.6 PATHS OF TRAVEL TO EXITS

BCA 1990: Section D
BCA 1996: DP6 (Section D)

PURPOSE

Paths of travel to exits are to provide an unobstructed pathway for occupants travelling to an exit.

REQUIREMENTS OF THE EQUIPMENT

To provide a passage to an exit that is of a width and height as specified by the *Building Code of Australia*.

METHOD OF OPERATION

To ensure paths of travel to exits are operational and effective, they must not be obstructed or altered in any way.

It is the responsibility of the owner to ensure that all paths of travel to exits are maintained in an efficient condition and kept functional and clear of obstruction.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require a three-monthly inspection of this facility. The owner may delegate this function to another person or body where necessary or appropriate.

It is recommended that in carrying out the required inspections, the following points be covered:-

- a) Ensure no obstruction of any nature has encroached on or into the designated paths of travel.
- b) Check that the integrity of the fire isolation requirements on or in the relevant sections of the path of travel have not been breached or compromised.
- c) Check that no unauthorised alteration has been carried out on these sections.

MAINTENANCE RECORDS

A log book must be kept to record:-

- a) The date the inspection was carried out; and
- b) Any problems encountered during the inspection; and
- c) The name, designation and signature of the person carrying out the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

1.7 VEHICULAR ACCESS AROUND LARGE ISOLATED BUILDINGS

BCA 1990: C2.4
BCA 1996: CP9 (C2.4)

PURPOSE

Where a building is permitted to be constructed in excess of the floor area requirements of the *Building Code of Australia*, vehicular access is required around that building for emergency services.

REQUIREMENTS OF THE EQUIPMENT

Vehicular access must:-

- a) Be capable of providing emergency vehicles access from a public road; and
- b) Have a minimum unobstructed width of six metres, with no part of this six metres further than 18 metres from the building, built upon, or used for any purpose other than vehicle or pedestrian movement; and
- c) Provide reasonable pedestrian access to the building from the vehicular access; and
- d) Must have load-bearing capability and unobstructed height to allow passage and operation of fire-fighting vehicles.

If a public road adjoining the building fulfils these requirements, it may be used to serve this purpose.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of this facility to confirm access is maintained and no encroachment has been made onto this access area. The owner may delegate this function to another person or body where necessary or appropriate.

MAINTENANCE RECORDS

The following information must be recorded:-

- a) The date of the check or inspection; and
- b) The name and status of the person carrying out the task; and
- c) Any problems identified; and
- d) Date these problems were rectified; and
- e) Signature of the person inspecting.

Log sheets for this purpose are provided in Appendix C of this manual.

Electrical services

2.1	EMERGENCY LIGHTING	2
2.2	EMERGENCY POWER SUPPLY	6
2.3	EMERGENCY WARNING AND INTERCOMMUNICATION SYSTEM	8
2.4	EXIT SIGNS	10

2.1 EMERGENCY LIGHTING

BCA 1990: E3.4
BCA 1996: E3.4
Reference: AS 2293.1
AS 2293.2

PURPOSE

To safeguard occupants from injury by providing sufficient lighting to allow safe occupant evacuation in an emergency.

REQUIREMENTS OF THE EQUIPMENT

An emergency lighting system must:-

- a) Be installed to AS 2293.1; and
- b) Be automatic in operation in the event of failure of power supply to the main lighting system; and
- c) Provide a level of illuminance appropriate:-
 - a. to the use and size in floor area of the building; and
 - b. the distance required to reach exits.

METHOD OF OPERATION

CENTRAL LIGHTING SYSTEMS

This type of system will be set up to operate in one of two modes:-

- a) Where the emergency lighting is energised at all times when the building is occupied; or
- b) Where the emergency lighting is energised only when power to the normal lighting system fails.

SINGLE POINT LIGHT SYSTEMS

Each unit 'stands alone' and illuminates when normal lighting fails. Power is supplied from a built-in battery that is continuously under charge while normal lighting operates.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require maintenance to be carried out at least every six months. It should be noted that this is the lowest level of maintenance required by the Standard and more rigorous routines are also required as noted below. The owner may delegate this function to another person or body where necessary or appropriate.

Single point system

SIX-MONTHLY PROCEDURES

- a) Operate the self-contained emergency lights from their battery supply by turning off the normal lighting power supply.
- b) The lights must remain alight for at least 90 minutes.
- c) Replace any faulty lamps.
- d) Turn on the normal lighting power supply and check that the battery charger indicator functions properly.

Record the test and correct operation of the system.

Record the replacement of faulty lamps.

TWELVE-MONTHLY PROCEDURES

- a) Carry out the six-monthly procedures.
- b) Clean all light emitting and reflecting surfaces.

Record the testing and cleaning.

CENTRAL LIGHTING SYSTEM

Checks should be undertaken on the following elements of your system:-

- batteries
- battery chargers
- inverters
- distribution and control equipment
- lights and exit signs
- the complete system

SIX-MONTHLY TEST

Batteries

a) Lead-acid batteries - using a hydrometer and referring to the maintenance manual, test randomly selected cells for:-

- a. Electrolyte density.
- b. State of charge.

Record the result of this test.

- b) All batteries, including lead-acid batteries.
 - a. Visually check electrolyte level of each cell.
Record those cells that require topping up.
 - b. Visually inspect all cell containers for electrolyte leakage. Have leaking cells repaired or replaced by a qualified person.

Record any repairs or replacement.

Battery chargers

- a) Visually inspect the unit.
- b) Clean unit and cubicle of dust and dirt.
- c) Check battery voltage reading is within normal limits.
- d) Check all connections are tight.

Record that the checks have been carried out.

Record battery voltage reading.

Inverters

- a) Visually inspect all components.

Record the inspection, the D.C. input voltage and current and the A.C. output voltage and current.

Distribution and control equipment

- a) Visually inspect relays, contactors, circuit breakers and fuses.
Record inspection and any problems identified.
- b) Check all connections for tightness.
Record the check.
- c) Remove any dust and dirt accumulated within the distribution and control equipment enclosures.
Record the cleaning.
- d) Check that sensing equipment operates system when isolated from A.C. mains supply.
Record the check and any problems identified.

Emergency lights and exit signs

- a) Check all lights and exit signs for correct operation.
- b) Replace any faulty lamps.
Record the check and any lamps replaced.

Total system

- a) Check for correct operation when battery charger turned off and mains failure simulated.
- b) Check satisfactory operation of the charger-failure alarm while carrying out above check.
- c) Record these checks and any problems identified.

Restore the system to normal operation, and check correct charging of batteries.

TWELVE-MONTHLY TEST

Batteries - for any battery requiring maintenance of electrolyte above a specified level.

Lead-acid batteries only - for each cell.

Using a hydrometer and referring to the maintenance manual,

- a) Check electrolyte density.
- b) Check state of charge.
Record the results of these checks.

All types of batteries - (including lead-acid)

- a) Visually check electrolyte level in all cells.
Record level for each cell.
- b) Visually inspect all cells for electrolyte leakage. Mop up and neutralise any spilt liquid, using baking powder dissolved in water.
Record the inspection and any faults found.
- c) Inspect all cell connections for corrosion and tighten any loose joints.
- d) Treat all exposed metal surfaces with petroleum jelly or other recognised battery terminal preservative.
Record the inspection and treatment.
- e) Measure overall battery voltage and individual cell voltages, using a finely calibrated voltmeter.

Record any cell with a voltage difference from average of more than + 0.03 volt.

Battery charger

- a) Carry out tests required in six-monthly test.
Record the test.
- b) Check voltmeter calibration.
Record the check and result.
- c) Check satisfactory operation of battery earth-fault detection system, if fitted.
Record the check.
- d) Check satisfactory operation of the battery low-voltage alarm, if fitted.
Record the check.

Inverter

- a) Carry out tests on items required in six-monthly test.
Record the tests.
- b) Check voltmeter calibration.
Record the check and result.

Lights and exit signs

- a) Carry out all checks required in the six-monthly test.
Record the tests.
- b) Clean all light emitting and reflecting surfaces.
Record the cleaning.

Total system

1. Check battery voltage on completion of discharge test, by the following method:-
 - a) Turn off battery charger.
 - b) Simulate mains failure (turn off power).
 - c) Using all the installed emergency lighting, test discharge for at least 90 minutes.

Record battery voltage on completion of this test. If battery voltage is below acceptable limits after completion of this test, re-service or replace the battery.

Record re-service or replacement.

2. Measure the time taken for the battery charger to change over automatically to the 'float charge' mode, after;
 - a) Disconnecting the load.
 - b) Turning on the battery charger.
 - c) Manually selecting 'boost charge' mode.
Record the time taken.

The above testing procedures are detailed in AS 2293.2. These procedures must be available to your designated tester in a hard bound A4 size maintenance folder. This folder must be provided by the installer of your system.

MAINTENANCE RECORDS

A manufacturers' hard bound log book, or an alternative system (this would include this manual), is recommended for the recording of maintenance information.

Sheets for this purpose are included in the log book provided in Appendix C of this manual.

2.2 EMERGENCY POWER SUPPLY

BCA 1990: Spec G3.8
BCA 1996: G3.8 (Spec G3.8)

PURPOSE

An emergency power supply is required to ensure the operation of required safety systems in the event of mains power failure.

REQUIREMENTS OF THE EQUIPMENT

An emergency power supply must:-

- a) Be connected automatically if the normal power supply fails; and
- b) If located within the building, be separated from the remainder of the building by an enclosure with the required fire-resistance rating; and
- c) Be connected to the required safety systems by suitable fire-resisting cabling.

The power supply can be provided by either of the following:-

- a) Having two separate cables feeding into your substation; or
- b) Having two or more separate supplies coming from separate substations outside your building; or
- c) Supplied from a generating set capable of starting and taking the necessary electrical load within 30 seconds of failure of the mains supply.

METHOD OF OPERATION

On failure of the main electrical supply, the system must:-

- a) Automatically switch over to the alternate supply, providing power to at least the required safety systems.
- b) If provided by a generating set:-
 - Start the engine.
 - Bring engine up to full operating speed.
 - Provide power to at least the required safety systems, within 30 seconds of mains failure.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require that emergency power supplies be tested six-monthly. The owner may delegate this function to another person or body where necessary or appropriate.

Where your alternative supply is provided externally to your premises by your power supply authority, it is recommended that you make contact with your power supply authority, to request that it test the automatic change-over switching facility, which in most cases is part of the supply equipment.

If you have a generating set, maintenance routines are recommended to be carried out at the following intervals:-

- Weekly
- Monthly
- Six-monthly
- Yearly

Generating set:

WEEKLY

1. Check water and oil levels. Top up if necessary.
2. Check required spares are on hand - belts, filter cartridges, engine oil.

3. Where batteries are installed, check batteries and charger for:-
 - a) Freedom from corrosion on terminals and in battery compartment.
 - b) Correct electrolyte level, top up if necessary.
 - c) Voltage per cell - using a voltmeter, ensure voltage is not less than 2 volts for lead-acid, batteries, 1.5 volts for nickel-cadmium (If voltage is less, have charger checked by a qualified person).
4. Start the engine by simulating a power failure (turn off monitoring circuit), run engine for at least 10 minutes, then check for the following:-
 - a) Visually check for water, oil or fuel leaks, loose fittings or ancillary equipment.
 - b) Visually check belt drives.
 - c) Correct operation of battery charging alternator or generator (check volt meter).
 - d) Battery charger power-failure alarm, if fitted.
 - e) Excessive vibration or heat.
 - f) Correct running speed.
 - g) After running and shutting down:-
 - i) Check water, oil and fuel levels. Top up if necessary.
 - ii) Ensure any strainer or filter, if fitted, on the engine water
 - ii) Ensure any strainer or filter, if fitted, on the engine water cooling system, is checked and cleaned.
 - iii) Ensure the engine 'stop' mechanism automatically returns to the start position.

MONTHLY

- a) Start the engine using the manual control, run the engine at rated speed for at least 30 minutes and check for correct operating temperature.
- b) Carry out the weekly procedures.

SIX-MONTHLY

- a) Carry out the weekly and monthly procedures.
 - a. Check, clean and replace, if necessary, engine-fuel sludge and sediment trap, fuel, oil and air filters.
- b) Change lubricating oil, if advised by engine manufacturer at this frequency (If not, change at least yearly).

MAINTENANCE RECORDS

The following records are required:-

SIX-MONTHLY TEST

The following information must be entered in your log book:-

- The date of test and time conducted.
- Execution of test - satisfactory or otherwise.
- Any maintenance work required.
- Name of person carrying out test.
- Signature of person carrying out test.

Log book sheets for this purpose are included in Appendix C of this manual.

2.3 EMERGENCY WARNING AND INTERCOMMUNICATION SYSTEM

BCA 1990: E4.9
Spec E1.5
Spec E1.7
BCA 1996: EP4.3 (E4.9)
Reference: AS 2220.1
AS 2220.2
AS 1851.10

PURPOSE

An emergency warning and intercommunication system (EWIS) is installed in a building to alert occupants in the event of an emergency and enable an orderly evacuation of the building.

REQUIREMENTS OF THE EQUIPMENT

To fulfil its function, the EWIS must have the following facilities:-

- a) A master emergency control panel (MECP); and
- b) Any necessary additional emergency control panels (ECP); and
- c) The necessary distribution system to transmit a warning signal to each evacuation zone in the building; and
- d) A warden intercommunication point (WIP) located on each floor or in each evacuation zone; and
- e) A notice at each ECP giving clear instructions on how to operate this equipment correctly; and
- f) An inter-connection with the building fire alarm system.

To ensure the system fulfils its purpose, it is essential that all staff/personnel located in the building are given training in identification of the 'alert' and 'evacuation' signals, both audible and visible, and take part in an evacuation exercise.

METHOD OF OPERATION

A key requirement for this system is the appointment of a house warden and a zone warden for each evacuation zone in the building.

These people should be appointed and trained to fulfil their respective roles.

In addition, each member of staff should be advised of the house and zone wardens appointed, their duties, and the authority designated to these wardens.

On activation of the fire alarm system, the EWIS shall transmit the 'alert' signal until manual control of the system is established. If manual control is not established in the pre-determined time for your system, the 'evacuate' signal is automatically transmitted.

The 'alert' signal must also be capable of manual initiation from each ECP and WIP.

If manual control is established, the house warden:-

- Attends the MECP.
- Gathers information on the incident.
- Makes a decision on evacuation.
- Advises the zone wardens of this decision.
- Supervises the evacuation if ordered.
- Becomes the focal point of contact with responding emergency services.

MAINTENANCE CHECKS

The maintenance routines in AS 1851.10 require testing and checking of the system:-

- Monthly
- Six-monthly

Full details of the required monthly and six-monthly maintenance routines and the Levels 1 and 2 maintenance checks are detailed in AS 1851.10.

Level 1 routines can be carried out by the owner of the building or by a designated person with the appropriate experience in the necessary procedures.

Level 2 routines are recommended to be carried out by someone competent and experienced in this field of emergency warning and intercommunication systems. This person should consult the owner before carrying out this routine.

These regular checks provide an opportunity to ensure the system is fully operational and to ensure all personnel are familiar with the warning system.

