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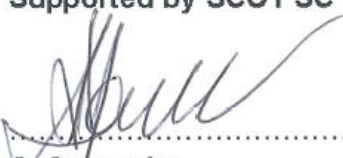
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1. INTRODUCTION

The performance of the fire systems to function as designed (i.e. to control adverse effects of fire on plant operation) is essential to the overall fire protection program. Fire protection systems must be ready to function correctly, the moment a fire breaks out. This requires a high level of reliability for the operation of fire protection systems. To achieve the high level of reliability it is necessary to develop a well-conceived and executed schedule for inspection, testing and maintenance of fire protection systems.

Inspections are to be carried out on a frequent basis to confirm visually the operational status of the equipment, and to identify proactively whether the system, the protected space or hazard has been altered, damaged or compromised.

The purpose of testing is to confirm the correct function and performance of fire protection systems by providing a definite schedule for observing and measuring the functional performance of equipment against pre-established performance criteria.

Scheduled maintenance establishes preventive maintenance of the equipment to minimize the likelihood of breakdown and to ensure it is kept in a state of constant readiness.

These activities, along with the effectiveness and frequency with which they are conducted, provide the method for reaching the minimum desired level of reliability for fire protection systems.

2. SUPPORTING CLAUSES

2.1 SCOPE

The effective performance of fire protection systems can only be ensured if:

- a. The system is appropriate to the hazard and has been designed and installed in accordance with a recognised design standard.
- b. The system has been appropriately commissioned to confirm that it operates as intended. Verification is provided in the form of baseline data.
- c. Inspection and Maintenance activities are frequently performed to ensure its operational readiness and to confirm functionality and performance through regular testing.

This standard covers item (c) above and is predicated on a satisfactory completion of system design and installation (a), which is confirmed during commissioning (b).

This standard describes the minimum requirements for the inspection, testing and maintenance (ITM) of fire protection systems and manual fire-fighting equipment (which only includes hose reels, hydrants and fire extinguishers), and is used as one of the base documents in the compilation of the Maintenance Execution Strategy and Planned Maintenance Procedures (i.e Works Instructions or Work Packages).

The functional testing of system interconnection is also addressed in this standard.

Fire/smoke detection and alarm system is an integral part of fire systems, it is covered in another standard (refer [5]) that must be used in conjunction with this standard.

Mobile fire-fighting equipment (fire-fighter protective clothing, fire hoses and couplings, breathing apparatus, fire appliances etc) is not addressed in this standard but is addressed in the Operational Standard for Inspection, Testing of Fire and Rescue Non-Plant Equipment in Generation [9].

Preventative fire protection inspections and procedures (hot work permits, housekeeping practices to control rubbish, identify hazards, confirming that escape routes are kept clear and unobstructed etc.) and emergency evacuation procedures and drills are not covered by this standard.

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2.1.2 Purpose

The objective of this standard is to maximize the reliability and availability of fire protection systems and equipment such that the systems and equipment meet the functional design intent, and is likely to continue to do so until the next scheduled maintenance activity. It is not related to any design functions.

2.1.3 Applicability

This standard is intended to provide a systematic and uniform basis for Eskom personnel to implement and administer inspection, testing and preventative maintenance programs applicable to fire protection systems and fire-fighting equipment throughout Eskom Holdings Limited Divisions.

This standard has been developed for existing Eskom properties and shall also be applied to any system installed in new buildings and/or plant constructed in the future. It has been developed on a general basis to incorporate systems and equipment found at power station sites, but may also be found at other Eskom properties. Power Stations and other Business Units should extract what is applicable to them, as not all of the systems and equipment components addressed in this standard will be found at every location.

Any system or equipment not addressed in this standard, which is installed at an Eskom location, must meet the requirements of an inspection, testing and maintenance program developed for the specific system or equipment. The program needs to be compiled jointly with the respective fire protection personnel and the manufacturers.

The inspection, testing and maintenance of fire/smoke detection and alarm systems are covered in Eskom Standard 240-54937654, Inspection, Testing and Maintenance of Fire Detection Systems, [5].

This standard should be read and applied in conjunction with the detection standard to complete the package of fire protection systems found in facilities. The fire detection standard [5] is referenced in this document where system testing involves interfacing with the detection systems for status monitoring or actuation of fire protection systems.

2.2 NORMATIVE/INFORMATIVE REFERENCES

Parties using this standard shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

- [1] ISO 9001 Quality Management System
- [2] Occupational Health and Safety Act 85 of 1993
- [3] National Building Regulations and Building Standards Act 103 of 1977
- [4] EST 32-124 Eskom Fire Risk Management
- [5] 240-54937654 Inspection, Testing and Maintenance of Fire Detection Systems

2.2.2 Informative

2.2.2.1 Eskom Standards

- [6] 240-54937450 Fire Protection & Life Safety Design Standard
- [7] 240-56737448 Fire Detection and Life Safety Design Standard
- [8] 240-126467640 Operational Standard for Fire Fighter Training in Generation
- [9] 240-126467668 Operational Standard for Inspection, Testing of Fire and Rescue Non-Plant Equipment in Generation

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[10] 240-126468603 Operational Standard for Fire Management in Generation

[11] 36-681 Plant Safety Regulations

2.2.2.2 South African National Standards

[12] SANS 193 Fire Dampers

[13] SANS 306-4 Fire Extinguishing Installations and Equipment on Premises, Part 4: Specification for Carbon Dioxide Systems

[14] SANS 331 Fire Extinguishing Aerosol Systems

[15] SANS 369-2 Code of Practice for the Operation of Fire Protection Measures – Part 2: Mechanical Actuation of Gaseous Total Flooding and Local Application Extinguishing Systems

[16] SANS 1253 Fire Doors and Shutters

[17] SANS 1475-1 The Production of Reconditioned Fire-Fighting Equipment – Part 1: Portable and Wheeled (Mobile) Rechargeable Fire Extinguishers

[18] SANS 10105-1 The Use and Control of Fire-Fighting Equipment – Part 1: Portable and Wheeled (Mobile) Fire Extinguishers

[19] SANS 10105-2 The Use and Control of Fire-Fighting Equipment – Part 2: Fire Hose Reels and Above-Ground Fire Hydrants

[20] SANS 10177-2 Fire Testing of Materials, Components, and Elements Used in Buildings, Part 2: Fire Resistance Test for Building Elements

[21] SANS 10400 The Application of the National Building Regulations

[22] SANS 14520-1 Gaseous Fire-Extinguishing Systems – Physical Properties and System Design: Part 1: General Requirements

2.2.3 National Fire Protection Association

[23] NFPA 11 Standard for Low-, Medium-, and High-Expansion Foam

[24] NFPA 12 Standard on Carbon Dioxide Extinguishing Systems

[25] NFPA 13 Standard for the Installation of Sprinkler Systems

[26] NFPA 15 Standard for Water Spray Fixed Systems for Fire Protection

[27] NFPA 17 Standard for Dry Chemical Extinguishing Systems

[28] NFPA 25 Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems

[29] NFPA 750 Standard on Water Mist Fire Protection Systems

[30] NFPA 850 Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations

[31] NFPA 2001 Standard on Clean Agent Fire Suppression Systems

2.2.4 British and European Standards

[32] EN 12101-6 Smoke and Heat Control Systems - Part 6: Specification for Pressure Differential Systems – Kits

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2.3 DEFINITIONS

Definition	Description
Alarm Pressure Switch	An alarm device connected in the alarm water line. Water pressure forces a diaphragm upward closing a switch that initiates an alarm indicating water flow in the system.
Alarm Valve	A valve which may be opened or closed to regulate the flow of water to all or part of a sprinkler system.
Approved by	The accountability of the Approver of the document is equivalent to the specified role of Functional Responsible/Owner as identified in 240-53114186 and 32-6 for Documents and Records Management.
Automatic Detection Equipment	Equipment that automatically detects heat, flame, smoke, flammable gases, or other conditions likely to produce fire or explosions, and cause automatic actuation of alarm and protection equipment.
Booster Connection	A connection through which a Fire Department can pump water into a water-based fire protection system.
Butterfly Valve	An indicating-type control valve incorporating a wafer-type body with a gear-operated, quarter-turn disc in the waterway.
Checked	A comparison of condition against prescribed criteria or information.
Competent Person (Personnel)	Means a person who is qualified by virtue of his education, training, experience and contextual knowledge to perform specific activities as defined in this standard.
Deluge System	A fixed fire protection system in which the pipe system is empty until the deluge valve operates to distribute pressurized water from open water-spray or foam-water nozzles. The deluge valve is activated by operation of a fire detection system installed in the same area as the nozzles. Various types of detection systems may be used, including smoke, heat or flame. The deluge valve is activated by a hydraulic, pneumatic, electric or manual release system or any combination of these. When the detection device is activated, the deluge valve is tripped and water flows into the piping system, discharging through all nozzles simultaneously.
Dry-Pipe Sprinkler System	A system employing automatic sprinklers attached to a piping system containing air or nitrogen under pressure, the release of which (as from the opening of a sprinkler) permits the water pressure to open a valve known as a dry-pipe valve. The water then flows into the piping system and out the opened sprinklers.
Electric Release System	An electrical system employing smoke, heat or flame detectors to detect a fire and to release a deluge valve. The operation of a detector causes an electrical signal to be sent to the tripping device of the deluge valve, thereby causing the valve to open.
Fire Detection Panel	A permanent panel used for the termination, controlling, powering, operating, monitoring, indicating, testing, programming, etc. of different fire detectors, alarms and other input / output units.
Fire Resistance Level (FRL)	When tested in a furnace in accordance with SANS 10177-2, the exposure period in minutes of a fire resistant barrier/element before the acceptance criteria for structural stability, integrity and insulation – expressed in that order - were exceeded. Note: A dash means that there is no requirement for that criterion. For example, 90/-/- means there is no requirement for an FRL for integrity and insulation, and -/-/- means there is no requirement for an FRL.
Fire Water Distribution Systems	The system of piping used for the distribution of fire water on a site. It connects the water source(s) to the points of use which may include any number of water-based fire protection systems (e.g. sprinklers, water-spray, foam etc.) or hydrants. The fire water distribution system is usually arranged as a network of interconnecting pipe loops to allow for the supply

