

## 8. FIRE SERVICES

### 8.1.00 INTRODUCTION

Fire systems are systems installed in buildings to detect or protect the building and occupants from smoke or fire.

Fire detection is the process of detecting fire or smoke in buildings using:

- smoke and thermal detectors
- manual call points (note when linked to the detection system will initiate a brigade call out when operated).

Fire protection of buildings relates to the active process of protecting the building (fire fighting) by use of:

- fire hose reels
- fire hydrants
- sprinkler systems
- gaseous fire quenching systems
- fire extinguishers.

In conjunction with the detection or protection systems, other services are utilised to assist occupants in the safe evacuation of buildings:

- EWIS warning systems
- smoke management systems
- emergency lighting systems.

Provision of fire protection services in hospitals is defined by current regulations and codes to give an appropriate level of protection to patients, personnel and buildings.

Water main pressure and all requirements for fire tanks and pumps assemblies shall be identified early in the design process.

Installations are to always be designed to the minimum required to meet the regulations. Smoke detection systems are to be installed to comply with AS1670.

### 8.2.00 OBJECTIVE

The objective of this document is to present a common set of criteria for fire services in a format which is accessible both to designers and those who brief designers. In general specific planning procedures and known design criteria have not been addressed.

This document does not cover general subjects which are normally dealt with under 'good engineering practice'. Designers are to refer to Australian Standards for good practice and statutory regulations for minimum standards.

The core objective is to provide fire detection and suppression systems that meet the requirements of all relevant codes and functionality using cost-effective solutions that achieve an optimal balance between capital, operating and maintenance costs over the life of the service.

Principally the objectives of the provisions of the BCA for fire fighting equipment and services are to:

- safeguard occupants from illness or injury while evacuating during a fire
- provide facilities for occupants and the fire brigade to undertake fire-fighting operations
- prevent the spread of fire between buildings.

The fire fighting equipment and services are to be provided to meet the minimum deemed-to-satisfy provisions.

The functional statement and performance requirements of the BCA are to be complied with.

### 8.3.00 OUTCOME STATEMENT

Achieve the objectives of this document through the use of fire services systems with low whole-of-life costs while meeting relevant code and OHS requirements.

Service	System	Criteria
Fire Services	Detection and alarm Systems	<p>Systems to be provided in accordance with Code.</p> <p>All components provided within patient areas are to be selected based upon ease of maintenance and cleansing. No units are to be provided that cannot easily be sterilised and cleaned.</p> <p>Components are to be selected with regard to the environmental factors likely to be present. This is to include the possibility of sensitive electromagnetic electrical scanning equipment or the like.</p> <p>The detection systems selected shall be so with due regard to the minimisation of false alarms, ionisation or optical type detector provisions are to be compatible with the uses of the rooms. Selections are to be made with regard to the rooms' function and consideration given to the likelihood of steam, water vapour and in some instances other vapours which may initiate a false alarm i.e. vapours present within some forms of traditional medicine.</p>
	Hydrant and hose reel systems	<p>Hydrant and hose reel systems are to be provided in accordance with code.</p> <p>All components provided within patient areas are to be selected based upon ease of maintenance and cleansing. No units are to be provided that cannot easily be sterilised and cleaned.</p> <p>Preference shall be given to the provision of hose reels in cabinets or cupboards with easy clean surfaces.</p>
	Sprinklers	<p>Sprinklers to be provided in accordance with code.</p> <p>All components provided within patient areas are to be selected based upon ease of maintenance and cleansing.</p>

		<p>No units are to be provided that cannot easily be sterilised and cleaned preference is to be given to concealed pattern heads.</p> <p>Components are to be selected with regard to the environmental factors likely to be present. This is to include the possibility of sensitive electromagnetic scanning equipment or the like.</p>
--	--	---

## Codes and Standards

8.4.00 Fire services are to be designed to the following codes and standards:

BCA	Building Code of Australia
AS 1670	Fire detection, warning and intercom systems
AS 4428	Fire detection, warning, control and intercom systems - control and indicating equipment
AS 1603	Automatic fire detection and alarm systems
AS/NZS 2441	Installation of fire hose reels
AS 2419	Fire hydrant installations
AS 2118	Automatic fire sprinkler systems
AS 4214	Gaseous fire extinguishing systems
AS 1851	Maintenance of fire protection systems and equipment
AS/NZS 2444	Portable fire extinguishers and fire blankets
AS/NZS 2293	Emergency evacuation lighting and exit signage for buildings
AS 1668.3	Smoke control systems for large single compartments or smoke reservoirs
AS/NZS 1668.1	The use of ventilation and air conditioning in buildings - fire and smoke control in multi-compartment buildings
AS/NZS 3000	Electrical installations.

Note: Some smoke management relevant sections of the BCA are strongly linked to HVAC services. Consequently relevant issues are discussed in the Mechanical Section.

## Cost Effectiveness

8.5.00 COST EFFECTIVENESS

There is scope for more cost effective fire protection of health care buildings. In particular:

- The BCA requirements for EWIS in a hospital should be rationalised and standardised. The part that the EWIS plays in the emergency plan should be explained. The role of floor wardens and head wardens in a conventional building do not apply. In particular the facilities to be provided at a staff station should be clearly stated. Perhaps a WIP and a break glass unit would suffice.
- The designers should note a fire alarm sounding within the building may cause extreme anxiety in some patients leading to an elevated health risk, especially for bed bound patients. Consideration should be given to a system of:
  - nurse call system transmitted fire alarm messages
  - PA coded announcements for hospital staff

- flashing strobe lights which would activate on a General Fire Alarm rather than an audible alarm
- PA announcements to general public in conjunction with alarm tone announcement
- PA systems must have an emergency channel.

Where limited staff are available to evacuate non-ambulatory patients and a nurse call system is not installed a standard alarm system should be recommended.

- The treatment of patient care areas in terms of speakers and audible alarms should be spelt out.
- The design of the sprinkler system should not preclude the use of innovative technologies such as:
  - extended coverage sprinklers
  - residential sprinklers,
- Areas ancillary to patient care should be defined in terms of the nearest BCA and AS 2118 categories. Large areas of the hospital, particularly administration, may be suitable for the installation of light hazard sprinklers. Capital and Life cycle costing techniques to be used to determine the feasibility of using sprinkler systems.

## Planning

---

### 8.6.00 GENERAL

The best means of reducing capital and recurrent costs for fire services is in careful planning of buildings to minimise or avoid the need for fire protection, especially sprinklers.

Fire Safety Engineering (FSE) allows a holistic approach that can provide benefits in terms of cost effectiveness and increased functionality. A building less than 25m in height does not require sprinklers but the provision of sprinklers may enable some other modification to the building that is desirable.

Where specific facility-related fire risks are not covered adequately in the BCA and other relevant regulations, the risk shall be analysed and a suitable engineering solution shall be developed and implemented to maintain an acceptable risk level. The need for additional measures for a specific facility and the suitable solution shall be established during the design process.

Consideration should be given to undertaking FSE analysis of all significant health care buildings.

Health buildings shall be planned to minimise or avoid the need for sprinkler systems.

### 8.6.05 SPRINKLER DESIGN

Where installed, sprinkler pipe systems shall be determined by the full hydraulic calculation method. Sprinklers where provided shall be in accordance with the requirements of the BCA and AS 2118.

The need for fire sprinklers for a specific facility and the suitable solution shall be established during the design process by a Certified Fire Engineer.