Before carrying out a simulated fire call to test your EWIS, the fire station receiving your alarm system shall be notified of the impending test. You could be charged for the fire brigade's attendance at a false alarm.

Any necessary corrective action must be carried out as soon as practicable, to ensure your system is fully operational at all times.

MAINTENANCE RECORDS

The following documents, required under AS 2220.1, must be provided for your EWIS by the suppliers of your system:-

- a) Operator's manual - this must give the necessary instruction on how to make the system work; and
- b) An as-installed drawing showing the whole system; and
- c) A bound log book, with numbered pages, showing the following information:-
 - i) Identification of your building; and
 - ii) Description of the system components and their location; and
 - iii) All commissioning data needed for future maintenance, including:-
 - a) All the necessary discharge rates and charging information for the batteries; and
 - b) Location and items of equipment not at the ECP; and
 - c) Maximum audio power available for each evacuation zone; and
 - d) The actual audio power required for each evacuation zone; and
 - iv) Date of commissioning; and
 - v) Pages to record the results of the monthly and six-monthly maintenance routines.

Log book sheets for this purpose are included in Appendix C of this manual.

2.4 EXIT SIGNS

BCA 1990: E4.5
BCA 1996: EP4.2 (E4.5)
Reference: AS 2293.1
AS 2293.2

PURPOSE

Exit signs are provided to aid occupant identification of exits and paths of travel to exits.

REQUIREMENTS OF THE EQUIPMENT

Exit signs must be:-

- a) Installed to AS 2293.1; and
- b) Clearly visible to persons approaching an exit; and
- c) Located in positions where exits are not readily apparent, i.e. corridors, hallways and lobbies, with directional arrows indicating the direction to an exit; and
- d) Located on, above, or adjacent to each door providing egress (as detailed in *BCA E4.5*); and
- e) Clear and legible in writing with adequate size letters and symbols; and
- f) Provided with emergency illumination in the event of normal power supply failure.

METHOD OF OPERATION

Exit signs must be set up to operate as follows:-

- be illuminated at all times by mains power supply or by being a self contained unit; and
- be either internally or externally illuminated; and
- have a provision for emergency power supply in the event of failure of the normal power source.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require maintenance to be carried out at least every six months to AS 2293.2. It should be noted that this is the lowest level of maintenance required by the Standard and other routines are also required on a yearly basis. The owner may delegate this function to another person or body where necessary or appropriate.

The testing procedures of exit signs are detailed in AS 2293.2. These procedures must be available to your designated tester in a hard bound A4 size maintenance folder. This folder must be provided by the installer of your system.

MAINTENANCE RECORDS

A manufacturers' hard bound log book, or an alternative system (this would include this manual), is recommended for the recording of maintenance information.

Sheets for this purpose are included in the log book provided in Appendix C of this manual.

- → Fire-detection and suppression equipment



The Building Commission is a professional, supporting and forward-thinking body. It strives to create better

Fire-detection and suppression equipment

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3.1 FIRE-DETECTION AND SUPPRESSION EQUIPMENT

BCA 1990: E1.8
Spec E1.8
BCA 1996: EP1.6 (E1.8, Spec E1.8)

PURPOSE

A fire control centre is provided as an area from which fire-fighting operations or emergency procedures can be directed or controlled.

REQUIREMENTS

The fire control centre or room must:-

- a) Contain the controls, panels, telephones, furniture and equipment associated with the required fire services in the building; and
- b) Only be used for fire-fighting and other reasons concerning the safety or security of the building occupants; and
- c) Be accessible via two ways:-
 - a. from the front entrance of the building; or
 - b. direct from outside the building; and
- d) Have the following as detailed in Spec E1.8 of the *Building Code of Australia*:-
 - a. sufficient floor area for its proper functioning; and
 - b. adequate ventilation; and
 - c. suitable power supply; and
 - d. emergency lighting; and
 - e. a sign on the outside of the door identifying it as the 'Fire Control Centre'; and
 - f. low noise level with all fire safety equipment operating.

MAINTENANCE CHECKS

To ensure the fire control centre is operational, it is recommended that maintenance be carried out as follows:-

YEARLY

It is recommended that the relevant building surveyor should require an annual inspection of this facility. The owner may delegate this function to another person or body where necessary or appropriate.

It is also recommended that an exercise be held at least yearly, to ensure this facility is workable.

This exercise could be held in conjunction with:-

- a) The fire authority serving the area.
- b) An evacuation exercise for the premises.

MAINTENANCE RECORDS

The following information must be recorded:-

- a) The dates the monthly and yearly inspections were carried out; and
- b) The name of the person conducting the inspections and
- c) Any problems identified in the inspections; and
- d) Actions taken to rectify problems identified; and
- e) Date this rectification occurred; and
- f) Signature of the person conducting the inspection.

Information relating to the conduct of an evacuation exercise could also be recorded.

A log sheet to record this information is provided in Appendix C of this manual.

3.2 FIRE DETECTION AND ALARM SYSTEM

BCA 1990: E1.7
Spec E1.8
BCA 1996: EP2.1, EP2.2
(Part E2, Spec E2.2a)
Reference: AS 1670
AS 1851.8

PURPOSE

A fire detection and alarm system is installed to sense and provide warning of a fire in its initial development stage. Proper operation of this system will afford the building occupants the maximum amount of time available to seek safe refuge.

REQUIREMENTS OF THE EQUIPMENT

A fire alarm system must automatically:-

- a) Sense the presence of a fire and advise its location; and
- b) Advise the fire brigade; and

If installed:-

- c) Switch the air handling system into the smoke ventilating mode; and
- d) Activate the closure of smoke and fire-isolating doors; and
- e) Activate necessary fire pumps.

In addition to these automatically activated functions, the alarm system may have a manual means to activate the system.

METHOD OF OPERATION

Detectors of differing types are installed throughout the building to comply with AS 1670. The standard designates the location and the suitable detector type to be installed.

A signal from a detector is relayed to the control and indicating equipment in the system, which activates the various responses listed above.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require the facilities to be inspected weekly. It should be noted that this is the lowest level of maintenance routines required by AS 1851.8. More rigorous monthly and yearly routines are also required and are detailed in the Standard. The owner may delegate the maintenance function to another person or body where necessary or appropriate.

Weekly tests are required when the alarm is connected to an unmanned fire station or when required by the building surveyor because of the nature of the premises.

MAINTENANCE RECORDS

The necessary maintenance records are located in Appendix C of this manual.

3.3 FIRE EXTINGUISHERS – PORTABLE

BCA 1990:	E1.6 Spec E1.8
BCA 1996:	EP1.6 (E1.8, Spec E1.8)
Reference:	AS 2444 AS 1851.1

PURPOSE

Portable fire extinguishers provide occupants with an appliance with which to attack a fire in its initial stages.

REQUIREMENTS OF THE EQUIPMENT

To provide fire extinguishers, containing extinguishing agent suitable for the fire hazard likely to be encountered. Fire extinguishers complying with Australian Standards are marked with a fire classification and rating, determined in accordance with AS/NZS 1850, which indicates the class and size of fire for which they have been successfully tested.

Each extinguisher must be located in a conspicuous and readily accessible position, the location being indicated by the appropriate signage.

METHOD OF OPERATION

A fire extinguisher is put into operation by transporting the extinguisher close to the fire and following the operating instructions clearly displayed on the extinguisher.

It is essential that all staff members in the premises are suitably trained in the correct use of fire extinguishers located in the premises.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require that fire extinguishers be maintained six-monthly to AS 1851.1. It should be noted that this is the lowest level of maintenance routines required by AS 1851.1. More rigorous routines are also required and are outlined below. The owner may delegate this function to another person or body where necessary or appropriate.

A five-level inspection and service procedure is detailed in AS 1851.1:-

- Six-monthly
- Twelve-monthly
- Three-yearly
- Six-yearly
- After use of the extinguisher

A comprehensive maintenance schedule is detailed in AS 1851.1 for all types of fire extinguishers. All maintenance work must be carried out by experienced personnel, observing recognised safety procedures (AS 1851.1, Section 2.1.5).

MAINTENANCE RECORDS

- For the purpose of maintaining service records, each extinguisher in the premises must have a unique site identification mark (AS 1851.1 Section 2.1.1).
- If more than 10 extinguishers are located in or on the premises, a site plan showing the location of each extinguisher and its identification, type, size and rating must be provided (AS 1851.1 Section 2.1.2).
- A maintenance record tag as per AS 1851.1 Section 2.3.2, must be attached to each extinguisher.
- A report on the correct provision and location of extinguishers must be provided by the service agency or personnel (AS 1851.1 Section 2.1.4).

3.4 FIRE HOSE REELS AND FIRE MAINS

BCA 1990: E1.6
Spec E1.8
BCA 1996: EP1.6 (E1.8,
Spec E1.8)
Reference: AS 2444
AS 1851.1

PURPOSE

Fire hose reels are provided to enable occupants to undertake initial fire extinguishment.

REQUIREMENTS OF THE EQUIPMENT

Fire hose reel systems must:-

- a) Provide sufficient hose reel length to enable every part of the floor or storey on which it is installed to be reached by laying the hose along normal lines of access throughout that floor; and
- b) Be provided with a water supply rate of at least 0.33 litres/second.(AS 2441).

METHOD OF OPERATION

The occupants of the premises should be able to operate the system:-

- a) By locating any hose reel within the building.
- b) By following the operating instructions displayed on the hose reel.
- c) It is essential that all staff personnel on the premises are trained in the safe and efficient operation of fire hose reels.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require that fire hose reels be maintained at six-monthly intervals to AS 1851.2, and fire mains maintained weekly to AS 1851.4. Pumpsets servicing the equipment are required to be serviced in accordance with AS 1851.14 (refer to 3.9). It should be noted that these are the lowest levels of maintenance routines required by the Standards. More rigorous routines are also required by AS 1851.2 and are outlined below.

The maintenance and inspection may be carried out by the owner or the owner may delegate this function to another person or body where necessary or appropriate.

SIX-MONTHLY INSPECTION (As per AS 1851.2 Section 3)

- a) Check that the operating instructions on both the hose reel and the manual valve stop assembly are clear and legible.
- b) Check that there is no leakage of water exceeding 5 ml in a three minute period from any point of the hose reel assembly, with the stop valve fully open, the nozzle closed, and the hose partially run out to at least five metres.
- c) Check that the hose runs out freely through the hose guide.
- d) Check for signs of corrosion or damage that may affect the operation of the hose reel.

After this inspection, it is essential that the hose is rewound in even layers, the nozzle re-engaged correctly in the interlock, the valve shut off and the hose de-pressurised by opening the discharge nozzle. Close the nozzle when de-pressurised.

TWELVE-MONTHLY INSPECTION (As per AS 1851.2 Section 3)

Carry out the checks required for the six-monthly inspection, with the exception of item (b). In addition, the following points should be checked:-

- a) With the stop valve turned fully open, the nozzle closed and the hose fully run out, check for any leakage of water exceeding 5 ml in a three minute period, from either the valve gland, spindle gland, or discharge nozzle.
- b) That the hose can be run out easily in any direction.
- c) That the flow rate supplied is not less than 0.33 litres/second, with the nozzle in the jet mode (This will fill a 10-litre bucket in 30 seconds).

As with the six-monthly test, it is essential that the hose is rewound in even layers, the nozzle re-engaged correctly in the interlock, the valve shut off, and the hose de-pressurised by opening the discharge nozzle. Close the nozzle when de-pressurised.

Any defects found should be reported to management and the necessary repairs or replacement carried out as soon as possible, to ensure the equipment is ready for use if needed. In addition, a label showing the date of service and a description of the fault should be attached to the side plate of the faulty hose reel.

MAINTENANCE RECORDS

A log book, showing the location and identifying marks or numbers for each hose reel on the premises, must be established.

Sheets for this purpose are included in the appendix C of this manual.

The following information must be recorded:-

- a) The date of each inspection; and
- b) Any defects found; and
- c) On the tag attached to each hose reel, the date of each inspection.

For fire hose reel pumps, refer to 3.9 of this section.

3.5 FIRE HYDRANT SYSTEM AND FIRE MAINS

BCA 1990: E1.3
BCA 1996: EP1.3 (E1.3)
Reference: AS 2419
AS 1851.4
AS 1851.14

PURPOSE

A fire hydrant system is installed to provide fire-fighting personnel a supply of water for fire-fighting purposes.

REQUIREMENTS OF THE EQUIPMENT

To fulfil its purpose, the hydrant system must:-

- a) Be installed to AS 2419.1; and
- b) Be located to provide coverage to every part of the building or site requiring coverage; and
- c) Provide a specified minimum flow of water at all times; and
- d) Be readily accessible to fire-fighting personnel.

METHOD OF OPERATION

The supply of water to the hydrant system must be provided automatically, once a hydrant valve is opened or, in some systems, once a fire alarm has been activated.

Any pump incorporated into the system must be powered by a motor that will enable operation regardless of primary electrical mains failure.

The water supply must be acquired from a source that will provide adequate water for a specified period of time.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require that fire hydrants and fire main systems be maintained monthly to AS 1851.4. It should be noted that this is the lowest level of maintenance routines required by AS 1851.4. More rigorous routines are also required and are outlined below. The owner may delegate this function to another person or body where necessary or appropriate.

Maintenance work, involving inspections, testing and servicing, has been classified into six levels, at the following frequencies:-

- Weekly
- Monthly
- Quarterly
- Yearly
- Three-yearly
- Six-yearly

Note: The weekly maintenance routine relates to the pumpset and is to be carried out in accordance with AS 1851.14 Table 7.1. (Refer to 3.9 of this section)

Complete details of this six-level program are included in AS 1851.4.

Before maintenance work is carried out, the following precautions must be taken:-

- a) Whenever maintenance work will render the system inoperative, or will activate the fire alarm system, notify the fire brigade and the owner of the building, or his or her agent, before any action is taken. If you call out the fire brigade unnecessarily, you could be charged for their attendance; and
- b) Before turning off the water, a thorough check of all of the premises must be made, to ensure it is as safe from a threat of fire as is possible; and
- c) Ensure all the other fire suppression equipment is fully operational.

After this work is completed, the hydrant system must be tested to ensure it operates at its designed performance level, and the fire brigade must be notified that the system is again operational.

Whenever the system is disabled for maintenance or modifications, special precautions should be implemented as detailed in AS 1851.4.

MAINTENANCE RECORDS

The maintenance records must record:-

- a) All the inspections, testing and servicing procedures required under AS 1851.4; and
- b) Details of defects found and unscheduled repairs carried out; and
- c) Details of any remedial action taken.

All these details must be systematically entered in the log book established for the hydrant system. This log book should be maintained by a person responsible for it, and must be available for inspection when required. Record sheets are included in Appendix C of this manual.

In addition, each hydrant must have a tag attached to it, showing the dates on which the yearly, three-yearly and six-yearly procedures were carried out.

3.6 SMOKE ALARMS

BCA 1990: E1.7
Spec E1.7
Vic - H101.9
Vic - H103
BCA 1996: EP2.1, EP2.2 (Part
E2, Spec E2.2a)
Reference: AS 3786
AS 1851.8

PURPOSE

Smoke alarms are installed either singly or in an interconnected circuit, to detect and provide an early warning of the presence of fire.

