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Owner

The overall responsibility for these standards resides with RMIT University Property Services

Review

This Document is reviewed every two years

¹ Printed copies of this document are considered uncontrolled and may not reflect the most recent revision

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1. Introduction

1.1 Background

This document details the minimum RMIT design requirements for fire protection systems. It forms part of the suite of RMIT Design Standards set out below. All volumes of the standards are available on the RMIT Property Services Design Standards web page.

- Volume One Introduction
- Volume Two Architecture and Planning
- Volume Three Electrical Systems
- Volume Four Fire Protection Systems
- Volume Five Hydraulic Systems
- Volume Six Mechanical HVAC Systems
- Volume Seven Vertical Transportation Systems
- Volume Eight Building Management Systems
- Volume Nine Electronic Security
- Volume Ten Communications
- Volume Eleven Audio Visual
- Volume Twelve Landscape
- Design Standards Checklist

This document should be read in conjunction with *Volume One - Introduction*, which provides context on the organisational and governance arrangements that apply to the design and construction of new facilities and describes the key principles that underpin the requirements of the Standards:

- Safety
- Accessibility
- Innovation
- Student Experience
- Maintainability and Serviceability
- Modularity and Standardisation
- Reliability
- Compatibility
- Sustainability
- Heritage
- Life Cycle
- Precinct Wide Solutions

1.2 Purpose

The purpose of this brief is to set out the minimum requirements for the design of fire protection systems. The aim is to achieve the maximum possible consistency and standardisation across the fire protection systems on the RMIT University campuses.

Any design aspects not specifically addressed by this brief shall be identified by the consultant during the design process and shall be brought to RMIT University's attention for resolution.

1.3 Demonstrating Compliance with the Standards

Designers are required to confirm compliance and justify any proposed deviations by completing the Design Standards Checklist.

All deviations must be approved by RMIT prior to commencing design. Unless a robust justification is provided for deviations from the Standards, it is unlikely that approval will be given. Design Standards compliance is achieved through completion of the Design Standards Checklist and endorsement by RMIT of any proposed non-compliances.

2. Fire Protection Systems Design Standards

2.1 General

2.1.1	All new fire systems are to be installed and tested to AS 1851, 2012.
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2.2 Automatic Fire Sprinkler Systems

2.2.1	All sprinkler heads protecting habitable areas of the University shall be fast response unless deemed unsuitable by the Fire Services Manager and Fire Risk Engineering.
2.2.2	Wherever access permits, fire sprinkler protected parts of a building shall be divided into either vertical or horizontal flow switch zones.
2.2.3	Each flow switch shall be installed with a solenoid to allow for remote testing.
2.2.4	All flow switches must feature a screw adjustable delay mechanism.
2.2.5	Sprinkler installation zones shall be as small as practicable to minimise draining when maintenance / alteration is required.
2.2.6	All new and existing main stop valves must be fitted with a monitoring device, compatible with the Wormald MX Networked.
2.2.7	Discrete asset numbers are to be affixed to each valve, as per RMIT bar-coding protocol.
2.2.8	Documentation is to be provided which identifies the area serviced by the monitored stop valve service, including the appropriate barcode reference.
2.2.9	Full flow Gate Valves shall be used in all projects. Under no circumstances are wheel operated butterfly valves to be used.
2.2.10	Flexible fire sprinkler dropper pipes should be used for below ceiling fire sprinklers.
2.2.11	Each floor or horizontal sprinkler zone shall be fitted with a remote test drain as defined in the current AS 2118.1.
2.2.12	A locked shut valve shall be located in a readily accessible location (if in a ceiling space, this shall be via an access panel of 450x450mm minimum size). Clear and permanently fixed signage shall identify the location, under the ceiling.
2.2.13	A hose connection fitting shall be provided permanently, to the test drain.
2.2.14	Location of the fire sprinkler system test drains shall be considered to enable safe disposal of the water.
2.2.15	Flush type sprinklers should be used.
2.2.16	Where not practicable, fire sprinklers lower than 2.4m from floor level must have sturdy metal guards provided.
2.2.17	All new installations shall be equipped with the latest water saving technology, as approved by the RMIT Fire Engineer.
2.2.18	For existing installations Annubar flow testing shall be captured and re-used in accordance with 5 star green star requirements.
2.2.19	All new installations shall include the provision of a 240v power supply supplied from the nearest distribution board. The circuit breaker shall be labelled appropriately.
2.2.20	All new fire sprinkler system installations shall be tested on a monthly, not weekly, basis. Therefore batteries provided for the fire sprinkler system equipment shall be capable of holding charge to suit the monthly testing.
2.2.21	All gauges shall be fitted with a ball valve to enable the service or replacement of the gauges.
2.2.22	Doors to pump rooms will be signed appropriately with details of the building(s) which the fire pump services.
2.2.23	Flow switches should be water saving type 'Zone check'.