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Definition	Description
	of fire water to any point of use by means of alternative flow paths in order to ensure that a break at any point in the piping system would not render the whole system inoperative. The water distribution system includes the piping and all associated fittings, valves and instruments required for the monitoring, testing, maintenance and operation of the system.
Functional Testing	Testing of a fixed fire protection system, component or equipment (such as water flow tests, alarm tests, dry-pipe, deluge or pre-action valve trip tests, system actuation tests and the like) to confirm that it operates as intended.
Hydraulic Release System	A pipe system – filled with pressurised water – and employing manual release or fixed temperature (pilot-sprinklers) or rate-of-temperature rise detectors to detect a fire and to release a deluge valve. The operation of a detection device causes the water pressure to drop within the release piping connected to the tripping device of the deluge valve, thereby causing the valve to open.
Inspection	A visual examination of an item, system or portion thereof to verify that it appears to be in operating condition and is free from physical damage.
Inspector's Test Connection	A test pipe, not less than 25 mm in diameter, ending in a smooth bare corrosion resistant orifice giving a flow equivalent to one sprinkler and located at the most remote points of a sprinkler system.
Main Drain	A pipe, not less than 50 mm in diameter, equipped with a shut-off valve and connected just below the alarm check valve and extending to a safe drainage location.
Maintenance	Work performed to keep equipment operable, or to make repairs.
Manually Operated Release System	A manually operated system used to release a deluge valve. The system may be used in conjunction with one of the other deluge valve release systems. The manual release device is arranged to operate as a stand-alone system to ensure operation, regardless of the potential failure of any associated automatic detection system.
Pneumatic Release System	A pipe system – filled with pressurised air or nitrogen – and employing manual release or fixed temperature (pilot-sprinklers) or rate-of-temperature rise detectors to detect a fire and to release a deluge valve. The operation of a detector causes the air/nitrogen pressure to drop within the release piping connected to the tripping device of the deluge valve, thereby causing the valve to open.
Pre-action Sprinkler Systems	A sprinkler system employing automatic sprinklers attached to a piping system that contains air that might or might not be under pressure, with a supplemental detection system installed in the same area as the sprinklers. Operation of the system depends on the system configuration: a) single-interlocked - for single-interlocked systems, the pre-action valve is opened to fill the piping with water upon activation of the detection system. Once primed with water, the system operates as a wet pipe sprinkler system. b) double-interlocked - for double-interlocked systems, the sprinkler piping is filled with air/nitrogen under pressure. Upon activation of the detection system and operation of the sprinkler system (pressure is lost from the sprinkler piping when a sprinkler opens); the pre-action valve is opened to allow water to flow into the piping and out of the opened sprinkler heads. c) non-interlocked systems - for non-interlocked systems the sprinkler piping downstream of the pre-action valve is filled air/nitrogen under pressure. Upon activation of the detection system or operation of the sprinkler system, the pre-action valve is opened to allow water to flow into the piping.
Remote Alarms	Remote alarms as relating to fire systems shall mean an audible warning buzzer and visual indicator on the fire panel and Fire Detection System (FDS), Human Machine Interface (HMI) in a manned control room (i.e. EOD, SOR, OPCR, etc.)

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Definition	Description
Retard Chamber	A device used in conjunction with wet pipe sprinkler systems in areas where the system water supply may have a variable pressure, possible pressure surge or water hammer. The device is used to mitigate false alarms as a result of varying water pressure situations
Sprinkler Head (also referred to as head)	A thermo sensitive device designed to react at a pre-determined temperature to automatically release a stream of water, distributing it in specific patterns and quantities over designated areas.
Sprinkler System	A sprinkler system, for fire protection purposes, is an integrated system of underground and overhead piping designed in accordance with fire protection engineering standards. The installation includes a water supply such as a gravity tank, fire pump, reservoir or pressure tank and/or connection by underground piping to a city main. The portion of the sprinkler system above ground is a network of specially sized or hydraulically designed piping installed in a building, structure or area, generally overhead, and to which sprinklers are attached in a systematic pattern. Each system has a controlling valve (alarm, dry or pre-action valve) located in the system riser or supply piping and a device for actuating an alarm when the system is in operation. The system is usually activated by heat from a fire and discharge water over the fire area.
Supervised Valve	A valve that is monitored to indicate an alarm should its position or status change.
Suppressant	A medium or agent that is used to control the spread of fire or to suppress a fire, either by direct application to the fire or by application to a space with a fixed volume. The suppression medium can be water, a gas, an aerosol or a powder.
Suppressant Release Panel	An electrical panel that is used to control the release of a fire suppressant upon the activation of relevant automatic fire detection devices, and to control all functions associated with resetting, disabling or manually activating the system.
Tamper Switch	An electrical device for control-valve supervision that initiates an alarm when the control valve is moved from the normal position
Water Flow Alarm	A device so constructed and installed that any flow of water from a sprinkler system equal to or greater than that from a single automatic sprinkler will result in an alarm signal.
Water Spray Nozzle	A normally open water discharge device that, when supplied with water under pressure, distributes the water in a special directional pattern peculiar to the particular device.
Water Spray System	A water spray system is a special fixed pipe system connected to a reliable source of fire protection water supply, and equipped with water spray nozzles for specific water discharge and distribution over the surface or area to be protected. The piping system is connected to the water supply through an automatically or manually actuated valve which initiates the flow of water. An automatic valve is actuated by operation of automatic detection equipment installed in the same areas as the water spray nozzles. (In special cases the automatic detection equipment may also be located in another area).
Water-Motor Gong	A device that converts the force of water pressure into mechanical motion to operate an alarm gong.
Wet-Pipe Sprinkler System	A system employing automatic sprinklers attached to a piping system containing water and connected to a water supply. Water discharges immediately from sprinklers opened by heat from a fire.
Wire Seals	Small-diameter wire that is threaded and knotted within a lead seal and fitted to valve wheels/handles to prevent tampering. The closing of the seal makes it impossible to turn a valve unless the seal is broken. A broken seal indicates that the position of the valve may have been changed from its normal "sealed" position. Plastic devices are available for the same purpose.

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2.3.1 Disclosure Classification

Controlled Disclosure: Controlled Disclosure to external parties (either enforced by law, or discretionary).

2.4 ABBREVIATIONS

Abbreviation	Description
AHU	Air-handling unit
CBMS	Consolidated Building Management System
CIE	Control and Indicating Equipment
CMMS	Computerised Maintenance Management System
EN	European Standard
EOD	Electrical Operating Desk
ESCF	Embankment Supported Coated and Fabric
FDS	Fire Detection System
FFCP	Fire Fan Control Panel
FIP	Fire Indicator Panel (same as smoke detection panel)
FRL	Fire Resistance Level
HMI	Human Machine Interface
HVAC	Heating Ventilation and Air Conditioning
ITM	Inspection, Testing and Maintenance
MJC	Multiple Jet Control Valve
NFPA	National Fire Protection Association (USA)
NRV	Non-Return Valve
OHS	Occupational Health and Safety
O&M	Operating and Maintenance
OPCR	Outside Plant Control Room
PCM	PCM
PM	Preventative Maintenance
r/min	Revolutions per minute
SANS	South African National Standards
SOR	Station Operating Room
VWD	Visual Warning Device

2.5 ROLES AND RESPONSIBILITIES

Inspection, testing and maintenance measures detailed in this standard are to be performed by competent persons only.

Eskom personnel accountable and responsible for fire protection systems at the relevant Eskom properties shall implement and administer inspection, testing and preventative maintenance programs applicable to fire protection systems and fire-fighting equipment throughout Eskom Holdings Limited Divisions. For example the power station O&M Engineers are responsible for the overall maintenance regime at their respective power stations and as such are responsible to ensure that site specific preventative maintenance schedules are drawn up based on this document.

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When working in a power station environment competent persons are to ensure that they fully comply with the Plant Safety Regulations [11].

Table 1 gives guidance on the relevant inspection, testing and maintenance that must be performed by the various disciplines where applicable.

Table 1: Discipline Specific Involvement during Inspection, Testing and Maintenance

Applicable ITM Schedules	Water Supplies			Water Supplies			Water Supplies			Water-Based Fire Protection Systems Special Hazard Systems and Fire Extinguishers			Water-Based Fire Protection Systems			Special Hazard Systems and Fire Extinguishers			Passive Fire Protection - Structural Stability Passive Fire Protection - Fire and Smoke Containment			Smoke Control Systems			General			** Refer to Applicable Standard		
Systems and / or Components	Fire Pumps & Pump House			Fire Main Pipe Lines			Water Storage Tanks			Sprinkler / Deluge / Foam / Gas / Aerosol / Dry Chemical / Water Mist System			Hydrants and Hose Reels			Extinguishers			Passive Fire Protection			Smoke Control Systems			Other Applicable Equipment related to Fire Protection			Fire Detection System		
*	I	T	M	I	T	M	I	T	M	I	T	M	I	T	M	I	T	M	I	T	M	I	T	M	I	T	M	I	T	M
Engineering	X	x		x			x			x	x		x			x			x			x			x			x	x	
Maintenance		x	x			x			x			x			x			x			x			x			x			x
Operating	X	x		x	x		x	x		x	x		x	x								x	x		x	x		x	x	
*** Fire Department	X	x					x			x	x		x	x		x	x		x	x		x			x			x	x	
NOTES:	*			I - Inspection, T -Testing, M – Maintenance																										
	**			ITM for fire Detection is captured in Eskom Standard Inspection, Testing and Maintenance of Fire Detection Systems [5]																										
	***			Fire Department – This applies to on-site Fire Department. If there is no fire department, engineering / operating must take the inspection accountability.																										

2.6 PROCESS FOR MONITORING

A maintenance program typically consists of four stages:

- Stage 1 – Inspection, testing and preventative maintenance activities. PMs are used to ensure that key activities are performed at regular intervals. When an activity has been completed, the result is recorded, followed by whether the action resulted in a pass or fail.
- Stage 2 – Record keeping. Records are required to be kept for each functional activity and should include specific results (as appropriate), and the outcome of the activity through the use of 'pass/fail' or 'yes/no' criteria.
- Stage 3 – Reporting and rectification. Where failures have been identified, they should be reported to the relevant Eskom personnel and a works order generated (usually in SAP PM) for the rectification works.
- Stage 4 – Updating of records. Following rectification of identified failures, functional testing should be undertaken to confirm that the system is operating as intended.

The Schedules in this standard are an example for documenting Stages 1, 2 and 4. The actual documenting should be done through the PMs and Work packages on each site where it is applicable.