This early warning is designed to provide as much time as possible to alert occupants of this threat.

REQUIREMENTS OF THE EQUIPMENT

To carry out its function, a smoke alarm must be:-

- a) A system:-
 - a. designed in compliance with AS 3786, or
 - b. listed in the SSL (Scientific Services Laboratory) Register of accredited Products;
- b) Connected to the consumer mains supply; and
- c) Located in accordance with AS 1670, Specification E1.7 of BCA 90 and Specification E2.2(a) of BCA 96 where applicable; and
- d) Must have an external or internal power source, or a combination of both.

METHOD OF OPERATION

There are two basic types of smoke alarms:-

- a) The ionization type, where smoke entering the chamber causes a change in current flow;
- b) The optical type, which operates by the scattering or absorption of light by smoke particles in a light beam.

Both situations cause the alarm to sound locally or at a remote central location.

An alarm system may be required by the *Building Code of Australia* or building surveyor to also transmit an alarm signal to a fire station.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require smoke alarms be checked monthly. The owner may delegate this function to another person or body where necessary or appropriate.

MONTHLY

- i) Perform the operational test of the alarms in accordance with the manufacturer's instructions.
- ii) Visibly check each unit for damage.

YEARLY

- i) Battery - if not of the rechargeable type, renew battery with a battery as specified on or in the alarm.
- ii) If a rechargeable battery, check its voltage, using a voltmeter. If the voltage is as specified on the battery or the alarm, re-install. If voltage is not satisfactory, renew the battery and have the charging circuit tested by a qualified service provider.
- iii) Using a vacuum cleaner, carefully clean the inside and cover of the alarm unit. Avoid physical damage.
- iv) Where provided, turn off external power supply to smoke alarm and test as per manufacturer's instructions. Restore power supply when completed.
- v) Carry out the monthly routine.

MAINTENANCE RECORDS

A log book must be kept to record:-

- a) The completion of the monthly routine; and
- b) The completion of the yearly routine; and
- c) Any maintenance required on the system; and
- d) The date and name of the person testing the system.

Log sheets for this purpose are located in Appendix C of this manual.

3.7 SPRINKLER SYSTEM AND FIRE MAINS

BCA 1990: E1.5
Part E1
BCA 1996: EP1.4 (E1.5)
Reference: AS 2118
AS 2419.1
AS 1851.3
AS 1851.4
AS 1851.14

PURPOSE

A sprinkler system is installed to provide a full-time automatic fire suppression system, with the ability to summon the fire brigade automatically.

SYSTEMS AND EQUIPMENT

- a) Automatic sprinkler systems may include:-
- b) Wet pipe systems and sprinklers.
- c) Valve installations.
- d) Electric motor and compression-ignition engines and pumpsets.
- e) Fire brigade booster connections.
- f) Pre-action systems.
- g) Water storage systems.
- h) Alarms and interface with automatic fire alarm and detection systems where installed.

REQUIREMENTS OF THE EQUIPMENT

To provide the required protection, the sprinkler system must be:-

- a) An automatic fire sprinkler system complying with:-
 - a. AS 2118 subject to *Building Code of Australia* Specification E1.5; or
 - b. NFPA 13R type system; and
- b) Maintained in accordance with AS 1851.3, either by or under the direct supervision of personnel competent in sprinkler system maintenance.

METHOD OF OPERATION

To comply with AS 2118, the sprinkler system must have:-

- a) Provision for an adequate water supply; and
- b) A pumping system to pressurise the sprinkler system; and
- c) A distribution pipe system to deliver water to each sprinkler head; and
- d) Sprinkler heads to perform according to the risk they are protecting; and
- e) A local alarm facility to alert the operation of a sprinkler system; and
- f) A direct alarm connection to the fire brigade (where required).

The sprinkler system is activated by a sprinkler head or heads responding to a rise in temperature. Water flows through the head(s), lowering the residual water pressure, which causes the pump system to come into operation. Water flowing through the system drives the water-motor in the local alarm, sounding the alarm bell. Where fitted, a direct alarm is transmitted to the fire brigade.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor require that fire mains be maintained weekly to AS 1851.3. It should be noted that this is the lowest level of maintenance routines required by the Standards. More rigorous routines are also required by AS 1851.3 and are outlined below. The owner may delegate this function to another person or body where necessary or appropriate.

The sprinkler system maintenance program specified in AS 1851.3 and AS 1851.14 (for pumpset maintenance), provides for inspection, testing and maintenance at the following frequencies:-

- Level 1 routines - weekly
- Level 2 routines - quarterly
- Level 3 routines - yearly
- Level 4 routines - three-yearly
- Level 5 routines - six-yearly

The detail for these routines is detailed in chart form in AS 1851.3 (attached).

Pumpset maintenance routines are detailed in AS 1851.14 (refer to 3.9 of this section).

When the system is rendered partially or fully disabled due to maintenance or modifications, the following precautions are mandatory:-

- a) The building owner or his or her representative must be notified; and
- b) The fire station to which the system is connected, or the nearest fire station if there is no connection, must be notified before work commences and after work is completed.

The following additional precautions should be observed, as far as is practicable, whether the system is inoperative through an emergency or planned occurrence:-

- a) Under all circumstances, keep as much of the system fully operational as is practicable. If the necessary work is to extend over several days or weeks, re-instate the system as far as is practicable at the end of each working day.
- b) Where the system has to be left disconnected outside working hours, consideration should be given to employing a watchman while the system is disconnected.
- c) Whenever it is possible, disconnection of the system should be undertaken when production machinery is inoperative.
- d) While the system is down, smoking should be banned in the affected areas.
- e) Notify senior department personnel or tenants' representatives of the situation, so that fire-extinguishing appliances can be kept immediately available, with trained personnel on hand to use them if necessary.
- f) Notify the insurer or insurance broker of the situation.
- g) Have all necessary equipment and material available and do all the work possible prior to isolating the sprinklers.
- h) Hot cutting or welding should be avoided, where possible, in an area where the sprinkler system is not operational. This includes work on the sprinkler system.
- i) Avoid all sources of ignition.

Maintenance testing of these systems should be carried out in conjunction with the fire alarm system testing to assure that the systems are correctly interfaced.

Prior to and following this test, it is essential that the fire brigade that receives the alarm shall be advised of the imminent test, checked to see the test call was received, and advised when the system is re-set and operational.

MAINTENANCE RECORDS

Records of all maintenance routines must be in a log book kept at the sprinkler control valves.

Suitable recording sheets are attached in Appendix C of this manual.

These correspond to the maintenance routines outlined in AS 1851.3.

3.8 STATIC WATER SUPPLY

BCA 1990: Part E11
BCA 1996: EP1.3, EP1.4 (Part E1)
Reference: AS 2419.1
AS 2118
AS 1851.14

PURPOSE

To provide a water supply to an automatic sprinkler or a fire hydrant system.

REQUIREMENTS OF THE EQUIPMENT

Static water supply must:-

- a) Be installed in combination or individually (where appropriate) with AS 2118 or AS 2419.1; and
- b) Have sufficient water capacity and flow rate as specified in the above standards.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor require an annual inspection of this facility. The owner may delegate this function to another person or body where necessary or appropriate.

Pumpset maintenance is to be carried out in accordance with AS 1851.14 (refer to 3.9 of this section).

MAINTENANCE RECORDS

A log book must be established with the following information recorded:-

- a) The date of the check or inspection; and
- b) The name and status of the person carrying out the task; and
- c) Any problems identified; and
- d) Date these problems were rectified; and
- e) Signature of the person inspecting.

3.9 PUMPSET SYSTEMS

BCA 1990: Part E1
BCA 1996: EP1.1, EP1.3,
EP1.4 (Part E1)
Reference: AS 2441
AS 2419.1
AS 2118
AS 1851.14

PURPOSE

To ensure the reliability of fire protection equipment that requires a supply of water.

REQUIREMENTS OF THE EQUIPMENT

A pumpset system must:-

- Be selected and installed in accordance with AS 2941 1995 according to the fire protection equipment it is to support.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor require pumpsets to be maintained weekly to AS 1851.14. It should be noted that this is the lowest level of maintenance routines required by the Standard. More rigorous routines are also required by AS 1851.14 and are outlined below. The owner may delegate the maintenance function to another person or body where necessary or appropriate. The pumpset maintenance program specified in AS1851.14 provides for inspections, testing and maintenance at the following frequencies:-

- Level 1 routines – weekly
- Level 2 routines – quarterly
- Level 3 routines – annually
- Level 4 routines – three-yearly

These routines are detailed in table form in AS 1851.14.

When the pumpset is rendered partially or fully inoperative due to maintenance or modifications, the following precautions shall be taken:-

- (a) The building or facility management shall be notified.
- (b) The fire station to which the system is connected or the nearest fire station if there is no brigade connection, shall be notified before work commences and after work is completed.

NOTE: It is recommended that this practice be followed for all pumpset systems.

The following additional precautions should be observed as far as is practicable:-

- (a) Under all circumstances, as much of the system as is practicable should be kept operational. Should the work extend over a day, the system is to be reinstated as far as practicable at the end of each day.
- (b) Where the system is to be left disconnected outside working hours, the building/facility management should be notified. Consideration should be given to the employment of a watchman at the premises for the period of disconnection.

Where possible, the electricians should be isolated in areas where the fire protection has been limited or withdrawn, especially outside working hours.

A warning and advice should be provided at the fire indicator panel (FIP) (where provided) or the fire pumpset. The warning should include details of equipment outage and contact name and phone number.

- (c) Whenever practicable, system disconnection should be undertaken when production machinery is inoperative.
- (d) Smoking in the vicinity of the affected areas should be prohibited for the period of disconnection.
- (e) Those senior department/tenancy representatives affected should be notified so that fire extinguishing equipment can be held in special readiness for immediate use with a sufficient number of trained personnel available to use them if required.
- (f) The insurer or insurance broker for the property should be notified.
- (g) All needed equipment and materials should be on hand and all work possible should be done prior to isolation of the fire protection equipment.

- (h) Hot cutting and welding should not be performed on a fire pumpset in situ or in an area where the fire protection equipment is impaired. If such work is unavoidable, it should be carried out in accordance with AS 1674.1 and AS 1674.2.
- (i) Simultaneous undertaking of other work that may further reduce the integrity of fire protection, or increase the fire risk, should be avoided.
- (j) All sources of ignition should be avoided.

MAINTENANCE RECORDS

A log book must be established with the following information recorded:-

- a) The date of the check or inspection; and
- b) The name of the person or organisation carrying out the task; and
- c) The address of the premises and pumpset identification (if necessary)
- d) The pumpset location within the building, the date of manufacture and the date in service.
- e) Signature of the person inspecting.

The Standard also requires the use of a pumpset performance log to record details of the pumpset performance at commissioning and any subsequent tests or re-commissioning.

Suitable recording sheets are attached in Appendix C of this manual.

- → Fire-resistance



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Fire - Resistance

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4.1 FIRE CURTAINS

BCA 1990: Spec H1.3
BCA 1996: H1.3 (Spec H1.3)

PURPOSE

A fire curtain is provided in a theatre to prevent the passage of smoke and fire from the stage area to the audience area.

REQUIREMENTS OF THE EQUIPMENT

A fire curtain must be either:-

- a) Non-combustible and fitted to inhibit smoke penetration around its perimeter when fully lowered; or
- b) A curtain with specified early fire hazard indices and protection by a deluge sprinkler system across its total width.

Either type of curtain must be:-

- a) Capable of closing fully within 35 seconds; and
- b) Operated automatically by a heat activated device, or manually from either the stage side or audience side.

METHOD OF OPERATION

A fire curtain must be operated by:-

- a) An automatic system of heat-activated devices; or
- b) Manually operated devices, or
- c) By a push-button emergency release device.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of this facility to ensure no mechanical damage has occurred or any interference exists that prevents its operation. The owner may delegate this function to another person or body where necessary or appropriate.

TWELVE-MONTHLY

- a) Visual check of operating mechanism to ensure no physical damage or obstruction.
- b) Visual check of curtain's condition.
- c) Visual check of heat detection equipment and sprinkler heads (if provided).
- d) After first isolating the fire alarm system and sprinkler system (if provided), test the operation of the curtain by:-
 - a. Activating the heat-sensing equipment.
 - b. Activating the manual operating system.
 - c. Activating the emergency push button device.

MAINTENANCE RECORDS

A log book, included in Appendix C of this manual must be implemented to record:

- a) The 12-monthly inspections and tests, and problems identified; and
- b) The date checks and inspections were carried out; and
- c) The name and signature of the person carrying out the checks and inspections.

4.2 FIRE INDICES FOR MATERIALS

BCA 1990: C1.10
BCA 1996: CP4 (C1.10)
Reference: AS 1530.3

PURPOSE

To indicate the suitability or otherwise of building materials, assemblies, linings and surface finishes in the ability to resist spread of flame and generation of smoke.

REQUIREMENTS

The indices provide a means of assessing building materials and components, using standard tests as outlined in AS 1530.3, for their performance according to:-

- a) Their tendencies to ignite;
- b) Their tendencies to propagate flame;
- c) The heat they release once ignition has occurred; and
- d) Their tendencies to release smoke.

Using the above criteria, selection of suitable material can be made to fulfil a proposed class of building. Testing and selection of materials takes place prior to construction and finishing of a new building.

Building owners must ensure that any new material introduced to their premises conforms to the requirements of the *Building Code of Australia*.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of this facility to ensure that materials that do not conform to the fire hazard indices do not occur in or have not been introduced to the premises. The owner may delegate this function to another person or body where necessary or appropriate.

The manufacturer or supplier of these materials should be able to advise whether their product conforms.

MAINTENANCE RECORDS

To ensure compliance with the *Building Regulations*, owners of buildings must record the details of their yearly inspections.

Details that must be recorded include:-

- a) Identification of the premises; and
- b) Site address; and
- c) Name of building owner; and
- d) Date the inspection was carried out; and
- e) Any non-conforming materials identified; and
- f) Steps taken to remove or replace the non-conforming material; and
- g) Name and signature of the person carrying out the inspection.

A log sheet to record this information is included in Appendix C of this manual.

4.3 FIRE-ISOLATED LIFT SHAFTS

BCA 1990: Section C
BCA 1996: CP4 (C1.10)
Reference: AS 1735.11

PURPOSE

Lift shafts are required to be fire-isolated to prevent the passage of fire via the shaft to other floor levels of the building.

REQUIREMENTS

Depending on the building's type of construction, the lift shaft should be either:-

- a) Built to provide a specified level of fire-resistance, or
- b) Built of non-combustible material.

The lift-landing doorways must be protected by doors with a specified fire-resistance level, constructed and installed in accordance with AS 1735.11.

These doors must be set to remain closed except when receiving or discharging passengers, goods or vehicles.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of this facility. The owner may delegate this function to another person or body where necessary or appropriate.

