

## 08 - Fire Protection Systems

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2.0	28 February 2012	Mark Pritchard	
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## 8 Fire Protection Systems

### 8 Fire Protection Systems 1

*Introduction 1*

*Overview of Design Principles 2*

*Specific Design Requirements 3*

*Fire Protection and Fire Protection Systems 3*

*Fire Indicator Panel (FIP) 6*

*Required Exit/Egress Doors 7*

*Emergency and Exit Lighting 7*

#### Introduction

**08.01** The Australian National University (ANU or the University) has set minimum requirements for essential fire safety measures for use in new and refurbished buildings at all Campus's. The Campus and Building Requirements Manual (the CBRM, Requirements or the Manual) may exceed the minimum requirements of the Australian Standards.

**08.02** The Consultant shall refer to the relevant Australian Standard and the National Construction Code (NCC) and consult with ACT Fire and Rescue and the Principal's Representative (the Principal or the Principal's Project Manager) at the earliest possible stage in the design process. This will ensure that both local ACT Fire and Rescue and the ANU Requirements are met and delays avoided at the building occupation stage.

**08.03** The Consultant shall consider Safety in Design principles for maintenance of all essential fire safety measures, including the position of smoke detectors on ceilings.

**08.04** The CBRM is intended to be read and distributed electronically. This does not preclude printing sections of the Requirements; however, the University takes no responsibility for the completeness and currency of printed/hard copy material distributed amongst the Consultant team. Notwithstanding any Consultant's particular discipline or area of responsibility, each Consultant and/or designer shall consider the document in its entirety.

**08.05** The complete CBRM consists of the following Sections which may be referred to within this Section:

Campus and Building Requirements Manual	
Section 01	General Requirements
Section 02	Architectural Requirements
Section 03	Roads, Car Parking & Civil Works
Section 04	Soft Landscaping

<b>Section 05</b>	Roofing, Roof Fabric & Roof Safety
<b>Section 06</b>	Building Management Systems
<b>Section 07</b>	Electrical Services
<b>Section 08</b>	Fire Protection Systems
<b>Section 09</b>	Hydraulic Systems
<b>Section 10</b>	Mechanical Services
<b>Section 11</b>	Lifts, Cranes & Vertical Transportation Systems
<b>Section 12</b>	Security, CCTV & Access Control
<b>Section 13</b>	ICT Requirements

## Overview of Design Principles

### Australian Standards and Statutory Requirements

**08.06** All works shall comply with the relevant Australian Standards, NCC and ACT Fire and Rescue policies. Where a standard or code referenced is superseded the new standard or code shall be adopted.

### Definition of Essential Fire Safety Measures

**08.07** Design and installation of essential fire safety measures shall include all subjects / aspects pertaining, but not restricted to the following:

- automatic fire detection and alarm systems;
- automatic fire sprinkler systems;
- access panels, doors and hoppers to fire resisting shafts;
- automatic fail safe devices;
- Emergency Warning and Intercommunication Systems (EWIS);
- smoke and heat alarm systems;
- emergency evacuation plans;
- Emergency and exit lighting (refer to [Section.07 Electrical Services](#));
- fire doors;
- smoke doors;
- fire hose reel systems;
- fire hydrant systems;
- fire seals protecting openings in fire resisting component;
- fire shutters;
- gaseous fire suppression systems;
- mechanical air handling system shutdown;
- portable fire extinguishers and fire blankets;
- pressurising systems;
- fire dampers;
- smoke and heat vents;

- smoke dampers;
- standby power systems;
- required power operated exit doors;
- wall wetting sprinkler and drencher systems; and
- warning and operational signs.

**08.08** The classification of a building will determine the essential fire safety measures. The proposed essential fire safety measures shall be submitted to the Principal's Representative by the Consultant team during initial design development, for review and comment.

**08.09** Several buildings at the ANU contain increased risks for health and safety hazards in excess of those normally found in typical Class 9b buildings. The essential fire safety measures may need to be increased in these buildings.

**08.010** The Requirements be in addition to, but not in substitution of legislation.

### Specific Design Requirements

#### Fire Monitoring Provider

**08.011** The ANU uses an external service provider to monitor fire systems in its buildings. The Principal's Representative will arrange the application process for the facility to be connected to the service provider.