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2.7 REQUIRED DOCUMENTATION

In order to facilitate the implementation of the maintenance program, the following documentation is required:

- a. A schedule of essential functionality and performance requirements (e.g System and sub-systems description, component description, systems normal operating pressures, pumps' bench test curves and performance data, pressure relief and regulators normal operating settings).
- b. 'As-built' drawings and diagram(s) of the installation (i.e P&IDs, Spray direction and spray / sprinkler positioning drawings, pumps and pumps' auxiliaries drawings and diagrams).
- c. Plant register.
- d. Baseline data obtained during commissioning (to be used for measuring system performance against).
- e. Operating and maintenance manuals.
- f. ITM schedules and records.
- g. Plant history sheet.
- h. Pumps performance test results.
- i. Systems Interface diagrams / tables.

2.8 RELATED/SUPPORTING DOCUMENTS

[33] 240-127420730 Fire Pump Annual Performance Test Form

[34] 240-134826496 Fire Pump Annual Performance Test Guideline

3. WATER SUPPLIES

3.1 GENERAL

Water supplies for fire protection systems include:

- a. Fire water distribution systems
- b. Water storage tanks
- c. Fire pump-sets (Jockey, Fire Water Booster, Main Fire Pumps) and associated fuel supplies

3.2 ITM SCHEDULES

ITM schedules for the various systems can be found by reference to Table 2 below.

Table 2: Reference table for ITM Schedules – Water supplies

Element/system	ITM Schedules
Firewater piping, valves and fittings	Table 9 to Table 11
Water storage tanks	Table 12 to Table 14
Fire pump-sets (Jockey, Fire Water Booster, Main Fire Pumps) and associated fuel supplies	Table 15 to Table 18

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4. WATER-BASED FIRE PROTECTION SYSTEMS

4.1 GENERAL

Water-based fire protection systems covered in this Section include:

- a. Sprinkler – wet systems
- b. Sprinkler – dry systems
- c. Sprinkler – pre-action systems
- d. Water and foam-water spray deluge systems
- e. Foam systems (proportioning and foam making equipment, foam concentrate/premix solutions)
- f. Hydrant systems
- g. Hose reels

Whilst open nozzle water mist systems also utilize water for fire protection/extinguishment, these systems have been included in the Special Hazards section. The reason for this is that these systems make use of actuating devices and controls common to other 'Special Hazard Systems'.

4.2 ITM SCHEDULES

ITM schedules for the various systems can be found by reference to Table 3 below.

Table 3: Reference table for ITM Schedules – Water-based fire protection systems

Element/system	ITM Schedules
Sprinkler systems – Wet	Table 19 to Table 21
Sprinkler systems – Dry	Table 22 to Table 24
Sprinkler systems – Pre-action	Table 25 to Table 27
Deluge water and foam-water spray	Table 28 to Table 30
Foam systems	Table 31 to Table 33
Hydrant systems	Table 34 to Table 36
Hose reels	Table 40 to Table 41

5. SPECIAL HAZARD SYSTEMS AND FIRE EXTINGUISHERS

5.1 GENERAL

This Section sets out the requirements for inspection, testing and maintenance of the following Special Hazard fixed fire protection systems as well as fire extinguishers:

- a. Gaseous (CO₂, inert gas and halocarbons)
- b. Aerosol
- c. Dry chemical
- d. Open nozzle water mist
- e. Fire Extinguishers

Special hazard fire suppression systems that incorporate electrical detection and control systems shall be serviced in accordance with this Section and the requirements of Fire Detection Inspection Testing and Maintenance Standard [5].

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5.2 ITM SCHEDULES

ITM schedules for the various systems can be found by reference to Table 4 below.

Table 4: Reference table for ITM Schedules – Special hazard fire protection systems

Element/system	ITM Schedules
Gaseous, Aerosol, Dry chemical and Open nozzle water mist systems	Table 37 to Table 39
Portable and wheeled fire extinguishers	Table 42 to Table 43

6. PASSIVE FIRE PROTECTION – STRUCTURAL STABILITY

6.1 GENERAL

The Section sets out the ITM requirements for fire protection systems that are used to provide structural elements with the necessary stability fire resistance rating. Systems include spray-applied materials, intumescent paints/coatings and board systems.

6.2 ITM SCHEDULES

ITM schedules for the various systems can be found by reference to Table 5 below.

Table 5: Reference table for ITM Schedules – Structural fire protection

Element/system	ITM Schedules
Structural fire protection systems	Table 44

7. PASSIVE FIRE PROTECTION – FIRE AND SMOKE CONTAINMENT

7.1 GENERAL

This Section sets out the requirements for maintenance of passive fire and smoke containment systems comprising vertical and horizontal fire and smoke compartment barriers together with any openings, fire doors and fire shutters (SANS 1253), or any service penetrations and control joints, preventing the passage of fire and smoke to other compartments. These include, but are not limited to the following:

- Fire and smoke barriers – vertical and horizontal (including walls, floors, ceilings, bulkheads)
- Fire-resistant door-sets (hinged and pivoted and horizontal sliding)
- Fire shutters
- Fire-rated glazing
- Access panels and ceiling hatches
- Ducts and dampers
- Fire stopping and intumescent coatings
- Fire traps in drainage systems

7.2 ITM SCHEDULES

ITM schedules for the various systems can be found by reference to Table 6 below.

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Table 6: Reference table for ITM Schedules pertaining to fire and smoke containment systems

Element/system	ITM Schedule
Fire and Smoke Barriers – Walls	Table 45
Fire and Smoke Barriers – Floors	Table 46
Fire and Smoke Barriers – Ceilings and Bulkheads	Table 47
Opening Protectives - Hinged and Pivoted Fire-Resistant Door-sets	Table 48
Opening Protectives – Horizontal Sliding Fire-Resistant Doors	Table 49
Opening Protectives – Fire Shutters	Table 50
Opening Protectives – Fire Rated Glazing	Table 51
Opening Protectives – Access Panels	Table 52
Opening Protectives – Ceiling Hatches	Table 53
Opening Protectives – Fire Rated Ducts	Table 54
Opening Protectives – Fire Dampers (Mechanical and Intumescent)	Table 55
Opening Protectives – Fire Dampers (Motorised)	Table 56
Opening Protectives – Fire Stopping & Intumescent Coatings	Table 57
Fire Traps	Table 58

8. SMOKE CONTROL SYSTEMS

8.1 GENERAL

8.1.1 Applicability

This Section only applies to the fire and smoke control features of HVAC systems, including shutdown function for systems that are required not to run in fire mode.

8.1.2 Schedule of essential functionality and performance requirements

Documentation shall include a schedule indicating the correct fire mode operation of all components, such as fans and dampers, and the required performance parameters of the system. Where relevant, this operation shall be linked to the applicable fire alarm zone.

The schedule of essential functionality and performance requirements shall incorporate the following:

- a. Unambiguous description of HVAC system operation in fire mode. As it is critical that this document always be available to Operating and Maintenance, the document should ideally be associated with the testing documentation, rather than being archived in design files, and hence difficult to find.
- b. Provision to record the status and/or performance (correct or faulty) of the following:
 - i. Operation of every fan or air-handling unit (AHU) in normal duty.
 - ii. Operation of every fan or AHU during general fire alarm condition.
 - iii. Operation of every fan or AHU during a zone-specific fire alarm condition.
 - iv. Operation of every motorized damper required to operate during a general or zone-specific fire alarm condition.

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- v. Every required make-up airflow path (natural or via door or damper).
 - vi. Manual override control from the fire fan control panel (FFCP) (ON and OFF).
 - vii. Fan or damper indicator lamps on the FFCP.
- c. Provision to describe specific HVAC function linked to specific fire alarm zone reference, and to record correct operation of fire/HVAC function.

Floor plans, showing smoke alarm zones necessary for the development of the schedule of essential functionality and performance, shall be drawn and made available for the testing team, to assess if specific detectors, used to activate smoke control systems, actually operate in the correct zone.

8.1.3 Functionality and Performance Tests

Testing of the fire and smoke control features of HVAC systems requires verification of both functionality as well as performance of the components and the systems. For the purpose of this Section, functionality shall be demonstrated by a fan starting or stopping, a damper opening or closing, or an indicator lamp turning on/off. Performance is demonstrated by measurement of airflow velocity or volume flow rate, pressure difference between compartments, door opening force, etc.

8.2 ITM SCHEDULES

The fire and smoke control features of all HVAC systems shall be subjected to inspection, testing and preventive maintenance as referenced in Table 7 below.

Table 7: Reference table for ITM activities – Smoke control systems

Element/system	ITM Schedule
Fans and motors – Supply, exhaust spill or return air used in day-to-day operation	Table 59
Fans and motors – Supply, exhaust spill or return air used in fire mode only	Table 60
Control damper – Motorised	Table 61
Makeup air and relief vent – Motorised	Table 62
Smoke curtains	Table 63
Automatic smoke and heat vents	Table 64
Outdoor air intakes	Table 65
Draught curtains/Smoke baffles/Smoke reservoirs	Table 66
Smoke control features – Fire fan control panel (FFCP)	Table 67
Smoke control features – Variable frequency inverters (VFIs)	Table 68
Smoke control systems – Fire-isolated exit pressurisation	Table 69
Smoke control systems – System change-over under fire conditions	Table 70
Smoke control systems – Smoke exhaust	Table 71
Smoke control systems – HVAC system shutdown	Table 72

9. SYSTEMS INTERFACE TESTING

9.1 GENERAL

Where fire protection systems are interfaced to other systems, 'end-to-end' tests are required to confirm that each interfaced system operates in accordance with the approved design. A concurrent test of all

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interfaced systems, as would occur in a fire, is required to ensure that there are no unwanted interactions between systems or unsustainable electrical loads on systems or system components.

This Appendix sets out the recommended procedures for the concurrent 'end-to-end' test of the system interfaces to confirm that they operate in accordance with the approved design.

The baseline data required to perform the tests includes the system interface diagram and the relevant cause-and-effect matrices which should be verified as set out in a test schedule.

9.2 PRECAUTIONS

Prior to commencing any interface testing, the following precautions should be carried out:

- a. Ensure that the responsible entity for the coordination of the concurrent attendance of each person or persons has arranged for the attendance of all persons required to properly conduct the test.
- b. The precautions detailed in each relevant Section of this Standard.