MAINTENANCE RECORDS

The following information must be recorded:-

- a) The dates the monthly and yearly inspections were carried out; and
- b) The name of the person conducting the inspections; and
- c) Any problems identified in the inspections; and
- d) Actions taken to rectify problems identified; and
- e) Date rectification occurred; and
- f) Signature of the person conducting the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

4.4 FIRE-PROTECTIVE COVERINGS

(Including fire-rated control joints, fire-rated materials applied to building elements)

BCA 1990: A2.3, Spec A2.3
Section C
BCA 1996: A2.3, CP1,
CP2 (A2.3, Spec A2.3,
Section C)
Reference: AS 1530.4

PURPOSE

These materials, when assigned to their particular applications, assist in maintaining the integrity of the fire separation between floors or fire compartments in the building, or provide protection to structural elements to retain their integrity in the event of fire.

REQUIREMENTS

To ensure these materials fulfil their function:-

- a) The material used must be identical to a prototype or sample of that material that has been submitted to, and passed the standard fire test, as referred to in AS 1530.4; or
- b) The material used is listed and accepted in Table 1 of Specification A2.3 of the *Building Code of Australia*; and
- c) The material applied or constructed in accordance with that standard or that specific action.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of this facility. The owner may delegate this function to another person or body where necessary or appropriate.

Maintenance checks are also recommended to be carried out after maintenance work that may have damaged or removed a section of material.

These checks should be carried out visually, with further investigation of any suspect areas.

Any problems identified should be rectified as soon as is practicable, by either:-

- a) Referral back to the contractor who carried out the maintenance work, or
- b) By having your own maintenance staff or contractor carry out the necessary repairs.

MAINTENANCE RECORDS

The following information must be recorded:-

- a) The dates of the maintenance and inspections; and
- b) The name of the person conducting the inspections; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date the rectification occurred; and
- f) Signature of the person conducting the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

4.4 FIRE-RATED ACCESS PANELS

BCA 1990: Part C3
BCA 1996: CP8 (Part C3)
Reference: AS 1905.1
AS 1851.7

PURPOSE

Fire-rated access panels are provided where access to shafts containing ventilation equipment, pipes, garbage chutes or other services, is required for maintenance purposes.

REQUIREMENTS

A panel, together with its frame, requires:-

- a) A fire-resistance level, and
- b) Installation to a standard that will maintain the required fire-resistance level.

The covering could be constructed as a panel, or as a fire door.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require that fire-rated access panels be inspected annually. The owner may delegate this function to another person or body where necessary or appropriate.

It is also recommended that panels be checked visually after maintenance work.

Where the opening is protected by a fire door, constructed and installed in accordance with AS 1905.1, maintenance and inspection of these doors must be in accordance with AS 1851.7 and should be carried out in conjunction with other fire doors.

MAINTENANCE RECORDS

For fire rated panels, the following information should be recorded:-

- a) The dates of the monthly, after maintenance and yearly inspections; and
- b) The name of the person conducting the inspections; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date the rectification occurred; and
- f) Signature of the person conducting the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

4.5 FIRE-RESISTING SHAFTS

BCA 1990: A2.3, Spec A2.3
Section C
BCA 1996: A2.3, CP1,
CP2 (A2.3, Spec A2.3,
Section C)
Reference: AS 1530.4

PURPOSE

Shafts provided in buildings for provision of lifts, stairs, ventilation or services, passing from one storey or compartment to another, must have a fire-resistance level to protect those services and the compartments through which they pass.

REQUIREMENTS:

A fire resisting shaft must:-

- a) Be provided with the fire-resistance level as specified in the *Building Code of Australia*; and
- b) Have all openings into the shaft protected with doors, panels, or fire-stopping material rated to provide the required fire-resistance level; and
- c) Have its integrity preserved by:-
 - a. not permitting any unauthorised opening to be constructed; and
 - b. not permitting storage of any goods, material or equipment in these areas.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of this facility. The owner may delegate this function to another person or body where necessary or appropriate.

To ensure the integrity and safety of fire resisting shafts, inspections should ensure:-

- a) No unauthorised penetration of a shaft has occurred.
- b) Equipment protecting doorways or other openings is operational (fire doors protecting openings must be inspected and maintained in accordance with Section 14 of this manual).
- c) No unauthorised goods, material or equipment have been stored in these areas.

MAINTENANCE RECORDS

The following information must be recorded:-

- a) The date the annual inspection was carried out; and
- b) The name of the person conducting the inspections; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date the rectification occurred; and
- f) Signature of the person conducting the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

4.6 FIRE-RESISTING STRUCTURES

BCA 1990: Section C
BCA 1996: CP1, CP2, CP6
(Section 6)

PURPOSE

Certain elements and structures within the building must have a fire-resistance level to maintain structural stability during a fire and restrict the spread of fire.

REQUIREMENTS

A fire-resisting structure must:-

- a) Be provided with the fire-resistance level specified in the *Building Code of Australia*; and
- b) Have all openings protected with doors, windows, shutters, panels or other means rated to provide the required fire resistance level.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of these structures. The owner may delegate this function to another person or body where necessary or appropriate.

To ensure the integrity and safety of fire-resisting structures, inspections should ensure:-

- a) No unauthorised penetration or attachment.
- b) Proper operation of devices protecting openings.
- c) No damage has occurred.

MAINTENANCE RECORDS

The following information must be recorded:-

- a) The dates the three-monthly and yearly inspections were carried out; and
- b) The name of the person conducting the inspections; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date the rectification occurred; and
- f) Signature of the person conducting the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

4.7 FIRE SHUTTERS AND FIRE WINDOWS

BCA 1990: Spec C3.4
BCA 1996: CP8 (Spec C3.4)
Reference: AS 1530.4

PURPOSE

To provide protection to openings by maintaining the integrity of fire-separation and compartmentation.

REQUIREMENTS OF THE EQUIPMENT

Fire shutters

- Must be designed, constructed and installed as identical to a tested and approved prototype.
A steel shutter must comply with AS 1905.2; and
- Must operate automatically and close at a rate of between 0.25 and 0.3 metres per second; and
- Must maintain their integrity for the time period as required by the *Building Code of Australia*.

Fire windows

Must be designed, constructed and installed to achieve the required fire-resistance level and may be an automatic closing or permanent closure.

METHOD OF OPERATION

Fire shutters and openable fire windows are operated automatically by a heat-sensing device incorporated in their design.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection.

The owner may delegate this function to another person or body where necessary or appropriate.

MAINTENANCE RECORDS

The following information must be recorded:-

- a) The monthly check to ensure no obstruction to these items; and
- b) The annual inspection to ensure satisfactory operation of these items; and
- c) The date the checks and inspections were carried out; and
- d) The name and signature of the person carrying out the checks and inspections; and
- e) Any problems identified during the checks or inspections.

A log sheet to record this information is provided in Appendix C of this manual.

4.8 LIFTS – WARNING SYSTEMS

BCA 1990: Part E3
BCA 1996: EP3.3 (Part E3)
Reference: AS 1735.2
OH&S (Plant)
Regs 1995

PURPOSE

Warning systems, associated with passenger lifts, are installed to warn occupants of the use of lift during a fire.

REQUIREMENTS OF THE EQUIPMENT

A passenger lift must:-

- a) Comply with the *Building Code of Australia (BCA)* E3.3; and
- b) Have a warning sign saying 'Do not use lifts if there is a fire' installed on every floor, near the call button for a passenger lift or group of lifts, throughout the building.

Emergency lifts (where required) must:-

- a) Comply with the *BCA* E3.4 and AS 1735.2; and
- b) Be provided with a notice in the lift car stating the safe working load of the lift; and
- c) Be provided with a two-way voice communication system (e.g. phone), inside the car; and
- d) Be provided with an information panel, giving details of the building address and lift number, and operating instructions for the phone; and
- e) Be provided with an audible alarm, operated from inside the lift car, and sounding at a location outside the lift.

MAINTENANCE CHECKS

Maintenance of these items should be included in the periodic maintenance of lifts, required under the *Occupational Health & Safety (Plant) Regulations 1995*. It is a requirement under AS 1735.2 that a yearly inspection be carried out. This annual inspection must be carried out by the owner of the building. The owner may delegate this function to another person or body where necessary or appropriate. Included in this inspection should be a review of the maintenance records complied with by the maintenance contractor, which should be made available to the owner.

MAINTENANCE RECORDS

A record of the yearly inspection must be kept including:-

- a) Dates the yearly inspections occurred; and
- b) Name of the person conducting the inspections; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date the rectification occurred; and
- f) Signature of the person conducting the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

4.9 LIGHTWEIGHT CONSTRUCTION

BCA 1990: C1.8
Spec C1.8
BCA 1996: CP1, CP2
(C1.8, Spec C1.8)

PURPOSE

Lightweight construction can be used to provide:-

- a) A wall with a fire-resistance level.
- b) A surround for a lift, stair or service shaft.
- c) A wall bounding a corridor, passageway or ramp.
- d) A fire-resisting covering for a steel column.

REQUIREMENTS

Where used as:-

- a) A wall with a fire-resistance level, it must be:-
 - a. Constructed to provide that fire-resistance level; and
 - b. Subjected to and fulfil the testing and criteria specified in the *Building Code of Australia (BCA)* Specification C1.8; and
- b) A surround for a lift, stair or service shaft, or a wall bounding a corridor, passageway or ramp:-
 - a. It must be subjected to and fulfil the testing and criteria specified in the *BCA*, Spec. C1.8; and
- c) The fire-resisting covering of a steel column:-
 - a. It must fulfil the requirements of Section C1.8 of the *BCA*.

These criteria will be specified and built into the structure during construction.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of this facility. The owner may delegate this function to another person or body where necessary or appropriate.

To ensure the integrity of lightweight construction, the following inspection is recommended:-

- a) If the structure has a fire-resistance level, the inspection should ensure that:-
 - a. no unauthorised penetrations or attachments have occurred.
 - b. no physical damage has occurred.
- b) If a surround for a shaft or a wall bounding a corridor, passageway or ramp:-
 - a. no unauthorised attachments.
 - b. no physical damage.
- c) If providing fire-resisting covering to a steel column:-
 - a. damage-prevention equipment is in place e.g.: steel cladding or protective barriers.
 - b. no physical damage.

MAINTENANCE RECORDS

The following information must be recorded:-

- a) The dates the three-monthly and yearly inspections were carried out; and
- b) The name of the person conducting the inspections; and
- c) Any problems identified in the inspections; and
- d) Actions taken to rectify problems identified; and
- e) Date this rectification occurred; and
- f) Signature of the person conducting the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

4.10 PENETRATIONS IN FIRE-RATED STRUCTURES

BCA 1990: Part C3
BCA 1996: CP8 (Part C3)

PURPOSE

Maintain the integrity of a service penetration in a building element that has a fire-resistant level.

REQUIREMENTS

Where pipes or services penetrate fire-rated elements:-

- a) The opening must be neatly formed, cut or drilled; and
- b) Minimum clearances must be maintained from:-
 - a. other services; and
 - b. combustible material; and
- c) The gap between the pipe or service and the floor, wall or ceiling must be fire stopped to a standard and with a material that will maintain the fire-resistance level of that element.

Where an item or service such as an electrical switch, outlet or socket is accommodated in an opening or recess in a wall, floor or ceiling:-

- a) The opening or recess must not:-
 - a. be within 300 mm horizontally and 600 mm vertically of any opening on the other side of that wall, or
 - b. extend beyond half the thickness of the wall.
- b) The gap behind or between the service and the wall, floor or ceiling must be fire-stopped.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require an annual inspection of this facility. The owner may delegate this function to another person or body where necessary or appropriate.

Because of the role of these penetrations, it is essential that they be maintained in a condition that will not allow the passage of fire from one compartment to another.

To ensure this security, visual checks should be carried out after maintenance work that may have interfered with their integrity. Any suspect area should be investigated further.

Any problems identified by these checks and inspections must be rectified as soon as is practicable, by either:-

- a) Referral back to the contractor who carried out the maintenance work; or
- b) By having your own maintenance staff or contractor carry out the necessary repairs.

MAINTENANCE RECORDS

The following information must be recorded:-

- a) The dates the three-monthly, after maintenance and yearly inspections were carried out; and
- b) The name of the person conducting the inspections; and
- c) Any problems identified in the inspection; and
- d) Actions taken to rectify problems identified; and
- e) Date rectification occurred; and
- f) Signature of the person conducting the inspection.

A log sheet to record this information is provided in Appendix C of this manual.

- → Mechanical services



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Mechanical Services

5.1	AIR CONDITIONING AND MECHANICAL VENTILATION SYSTEMS	2
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5.1 AIR CONDITIONING AND MECHANICAL VENTILATION SYSTEMS

BCA 1990: F4.5
BCA 1996: FP4.3, FP 4.4
Part I1
Reference: AS 1668.2
AS/NZS 3666.1 & 2
AS 1668.1 & 2

PURPOSE

A mechanical air handling system must safeguard occupants from illness or loss of amenity due to lack of air freshness.

SYSTEM AND EQUIPMENT

The following systems and equipment are included within the scope of this section:-

- Air conditioning systems, including air handling systems and thermal plant systems incorporating condenser water systems.
- Ventilation systems including car park ventilation systems, evaporative cooling systems and general exhaust systems.
- Smoke spill and smoke control systems including stair pressurisation systems.
- Kitchen exhaust systems.
- System components including fire dampers, humidifiers, electric duct heaters, etc.

REQUIREMENTS OF THE EQUIPMENT

A mechanical air handling system must:-

- a) Be installed in accordance with AS 1668.1, 2 and AS/NZS 3666.1 and 2; and
- b) Deliver adequate amounts of outdoor air and provide sufficient circulation; and
- c) Remove contaminants present in the compartment or building to maintain an acceptable air quality.

METHOD OF OPERATION

Air conditioning and mechanical ventilation systems modes of operation are typically classified as Normal and Fire Mode:-

Normal Mode

Systems operate in this mode to maintain acceptable indoor air quality when the building is occupied. Controls may be either manual or automatic.

Fire Mode

In the event of a fire being detected or reported via the fire alarm system, air conditioning and mechanical ventilation systems are required to change over to fire mode operation. This mode of operation is explained further in 5.2 of this section.

An automatic air handling system must be provided with manual override operation.

Automatic operation can be accomplished by:-

- Time clock switching.
- Thermostat-controlled switching.
- Atmospheric contaminant monitoring.

MAINTENANCE CHECKS

To ensure the ongoing efficiency of an air handling system after installation, AS 3666.2 sets out minimum maintenance requirements to ensure health standards are not compromised.

The maintenance of these systems is an ongoing responsibility. This is a requirement of the *Regulations* and AS 3666.2

Maintenance of an air handling system can be carried out by the owner or he or she may delegate this function to another person or body where necessary or appropriate.

To ensure full compliance with this requirement, a maintenance program must be prepared, including:-

- a) All data relevant to the air handling system.
- b) A formal strategy and recording system for effective management of a series of maintenance procedures.

The maintenance program must be implemented in accordance with the information and requirements of the maintenance routines set down in Section 2 of AS/NZS 3666.2. A full description of the requirements for the maintenance of air handling systems, heated water systems and cooling water systems is included and involves routines to be carried out on a monthly, quarterly, six-monthly and annual basis.