#### Tender Packages for Fire Systems

**08.012** All fire system packages must be separately tendered and not be incorporated into another trade package. For example, a dry fire system must not form part of an electrical tender package.

#### Major Refurbishments

**08.013** Major refurbishments of buildings will be required to meet the CBRM. Advice on the scope and inclusions for systems in major refurbishment projects can be sought from the Associate Director, Projects with input from the Engineering and Technical Officer (Fire).

#### Block Plans

**08.014** Block plans shall be submitted to the Principal's Representative to review prior to final installation.

### Fire Protection and Fire Protection Systems

#### Standardised Equipment

**08.015** The ANU has standardised the type/brand of equipment. Any equivalent technologies must be submitted as an alternative solution in the tender.

<b>Analogue/Addressable Fire Panel</b>	:	Fusion Advanced AU5000
	:	Syncro AS

Extinguishant Control Panel	:	Sigma XT
Aspirated Detectors	:	VESDA
Warning System EWS	:	Simplex T-Gen 50
Warning System EWIS	:	Notifier Inertia I-2000
Sprinkler Systems	:	Any SSL approved

### Sprinkler (Wet) Systems

**08.016** For sprinkler systems, the Consultant shall prepare plans, specifications and tender documents for the installation of the system as part of the design and documentation procedure.

**08.017** Plans and specifications shall conform to the ANZ/ISO Standards for Automatic Sprinkler Installations, supplemented by the [Additional Requirements](#) outlined in this section.

**08.018** The wet system shall meet the requirements of the Australian Standards and comply with the requirements of the NCC and the Chief Officer, ACT Fire and Rescue.

#### 08.019 Additional Requirements

- The ANU has a preference for automatic sprinkler systems in all new general type buildings greater than two storeys high. If for any reason a dispensation from this rule is sought, the application must go to the Associate Director, Maintenance, Facilities and Services.
- The ANU has a preference for quick response heads.
- Drain pipes shall not terminate in blind spaces under the building. Drains will be sized to accommodate a discharge rate of 2000 L per minute (200 – 250 mm diameter would be considered minimum).
- The minimum classification of sprinkler systems on the ANU Campus shall be Ordinary Hazard 1. Extra light hazard systems shall not be accepted.
- All sprinkler systems shall be fitted with an automatic electric jacking pump to enable the sprinkler system to be restored to normal operating pressures after maintenance procedures.
- ACT Fire and Rescue requires that all sprinkler systems be separately monitored and that all flow switches are represented at the Fire Indicator Panel (FIP).
- Devices such as retard chambers will not be accepted on the ANU's fire sprinkler systems.

### Dry Fire Alarm Systems

**08.020** For dry fire alarm systems, the Consultant shall prepare plans, specifications and tender documents for the installation of the alarm system as part of the design and documentation procedure.

**08.021** Plans and specifications shall conform to *AS 1670 Automatic fire detection and alarm systems - System design, installation, and commissioning*.

**08.022** The dry system shall meet the requirements of the Australian Standards and comply with the requirements of the Chief Officer, ACT Fire and Rescue.

**08.023** The Consultant shall arrange for the successful tenderer to submit full detail drawings of the installation (layout), type of detectors and FIP type to the Principal's Representative before any work is commenced.

**08.024** The drawings shall show the following information:

- circuit grouping;
- detector grouping and position;
- route of cabling and conduit runs concealed from view; and
- cabling and location of any other ancillary equipment associated with the contract.

**08.025 Additional Requirements**

- For fire detection systems, the specification for the automatic fire alarm system shall include all wiring in the installation as part of the contract and such wiring shall be carried out in accordance with *AS 3000 Electrical Installations*.
- All detectors shall be identified on the layout plans by circuit and detector numerals. Example: 8/12 indicates No. 8 circuit, No. 12 detector.
- A systems interface matrix shall be supplied and installed near the FIP.

**Fire Detection Alarm System**

**08.026** The ANU has a preference for automatic fire detection systems in all new general type buildings. If for any reason a dispensation from this rule is sought, the application must go to the Associate Director, Maintenance, Facilities and Services.

**08.027** The fire detection alarm system shall automatically indicate an alarm to the local fire authority upon detection of a fire by a thermal or smoke detector or any other fire detection device or manually operated alarm via the ANU's fire monitoring service provider.