2.3 Automatic Fire Detection Systems

2.3.1	Automatic Fire Detection Systems will be fully addressable and networked back to the RMIT Security control room and interconnected with the relevant fire graphic system.
2.3.2	Where smoke doors are automatically operated to close, in the event of a fire alarm, they shall have an inbuilt delay and appropriate warning system to alert occupants that doors are about to close (e.g. speakers and not an electronic sounder).
2.3.3	All detectors shall indicate a continuous steady light in an alarm condition. This includes situations where existing detectors are to be connected to a new fire indicator panel.
2.3.4	The location of OWS speakers and WIP points must allow the Warden to communicate using the intercommunication system while the warning signal is sounding.
2.3.5	All new fire panels must provide 130% of the project's requirements.
2.3.6	Where works are integrating with an existing panel, consideration must be made of the total load following completion of the project. Allowance should be made for the existing panel to be upgraded or replaced to provide 130% of total demand.
2.3.7	All switchboards will have a smoke detector installed, complete with remote indicator.
2.3.8	Automatic closing of fire /smoke doors shall only occur in the zone of the alarm origin. Fire Doors leading onto pressurize fire egress paths shall close in any case.
2.3.9	All smoke or thermal detectors within a concealed space must be fitted complete with a Famco bracket and remote indicator.
2.3.10	The provision of manual call points shall be kept to a minimum. Where specifically required, they shall be designed in consultation with the Manager Fire Safety Engineering RMIT Property Services.
2.3.11	All manual call points shall be Key-resettable (as supplied by AMPAC model FP 2) and be mounted within a RMIT standard box (sample available from RMIT Fire Engineer).
2.3.12	Preferred location of manual call points is adjacent to the fire hose reel cabinet and adjacent to required fire exits.
2.3.13	Shall be engraved Traffolyte and placed adjacent to all Fire Indicator Panels and Sub Fire Indicator Panels.
2.3.14	Shall indicate all fire zones, exits, isolation valves, WIP phones and fire equipment locations.
2.3.15	Must be wall mounted be correctly orientated with respect to the building with an accurate "You are here" symbol, the date of installation and installer's contact details.
2.3.16	VESDA is the preferred detection protocol at all RMIT locations.
2.3.17	System shall be complete with air flow alarm.
2.3.18	Aspirated Smoke Detection must be provided in areas where it is not safe to access point type smoke detector, e.g. areas above seating or in high void spaces.
2.3.19	A Schroder air valve must be provided on a 45 ⁰ tee orientated away from the VESDA unit towards the sampling tube.
2.3.20	All works must include the removal and decommissioning of all redundant equipment including programs within the FIP & EWIS panels as well as the fire graphic installation within the security control room.
2.3.21	Block Plans shall be engraved Traffolyte and placed adjacent to all Fire Indicator Panels and Sub Fire Indicator Panels.
2.3.22	Block Plans shall indicate all fire zones, exits, isolation valves, WIP phones and fire equipment locations.
2.3.23	Block Plans must be mounted on the wall with correct orientation with respect to the building. The plan shall have a "You are here" symbol, the date of installation and installer's contact details.

2.3.24	Fire Indication Panels (FIPs) shall have LED indication per zone along with zone description as per RMIT format.
2.3.25	FIP's shall have PIB's installed as part of using I/P addresses for graphic networking capability.
2.3.26	All devices shall have CSIRO compatibility listing with the existing TYCO MX system.
2.3.27	Smoke detection is to be provided at all electrical switchboards and communication racks.
2.3.28	Incorporate new architectural backgrounds into the Colour Graphics System, these shall be clean and detail only a limited floor plan of the space.