On completion of any procedure, ensure that each control is returned to the condition or state prior to the test. When any function is left impaired, is disabled or is not restored to 'normal', it should be recorded in the system logbook and the relevant personnel should be notified.

9.3 TEST PLAN

As most interface configurations are unique to the particular building or facility, a test plan detailing each step of the interface test procedure should be available to ensure that tests are carried out consistently and results are adequately documented. The test plan should be based on the procedures that were used during the commissioning of the systems interfaces.

Where a test plan does not exist, it should be prepared and documented by a competent person or persons having an understanding of the interface requirements of the approved design.

The test plan should detail the concurrent attendance of persons specializing in each interfaced system required to achieve the end-to-end test and should include the following:

- a. A list of all interfaced system
- b. Systematic test procedure detailing the method for conducting each interface test
- c. List of persons and their responsibilities required to test or verify the function of each interface
- d. Additional precautions and procedures (e.g. plant shutdown)
- e. Form of test report

9.4 RESULTS

Pass or fail test results for each interfaced system should be recorded in the respective system records with detailed of results in interface test report.

Recorded test results in accordance with the Tables below may be electronically based; however, a hard copy record of the system interface tests should be kept on site and be available at all times. The records include names and signatures of all persons that assessed the compliance of the interfaces to the requirements of the approved design including the dates when the tests were performed.

Any defects identified in the interface tests should be recorded on the respective system's yearly condition report.

Examples of test schedules can be found by reference to Table 8.

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Table 8: Reference table for systems interface testing

Element/system	Schedules
Sprinkler/deluge systems	Table 73
Fire detection system	Table 74
Special hazard system	Table 75
Fire fan control panel	Table 76

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This document has been seen and accepted by:

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11. REVISIONS

Date	Rev.	Compiler	Remarks
January 2013	0	M D Collier	First draft for comment
March 2013	1	M D Collier	Final Document for Authorisation and Publication
August 2014	2	M D Collier	Final Revised Document for Authorisation and Publication
February 2018	2.1	M D Mathebula	Minor changes from Rev 2. The following mainly affected: • Definitions detailed in table format. • Competency Definition updated. • Maintenance frequency indication optimised. • Figure 1 and Figure 2 deleted. • Table 1 added. • Table 9 to Table 18 updated. • Table 57 revised. • Table 58 added. • Table 74 and Table 75 deleted.
February 2018	2.2	M D Mathebula	Final Draft for Business Review Process
March 2018	2.3	M D Mathebula	Updated final Draft after Business Review Process
March 2018	3	M D Mathebula	Final Rev 3 Document for Authorisation and Publication

12. DEVELOPMENT TEAM

The following people were involved in the development of this document:

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- Marius Engelbrecht
- Mbali Mathebula

13. ACKNOWLEDGEMENTS

- Niloshen Moodley
- Nkosi Ndika

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APPENDIX A: ITM SCHEDULES

Detail tables follow from the next page onwards

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Table 9: Inspection Schedule and Record – Fire Water Piping, Valves and Fittings

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Water supply *reticulation sectional and isolating valves – secured	a) CHECK that all sectional valves are secured in the correct operating position with padlock and chain.		✓						Ensure locks and chains used as securing devices are sturdy and resistant to breakage except by heavy cutting devices
		b) CHECK all underground key-operated valves if in the correct operating position		✓						Note that underground key-operated valves cannot be physically secured nor monitored due to the valve assembly configuration.
1.2	Water supply *reticulation sectional valves –monitored	CHECK that all monitored sectional valves including underground key-operated valves are in the correct operating position.				✓				
1.3	All sectional valves and other distribution components	CHECK all sectional valves reticulation isolating valves, pressure gauges air-valves, pressure reducing valves, strainers and non-return valves for leaks and signs of physical damage.		✓						
1.4	Installation survey	Pipework—CHECK that exposed water distribution system, including pipework, pipe supports and valves appears free from corrosion and damage, and not subject to external loads and pipework is properly supported.						✓		
1.5	Design survey	Site documentation—CHECK that piping layouts conform to site drawings and documentation, and that no changes were made to piping without updating the documentation and drawings.						✓		
1.6	Plant labelling	CHECK if all plant labelling and reference labels are provided, properly affixed and legible.						✓		Where plant labelling are not provided, missing or not legible then new replacement labels must be obtained and correctly affixed to the relevant system components

* Reticulation will be deemed to incorporate both the supply (suction) and distribution (pressure) sides of the fire reticulation.

Table 10: Test Schedule and Record – Fire Water Piping, Valves and Fittings

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
2.1	Water *reticulation sectional and isolation valves status (Stroke test)	a) OPERATE all water supply sectional and isolation valves including underground key-operated valves from fully open to fully closed.						✓		
		b) VERIFY that the valve position indicators are securely mounted and indicate correctly.						✓		Note: Valve operating indicators may not necessarily be found on underground key-operated valves.
		c) WHERE monitored, test each valve anti-tamper switch by closing and re-opening the valve. Verify correct indication at the CIE in the respective monitoring control room (SOR, EOD, OPCR, etc.)						✓		
2.2	Restoration to operational condition	RETURN, after completion of testing procedures, all valves to the operational condition, and secure.						✓		
2.3	Recording	RECORD all test results in valve test log (PM).						✓		
2.4	Non-return valves	VERIFY that all non-return valves are operating freely and are seating correctly.							✓	
2.5	Pressure reducing station test	a) OPERATE all pressure-reducing valves and verify correct operation under flow conditions.						✓		
		b) VERIFY & RECORD that pressure readings on the low pressure side of the valves are within the range stated at the pressure-reducing valve station.						✓		High pressure gaugekPa Low pressure gaugekPa
2.6	Pressure Relief Station testing	a) OPERATE pressure-relief valve and note operating pressure is within the range stated on the nameplate provided at the reducing valve station.						✓		Operating pressure..... kPa
		b) VERIFY & RECORD the pressure readings at which the pressure relief valve operates and if within the range stated at the pressure-relief nameplate.						✓		Operating pressure..... kPa

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
2.7	*Reticulation flow test	TEST the supply capacity of the piping system at flows representative of those experienced during a fire to determine the internal condition of the piping. a) Measure the flow and pressure drop across piping and compare with results of previous test. b) Several readings must be obtained from hydraulically challenging areas i.e. most highest point; furthest away from fire pump room; long sections with smaller diameter pipe lengths supply various sub-systems, etc.						✓		This is applicable to fire hydrant systems) and active systems' reticulation (i.e. emulsifier, sprinklers) Flow.....L/s Supply pressurekPa

*Reticulation will be deemed to incorporate both the supply (suction) and distribution (pressure) sides of the fire reticulation.

Table 11: Preventative Maintenance Schedule and Record – Fire Water Piping, Valves and Fittings

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
3.1	Water *reticulation - Strainers/screens	a) CHECK suction inlet strainer(s), sand-box filters or screen(s) for blockages and corrosion.						✓		Note: Strainers are cleaned every year and every time there was a significant flow
		b) CLEAN suction inlet strainer(s). Lower raised screen and raise and clean 'in-use' screens.						✓		
3.2	Water supply non-return-valves	RENEW water supply non-return valve seatings and gaskets.							✓	
3.3	Sectional and isolation valves (Gate valves)	For screw-down style valves, EXAMINE seating and fit new washers. For packed gland variants, FIT new gland packing. Inspect condition of disc for pitting and corrosion. Inspect seat area for silt, damage or deformity. Lubricate and service valves in accordance with manufacturer's recommendations.							✓	
	Sectional and isolation valves (Butterfly valves)	INSPECT condition of disc for pitting and corrosion. Inspect seat area for silt, damage or deformity. Lubricate and service valves in accordance with manufacturer's recommendations.							✓	
3.4	Pipework in corrosive atmospheres	MITIGATE the source of external corrosion where possible.							✓	
		INSPECT reticulation pipe work to determine level of corrosion REPAIR / MAINTAIN reticulation pipework found with manageable corrosion REPLACE affected pipework with un-treatable (deep-seated) levels of corrosion						✓		
		CONDUCT NDT and destructive tests on a sample of the exposed corroded reticulation							✓	
3.5	Gauges	CHECK all pressure gauges against calibrated gauge.							✓	

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Table 12: Inspection Schedule and Record – Water Storage Tanks

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Tanks – without monitored water level alarms	CHECK that the tank is full and that the level indicator reads correctly.(applicable to dedicated fire water storage tanks		✓						
1.2	Tanks – with mechanical / hydraulic water level gauge	a) CHECK that the tank is full and that the level indicator reads correctly (applicable to dedicated fire water storage tanks).	✓							
		b) CHECK mechanical gauge moving components for corrosion, wear and tear.	✓							
1.3	Tanks – atmospheric	INSPECT externally tank condition, supporting structure (plinths, steel supports, etc.), fittings, nozzles, and acceptable condition of roof, hatches and ladders, external corrosion.							✓	
1.4	Tanks – pressure	INSPECT externally for structural integrity, freedom from corrosion.							✓	
1.5	Tanks – all types (corrosion protected)	INSPECT internally condition of tank, internal fittings, nozzles, vortex plates etc. and where a liner is fitted for liner detachment.							✓	
1.6	Plant labelling	CHECK if all plant labelling and reference labels are provided, properly affixed and legible.						✓		Where plant labelling are not provided, missing or not legible then new replacement labels must be obtained and correctly affixed to the relevant system components

Table 13: Test Schedule and Record – Water Storage Tanks

[illegible]

Table 14: Preventative Maintenance Schedule and Record – Water Storage Tanks

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2-Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
3.1	Tanks – atmospheric	a) REPLACE inlet valve washer and lubricate the float mechanism.							✓	
		b) LUBRICATE water level indicator, pulleys and cables and check indicator for correct operation.							✓	
3.2	Tanks – all types	a) REPAINT tanks externally and internally, as well as supporting structure as required.	As required.							
		b) MAINTAIN cathodic protective devices and anodes where fitted.					✓			
3.3	Gauges	CHECK all pressure gauges against calibrated gauge.							✓	
3.4	Tanks – ESCF	CLEAN exposed surfaces every 2 years and paint as required. Maintain as per manufacturer's recommendations.	See action column.							
3.5	Tank drain	Drain the water from the tank and clean internally every 15 years.	See action column.							Note: If the tank has dual compartments one compartment should be drained at a time so that water supply is available at all times.