Systems that include devices such as automatic air quality monitoring systems for car park ventilation systems and the like are covered in Appendix M of AS 1668.2.

Operating and maintenance manuals must be available for all equipment in the system.

OTHER MATTERS TO CONSIDER – COOLING TOWERS

The Building Act 1993 requires the registration of all cooling tower systems and the development of a Risk Management Plan (RMP) for each cooling tower system.

The *Building (Legionella Risk Management) Regulations 2001* specify the risks that an RMP must address. The *Health (Legionella) Regulations 2001* also prescribe maintenance, testing and associated record-keeping relating to cooling tower and warm water system that a responsible person must comply with. 'Responsible person' means the person who owns, manages, or controls the cooling tower system or warm water system.

Cooling Tower Maintenance

The responsible person must ensure that any cooling tower system that the responsible person owns, manages or controls is maintained and tested in the manner set out in the *Health (Legionella) Regulations 2001*, unless the system is shut down, or is otherwise not in use, and is completely drained of water.

Water quality and treatment

- a) Ensure that the water of the cooling tower system is maintained in a clean condition.
- b) Ensure that the water of the cooling tower system is continuously treated with:-
 - a. one or more biocides to effectively control the growth of micro-organisms, including Legionella; and
 - b. chemicals or other agents to minimise scale formation, corrosion and fouling.

Disinfection, cleaning and re-disinfection

- a) Ensure that a chlorine-compatible bio-dispersant is added to the recirculating water of the cooling tower system, and that the system is then disinfected, cleaned and re-disinfected:-
 - a. immediately prior to initial start-up following commissioning or any shut-down period of greater than one month; and
 - b. at intervals not exceeding six months.

Routine inspections and testing

- a) Ensure that the cooling tower system is inspected at least once each month to check that the system is operating without defects.
- b) Ensure that at least once each month a sample of the recirculating water of the cooling tower system is taken and is delivered to a laboratory for testing and reporting on for heterotrophic colony count.

High heterotrophic colony count detected in cooling tower system

- a) Within 24 hours of receiving a report that any sample of water taken from the cooling tower system has a heterotrophic colony count exceeding 100,000 colony forming units per millilitre, the responsible person must ensure that the following procedure is implemented:-
 - a. the water of the system must be manually treated with additional quantities of biocide, or with an alternative biocide; and
 - b. the water treatment program, tower operation and maintenance program of the system must be reviewed; and
 - c. any faults must be corrected and any changes necessary to prevent a re-occurrence of those faults must be implemented.
- b) Between two and four days ensure that a further sample of the recirculating water of the system is taken and is delivered to a laboratory for testing and reporting on for heterotrophic colony count.
- c) Within 24 hours of receiving a report that a sample taken has a heterotrophic colony count exceeding 100,000 colony-forming units per millilitre, the responsible person must ensure that the water of the cooling tower system is disinfected, cleaned and re-disinfected.
- d) Between two and four days after the water has been re-disinfected the responsible person must ensure that a further sample of the recirculating water of the cooling tower system is taken and is delivered to a laboratory for testing and reporting on for heterotrophic colony count.
- e) If, after following the above procedures, the heterotrophic colony count still exceeds 100,000 colony forming units per millilitre, the responsible person must:-
 - a. ensure that the steps are repeated until the heterotrophic colony count does not exceed 100,000 colony forming units per millilitre in two consecutive water samples taken approximately one week apart; or
 - b. close the cooling tower system until the problem has been remedied.

What if Legionella is detected in cooling tower system?

- a) Within 24 hours of receiving a report that Legionella has been detected in a water sample taken from a cooling tower system that is not associated with any suspected or known case of legionellosis, the responsible person must ensure that the following procedure is implemented:-
 - a. the cooling tower system must be disinfected; and
 - b. the water treatment program, tower operation and maintenance program of the system must be reviewed; and
 - c. any faults must be corrected and any changes necessary to prevent a re-occurrence of those faults must be implemented.
- b) Between two and four days after the disinfection has been completed, the responsible person must ensure that a further sample of the recirculating water of the system is taken and is delivered to a laboratory for testing and reporting on for Legionella.
- c) Within 24 hours of receiving a report that Legionella has been detected in a sample taken the responsible person must ensure that the water of the cooling tower system is disinfected, cleaned and re-disinfected.
- d) Between two and four days after the disinfection has been completed, the responsible person must ensure that a further sample of the recirculating water of the system is taken and is delivered to a laboratory for testing and reporting on for Legionella.
- e) If, Legionella is still detected, the responsible person must:-
 - a. ensure that the steps above are repeated until:
 - i. Legionella is not detected in two consecutive water samples taken approximately one week apart; or
 - ii. close the cooling tower system until the problem has been remedied.

- f) If, while following the procedure, of this Part, Legionella is detected in three consecutive water samples taken from the same system, the responsible person must notify the Secretary to the Department of Human Services of the detection of the presence of that organism:-
 - a. immediately by telephone; and
 - b. by notice in writing within three days of the detection of the organism on the third occasion.

MAINTENANCE RECORDS

To ensure proper control of the maintenance program, the following documentation should be provided:-

Operating and maintenance manuals should be provided for all plant, equipment and systems which are the subject of this Standard. Operating and maintenance manuals shall include at least the following:

- a) Physical details of the plant, equipment and systems.
- b) Recommendations on maintenance, including water treatment maintenance and management.
- c) Recommended cleaning, disinfection and emergency decontamination procedures.
- d) Start-up, operating and shut-down procedures.
- e) Particulars of the maintenance management program.

Maintenance records shall contain at least the following information:

- a) Date, item of plant, equipment or system and nature of service performed.
- b) Details of defects found and rectification procedure undertaken.
- c) The name of the person or company performing the service.

Log sheets to record the completion of the four-level maintenance routines are included in Appendix C of this manual.

Log sheets for the testing of cooling towers should be developed in accordance with the requirements of the *Health (Legionella) Regulations 2001*.

5.2 SMOKE CONTROL MEASURES, STAIRWELL PRESSURISATION SYSTEMS, FIRE DAMPERS

BCA 1990: Part E2
G3.8
Part H1
BCA 1996: EP2.1, EP 2.2
(Part E2, G3.8)
Reference: AS 1668.1
AS 1851.6

PURPOSE

To ensure, under fire and smoke conditions, occupants have sufficient time to evacuate before the evacuation route becomes untenable.

REQUIREMENTS OF THE EQUIPMENT

To fulfil its purpose, the system must:-

- a) Be installed in accordance with AS 1668.1 1991 or Specification E2.2; and
- b) Respond to automatic heat or smoke-sensing equipment; and
- c) Remove smoke from the fire affected area to the outside atmosphere or if required, provide a pressurised atmosphere in fire isolated exits to prevent entry of smoke from the fire compartment.

METHOD OF OPERATION

Air conditioning and mechanical ventilation systems modes of operation are typically classified as Normal and Fire Mode:-

Normal Mode

Systems operate in this mode to maintain acceptable indoor air quality when the building is occupied. Controls may be either manual or automatic.

Fire Mode

In the event of a fire being detected or reported via the fire alarm system, air conditioning and mechanical ventilation systems are required to change over to fire mode operation. In fire mode the systems provide a purging or zoned smoke control strategy. Purging strategies discharge air from the smoke zone to outside whilst providing adequate relief air. Zoned control systems aim to maintain the non-fire affected fire compartment at a positive pressure relative to the fire compartment.

Older systems installed prior to the introduction of AS 1668 may simply shut down on fire mode to reduce the propagation of smoke through the building.

An automatic air handling system must be provided with manual override operation.

Automatic operation can be accomplished by:-

- Time clock switching
- Thermostat controlled switching
- Atmospheric contaminant monitoring

The smoke control system must:-

- a) Respond to an automatic sensing of a fire condition; and
- b) Automatically activate the appropriate equipment to:-
 - a. Vent smoke to the atmosphere; and
 - b. Introduce outside air to either within the same fire affected compartment or to the non-fire affected compartments; and
 - c. Develop a positive air pressure in the fire-isolated stairwells (where required); and
- c) Have a manual override facility to enable fire-fighting personnel to control the system.

The systematic re-action of the various components in the smoke and air handling systems will have been programmed into this equipment during the design, installation and commissioning of the equipment into your building. Checks and maintenance of an air handling system are recommended to be carried out in conjunction with the fire alarm system testing to assure that the systems are correctly interfaced.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require that maintenance and inspection of smoke control measures and stairwell pressurisation measures be carried out monthly to AS 1851.6 Level 1 routines. It should be noted that the results of a Level 1 routine may initiate a further three levels of routine maintenance requirements. The owner may delegate these functions to another person or body where necessary or appropriate.

To ensure full compliance with this requirement, a maintenance program must be prepared, including:-

- a) All data relevant to the smoke control system; and
- b) A formal strategy and recording system for effective management of a series of maintenance procedures.

Implementation

The maintenance program must be implemented in accordance with the information and requirements of the maintenance routines set down in Section 3 of AS 1851.6. Any follow-up action must be implemented as required in Section 2 of that Standard.

MAINTENANCE RECORDS

Maintenance records should contain the following information:

- a) Date, item of plant, equipment or system and nature of service performed; and
- b) Details of defects found and rectification procedures undertaken; and
- c) The name of the person or company performing the service.

AS 1851.6 also requires the provision of operating and maintenance manuals, a maintenance schedule, a plant register and a plant history record. Further details for all the information in this section are available in AS 1851.6 Sections 2, 3 and 4.

Log sheets to record the completion of the maintenance routines specified in AS 1851.6 are included in Appendix C of this manual.

5.3 SMOKE VENTS

BCA 1990: Part E2.4
G3.8
H1.2
Spec H1.2
BCA 1996: EP2.1, EP 2.2
(Part E2, G3.8)
Reference: AS 2665
AS 1851.5

PURPOSE

Smoke and heat vents are installed to assist the discharge of smoke and heat generated by a fire.

REQUIREMENTS OF THE EQUIPMENT

A smoke venting system is made up of the following components:-

- a) Vents and their operating mechanism.
- b) Draught curtains.
- c) Inlet ventilation.

This system must be designed and installed in accordance with AS 2665.

METHOD OF OPERATION

The system:-

- a) Contains the smoke/heat within the confines of the smoke curtains.
- b) Activates the vents, using the rising temperature, releasing the trapped smoke/heat to atmosphere.
- c) Assists the ventilation process by introducing air to replace the rising smoke/heat column.

Operation of the system must be automatic, with a manual control in addition.

MAINTENANCE CHECKS

It is recommended that the relevant building surveyor should require maintenance to be carried out at least every six months to AS 1851.5. The owner may delegate this function to another person or body where necessary or appropriate.

Periodic testing and inspection is recommended by AS 1851.5 to be implemented:-

- Six-monthly
- Yearly
- After maintenance

MAINTENANCE RECORDS

Records must be developed and maintained to record the following:-

- a) Date of the inspection, test or maintenance; and
- b) Name of the person carrying this out; and
- c) Details of any faults detected; and
- d) Action taken to rectify any faults detected; and
- e) Date on which any faults were rectified.

Log sheets for this purpose are provided in Appendix C of this manual.

- → Part 3

- Buildings constructed before July 1994



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Part 3 – Buildings constructed before 1 July 1994

The *Building Regulations 2006* (the *Regulations*) require that owners of buildings built prior to 1 July 1994 maintain the essential safety measures installed within the building.

Any essential safety measure in Class 1b, 2, 3, 5, 6, 7, 8 and 9 buildings and places of public entertainment constructed before 1 July 1994 must be maintained by the owner to a working condition that enables them to fulfil their purpose and meet the expectations of inspecting authorities.

What essential safety measures are required to be maintained?

Part 12, Subdivision 2 of the *Regulations* does not explain or define the terms 'item of equipment', 'form of construction' or 'safety strategies'. However, it is expected that building owners will engage suitably qualified and competent persons to establish the essential safety measures and outline a level of maintenance. In some instances this may be a difficult task and may involve detailed inspection and research of historical documentation to establish the essential safety measure and frequency and type of maintenance.

Essential safety measures in this Part means any measure required for the safety of persons using a building or place of public entertainment. It includes an item of equipment, form of construction or safety strategies.

Essential safety measures in a building constructed prior to 1 July 1994 could be, but are not limited to:-

- Air conditioning systems
- Emergency lifts
- Emergency lighting
- Emergency power supply
- Emergency warning and intercommunication systems
- Exit doors
- Exit signs
- Fire brigade connections
- Fire control centres
- Fire control panels
- Fire curtains
- Fire dampers
- Fire detectors and alarm systems
- Fire doors
- Fire extinguishers (portable)
- Fire hydrants
- Fire indices for materials
- Fire-isolated lift shafts
- Fire-isolated passageways
- Fire-isolated ramps
- Fire-isolated stairs
- Fire mains
- Fire-protective coverings
- Fire-rated access panels
- Fire-rated control joints
- Fire-rated materials applied to building elements
- Fire-resisting shafts
- Fire-resisting structures
- Fire shutters
- Fire windows
- Lightweight construction
- Mechanical ventilation systems
- Paths of travel to exits
- Penetrations in fire-rated structures
- Smoke alarms
- Smoke control measures
- Smoke doors
- Smoke vents
- Sprinkler systems
- Stairwell pressurisation systems
- Static water storage
- Vehicular access for large isolated buildings
- Warning systems associated with lifts
- Any other fire safety matter which is required by the *Act* or *Regulations* and the relevant building surveyor designates on the occupancy permit or otherwise determines in writing

The *Regulations* require that the owner must ensure that an essential safety measure:-

- a) Is maintained in a state which enables the essential safety measure to fulfil its purpose; and
- b) Must not be removed from its approved location except for the purposes of providing maintenance.

What should be the level of maintenance?

If there was no specific standard of maintenance in force at the time, then any relevant Australian Standards available at the time may be used as a guide to the level of adequate maintenance. If there was no relevant Australian Standard in existence at the time of installation, then the first published edition of a relevant Standard may be used as a guide to what may be adequate maintenance.

The level of maintenance expected in the future by inspecting authorities should not be greater than that required at the time the initial maintenance requirement was determined for that existing essential safety measure.

Do I need to upgrade my essential safety measure?

The *Regulations* do not require the automatic upgrade of systems in buildings where regulations change from time-to-time. The essential safety measure must be maintained by the owner to a working condition that enables them to fulfil their purpose.

The enforcement provisions of Part 8 of the *Act* provide for a municipal building surveyor or private building surveyor where appointed, to review any risk to the life, safety, or health of any occupant in a building. As part of the enforcement process consideration could be given to upgrading the essential safety measures to current standards and practices.

Cooling Towers

The *Building (Legionella) Act 2000* requires all cooling tower systems in Victoria to be registered with the Building Commission to help track potential sources of Legionnaires' disease. The *Building Act 1993* requires the registration of all cooling tower systems and the development of a Risk Management Plan (RMP) for each cooling tower system.

The *Building (Legionella Risk Management) Regulations 2001* specify the risks that an RMP must address. The *Health (Legionella) Regulations 2001* also prescribe maintenance, testing and associated record-keeping relating to cooling tower and warm water systems that a responsible person must comply with.