2.4 Compatibility- Fire Detection and Alarm Systems

2.4.1	Where changes have been made to FIP programmes, all networked panels on the systems will also be changed to represent the current additions/ deletions.
2.4.2	All new Fire Indicator Panels and field devices shall be fully compatible with the TYCO MX 4428 analogue addressable site wide network.
2.4.3	All new and alteration works shall be fully integrated in the MFIP software and Colour Graphics backgrounds.

2.5 Occupant Warning Systems (OWS)

2.5.1	All new SFIPs to be provided with an OWS or EWS / TGEN module, including public address facilities and network cards.
2.5.2	All new systems must provide 130% of the project's requirements.
2.5.3	Where works are integrating with an existing system, consideration must be made of the total load following completion of the project. Allowance should be made for the existing system to be upgraded or replaced to provide 130% of total demand.
2.5.4	All new OWS systems shall be Quintrix QE90 and have 30% spare capacity.
2.5.5	Shall be prepared in consultation with the project design team, and then submitted for review and approval by the RMIT Fire Engineer.
2.5.6	Where a OWS system is not installed, an EWS (Emergency Warning System) / TGEN (Tone Generator) must be provided throughout. In this case a PA facility will be included.
2.5.7	Recessed type speakers shall be fitted with plug and socket connection, with a minimum 2000mm cable for future relocation during fit out or renovation.
2.5.8	All wiring shall be secured to the rear of the speaker with nylon zip ties.
2.5.9	Horn speakers shall have minimum 500mm cable and only be installed within plant rooms and large open spaces. Other locations shall require approval from the RMIT Fire Engineer.
2.5.10	Mount OWS speakers clear from WIP & MECP phones to allow clear communication during transmission of alert and evacuation tones.
2.5.11	Emergency Warning Lights / Strobes shall be installed in all teaching spaces and lecture theatres.
2.5.12	Strobes shall identify both Alert and Evacuate modes of the warning system.
2.5.13	EWIS/ EWS to be installed to AS 1670.4. Minimum 50 watt amplifiers are to be used for allowance of future expansion.

2.6 Fire Services Ring Mains and Valves

2.6.1	All fire services ring main isolation valves shall be readily accessible via access panels or the like.
2.6.2	All valves shall be labelled in accordance with RMIT bar-coding protocol and recorded on "As-Built" drawings.
2.6.3	All designs are to consider the building's existing incoming water supply, internal reticulated installation mains, existing valves and connection to the networked monitoring system. The scope of works for every project should include bringing all these areas up to the minimum RMIT standards, as outlined in this document.
2.6.4	Secure bracketing 300mm either side of all rolled grooved couplings larger than 65mm diameter.
2.6.5	All existing and new fire mains shall be fitted with adhesive barcode labels, in line with RMIT bar-coding protocol, at 15 meter intervals.
2.6.6	New installations or extensions to fire mains must be fitted with a 100mm diameter lock shut valve.
2.6.7	Lock shut valve must be adjacent to a drain capable of safely draining the flow capacity of the water supply.
2.6.8	All works must include the removal and decommissioning of all redundant equipment.

2.7 Gaseous Flooding Systems

2.7.1	All systems shall be protected from spurious discharge by the use of aspirated smoke detection, point type detection in a double interfaced arrangement.
2.7.2	Gas bottle must be mounted on a raised plinth and secured firmly against a wall, enclosed within a lockable enclosure.
2.7.3	Each gas system shall be complete with gas module and connected into the nearest Sub Fire Indicator Panel via a dedicated loop/zone.
2.7.4	Ventilation must be extended directly outside, not into corridor or to an adjacent space.