Table 15: Inspection Schedule and Record – Fire Pump-sets & Fuel Supplies

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Pump areas	a) CHECK that pump areas are unobstructed (i.e. free access around the pump sets without hindrance) ,	✓							
		a) CHECK that pump areas are not used for storage (i.e. no storage of combustible materials, flammable liquids, flammable gasses, spare motors or components) and that area is generally clean and free from fuel, oil and water spillages on the floors.	✓							
		b) CHECK that pump area lighting is adequate (i.e. no blown lights, broken light fittings, dark areas around the pumps.	✓							
		c) Where pump pressure-relief valves are fitted, CHECK that the discharge will not cause flooding or water damage (i.e. water discharge correctly directed into sump drains, terminating with an elbow facing the sump pit, etc.)	✓							
1.2	Valves and alarm cocks	a) CHECK that all valves are in the operating position (as indicated on the P&ID or mimic drawing), and	✓							
		b) CHECK that all the critical valves are secured against tampering where applicable.	✓							
1.3	Pressure gauges	a) CHECK that correctly ranged pressure gauges are installed and in an operative condition	✓							
		b) CHECK that gauges are defect free and legible (free from physical damage, lens clear with no fading, paint, dirt, oil, etc). Where fitted, check that glycerine levels of gauges are at the correct level and no leaks are found.	✓							
		c) INSPECT stop valves on gauges and ensure it is in the OPEN position.	✓							
		d) RECORD pressures and check that it is within the ranges indicated on the pressure gauge schedule. Pressure should be within $\pm 3\%$ of normal operating	✓							kPa

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		pressure.								
1.4	Auto start arrangement	a) Pressure Switches CHECK for mounted securing to pipe work tapping point, physical damage and gland is in place and secure. All removable covers are securely closed and IP rating requirements are still maintained.		✓						
		b) Signal Cabling CHECK that all signal cables are free from physical damage, terminated into the switch, conduit is securely mounted, flexible metal conduit (sprag) is in good condition and securely fixed.		✓						
		c) Pressure Gauges CHECK that gauges are defect free and legible (free from physical damage, lens clear with no fading, paint, dirt, oil, etc). Where fitted, check that glycerine levels of gauges are at the correct level and no leaks are found.		✓						
		d) NRV's CHECK that NRV's are installed in each sensing line and follow the flow direction correctly and leak free at joints,		✓						
		e) Valves CHECK valves are in correct operating position (fully open or fully closed), leak free, no damage on handles and spindles,		✓						
		f) Mimic Diagram ENSURE that a mimic diagram is provided, securely fixed in position, legible and clean. CONFIRM component labelling correspond with mimic diagram.		✓						
1.4	Fire pump controller status	a) CHECK that the main isolating switch is in the ON position and, where fitted, the GREEN power supply lamps are illuminated and that no RED warning lamps are on. Ensure all lights are functional by pressing the lamp test button, where fitted.	✓							

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		b) INSPECT pump controller panels and support (where applicable) for corrosion, defective door assemblies, doors closed, mechanical anchors to floor, etc.	✓							
1.5	Electrical Distribution Panel	b) INSPECT electrical distribution panel and support (where applicable) for corrosion, defective door assemblies, doors closed, mechanical anchors to floor, etc	✓							
1.6	Fuel tanks (day tanks and header tanks / bulk supply tanks)	<u>Day Tanks</u> a) CHECK that fuel gauges are defect free and legible (free from physical damage, lens clear with no fading, paint, dirt, oil, etc)	✓							Visible fuel level gauge may not be of the glass or plastic tube type The fuel level indicator shall not allow any leakage or spillage of fuel if broken.
		b) CHECK the fuel level and ensure that the fuel tank is not less than $\frac{3}{4}$ full. If less than $\frac{3}{4}$ full then refill.	✓							
		c) CHECK fuel supply pipes for condition and defects i.e. properly supported, no dents, no leaks, external corrosion, etc.	✓							
		d) Flexible hose connections between the fixed supply lines and the diesel driver must be of metal braded hose with no leaks, sharp bends or exposure to hot surfaces.	✓							
		e) CHECK fuel tank for signs of leakage, corrosion, adequacy of support, breather connection free of obstruction and routes to the outside.	✓							
		f) CHECK fuel supply lines to be locked in the open position. Fuel tank drain valves where fitted must be locked in the closed position.	✓							
		g) CHECK bund wall enclosure below fuel tank for physical damage to walls and floor, drainage, accumulation of combustible materials, etc.	✓							
		<u>Header Tanks / Bulk Supply Tanks</u> h) CHECK the fuel level and ensure that the fuel tank is not less than $\frac{3}{4}$ full. If less than $\frac{3}{4}$ full then refill.		✓						

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		i) CHECK fuel tank for signs of leakage, corrosion, adequacy of support, breather connection functional and free of obstruction.						✓		
		j) CHECK adequacy of structural steel support legs for deformity and corrosion.						✓		
		k) INSPECT fixtures (nuts & bolts) for adequacy.						✓		
		l) CHECK adequacy of structural concrete support legs / walls for deformity, cracks, spalling and discolouration.						✓		
		m) CHECK supply pipe work between Header and Day tank for condition and defects i.e. properly supported, no dents, no leaks, external corrosion, etc.		✓						
		n) CHECK fuel supply lines to be locked in the open position. Fuel tank drain valves where fitted must be locked in the closed position.	✓							
1.7	General inspection	a) CHECK for any obvious signs of physical damage or deterioration.		✓						
		b) INSPECT pump plinths (Cracks, spalling, mechanical anchor corrosion, corrosion of pump skids, etc.		✓						
		c) INSPECT pipes, pipe plinths and supports for adequacy of support, pipe movement, corrosion, loose/defective U-bolts, leaking, etc.		✓						
		d) INSPECT expansion bellows for alignment, physical damage, cracks / leaks.		✓						
1.8	Fire pump control panel batteries	a) CHECK fire pump control panel batteries for lose terminals, corrosion at terminals, damaged cabling, battery damage and deformity, etc.	✓							Amps Volts.....
		b) CHECK charging equipment for lose terminals, corrosion at terminals, damage cabling, Current & Voltage meters for correct readings and record.	✓							
1.9	Diesel driven pump engine start batteries	a) CHECK fire pump start batteries for lose terminals, corrosion at terminals, damaged cabling, electrolyte levels, battery damage and deformity.	✓							Amps Volts.....
		b) CHECK engine start batteries and charging equipment for lose terminals,	✓							

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		corrosion at terminals, damage cabling.								
		c) Check electrolyte level in batteries								
		d) CHECK battery charger panel Current & Voltage meters for correct readings and record	✓							
1.10	Plant labelling	CHECK if all plant labelling and reference labels are provided, properly affixed and legible.						✓		Where plant labelling are not provided, missing or not legible then new replacement labels must be obtained and correctly affixed to the relevant system components

Table 16: Test Schedule and Record – Fire Pump-sets & Fuel Supplies

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
2.1	Precautions	Prior to commencing any test function: a) CHECK all safety guards are in place and secured.	✓							
		b) Where diesel driven pump-sets are installed, CHECK engine coolant (radiator), engine cooling line valves in open position (inter-cooler / heat exchanger), engine oil, diesel fuel levels and belt drives. Check fuel water-trap/filter for water contamination. Rectify where low levels are observed.	✓							
		c) Check and record diesel driver hour meter reading prior to commencing the test run.	✓							
		d) CONFIRM, with the Control room Operator, prior to starting the fire pumps, that the test run is about to start.	✓							
2.2	Pressure gauges	Prior to commencing any test function, RECORD pressure readings from water supply (suction) and system pressure (discharge) gauges.	✓							Suction:kPa Discharge:kPa
2.3	Fire Pump controller – Diesel driven pump-set	a) CHECK enclosure for corrosion and the ingress of water, dust or insects. CLEAN and Rectify any defects noted.	✓							Repair defects found to ensure plant is healthy for test / run purposes
		b) CHECK operation of all visual indicators, switches and sounders. REPLACE any defective indicators and components and retest function.	✓							
2.4	Fire Pump Control Panel and Engine Start Batteries	a) TEST the float charge voltage of both the i. fire pump control panel and ii. engine start batteries and record the result. b) TEST battery fitness for duty as follows. Batteries shall be sized on a calculated capacity of 72 hours of standby power followed by three 15-second attempt-to-start cycles per battery unit, without AC power being available for battery charging.					✓			Amps Volts..... Amps Volts..... NFPA 20 section 11.2.7.2.1.5 <i>Reduce 72 hrs to 48hrs no charge but keep 3x 15sec cycles.</i>

[illegible]

[illegible]

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		<u>Diesel Header Tanks</u>								
		a) TEST signals for solenoid actuated valves on head tank fuel automatic filling arrangement for functionality where fitted.	✓							
		b) TEST electronic level indicating devices/instruments for functionality where fitted.					✓			
		c) TEST signals of electronic level indicating devices/instruments to manned control rooms for functionality where fitted.					✓			
		d) TEST / CALIBRATE electronic level indicating devices/instruments for accuracy where fitted on three (3) yearly basis.	See action column.							
2.8	Pump controller – Electric motor-driven pump-set	a) CHECK enclosure for corrosion and the ingress of water, dust or insects. CLEAN and Rectify any defects noted.		✓						
		b) Test operation of all visual indicators by conducting a lamp test (where provided).		✓						Repair defects found to ensure plant is healthy for test / run purposes
		c) Check switches and sounders if they are operational. REPLACE any defective indicators and components and retest function.		✓						
2.9	Batteries – Electric Pump Controller	a) CHECK that battery complies with details on identification plate fitted to the enclosure.		✓						
		b) CHECK battery for corrosion, physical damage / deformity and if securely mounted.		✓						
		c) CHECK electrolyte level and density of all open nickel-cadmium cells (including those for diesel engines and for the power supplies of the control panel).		✓						V
		d) CHECK float voltage of the battery and record.		✓						
2.10	Alternative power supplies – Electric motor-driven pump-	In addition to the requirement of Item 2.7 above where alternative power supplies are provided, RUN the pump(s) continuously for not less than 10			✓					kPa