The owner of the land on which a cooling tower system is located is required to register and renew the registration of that system on an annual basis. Once on the register, the application for renewal of registration will be sent to the owner before their current registration expires each year.

Maintenance and inspection records

For pre-1994 buildings, the *Regulations* do not specify a level of documentation to be kept by the owner. It is recommended that records of maintenance should be completed and made available to the building owner or agent at the time of conducting the system and equipment maintenance.

It is recommended that records should contain the following information:

- a) Record reference.
- b) Name of building or site.
- c) Address of building or site.
- d) Date of maintenance/inspection.
- e) System or equipment identification and location (Possibly a location plan).
- f) Frequency of maintenance activity undertaken.
- g) Defects identified.
- h) Name of property owner or the agent.
- i) Name and signature of the service person.
- j) Date the record was completed.

Form of records

If a person, such as a building surveyor, has been used to inspect and nominate essential safety measures, that person should provide advice as to the level of record-keeping required to satisfy the level and frequency of maintenance. As a minimum, it should include the information provided above.

Appendix C provides examples of log sheets available for 1994 to 2004 buildings. Although these have been developed for buildings built after 1 July 1994, the information contained within Appendix C Log Sheets can be used by owners to develop log sheets for the pre-1994 buildings.

Maintenance records may be electronically-based. Hard copy records should be kept on site and be available at all times. Technology in regard to the preparation of maintenance records has advanced considerably in recent years with the advent of purpose-designed software. As a minimum, a hard copy of records of maintenance are to be made available to organisations, such as regulators, fire authorities, insurance surveyors, fire auditors, etc., at all times. However, the hard copy records required may be prepared utilising electronic recording systems and this manual acknowledges such technology is designed to deliver an accurate, accountable, consistent and timely level of service.

Maintenance records can be in the form of maintenance record tags (in the case of hydrant landing valves, hose reels, portable and wheeled fire extinguishers and fire blankets), or log books (in the case of sprinkler, pumpset, fire hydrant, detection, smoke and heat alarm, fire alarm monitoring, sound, intercom, gaseous, aerosol, water mist, passive fire and smoke and HVAC and evacuation systems).

The use of maintenance record tags or labels shall not preclude the need for a separate maintenance record system.

Where log books are used, they shall have sequentially numbered pages in triplicate. Provision shall be made for the signatures of the building owner, occupier or agent, and the service person. The required distribution of copies shall be printed on each page as follows:

- a) Originalowner/occupier/agent
- b) Duplicateservice person
- c) Triplicateretain in book

Preparation of annual report

An owner of a building or a place of public entertainment must ensure that an essential safety measures report is prepared in accordance with *Regulation 1215* in respect of any essential safety measure required to be provided in relation to that building or place under the *Act* or these *Regulations* or any corresponding *Act* or *Regulations*.

In the case of a first report, it must be prepared before the 13 June 2009, and in the case of each subsequent report, before each anniversary of 13 June 2009.

A copy of the annual report is provided in Appendix A of this manual.

→ Appendices

- Appendix A – Annual Essential Safety Measures Report
- Appendix B – Building Regulations 2006
- Appendix C – Sample Log Sheets

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Appendix A - Annual Essential Safety Measures Report

Building Act 1993

Building Regulations 2006

REGULATION 1209 & 1215: ANNUAL ESSENTIAL SAFETY MEASURES REPORT¹

Property Address:

Building/s or part of building:

Classification of building/s or part of building:

PART A – Post July 1994 building

This part of report is in relation to occupancy permit no: *(insert no)* issued: *(insert date)*
or maintenance determination dated: *(insert date)* and is required to be prepared before each anniversary of the date
of that occupancy permit or maintenance determination.

Maintenance personnel details

The following personnel carried out maintenance on the essential safety measures in this building during the preceding 12 months.

Essential safety measure	Name	Address

PART B - All Buildings (pre and post July 1994 Buildings)

1) Details of any inspection report provided under section 227E² of the Building Act 1993; and

2) Compliance

I hereby state that I have*/the owner has* taken all reasonable steps to ensure that—

** Delete as applicable*

- (i) each essential safety measure is operating at the required level of performance or to fulfil its purpose; and
- (ii) where applicable each essential safety measure has been maintained in accordance with the occupancy permit or maintenance determination and will fulfil its purpose; and
- (iii) since the last annual essential safety measures report there have been no penetrations to required fire-resisting construction, smoke curtains and the like in the building, other than those for which a building permit has been issued; and
- (iv) since the last annual essential safety measures report there have been no changes to materials or assemblies that must comply with particular fire hazard properties, other than those for which a building permit has been issued; and
- (v) the information contained in this report is correct.

Signature

Owner/agent of owner*³

** Delete if inapplicable*

Signed:

Date:

Notes

1. The owner must ensure that this annual essential safety measures report and records of maintenance checks, service and repair work are available on the premises for inspection by the municipal building surveyor or chief officer after 24 hours notice. The penalty for non-compliance is a maximum of 10 penalty units.
2. Section 227E of the *Building Act 1993* provides the power for the chief officer and municipal building surveyor to inspect essential safety measures.
3. Under section 240 and 248(1) of the *Building Act 1993* an agent of the owner must have written authority from the owner to act as their agent. Also note the general rules of "Agency" also apply.

PART 12 - MAINTENANCE OF BUILDINGS AND PLACES OF PUBLIC ENTERTAINMENT

Division 1- Maintenance of Essential Safety Measures

Subdivision 1 - Maintenance of Essential Safety Measures in Buildings and Places of Public Entertainment

1201. Application of this Subdivision

- (1) Subject to sub-regulation (2), this Subdivision applies to -
 - (a) a Class 1b, 2, 3, 5, 6, 7, 8 or 9 building; and
 - (b) a Class 4 part of a building; and
 - (c) a place of public entertainment.
- (2) This Subdivision does not apply to a smoke alarm installed in a sole-occupancy unit in a Class 1b or 2 building or a Class 4 part of a building.

1202. Definitions

In this Subdivision -

"essential safety measure" means -

- (a) any of the following items required by or under the Act or these Regulations to be provided in relation to a building or a place of public entertainment -
 - (i) an item listed in Tables I1.1 to I1.11 of Volume One of the BCA, except the item in Table I1.4 relating to artificial lighting;
 - (ii) an item listed in clause I1.2 of Volume One of the BCA; or
- (b) any other item that is required by or under the Act or these Regulations to be provided in relation to a building or place of public entertainment for the safety of persons in the event of fire and that is designated by the relevant building surveyor as an essential safety measure; or
- (c) any other item that is an essential safety measure within the meaning of Division 1 of Part 12 of the Building (Interim) Regulations 2005 as in force before their revocation;

"maintenance determination" means a determination made by a relevant building surveyor under -

- (a) regulation 1204; or
- (b) regulation 1204 of the Building (Interim) Regulations 2005 as in force before their revocation; or
- (c) regulation 11.4 of the Building Regulations 1994 as in force before their revocation;

"maintenance schedule" in relation to a building or a place of public entertainment means a maintenance schedule prepared by a municipal building surveyor or a private building surveyor under regulation 1206 as updated from time to time under that regulation.

1203. Maintenance requirements for essential safety measures when occupancy permit required

- (1) An occupancy permit issued in respect of a building or place of public entertainment must include a condition which -
 - (a) lists all the essential safety measures pertaining to that building or place of public entertainment; and (b) specifies for each essential safety measure listed, the level of performance determined by the relevant building surveyor to enable the essential safety measure to fulfil its purpose.
- (2) In determining the level of performance of an essential safety measure, the relevant building surveyor must specify the provision of the building regulations with which the installation and operation of the essential safety measure is to comply and the frequency and type of maintenance required.
- (3) In this regulation **"provision of the building regulations"** has the same meaning as in section 160 of the Act.

1204. Maintenance requirements of essential safety measures in other circumstances

- (1) If an essential safety measure is provided in a building or place of public entertainment as a consequence of an emergency order or a building order or the carrying out of building work where an occupancy permit is not required to be issued the relevant building surveyor must determine -
 - (a) the level of performance required to enable the essential safety measure to fulfil its purpose; and
 - (b) the frequency and type of maintenance required.
- (2) A determination under sub-regulation (1) must -
 - (a) be in writing; and
 - (b) be given to the owner of the building or place of public entertainment without delay after it is made.

1205. Owner must comply with maintenance determination

The owner of a building or place of public entertainment must comply with a maintenance determination in relation to that building or place.

Penalty: 10 penalty units.

1206. Building surveyor may create or update a maintenance schedule

- (1) A municipal building surveyor or a private building surveyor may, on the application of the owner of a building or place of public entertainment, create a consolidated list of essential safety measures and the maintenance requirements relating to those essential safety measures -
 - (a) that are the subject of a condition imposed on an occupancy permit issued in respect of the building or place under -
 - (i) regulation 1203(1); or
 - (ii) regulation 1203(1) of the Building (Interim) Regulations 2005 as in force before their revocation; or
 - (iii) regulation 11.3(1) of the Building Regulations 1994 as in force before their revocation; or
 - (b) that are the subject of a maintenance determination in respect of the building or place.
- (2) In creating a maintenance schedule for the first time in respect of a building or a place of public entertainment, a municipal building surveyor or a private building surveyor must ensure that -
 - (a) any essential safety measure referred to under sub-regulation (1) that exists in the building or place of public entertainment at the time of creation of the schedule is listed in the schedule along with any maintenance requirement that relates to it; and
 - (b) the essential safety measures and related maintenance requirements are listed in chronological order in the schedule according to the date of the issue of the occupancy permit or the date of making of the maintenance determination that relates to each of those essential safety measures.
- (3) A municipal building surveyor or a private building surveyor may, on the application of the owner of a building or place of public entertainment, update a maintenance schedule prepared in respect of the building or place by adding any additional essential safety measures and related maintenance requirements required to be provided in relation to the building or place after the date of the creation of the schedule.
- (4) Any additional essential safety measures added to a maintenance schedule under sub-regulation (3) must be listed in chronological order in the schedule according to the date of issue of the relevant occupancy permit or the date of making of the maintenance determination (as the case may be).

1207. Maintenance schedule and maintenance determination to be available for inspection

An owner of a building or place of public entertainment must ensure that a copy of any current maintenance schedule prepared in respect of the building or place, and any current maintenance determination made in respect of the building or place relating to an essential safety measure that is not listed in a maintenance schedule, is available at that building or place for inspection by the municipal building surveyor or chief officer at any time on request after 24 hours notice.

Penalty: 10 penalty units

1208. Owner must prepare annual report

(1) An owner of a building or place of public entertainment, in respect of which a condition on an occupancy permit lists an essential safety measure or a maintenance determination has been made, must ensure that an annual essential safety measures report is prepared in accordance with regulation 1209 before each anniversary of the relevant anniversary date.

Penalty: 10 penalty units.

(2) In this regulation "**relevant anniversary date**" means -

- (a) the date of issue of the occupancy permit or the date of making of the maintenance determination; or
- (b) if more than one occupancy permit or maintenance determination or both is issued or made, the earliest date of issue or making of those documents.

Note: Regulation 2001 deems an annual essential safety measures report prepared in accordance with regulation 1209 of the Building (Interim) Regulations 2005 before 13 June 2006 to be an annual essential safety measures report prepared in accordance with this regulation.

1209. Contents and form of annual report

The annual essential safety measures report for the purposes of regulation 1208 must -

- (a) be in a form approved by the Commission; and
- (b) be signed by the owner or an agent of the owner; and
- (c) specify the address of the building or place of public entertainment that it relates to; and
- (d) include the details of any inspection report made under section 227E of the Act in respect of each essential safety measure; and
- (e) include a statement that the owner or an agent of the owner has taken all reasonable steps to ensure that—
 - (i) each essential safety measure is operating at the required level of performance and has been maintained in accordance with the relevant occupancy permit or maintenance determination and will fulfil its purpose; and
 - (ii) since the last annual essential safety measures report, there have been no penetrations to required fire-resisting construction, smoke curtains and the like in the building or place, other than those for which a building permit has been issued; and
 - (iii) since the last annual essential safety measures report, there have been no changes to materials or assemblies that must comply with particular fire hazard properties, other than those for which a building permit has been issued; and
- (iv) the information contained in the report is correct.

1210. Annual reports may be combined

If an annual essential safety measures report is required under regulation 1208 and under regulation 1214 in relation to the same building or place of public entertainment, the reports may be combined into one consolidated report.

1211. Annual reports and records to be made available

An owner of a building or place of public entertainment must ensure that any annual essential safety measures report required to be prepared under regulation 1208 and records of all maintenance checks and any service or repair work carried out to any essential safety measure are available at the building or place for inspection by the municipal building surveyor or chief officer at any time on request after 24 hours notice.

Penalty: 10 penalty units.

SUBDIVISION 2 - MAINTENANCE OF ESSENTIAL SAFETY MEASURES IN BUILDINGS AND PLACES OF PUBLIC ENTERTAINMENT CONSTRUCTED BEFORE 1 JULY 1994

1212. Application of Subdivision

This Subdivision applies to all Class 1b, 2, 3, 5, 6, 7, 8 and 9 buildings and places of public entertainment constructed before 1 July 1994.

1213. Definition of essential safety measure in this Subdivision

In this Subdivision, "essential safety measure" means any measure (including an item of equipment, form of construction or safety strategy) required for the safety of persons using a building or place of public entertainment.

1214. Owner of building or place constructed before 1 July 1994 must prepare annual report

(1) An owner of a building or place of public entertainment must ensure that an annual essential safety measures report is prepared in accordance with regulation 1215 in respect of any essential safety measure required to be provided in relation to that building or place under the Act or these Regulations or any corresponding previous Act or regulations -

- (a) in the case of the first report, before 13 June 2009; and
- (b) in the case of each subsequent report, before each anniversary of 13 June 2009.

Penalty: 10 penalty units.

(2) Sub-regulation (1) does not apply to any essential safety measure in respect of which an annual report is required to be prepared under Subdivision 1 of this Division.

1215. Contents and form of annual report for building or place constructed before 1 July 1994

The annual essential safety measures report for the purposes of regulation 1214 must -

- (a) be in a form approved by the Commission; and
- (b) be signed by the owner or an agent of the owner; and
- (c) specify the address of the building or place of public entertainment that it relates to; and
- (d) include the details of any inspection report made under section 227E of the Act in respect of each essential safety measure; and
- (e) include a statement that the owner or an agent of the owner has taken all reasonable steps to ensure that each essential safety measure -
 - (i) is operating and has been maintained in a state that enables the essential safety measure to fulfil its purpose; and
 - (ii) since the last annual essential safety measures report, there have been no penetrations to required fire-resisting construction, smoke curtains and the like in the building or place, other than those for which a building permit has been issued; and
 - (iii) since the last annual essential safety measures report, there have been no changes to materials or assemblies that must comply with particular fire hazard properties, other than those for which a building permit has been issued; and
- (iv) the information contained in the report is correct.