2.8 Fire Hydrants and Fire Hose Reels (FHRs)

2.8.1	FHRs shall be 36m long and have metal seals, nozzles and glands. Fast Fit or Quick fit models are not permitted.
2.8.2	Supply a permanent pressure gauge at the highest hydrant of each riser.
2.8.3	At the most hydraulically remote hydrant, provide a double millcock and a safe means of disposing of fire hydrant test water. Safe means of disposing of test water are either safe access to a roof capable of safely collecting and draining the fire test water back to rain water collection tanks or provision of a 150mm diameter drain extending to a collection tank at the lowest level of the building.
2.8.4	All buildings shall have their fire hydrant vertical riser pipe looped. These loops shall be fitted with isolation valves placed to provide isolation by floor level.
2.8.5	External Fire Hydrants shall be fitted with identification reflectors or road posts
2.8.6	External exposed hydrant outlets must be fitted with anti-tamper devices to prevent opening by the public. These shall be fitted with MFB 003 Padlocks.
2.8.7	At ground level provide external fire hydrants in preference to equipped internal fire hydrants.
2.8.8	Where there are multiple buildings and separate boosters, each booster shall have additional signage indicating the building number that the booster services. This is additional to the standard block plan within the booster cabinet.
2.8.9	Location and block plans shall be engraved Traffolyte and placed adjacent to all Fire Indicator Panels and Sub Fire Indicator Panels.

2.8.10	Location and block plans shall indicate all fire zones, exits, isolation valves, WIP phones and fire equipment locations.
2.8.11	Location and block plans shall be wall mounted, be correctly orientated with respect to the building with an accurate “You are here” symbol, the date of installation and installer’s contact details.

2.9 Other Fire System Equipment

2.9.1	All diesel start batteries shall be cradled and harnessed.
2.9.2	All fire pumps to be fitted with mechanical seals. No drip glands are to be used.
2.9.3	Fire pumps to be housed in a dedicated, acoustically rated room with clear signage.
2.9.4	Diesel exhaust pipes to be acoustically separate to avoid student disruption.
2.9.5	Lithium Ion batteries to be used for fire services pumps.
2.9.6	The battery reserve shall be suitable for 72 hours in quiescent conditions and two (2) hours for continuous alarm conditions
2.9.7	All fuel tanks shall be complete with a sturdy steel fabricated platform with steps and handrail to facilitate the safe re-filling of the fuel tank.
2.9.8	The fire services Block Plan shall be laminated and framed and installed within the booster cabinet.
2.9.9	A sign shall be placed on the front door of the cabinet, not less than 150mm high, in contrasting colour, and it will state ‘Fire Booster Cabinet’ and the name of the building.

2.10 Portable Fire Extinguishers

2.10.1	Extinguishers must be mounted on wall studs or columns.
2.10.2	Extinguishers shall be selected in accordance with MFESB Guideline. Water extinguishers are to be avoided at all times and consideration for fire hose reels usage where water extinguishers may be used.
2.10.3	In areas accessible by the general public, consideration should be given to housing extinguishers in a metal cabinet.

2.11 Passive Fire Protection

2.11.1	All pipe penetrations through walls having an FRL rating shall be sealed with fire rated mortar.
2.11.2	Fire pillows must not be used in any RMIT building.

2.12 Smoke and Fire Door Systems

2.12.1	All fire doors located externally to a building shall be sheathed in colour bond steel.
2.12.2	Where magnetic hold open devices for doors are required, wall or floor mounted magnets shall be used incorporating a release button mounted no higher than 1200 mm on the adjacent wall. A release button on the magnetic device will not be accepted.
2.12.3	Fire doors fitted with magnetic locks shall be connected to the RMIT Security system and the building’s FIP, operating in fail safe mode.
2.12.4	The RMIT approved Door Sequence Device is the COR Series Coordinators.
2.12.5	For alternate equipment seek approval from the RMIT Fire Engineer.

2.13 Preferred Manufacturers

2.13.1	Wormald MX 400 fire alarm panels are to be specified.
2.13.2	NOVEC 1230 is the preferred product to be used for fire suppression full flooding systems.
2.13.3	Fire master (Tyco) FHRs to be used.
2.13.4	The RMIT approved product is KBS Mortar Seal. Fire ratings and specifications of any alternative proposed must be supplied to the RMIT Fire Engineer and subsequently approved by the RMIT Fire Engineer before being used.