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
	set	minutes on supply from the alternative power supply.								
2.11	Pump starting devices – Electric motor-driven pump-set	a) START each electric pump-set by reducing the applied water pressure on the Auto Start Arrangement sensing line and run motor continuously for not less than 10 minutes with discharge valve into fire reticulation in the open position.		✓						Timemin
		b) RECORD the pump cut-in pressures and verify that they are within the set-points as indicated on the pressure gauge schedule / mimic drawing.		✓						Electric #1:cut in pressurekPa Electric #2:cut in pressurekPa
2.12	Electric motor-driven pump-set	During the running period, specified in Item 2.8 above. CHECK:								
		a) Pump operates at correct discharge pressures allowing for varying suction conditions. Record suction and discharge pressure.		✓						Suction Pressure.....kPa Discharge Pressure.....kPa
		b) Pump gland packing / mechanical seals and drain (where applicable) operates efficiently.		✓						
		c) Visual vibration conditions or abnormal noises are not evident. If any visual vibrations or abnormal noises are observed, immediately STOP the test run.		✓						
		d) Both local and remote 'pump running' alarms and lights operate.		✓						
		e) CHECK That the water flow is evident from the pressure relief valve when the pump is operating at shut-off head and the water flow ceases at the appropriate pressure after slowly opening the discharge valve. Note: Monitor the pump casing temperature for overheating (which will be indication of non-operating of pressure relief)		✓						Operating pressure.....kPa
2.13	Alarm Signal Transmission (all pumps)	g) Confirm that 'Pump Run' alarm signal has registered at the relevant Control Room.		✓						
		Test the transmission of all alarms associated with the fire pump sets (batteries not charging, primary electrical supply failure, pump fail to start, pump trip etc.) to the respective monitoring control room HMI.						✓		

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
2.14	Automatic sequential start	Where applicable, TEST automatic sequential starting of pumps.						✓		
2.15	Diesel driven pump-set – 2.15.1 Annual Pump Performance Test (Flow and load test) with test line provided.	a) With the pump room door closed and the pump test team present: i) Prior to starting the diesel pump ensure that all discharge isolation valves (reticulation supply, pressure relief and test line) are in the close position. ii) Start the pump and run the pump-set at shut-off (zero flow) for 5min to allow all equipment to attain normal operating temperature. Record readings of no-flow conditions in allocated space in pump test template. iii) Gradually increase the flow by opening the test line valve through the various incremental flow set-points as per the pump test template to the pump's maximum flow. Record readings at each pre-determined set point. iii Once the maximum flow reading has been obtained gradually reduce flow back to zero flow (closed head) condition. Allow the pump to run until a total test duration of 30minutes has been reached. iv) While at closed head condition check the pressure relief valve operation. CHECK that the system pressure relief valve opens and closes at the pressure stated on the pressure gauge schedule before finally concluding the diesel pump test. While carrying out the above procedures, CHECK temperature of bearings and stuffing box leakage and note and report any abnormality. NOTE: Where stand-alone fire pump rooms are provided ambient room temperature should be monitored. If the pump room temperature rises more than 10°C above ambient temperature, this could indicate inadequate ventilation and possible reduction in engine power.						✓		<u>Record the following data for each increment on the pump performance test template [33]</u> Suction pressure.....kPa Discharge pressure.....kPa Engine running temp.....°C Engine oil pressure.....kPa Engine Running Speedrpm Air temp. at manifold inlet.....°C Flow.....l/min
	Diesel driven pump-set 2.15.2 Annual Pump	a) With the pump room door closed and the pump test team present: i) Prior to starting the diesel pump, ensure that all discharge isolation						✓		<u>Record the following data for each increment on the pump performance test</u>

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
	Performance Test (Flow and load test) without test line provided	valves (reticulation supply and pressure relief) are in the close position. ii) Start the pump and run the pump-set at shut-off (zero flow) for 5min to allow all equipment to attain normal operating temperature. Record readings of no-flow conditions in allocated space in pump test template. iii) Gradually increase the flow by opening the fire reticulation supply valve through the various incremental flow set-points as per the pump test template to the pump's maximum flow. System demand should be created in accordance with BU specific reticulation configuration (i.e. fixed systems and/or fire hydrants) . Record readings at each pre-determined set point. Once the maximum flow reading has been obtained gradually reduce flow back to zero flow (closed head) condition. Return all fire systems and/or fire hydrants used during the test to their normal operating condition. Allow the pump to run until a total test duration of 30minutes has been reached. iv) While pump is running at closed head condition check the pressure relief valve operation. CHECK that the system pressure relief valve opens and closes at the pressure stated on the pressure gauge schedule before finally concluding the diesel pump test. While carrying out the above procedures, CHECK temperature of bearings and stuffing box leakage and note and report any abnormality. NOTE: Where stand-alone fire pump rooms are provided ambient room temperature should be monitored. If the pump room temperature rises more than 10°C above ambient temperature, this could indicate inadequate ventilation and possible reduction in engine power.								<u>template [33]</u> Suction pressure.....kPa Discharge pressure.....kPa Engine running temp.....°C Engine oil pressure.....kPa Engine Running Speedrpm Air temp. at manifold inlet.....°C Flow.....l/min
	Diesel driven pump sets 2.15.3 Annual Pump Performance Test (Engine	SIMULATE an engine fail to start by means of either automatic mode or manual mode. . Proceed as follows: The fail-to-start alarm shall operate after the sixth cycle of cranking, when						✓		

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
	Fail-To-Start Test)	the following sequence is carried out: Automatic Mode: 1) Isolate the fuel supply; 2) Select pump mode to AUTO START 3) By means of the pump test arrangement simulate a controlled pressure drop for the pump being tested 4) Witness and record the time for engine cranking (not less than 15 seconds) by the pump controller 5) Witness and record 10 second pauses between crank cycles of the engine 6) A total of six crank cycles should occur before the pump controller goes into a PUMP FAIL condition. 7) REINSTATE the fuel supply and proceed with manual start of pump, allow for a 5minute test run to ensure functionality is restored. Manual Mode: 1) Isolate the fuel supply; 2) With the pump controller in MANUAL MODE crank the engine for not less than 15 seconds; 3) Stop the cranking for not less than 10 seconds and not more than 15 seconds; 4) Repeat (2) and (3) a further five times; and 5) A total of six crank cycles should occur before the pump controller automatically goes into a PUMP FAIL condition. 6) REINSTATE the fuel supply and proceed with manual start of pump, allow for a 5minute test run to ensure functionality is restored. Ensure that engine-start cycling requirements and alarm activations are satisfied								

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
	Diesel driven pump sets 2.15.4 Annual Pump Performance Test (Pump Priming Tanks)	TEST correct operation of pump priming tanks and associated equipment, where fitted.						✓		
2.16	Electric motor driven pump-set – 2.16.1 Annual Pump Performance Test (Flow and load test) with test line provided	a) With the pump room door closed and the pump test team present: i) Prior to starting the electric pump ensure that all discharge isolation valves (reticulation supply, pressure relief and test line) are in the close position. ii) Start the pump and run the pump-set at shut-off (zero flow) for 3min to allow all equipment to attain normal operating temperature. Record readings of no-flow conditions in allocated space in pump test template. iii) Gradually increase the flow by opening the test line valve through the various incremental flow set-points as per the pump test template to the pump's maximum flow. Record readings at each pre-determined set point. iii) Once the maximum flow reading has been obtained gradually reduce flow back to zero flow (closed head) condition. Allow the pump to run until a total test duration of 30minutes has been reached. iv) While at closed head condition check the pressure relief valve operation. CHECK that the system pressure relief valve opens and closes at the pressure stated on the pressure gauge schedule before finally concluding the electric pump test. While carrying out the above procedure, CHECK temperature of bearings and stuffing box leakage and note and report any abnormality.						✓		<u>Record the following data for each increment on the pump performance test template [33]</u> A. Engine Running Speed (rpm) B. Flow (l/min) C. Suction pressures (kPa) D. Discharge pressure (kPa) E. Air temperature at the electric motor. (°C) F. Motor rpm (tachometer measurement). G. Volts (all three phases) H. Amps (all three phases)
		b) TEST correct operation of pump priming tanks and associated equipment, where fitted.						✓		

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
	Electric motor driven pump-set – 2.16.2 Annual Pump Performance Test (Flow and load test) without test line provided	a) With the pump room door closed and the pump test team present: i) Prior to starting the electric pump ensure that all discharge isolation valves (reticulation supply and pressure relief) are in the close position. ii) Start the pump and run the pump-set at shut-off (zero flow) for 3min to allow all equipment to attain normal operating temperature. Record readings of no-flow conditions in allocated space in pump test template. iii) Gradually increase the flow by opening the fire reticulation supply valve through the various incremental flow set-points as per the pump test template to the pump's maximum flow. System demand should be created in accordance with BU specific reticulation configuration (i.e. fixed systems and/or fire hydrants) . Record readings at each pre-determined set point. Once the maximum flow reading has been obtained gradually reduce flow back to zero flow (closed head) condition. Return all fire systems and/or fire hydrants used during the test to their normal operating condition. Allow the pump to run until a total test duration of 30minutes has been reached. iv) While pump is running at closed head condition check the pressure relief valve operation. CHECK that the system pressure relief valve opens and closes at the pressure stated on the pressure gauge schedule before finally concluding the diesel pump test. While carrying out the above procedures, CHECK temperature of bearings and stuffing box leakage and note and report any abnormality. NOTE: Where stand-alone fire pump rooms are provided ambient room temperature should be monitored. If the pump room temperature rises more than 10°C above ambient temperature, this could indicate inadequate								<u>Record the following data for each increment on the pump performance test template [33]</u> A. Engine Running Speed (rpm) B. Flow (l/min) C. Suction pressures (kPa) D. Discharge pressure (kPa) E. Air temperature at the electric motor. (°C) F. Motor rpm (tachometer measurement). G. Volts (all three phases) H. Amps (all three phases)

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		ventilation and possible reduction in engine power.								
2.17	Vibration monitoring	TEST all pump sets for excessive vibrations during the above pump performance tests.						✓		
2.18	Restoration to operational condition	After completion of testing procedures, RETURN all equipment, systems and valves to their operational condition.						✓		