1216. Annual reports and records to be made available by owners of buildings constructed before 1 July 1994

(1) An owner of a building or place of public entertainment must ensure that any annual essential safety measures report required to be prepared under regulation 1214 and records of all maintenance checks and any service or repair work carried out to any essential safety measure are available at the building or place for inspection by the municipal building surveyor or chief officer at any time on request after 24 hours notice.

Penalty: 10 penalty units.

(2) Sub-regulation (1) does not apply until 13 June 2009.

1217. Maintenance responsibility of owner of building or place constructed before 1 July 1994

The owner of a building or place of public entertainment must ensure that any essential safety measure required to be provided in relation to that building or place under the Act or these Regulations or any corresponding previous Act or regulations -

- (a) is maintained in a state which enables the essential safety measure to fulfil its purpose; and
- (b) is not removed from its approved location except—
 - (i) for the purpose of maintenance; or
 - (ii) in accordance with these Regulations.

Penalty: 10 penalty units.

SUBDIVISION 3 - MAINTENANCE OF EXITS AND PATHS OF TRAVEL RELATING TO BUILDINGS OR PLACES OF PUBLIC ENTERTAINMENT

1218. Maintenance of exits by occupiers of buildings or places of public entertainment

The occupier of a Class 1b, 2, 3, 5, 6, 7, 8 or 9 building or a place of public entertainment must ensure that -

- (a) all exits; and
- (b) any paths of travel to exits; and
- (c) any paths of travel on the allotment from exits to a road - required to be provided in relation to that building or place are maintained in an efficient condition and kept readily accessible, functional and clear of obstruction so that egress from the building or place is maintained.

Penalty: 10 penalty units.

DIVISION 2 - SWIMMING POOL AND SPA MAINTENANCE AND OPERATION

1219. Application of this Division

This Division applies to a swimming pool or spa that is appurtenant to a Class 1, 2, 3 or 10 building or a Class 4 part of a building.

1220. Swimming pool and spa maintenance and operation

- (1) The occupier of an allotment or building containing a swimming pool or spa must take all reasonable steps to ensure that any fence or other barrier, door, gate, lock, latch, catch, bolt or fly screen restricting access to the swimming pool or spa is maintained and operating effectively at all times.

Penalty: 50 penalty units.

- (2) The occupier of an allotment or building containing a swimming pool or spa must take all reasonable steps to ensure that any gate or door forming part of a swimming pool or spa barrier or fence that provides access to the swimming pool or spa is in the closed position except when a person is in the act of entering or leaving the part of the allotment or building containing the swimming pool or spa.

Penalty: 50 penalty units.

- (3) A person who enters or leaves the part of an allotment or building containing a swimming pool or spa must ensure that any gate or door forming part of the swimming pool or spa barrier or fence that provides access to the swimming pool or spa is in the closed position at all times, except when that person or another person is in the act of entering or leaving that part of the allotment or building.

Penalty: 50 penalty units.

Appendix C - Part 1 - Sample Log Sheets

4.1 EMERGENCY LIGHTING

REFER: AS 2293.2

SIX-MONTHLY AND TWELVE-MONTHLY PROCEDURES

Name of building: _____ Name of owner: _____

Address: _____

Level of performance and frequency of maintenance (as specified on occupancy permit): _____

Unit	Task	Routine 1 i.e. six Months	Routine 2 i.e. twelve Months	Signature
Battery Charger	Visual inspection of unit			
	Clean unit and cubicle			
	Check battery voltage - record voltage			
	Check all connections			
	Check voltmeter calibration - record result			
	Check battery earth - fault detector operates			
	Check battery low - voltage alarm operates			
Inverter	Visual inspection of unit			
	Check D.C. input voltage - record voltage			
	Check A.C. output voltage - record voltage			
	Check voltmeter calibration - record result			
Distribution and control equipment	Visually inspect - relays, contactors, fuses, circuit breakers			
	Check all connections for tightness			
	Clean down equipment and enclosures			
	Check sensing equipment operates system correctly when normal lighting supply isolated			
Emergency lights and exit signs	Check all lights operate correctly			
	Replace faulty lamps			
	Clean reflecting and light emitting surfaces			
Total system	Check proper operation with battery-charger off and mains supply isolated			
	Check charger-failure alarm operates			
	Check correct battery-charging when system restored			
	Check and record battery voltage after discharge test - 100% of lights for at least 90 minutes			
	Battery-charger change over time to "float charge" mode, after "boost" mode selected. Record time			
	Record battery re-service or replacement			
Date	Name of person conducting inspection	Status	Problems identified	Action to rectify
Date problem rectified		Signature		

EMERGENCY LIGHTING SYSTEM—SINGLE POINT LIGHTING

REFER: AS 2293.2

Name of building: _____ Name of owner: _____

Address: _____

Level of performance and frequency of maintenance (as specified on occupancy permit): _____

Date of inspection	Name of person inspecting	Light Number										Date of rectification	Signature											
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
Status																								
Endurance of battery after power turned off	Time in Mins (at least 90)																							
Faulty lamp replaced	✓ if replaced																							
Proper function of battery charger indicator	Yes ✓ No ✗																							
Endurance of battery after power turned off	Time in Mins (at least 90)																							
Faulty lamp replaced	✓ if replaced																							
Proper function of battery charger indicator	Yes ✓ No ✗																							
All light emitting and reflecting surfaces cleaned	✓ when completed																							
Date of inspection	Name of person conducting inspection	Status										Date of rectification	Signature											
		Problems identified on inspection										Action taken to rectify problem	Signature											

10.1 STANDBY POWER SYSTEM

Name of building: _____ Name of owner: _____

Address: _____

Level of performance and frequency of maintenance (as specified on occupancy permit): _____

Unit	Task Date	Week 1	Week 2	Week 3	Week 4	Week 5	Month
Generating Set	Check water and oil levels - top up if necessary						
	Check required spares on hand - belts, filter cartridges, engine oil						
Batteries and Charger	Freedom from corrosion						
	Check electrolyte level - top up if necessary						
	Check cell voltage Lead acid - 2 volts ni-cad - 1.5 volts						
Run engine for 10 mins then -	Visual check for leaks - oil, fuel, water, loose fittings or equipment						
	Visual check of belt drives						
	Check operation of alternator or generator (check voltmeter)						
	Check battery-charger power-failure alarm						
	Check for excessive vibration or heat						
	Check for correct running speed						
After running and shut-down	Check water, oil, fuel levels - top up if necessary						
	Check cooling system strainers or filters and clean if necessary						
	Ensure engine "stop" mechanism automatically returns to "start" position						
Start engine	Using manual controls						Monthly routine
	Check temp after 30 mins						Monthly routine
	Check and clean - fuel sludge and sediment trap, fuel, oil and air filters - replace if necessary						six-monthly routine
	Change engine oil (if not 6 months, then yearly)						six-monthly routine
	Weekly signature						

Appendix C - Part 2 Sample Log Sheets

2.1 EMERGENCY LIGHTING

REFER: AS 2293.2

SIX-MONTHLY AND TWELVE-MONTHLY PROCEDURES

Name of building: _____ Name of owner: _____

Address: _____

Level of performance and frequency of maintenance (as specified on occupancy permit): _____

Unit	Task	Routine 1 i.e. six Months	Routine 2 i.e. twelve Months	Signature
Battery Charger	Visual inspection of unit			
	Clean unit and cubicle			
	Check battery voltage - record voltage			
	Check all connections			
	Check voltmeter calibration - record result			
	Check battery earth - fault detector operates			
	Check battery low - voltage alarm operates			
Inverter	Visual inspection of unit			
	Check D.C. input voltage - record voltage			
	Check A.C. output voltage - record voltage			
	Check voltmeter calibration - record result			
Distribution and control equipment	Visually inspect - relays, contactors, fuses, circuit breakers			
	Check all connections for tightness			
	Clean down equipment and enclosures			
	Check sensing equipment operates system correctly when normal lighting supply isolated			
Emergency lights and exit signs	Check all lights operate correctly			
	Replace faulty lamps			
	Clean reflecting and light emitting surfaces			
Total system	Check proper operation with battery-charger off and mains supply isolated			
	Check charger-failure alarm operates			
	Check correct battery-charging when system restored			
	Check and record battery voltage after discharge test - 100% of lights for at least 90 minutes			
	Battery-charger change over time to "float charge" mode, after "boost" mode selected. Record time			
	Record battery re-service or replacement			
Date	Name of person conducting inspection	Status	Problems identified	Action to rectify
Date problem rectified		Signature		

EMERGENCY LIGHTING SYSTEM - SINGLE POINT LIGHTING

REFER: AS 2293.2

Name of building: _____ Name of owner: _____

Address: _____

Level of performance and frequency of maintenance (as specified on occupancy permit): _____

Date of inspection	Name of person inspecting	Light Number										Date of rectification	Signature											
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
Status																								
Endurance of battery after power turned off	Time in Mins (at least 90)																							
Faulty lamp replaced	✓ if replaced																							
Proper function of battery charger indicator	Yes ✓ No ✗																							
Endurance of battery after power turned off	Time in Mins (at least 90)																							
Faulty lamp replaced	✓ if replaced																							
Proper function of battery charger indicator	Yes ✓ No ✗																							
All light emitting and reflecting surfaces cleaned	✓ when completed																							
Date of inspection	Name of person conducting inspection	Status	Problems identified on inspection	Action taken to rectify problem	Date of rectification	Signature																		

2.2 EMERGENCY POWER SUPPLY

Name of building: _____ Name of owner: _____

Address: _____

Level of performance and frequency of maintenance (as specified on occupancy permit): _____

Unit	Task Date	Week 1	Week 2	Week 3	Week 4	Week 5	Month
Generating Set	Check water and oil levels - top up if necessary						
	Check required spares on hand - belts, filter cartridges, engine oil						
Batteries and Charger	Freedom from corrosion						
	Check electrolyte level - top up if necessary						
	Check cell voltage Lead acid - 2 volts ni-cad - 1.5 volts						
Run engine for 10 mins then -	Visual check for leaks - oil, fuel, water, loose fittings or equipment						
	Visual check of belt drives						
	Check operation of alternator or generator (check voltmeter)						
	Check battery-charger power-failure alarm						
	Check for excessive vibration or heat						
	Check for correct running speed						
After running and shut-down	Check water, oil, fuel levels - top up if necessary						
	Check cooling system strainers or filters and clean if necessary						
	Ensure engine "stop" mechanism automatically returns to "start" position						
Start engine	Using manual controls						Monthly routine
	Check temp after 30 mins						Monthly routine
	Check and clean - fuel sludge and sediment trap, fuel, oil and air filters - replace if necessary						six-monthly routine
	Change engine oil (if not 6 months, then yearly)						six-monthly routine
	Weekly signature						

3.2 FIRE DETECTION AND ALARM SYSTEMS, FIRE BRIGADE CONNECTIONS AND FIRE CONTROL PANELS

REFER: AS 1851.8

Name of building: _____ Maintenance organisation: _____

Address: _____

Telephone: _____

Place a tick ✓ in box where item is satisfactory

Place a cross ✗ in box where item is unsatisfactory

NOTE: Give details of all unsatisfactory items in REPORT section

Weekly checks

	Week 1	Week 2	Week 3	Week 4	Week 5
1.1 Fire alarm signal simulation	<input type="checkbox"/>				
1.2 Fire alarm bell or warning device operation	<input type="checkbox"/>				
1.3 Installation reset to normal	<input type="checkbox"/>				
1.4 Battery condition	<input type="checkbox"/>				
1.5 All switches returned to correct	<input type="checkbox"/>				
1.6 Fire alarm signal received at fire control station	<input type="checkbox"/>				

DATE (weekly) _____

MONTHLY

	CHECKED	YEARLY	CHECKED
2.1 All weekly procedures	<input type="checkbox"/>	3.1 All weekly and monthly procedures	<input type="checkbox"/>
2.2 Alarm zone facility operation	<input type="checkbox"/>	3.2 Visual inspection of all detectors and sampling points	<input type="checkbox"/>
2.3 Battery condition and terminals	<input type="checkbox"/>	3.3 Fault signal registration for each alarm zone	<input type="checkbox"/>
2.4 Condition of battery cabinet and battery storage	<input type="checkbox"/>	3.4 Detector and sampling point testing, as appropriate	<input type="checkbox"/>
2.5 Indicator lights correct operation	<input type="checkbox"/>	Enter results on detector test record (see Appendix C)	<input type="checkbox"/>
2.6 All alarms bells and signaling devices operation	<input type="checkbox"/>	3.5 Correct operation of all ancillary control facility	<input type="checkbox"/>
2.7 Fault condition simulation on all alarm zones and ensure:	<input type="checkbox"/>	3.6 Correct initiation of each controlled device	<input type="checkbox"/>
2.8 All CIE equipment clean and operative	<input type="checkbox"/>	3.7 Operation of all manual call points	<input type="checkbox"/>
2.9 All FIP, SIP, RP, and MP clearly visible and readily accessible	<input type="checkbox"/>	3.8 Power supply supervision alarm	<input type="checkbox"/>
2.10 All controls returned to normal condition	<input type="checkbox"/>	3.9 Control and indicating for deterioration	<input type="checkbox"/>
2.11 Correct of items previously recorded for action	<input type="checkbox"/>	3.10 Modification to the system 1. Detector condition 2. Building modifications	<input type="checkbox"/>
REPORTS		3.11 Spare glasses for manual call points	<input type="checkbox"/>

SIGNED: _____ SERVICE PERSON: _____

For owner or his agent

Print Name

DATE: _____

3.3 FIRE EXTINGUISHERS—PORTABLE

REFER: AS 1851.1

Name of building: _____ Name of owner: _____

Address: _____

Level of performance and frequency of maintenance (as specified on occupancy permit): _____

	Extinguisher No.																			
Year 1	Level 2 Yearly																			
	Level 1 6 monthly																			
Year 2	Level 2 (end of year 2)																			
	Level 1 Mid year 2																			
Year 3	Level 3 3 Yearly (end of year 3)																			
	Level 1 Mid year 3																			
Year 4	Level 2 (end of year 4)																			
	Level 1 Mid year 4																			
Year 5	Level 2 (end of year 5)																			
	Level 1 Mid year 5																			
Year 6	Level 4 6 Yearly (end of year 6)																			
	Level 1 Mid year 6																			
	Level 5 After use																			

3.5 FIRE HYDRANTS, FIRE MAINS

ROUTINE 2 - MONTHLY AND THREE-MONTHLY

REFER: AS 1851.4

(NOTE: Weekly maintenance of pumpset to 1851.14 is required)

Hydrant record care (monthly and quarterly inspection, testing and maintenance)

Building: _____

Maintenance organisation: _____ Telephone: _____

Address: _____

Place a tick ✓ in box where item is satisfactory
 Place a cross ✗ in box where item is unsatisfactory
 NOTE: Give details of all unsatisfactory items in REPORT sect