**Very Early Smoke Detection Apparatus (VESDA): Aspirated Smoke Detection System**

**08.028** The use of a Very Early Smoke Detection Apparatus (VESDA) system should be considered in all high risk or high insurance areas of the ANU.

**08.029** VESDA systems shall work independently; they shall be connected to the FIP and only Fire 1 and Fire 2 conditions shall activate the FIP.

**08.030** An isolated VESDA system shall display a fault on the FIP. A fault on the VESDA shall also activate a fault on the FIP.

**08.031** The VESDA shall have a mimic panel installed and the controller is to be located remotely from the VESDA.

**Detectors**

**08.032** All detectors containing end of line resistors shall be clearly marked on their bases and on the as installed drawings.

**08.033** All ceiling mounted detectors shall be symmetrically located with respect to luminaires, air registers and other ceiling mounted items.

#### **Hydraulic Hose Reels and Fire Extinguishers**

**08.034** The size and length of hoses shall be determined by the Chief Officer, ACT Fire and Rescue.

**08.035** The quantity and location of fire extinguishers shall be determined by the relevant standards and hazards in the facility.

**08.036** Fire extinguishers shall comply with the relevant Australian Standards.

**08.037** Installation of hose reels shall be included in the fire services contract and not form part of the general building works.

#### **Evacuation Systems: Emergency Warning System (EWS) and Emergency Warning and Intercommunication System**

**08.038** Emergency Warning System (EWS) and EWIS evacuation systems shall be installed in all buildings that are greater than two stories high. All evacuation systems installed shall comply with AS 1670 and NCC requirements.

#### **Fire Indicator Panel (FIP)**

**08.039** The panel shall incorporate all Alarm Zone Facilities (AZF's), Ancillary Control Facilities (ACF's), Master Alarm Facilities (MAF's), indicators and isolators grouped in a neat logical order.

**08.040** The Fire Indicator Box shall also contain all necessary test facilities, batteries and battery charger and battery voltmeter and all associated wiring and accessories.

**08.041** The Fire Indicator Box shall be a recessed wall mounted enclosure.

**08.042** Where possible the batteries shall be housed in a separate, ventilated compartment of the alarm panel and shall be completely sealed off from the remainder of the board to prevent corrosion. The batteries shall stand on PVC or other approved corrosion resistant tray of adequate size.

**08.043** The ampere hour capacity shall be sized to allow for additional items such as buzzers, bells and relays as required by this specification. Batteries shall comply with the current version of *AS 60598 Luminaires - General requirements and tests*.

**08.044** The battery charger shall be a fully automatic constant potential type employing all solid state components, and shall be capable of recharging a fully discharged bank of batteries to 80% of their capacity within 24 hours.

**08.045** The following controls shall be provided in the Fire Indicator Box:

- a manually operated switch to isolate door holders;
- a manually operated switch to isolate bells and relays for the purpose of maintenance;
- a manually operated switch to isolate air conditioning shutdown;
- a manually operated switch to isolate paging/evacuation system; and

- all switches shall be clearly labelled.

### Required Exit/Egress Doors

**08.046** All exit doors shall be fitted with an approved latching device that must be capable of opening from inside with normal door lever action and without recourse to a key. Should dead-locking devices be used, the dead-lock must cancel out under normal door lever action.

### Access Control Door Integration

**08.047** The access control door system is to be tripped to release all doors on any fire alarm condition. This is achieved by connecting the fire trip circuit to the output circuit on the FIP.

### Fire Doors

**08.048** All fire doors and door hardware shall meet the requirements of the NCC and Australian Standards.

**08.049** Sliding type fire doors shall not be installed, except in special cases and then only by approval of the Chief Officer, ACT Fire and Rescue.

### Smoke Doors

**08.050** Corridor smoke doors shall be double acting with a 180° swinging movement. The doors shall be effectively sealed against fire and smoke for reasonable periods of times. The closing mechanism shall ensure that the door returns to the sealed position as required.

### Electromagnetic Door Holders

**08.051** All smoke and fire doors shall be fitted with magnetic door holders operating in conjunction with the fire protection or detection system, whichever is the case and shall operate on 24 V DC.

### Emergency and Exit Lighting

**08.052** Emergency lighting shall be installed in accordance with current version of *AS 2293 Emergency escape lighting and exit signs for buildings - System design, installation and operation* and AS 3000. Refer to [Section.07 Electrical Services](#).