Table 17: Test Schedule and Record – Fire Pump-sets – Pressure Maintenance

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
3.1	Precautions	Prior to commencing any test function CHECK that all safety guards are in place and secure.		✓						
3.2	Pressure gauges & Transmitters	Prior to commencing any test function RECORD reading from suction line and system (discharge) pressure gauges.		✓						kPa
3.3	Valves	ENSURE all valves are correctly set and secured.		✓						
3.4	Pump	a) VERIFY operation (manual and automatic).		✓						kPa
		b) RECORD cut-in and cut-out pressures.		✓						kPa
		c) VERIFY that all pump running signals have been received in the control room		✓						
3.5	Hydro-pneumatic accumulator	VERIFY that pressure is correct.		✓						kPa
3.6	Valves	EXERCISE all pump-set isolating and pressure-relief valves, and monitoring facility if fitted.		✓						
3.7	Restoration to operational condition	RETURN, after completion of testing procedures, all equipment to the operational condition.		✓						
3.8	Recording	RECORD all test results in pump-set test log.		✓						

Table 18: Preventative Maintenance Schedule and Record – Fire Pump-sets & Fuel Supplies

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
4.1	Pump areas	a) REMOVE unnecessary material where pump areas are found to be obstructed and combustible materials not required for the operation of the pump-set(s)	✓							
		b) RECTIFY or provide additional lighting where lighting is found to be inadequate.	✓							
4.2	Batteries	a) REPLACE control panel batteries in accordance with manufacturer's recommendations.	See action column.							
		b) REMOVE any corrosion from battery terminals.	✓							
		c) If battery float voltage is found to be too low and battery charger operates correctly, replace batteries.	See action column.							
		d) REPLACE all engine-starting batteries (lead-calcium / lead acid) after a maximum of 3 years' service, irrespective of condition. Record date of replacement on the new battery and the date the batteries were replaced in the maintenance record.	See action column for frequencies							Note: The action is not applicable to Deep Cycle batteries which is inspected, tested and maintained in accordance with Eskom Electrical Standards. Date.....
4.3	Hydro-pneumatic accumulator (where fitted)	CHECK and adjust accumulator air pressure.					✓			
4.4	Diesel driven pump-set	a) *CLEAN, or replace as required, engine fuel sludge/sediment trap and air filter elements.					✓			
		b) REMOVE and clean heat exchanger strainer(s).								
		i. Raw water supply		✓						
		ii. Potable water supply				✓				

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
4.5	Diesel driven pump-set (The following maintenance activities cannot be conducted only on frequency but should also consider the OEM requirements for running hours. The lesser of the two frequencies shall prevail.)	a) *REPLACE engine oil with new oil that meets the engine manufacturer's specification. More frequent oil changes shall be carried out if recommended by the engine manufacturer.						✓		
		b) *REPLACE engine oil filter and fuel filters.						✓		
		c) CHECK and SAMPLE the condition of the fuel in the diesel head tanks and diesel day tanks and replace if contaminated or found with biological growth.						✓		Diesel samples to be submitted for laboratory analysis to confirm status of (aging) diesel
		d) *INSPECT engine cooling hoses and replace where necessary.						✓		
		e) *FLUSH engine cooling system.						✓		
		f) REFILL with manufacturer's approved corrosion inhibitor (water-cooled engines incorporating a radiator only).						✓		
		g) *PRESSURE TEST engine cooling system in accordance with the manufacturer's recommendations (radiator and heat exchanger cooled engines only).						✓		
		h) TEST solenoid valve / solenoid actuator on engine cooling system for functionality and reliability						✓		
		i) OVERHAUL engine cooling system pressure-reducing valves (where fitted).						✓		
		j) CARRY out any other maintenance procedures in accordance with the engine manufacturer's requirements.						✓		
		k) INSPECT pump/driver coupling for wear and alignment. Replace worn or damaged components.						✓		
		l) GREASE pump bearings to the manufacturer's specifications where grease nipples are provided.					✓			

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		m) Where the pump bearings are of the oil-lubricated type, REPLACE the bearing oil with new oil that meets the pump manufacturer's specification (does not apply to turbine type vertical shaft centrifugal pumps).						✓		
		n) REPLACE the oil in right-angle gearboxes with new oil that meets the manufacturer's specification.						✓		
4.6	Fuel Tanks	<u>Day Tanks</u> a) DRAIN & CLEAN diesel day tank and remove any sludge or sediment which might be present on a three (3) yearly basis.	See action column for frequencies.							
		<u>Header Tanks</u> b) DRAIN & CLEAN diesel day tank and remove any sludge or sediment which might be present.							✓	
		MITIGATE the source of external corrosion where possible by corrosion inhibitor paint and top coat in intervals of not more than ten (10) years unless identified by inspection before ten year interval. c) REPAIR / MAINTAIN fuel tank body found with manageable corrosion d) REPLACE fuel tank with un-treatable (deep-seated) levels of corrosion	See action column for frequencies							
4.7	Electric motor-driven pump-set (With electrical equipment isolated from all power supplies)	a) INSPECT the condition of all exposed heavy current-carrying contacts. Rectify any item showing signs of wear or corrosion.						✓		
		b) INSPECT pump/driver coupling for wear and alignment. Replace worn or damaged components.						✓		
		c) Where grease nipples are provided, GREASE pump and motor bearings to the manufacturer's specifications.						✓		
		d) Where the pump bearings are of the oil-lubricated type, REPLACE the bearing oil with new oil that meets the pump manufacturer's specification						✓		

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		(does not apply to turbine type vertical shaft centrifugal pumps).								
4.8	Non-return valves	a) ENSURE by removing from pipe reticulation and testing all non-return valves are operating freely and are seating correctly.						✓		
		b) OVERHAUL by removing from pipe reticulation all non-return valves.							✓	
4.9	Pump Internals - Disassemble pump and:	a) REPACK pump glands.						✓		
		b) INSPECT bearing housings for wear or damage, and repair or replace as required.							✓	
		c) INSPECT shaft and shaft sleeve(s) for wear or damage, and repair or replace as required.							✓	
		d) INSPECT casing, impeller (and wear rings where fitted) for wear, damage or corrosion, and repair, replace or clean as required.							✓	
		e) INSPECT shaft sealing device for wear and/or damage, and repair or replace as required.							✓	
		f) REASSEMBLE pump using new gaskets and/or O-rings and tighten all bolts, nuts and studs to the manufacturer's recommended torque settings.							✓	
		g) DISMANTLE right-angle gearbox, where installed and inspect for wear or damage. Repair or replace damaged components. Reassemble the gearbox using new gasket(s) and O-ring(s). Re-tighten fasteners to the manufacturer's recommended torque settings.							✓	
4.10	Relief valves	a) INSPECT, CLEAN and RESET the following valves in accordance with suppliers' specifications: <u>Circulation-relief valves</u> and <u>Pressure-relief valves</u>						✓		Inspect, clean and reset of relief valves should be done prior to the annual fire pump performance test.
		b) OVERHAUL the following valves in accordance with suppliers' specifications: <u>Circulation-relief valves</u> and <u>Pressure-relief valves</u> .							✓	

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
4.11	Stop valves	FIT new gland packing and lubricate spindles.							✓	
4.12	Suction strainers/screens	CLEAN pump suction strainers/screens.						✓		Yearly and every time there was significant flow.
4.13	Restoration to operational condition	RETURN, after completion of the maintenance procedures, all equipment to operational condition.	See Action Column							
Note: * Item / action requires to be included in the QCP when pumps are taken out for maintenance or service										

Table 19: Inspection Schedule and Record – Sprinkler Systems – Wet

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Main Isolation valve and trim valves	CHECK that the main Isolation valve(s) and trim valves in each control assembly are secured in the open position and correctly labelled.	✓							
1.2	Water motor alarm gong	INSPECT all water gong components as per the installation specific mimic drawing for defects and damage.(i.e. test line isolation valve, NRV, strainer, alarm gong body, etc.) <i>Note: Y-type strainers must be installed in a horizontal position with the basket pointing down wards.</i> CONFIRM flow direction is correct on strainers and non-return valves. INSPECT area below alarm gong discharge pipe to ensure free flow of water from the discharge opening.	✓							Load defect if Y-type strainers are found in vertical position or with baskets pointing up wards when strainer is installed in the horizontal position.
1.3	Pressure gauges	CHECK that all pressure gauge readings are within the ranges indicated on the pressure gauge schedule. Pressure should be within $\pm 3\%$ of normal operating pressure. CHECK for & RECORD that gauges are defect free and legible (free from physical damage, broken needles, lens clear with no fading, paint, dirt, oil, etc). Where fitted, check that glycerine levels of gauges are at the correct level and no leaks are found. INSPECT stop valves on gauges and ensure it is in the OPEN position.	✓							Installation: kPa Below stop valve: kPa Water supply 1: kPa Water supply 2: kPa RECORD any damage and defects as found for corrective action.
1.4	Pressure switches	CHECK for mounted securing to pipe work tapping point, physical damage and gland is in place and secure. All removable covers are securely closed and IP rating requirements are still maintained. Signal Cabling: CHECK that all signal cables are free from physical damage, terminated into the switch, conduit is securely mounted, flexible metal conduit (sprag) is in good condition and securely fixed.	✓							Grommets and gauge fronts to be in a good condition.

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.5	Control valve assembly area	CHECK that control valve assembly area is unobstructed and is not used for storage of any materials whether combustible or non-combustible.	✓							
1.6	Spare sprinklers and sprinkler spanners	CHECK for each type of sprinkler used the no. of spare sprinklers and that the correct sprinkler spanners are available.	✓							
1.7	Block plan, emergency instructions and pressure gauge schedule	CHECK for legibility and appropriate location.	✓							
1.8	Sprinkler stop valve location plate	Check for legibility and appropriate location of "Sprinkler Stop Valve" location plate.	✓							
1.9	Sprinkler booster connection	CHECK for accessibility, protective caps, freedom from damage and obstruction and correct signage.	✓							
1.10	Pipes and hangers	CHECK that exposed water distribution system, including pipework, pipe supports and valves, appears free from external corrosion and damage, not subject to external loads and pipework is properly supported.				✓				
1.11	Sprinkler Head condition	a) CHECK that sprinkler heads appear free from mechanical damage, corrosion and paint on operating elements or cover plates.				✓				
		b) CHECK for poorly fitting or missing escutcheons or cover plates, damaged guards, and attachment of foreign material.				✓				
1.12	Sprinkler obstructions	CHECK for obstructions likely to impede sprinkler discharge and for adequate clear space below sprinklers (500 mm for OH and 1000 mm for HH).				✓				
1.13	Sprinkler location and spacing	a) CHECK for presence of unprotected areas such as mezzanines, platforms and building extensions.				✓				
		b) CHECK for sprinkler spacing and location relative to wall, bulkhead and partition alterations and the introduction of fixtures and fittings shielding sprinkler discharge.				✓				

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.14	Sprinkler compatibility	CHECK that sprinklers within a compartment are of similar operating characteristics, e.g., area coverage, response and temperature rating.				✓				
1.15	External sprinklers	CHECK for new building structures, yard storage, exposing unprotected openings in fire resistant walls that may require the provision for external sprinklers.				✓				
1.16	Occupancy	CHECK that sprinkler design remains applicable for the occupancy hazard classification and the category of storage/process involved.				✓				Applicable during and after building alterations and change of use of plant areas and buildings.
1.17	Storage height	CHECK that sprinkler design remains applicable for storage heights.				✓				
1.18	MJC's	CHECK in situ for evidence of paint loading, external corrosion, etc. Replace if necessary.				✓				MJC's must be of a diaphragm type that can be tested at regular intervals. Old clack-type MJC's to be replaced with new type.
1.19	Site documentation	CHECK that up-to-date sprinkler plans are available on site.				✓				
1.20	Plant labelling	CHECK if all plant labelling and reference labels are provided, properly affixed and legible.				✓				Where plant labelling are not provided, missing or not legible then new replacement labels must be obtained and correctly affixed to the relevant system components.