Monthly checks	1	2	3	4	5	6	7	8	9	10	11	12
2.1 All weekly checks	<input type="checkbox"/>											
2.2 Hydrant valves accessible	<input type="checkbox"/>											
2.3 Hydrant leaks ALL valves	<input type="checkbox"/>											
2.4 Hose supply	<input type="checkbox"/>											
2.5 Hose fittings and blanking cap	<input type="checkbox"/>											
2.6 Cabinets	<input type="checkbox"/>											
2.7 Tank level	<input type="checkbox"/>											
2.8 Valves set and secured	<input type="checkbox"/>											
2.9 Isolation operation	<input type="checkbox"/>											
Date (monthly)	___	___	___	___	___	___	___	___	___	___	___	___

Quarterly checks	1	2	3	4
3.1 All weekly and monthly checks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2 Brigade alarm operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3 Valve pressure readings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4 Circuit-breaker/fuses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.5 Pressure switch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.6 Electric pump full load run	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.7 Compression - 30 min run test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.8 Ignition engine - temperature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.9 Driven pump manual restart	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Date (quarterly)	___	___	___	___

Report:

Hydrant identification (If necessary): _____ Location: _____

Date of manufacture: _____ Date of service: _____

FIRE HYDRANTS, FIRE MAINS**ROUTINE 3-YEARLY, THREE-YEARLY, SIX-YEARLY**

REFER: AS 1851.4

Hydrant record card (yearly, three-yearly and six yearly inspection, testing and maintenance)

Building : _____

Maintenance organisation: _____ Telephone: _____

Address: _____

Place tick ✓ a in box where item is satisfactory

Place a cross ✗ in box where item is unsatisfactory

NOTE: Give details of all unsatisfactory items in REPORT section

Yearly checks	Three-yearly checks
4.1 All weekly, monthly and quarterly checks <input type="checkbox"/>	5.1 All weekly, monthly, quarterly and yearly checks <input type="checkbox"/>
4.2 Alarm wiring and connectors <input type="checkbox"/>	5.2 Hydrant presence of water <input type="checkbox"/>
4.3 Hydrant presence of water <input type="checkbox"/>	5.3 Flow test <input type="checkbox"/>
4.4 Tank inspection <input type="checkbox"/>	5.4 Clean tanks <input type="checkbox"/>
4.5 Clean and maintain pipework <input type="checkbox"/>	5.5 Overhaul pressure reducing valves <input type="checkbox"/>
4.6 Electric pump starter operation and maintenance <input type="checkbox"/>	5.6 Overhaul non-return valves <input type="checkbox"/>
4.7 Filter <input type="checkbox"/>	5.7 Test flow switch <input type="checkbox"/>
4.8 Lubricating oil <input type="checkbox"/>	Date (three-yearly) _____
Date (yearly) _____	Six-yearly checks 6.1 All weekly, monthly, quarterly, yearly and three-yearly checks <input type="checkbox"/> 6.2 Hydrostatic test <input type="checkbox"/> Date (six-yearly) _____

Report:

Hydrant identification (If necessary): _____ Location: _____

Date of manufacture: _____ Date of service: _____

SMOKE ALARMS

REFER: AS 1851.8

Name of building: _____ Maintenance organisation: _____

Address: _____

Telephone: _____

Place a tick ✓ in box where item is satisfactory
Place a cross ✗ in box where item is unsatisfactory

NOTE: Give details of all unsatisfactory items in REPORT section

Weekly checks

	Week 1	Week 2	Week 3	Week 4	Week 5
1.1 Fire alarm signal simulation	<input type="checkbox"/>				
1.2 Fire alarm bell or warning device operation	<input type="checkbox"/>				
1.3 Installation reset to normal	<input type="checkbox"/>				
1.4 Battery condition	<input type="checkbox"/>				
1.5 All switches returned to correct	<input type="checkbox"/>				
1.6 Fire alarm signal received at fire control station	<input type="checkbox"/>				

DATE (weekly) _____

MONTHLY

	CHECKED	YEARLY	CHECKED
2.1 All weekly procedures	<input type="checkbox"/>	3.1 All weekly and monthly procedures	<input type="checkbox"/>
2.2 Alarm zone facility operation	<input type="checkbox"/>	3.2 Visual inspection of all detectors and sampling points	<input type="checkbox"/>
2.3 Battery condition and terminals	<input type="checkbox"/>	3.3 Fault signal registration for each alarm zone	<input type="checkbox"/>
2.4 Condition of battery cabinet and battery storage	<input type="checkbox"/>	3.4 Detector and sampling point testing, as appropriate	<input type="checkbox"/>
2.5 Indicator lights correct operation	<input type="checkbox"/>	Enter results on detector test record (see Appendix C)	<input type="checkbox"/>
2.6 All alarms bells and signaling devices operation	<input type="checkbox"/>	3.5 Correct operation of all ancillary control facility	<input type="checkbox"/>
2.7 Fault condition simulation on all alarm zones and ensure:	<input type="checkbox"/>	3.6 Correct initiation of each controlled device	<input type="checkbox"/>
2.8 All CIE equipment clean and operative	<input type="checkbox"/>	3.7 Operation of all manual call points	<input type="checkbox"/>
2.9 All FIP, SIP, RP, and MP clearly visible and readily accessible	<input type="checkbox"/>	3.8 Power supply supervision alarm	<input type="checkbox"/>
2.10 All controls returned to normal condition	<input type="checkbox"/>	3.9 Control and indicating for deterioration	<input type="checkbox"/>
2.11 Correct of items previously recorded for action	<input type="checkbox"/>	3.10 Modification to the system 1. Detector condition 2. Building modifications	<input type="checkbox"/>
REPORTS		3.11 Spare glasses for manual call points	<input type="checkbox"/>

SIGNED: _____ SERVICE PERSON: _____
For owner or his agent Print Name

DATE: _____
Signature

3.7 SPRINKLER SYSTEMS

ROUTINE—LEVEL 1 - WEEKLY

REFER: AS 1851.3

Name of building: _____ Name of owner: _____

Address: _____

Level of performance and frequency of maintenance (as specified on occupancy permit): _____

Routine	Date	Problems Identified	Remedial Action Taken	Name of Tester	Signature
1. Level 1					
2. Level 1					
3. Level 1					
4. Level 1					
5. Level 1					
6. Level 1					
7. Level 1					
8. Level 1					
9. Level 1					
10. Level 1					
11. Level 1					
12. Level 1					
13. Level 1					
14. Level 1					

SPRINKLER SYSTEMS

REFER: AS 1851.3

ROUTINE—LEVEL 2 - QUARTERLY, LEVEL 3 - ANNUALLY

LEVEL 4 - THREE-YEARLY, LEVEL 5 - SIX-YEARLY

(NOTE: Each new level incorporates the performance of each lower level)

Name of building: _____ Name of owner: _____

Address: _____

Level of performance and frequency of maintenance (as specified on occupancy permit): _____

Routine Level	Date	Problems Identified	Remedial Action Taken	Name of Tester	Signature
Level 2 Quarterly					
Level 2					
Level 2					
Level 2					
Level 3 Yearly					
Level 2					
Level 2					
Level 2					
Level 2					
Level 3					
Level 2					
Level 2					
Level 2					
Level 2					
Level 3					
Level 4 3 Yearly					
Level 5 6 Yearly					

3.9 PUMPSETS

ROUTINE 1 WEEKLY

REFER: AS 1851.14

Pumpsets record (Weekly inspection, testing and maintenance)

Premises: _____

Maintenance organisation: _____ Telephone: _____

Address: _____

Place a tick ✓ in box where item is satisfactory
 Place a cross ✗ in box where item is unsatisfactory
 NOTE: Give details of all unsatisfactory items in REPORT section

Weekly checks	Week			
	1	2	3	4
Storage tank water level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Isolation valves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pump controller cabinet condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Battery correct type	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Battery corrosion, damage and security	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Battery cabinet condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Battery float voltage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electric motor driven pumpset				
Pump start and pressure devices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vibration and noise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pump running alarms and lights	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pump under load	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pressure relief/flow control valve	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CI engine driven pumpset				
Water, oil , fuel levels and drive belts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pump start devices and pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gland/seal and drain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pump running alarm and lights	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vibration and noise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Running speed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water, oil and fuel leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alternator/generator operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Engine stop mechanism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooling water discharge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pump casing air relief valve	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Charger fail alarm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pressure relief/flow control valve	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water, oil and fuel levels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Service person _____

Signed _____

Date (Weekly) _____

Report(s): _____ Signed: _____
For owner or agent

Pumpsets identification (if necessary) _____ Date: _____

Location _____

Date of Manufacture _____ Date in service _____

Premises: _____

Maintenance organisation: _____ Telephone: _____

Address: _____

Place a tick ✓ in box where item is satisfactory
Place a cross ✗ in box where item is unsatisfactory
Write N/A where not applicable
NOTE: Give details of all unsatisfactory items in Report section.

	Quarter			
Quarterly	1	2	3	4
All weekly checks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check isolation valves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check non-return valves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check pressure relief/flow control valves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CI engine				
Check condensate drains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Run engine 30 min	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check exhaust system leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check exhaust system guards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Service person _____ Signed: _____ Date: _____
For owner or agent

Report(s): Signed: _____ Date: _____
For owner or agent

Pumpsets identification (if necessary)

Location _____ Date of Manufacture _____

Date in service _____

Pumpsets record (Yearly inspection, testing and maintenance)

Premises: _____

Maintenance organisation: _____ Telephone: _____

Address: _____

Place a tick ✓ in box where item is satisfactory
Place a cross ✗ in box where item is unsatisfactory
Write N/A where not applicable
NOTE: Give details of all unsatisfactory items in Report section.

Yearly	1	2	3	4
All weekly and quarterly checks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alarm wiring and connectors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electric motor driven pumpsets				
Check circuit -breakers/fuses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check motor starter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check starting sequence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Run pumpset for 30 min	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check phase fail alarm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

CI engine driven pumpsets

Service as per AS 2676	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check, clean or replace filters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inspect and clean heat exchanger strainer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Run pumpset for 30 min	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flush cooling system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

CI engine room

Check room heating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check ventilation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Valves and pipework

Overhaul PRVs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Test non-return valves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clean, inspect and repaint piping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check air release valve	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overhaul pressure reducing/flow control valves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Service person _____

Signed _____

Date _____

Report(s): Signed: _____ For owner or agent: _____ Date: _____

Pumpsets identification (if necessary)

Location _____ -

Date of Manufacture _____ Date in service _____

Pumpsets record (Three-yearly inspect on, testing and maintenance)

Premises _____ Maintenance organization _____

Address _____ Telephone _____

Place tick ✓ in box where item is satisfactory

Place ✗ in box where item is unsatisfactory

Write N/A where not applicable

NOTE: Give details of all unsatisfactory items in Report section.

Three-yearly

All weekly, quarterly and yearly checks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
---	--------------------------	--------------------------	--------------------------	--------------------------

CI driver

Service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check all safety guards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Service person _____

Signed _____

Date _____

Report(s): Signed: _____ For owner or agent

Pumpsets identification (if necessary) Date: _____ Location _____

Date of Manufacture _____ Date in service _____

4.6 FIRE-RESISTING SHAFTS

Name of building: _____ Name of owner: _____

Address: _____

Level of performance and frequency of maintenance (as specified on occupancy permit): _____

Date of inspection	Name and address of person conducting inspection	Problems identified in inspection	Action taken to rectify problem	Date of rectification	Signature

4.7 FIRE-RESISTING STRUCTURES

Name of building: _____ Name of owner: _____

Address: _____

Level of performance and frequency of maintenance (as specified on occupancy permit): _____

Date of inspection	Name and address of person conducting inspection	Problems identified in inspection	Action taken to rectify problem	Date of rectification	Signature

4.10 LIGHTWEIGHT CONSTRUCTION

Name of building: _____ Name of owner: _____

Address: _____

Level of performance and frequency of maintenance (as specified on occupancy permit): _____

Date of inspection	Name and address of person conducting inspection	Problems identified in inspection	Action taken to rectify problem	Date of rectification	Signature

4.11 PENETRATIONS IN FIRE-RATED STRUCTURES

Name of building: _____ Name of owner: _____

Address: _____

Level of performance and frequency of maintenance (as specified on occupancy permit): _____

Date of inspection	Name and address of person conducting inspection	Problems identified in inspection	Action taken to rectify problem	Date of rectification	Signature

5.2 SMOKE CONTROL MEASURES, STAIRWELL PRESSURISATION SYSTEMS, FIRE DAMPERS
ROUTINE—LEVEL 1

REFER: AS 1851.6

Level of performance and frequency of maintenance (as specified on occupancy permit): _____

Item	Routine	Quarterly		Quarterly		Signature
		Half-yearly	Half-yearly	Half-yearly	Half-yearly	
Fans	B2					
Supply and return air	B2					
Smoke-spill and air-pressurisation	B3					
Motors, induction	B3					
Fan drives, frequent use	B3					
Fan drives, test and emergency use only	B3					
Batteries for fire/smoke control services						
Lead-acid AS 2676.1						
Alkaline AS2676.2						
Fire dampers	B4					
Fire mode air dampers for smoke-spill, fresh air and recycle air, complete with their automatic gear	B5					
Automatic smoke detectors for fire/smoke control services	#					Serviced under Section 3.2 AS 1851.813
Air filters	B6					
Electric duct heaters	B7					
Kitchen exhaust system	B8					
Air-handling changeover under fire/smoke conditions	B9					
Fire-isolated escape routes protected by air-pressurisation systems	B10					
Automatic smoke/heat venting systems						Serviced under Section 5.3 AS 1851.5

* refers to routines contained in Appendix B of AS 1851.6
 Annual Inspection:

Name: _____ Signature: _____ Date: _____

SMOKE CONTROL, STAIRWELL PRESSURISATION SYSTEMS, FIRE DAMPERS

ROUTINE—LEVELS 2, 3 AND 4

Level of performance and frequency of maintenance (as specified on occupancy permit): _____

Item	Routine	Quarterly		Quarterly		Two-yearly (2) Five-yearly (5)	If inspection indicates necessity	
		Six-monthly	Quarterly	Six-monthly	Quarterly			
Fans	B2	Level 2	Level 2	Level 2	Level 2			
	B2		Level 2	Level 3				
	B2		Level 2	Level 3				
Motors, induction	B3	Level 2	Level 2	Level 2	Level 2			
	B3		Level 2	Level 3				
Batteries for fire/smoke control services			Level 2		Level 2	(2) Level 3		
Fire dampers	B4					(5) Level 2		
Fire mode air dampers for smoke-spill, fresh air and recycle air, complete with their automatic gear	B5		Level 2					
Automatic smoke detectors for fire/smoke control services		Serviced under Section 3.2 AS 1851.8						
Air filters	B6			Level 3				
Electric duct heaters	B7					(2) Level 2 (5) Level 3		
Kitchen exhaust systems	B8			Level 3				
Air-handling changeover under fire/smoke conditions	B9			Level 2				
Fire-isolated escape routes protected by air-pressurisation system	B10			Level 2		(2) Level 3		
Automatic smoke/heat venting systems		Serviced under Section 5.3 AS 1851.5						
Outdoor air intakes	B11	L2	L2	L2	L2	L2	L2	

* refers to routines contained in Appendix B of AS 1851.
Annual Inspection:

Name: _____ Signature: _____ Date: _____