NOTE: * Weekly inspections only required where isolating valves are not locked or monitored.

Table 20: Test Schedule and Record – Sprinkler Systems – Wet

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
2.1	Notification prior to start of test	NOTIFY alarm monitoring station of system testing.			✓					
2.2	Systems interfacing disabled	CHECK that alarm interfacing of systems have been disabled unless part of the test.			✓					
2.3	Pressure gauge readings before test	a) RECORD reading from each pressure gauge prior to Items 2.4 onwards.			✓					Installation: kPa Below stop valve: kPa
		b) VERIFY pressure gauge readings are within the ranges indicated on the pressure gauge schedule.			✓					Water supply 1: kPa Water supply 2: kPa
2.4	Control assembly, water gong, alarm transmission and strobes	a) OPERATE each alarm valve by opening each 15 mm test valve.			✓					15mm installed at the end of line
		b) RECORD time(s) to operation of alarm gong(s) and verify that these do not exceed 180 s.			✓					
		c) During the flow test VERIFY pressure switch responds accordingly and alarm signal is received in the relevant control room.)			✓					
		d) TEST all alarm-initiating devices (flow and pressure switches)			✓					
		e) VERIFY that water alarm gong is functional and clearly audible above ambient noise levels.			✓					
2.5	Control assembly reseating	CLOSE 15 mm test valve(s) and verify that alarm valve has re-seated.			✓					
2.6	Restore alarm	Restore FIP to operational status where fitted.			✓					
2.7	Pressure gauge readings after test	a) RECORD reading from each pressure gauge.			✓					Installation: kPa Below stop valve: kPa
		b) VERIFY pressure gauge readings are within the ranges indicated on the pressure gauge schedule.			✓					Water supply 1: kPa Water supply 2: kPa

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
2.8	Control assemblies resetting	RESET and secure all valves including trim valves in the normal operating position as labelled.			✓					
2.9	Water supply stop valves	Refer to Table 10.	See action column.							
2.10	Floor/zone indication test (where fitted)	a) OPERATE each flow switch test arrangement.			✓					
		b) VERIFY correct flow switch indication at the monitoring facility.			✓					
2.11	Main (50mm) drain valve water supply test – (Note: Where the highest sprinkler is more than 10 m above control valve, care should be taken that the system static pressure does not excessively elevate the residual pressure reading.)	a) OPEN the sprinkler control assembly main drain (50mm drain) valve. In the case of grouped valve sets, open one only.				✓				Before test water supply pressurekPa
		b) VERIFY that residual water supply pressure, with drain valve open, is within 10% of the value recorded on the pressure gauge schedule.				✓				Stabilize flow water supply pressure kPa
		c) CLOSE main drain valve and record time for pressure recovery.				✓				Time for pressure recoverys
		d) VERIFY that the time for pressure recovery aligns with previously recorded value.				✓				
2.12	Water proving test (Note: For systems with static water supplies, the water proving facility is provided downstream of the alarm valve. For systems with pumped supplies, the proving facility fitted downstream of the pump can be used to prove the system's pressure-flow requirements provided that the installation control valve(s) are	a) CONDUCT a water supply test. i) Discharge water through the flow measuring device at the flow corresponding to the hydraulically most favourable duty flow. Record the flowing pressure. ii) Discharge water flow through the flow measuring device to that corresponding to the most unfavourable duty point. Record the flowing pressure. iii) Shut off water flow to flow measuring device. Record static pressure.				✓				Static supply pressure... kPa Pump shut-off pressure kPa (1) Flow L/min @ Pressure ...kPa (2) Flow L/min @ Pressure ...kPa NOTES: 1 Corresponding to the hydraulically most unfavourable duty. 2 Corresponding to the hydraulically most favourable duty.
		b) VERIFY that the system flow and pressure requirements detailed on the block plan are satisfied.				✓				

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
	located close to the pump(s).	c) COMPLETE a water supply test report.				✓				
2.13	Alarm valve – Remote test valve	a) OPERATE the alarm valve by opening each remote test valve.				✓				
		b) RECORD time(s) to operation of alarm gong(s) and verify that these do not exceed 6 min.				✓				
2.14	Alarm valve reseating	CLOSE remote test valve(s) and verify that alarm valve has re-seated.				✓				
2.15	Sprinkler system interface control test (fire trips)	a) CONDUCT a functional system test via the pressure switch or flow switch with other interfaced fire systems (e.g., detection, HVAC, CBMS, conveyor control interface) as appropriate.				✓				
		b) VERIFY that the interface functions in accordance with the relevant systems' interface schematic.				✓				
2.16	Notification at end of test	NOTIFY alarm monitoring service that tests have been concluded.				✓				

Table 21: Preventative Maintenance Schedule and Record – Sprinkler Systems – Wet

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
3.1	Water motor alarm gong	CLEAN the strainer and lubricate the working parts of gong mechanism. CLEAN area below alarm gong discharge pipe to ensure free flow of water from the discharge opening.				✓				
3.2	Water supply strainers/screens	a) CHECK suction inlet strainer(s) or screen(s).				✓				
		b) Following water supply proving test (Item 2.14 in Table 20). CLEAN suction inlet strainer(s). Lower raised screen and raise and clean 'in-use' screen.				✓				
3.3	Alarm valve (wet)	Maintain as per manufacturer's recommendations, or FIT new alarm valve seating or port seating, check and clean annular groove and outlet ports, polish and lubricate seating spindle/shaft, and check operation of compensator valve if fitted. Fit a new alarm valve faceplate gasket.					✓			
3.4	Main drain and test valve	a) For screw-down style valves, EXAMINE seating and fit new washers.					✓			
		b) For packed gland variants, FIT new gland packing.					✓			
		c) For ball valves, CHECK for leakage and replace if leaking					✓			
3.5	Alarm cock plug type	REMOVE alarm cock barrels, clean, lap in, grease and reinstall. For packed gland variants, fit new gland packing.					✓			
3.6	Retard chambers (where fitted).	a) CLEAN strainer and check outlet plug and drain plug.				✓				
		b) CLEAN orifice, check seals and overhaul, where indicated, by a functional test.					✓			
3.7	Isolating valves and NRVs	Refer to Table 11.	See action column.							
3.8	Water motor alarm gong	CLEAN strainer on inlet line, clear water jet, flush drain, renew gasket, check operation of main spindle and striker, remove excess grease and then					✓			

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		lubricate.								
3.9	Gauges	CHECK all pressure gauges against a master gauge of known accuracy. Verify that the reading of the gauge under test is within ± 30 kPa of the reading of the master gauge at the nominal pressure indicated on the pressure gauge schedule.						✓		
3.10	Special valves (other than alarm valves)	OVERHAUL all pressure-reducing valves, tail-end system valves, and any other special valves that are installed in accordance with suppliers' specifications.	See action column.							
3.11	Sprinklers (Sample sprinklers should be selected from the range of site environmental conditions to which the system(s) is subjected, i.e., offices, boiler house, Chemical Services, Fuel Oil Bulk tanks, Turbine Hall environments, etc. Tests shall be conducted by a registered testing laboratory.)	REMOVE and TEST representative sample of sprinklers at the following intervals: a) Fast response sprinklers (not less than 14 samples), at 12 years, then 12 years, then after every 6 years. b) Dry pendent sprinklers (representative sample), at 12 years. c) All other sprinklers (not less than 14 samples), at 24 years then every 6 years thereafter. d) Fast response sprinkler response time index (RTI) test at 12 year intervals. e) Extra high temperature fusible link type sprinklers with temperature ratings of 163oC or higher and are exposed to semi-continuous to continuous maximum allowable ambient temperature conditions (30 oC below sprinkler temperature rating) shall be tested for operation every 5 years.	See action column for frequency							
3.12	MJCs	Perform inspection and test of Multiple Jet Control Valves and associated detection/actuation systems in accordance with Table 28.	See action column							
3.13	Pressure Switch	CALIBRATE pressure switches by means of bench test rig								To be done on six yearly intervals.

Table 22: Inspection Schedule and Record – Sprinkler Systems – Dry Pipe

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	General system	Inspection shall be carried out as per relevant items in Table 19.	See action column.							
1.2	System air pressure	a) CHECK system air pressure is reading within the range indicated on the pressure gauge schedule.		✓						Applicable for air/pneumatic systems
		b) CHECK water traps, where installed, for traces of water and other residues in air	✓							
1.3	Water motor alarm gong	a) INSPECT all water gong components as per the installation specific mimic drawing for defects and damage.(i.e. test line isolation valve, NRV, strainer, alarm gong body, etc.)		✓						<i>Note: Y-type strainers must be installed in a horizontal position with the basket pointing down wards</i>
		b) CONFIRM flow direction is correct on strainers and non-return valves.		✓						
		c) INSPECT area below alarm gong discharge pipe to ensure free flow of water from the discharge opening.		✓						
1.4	Pressure Switches	a) CHECK for mounted securing to pipe work tapping point, physical damage and gland is in place and secure. All removable covers are securely closed and IP rating requirements are still maintained.		✓						
		b) CHECK that all signal cables are free from physical damage, terminated into the switch, conduit is securely mounted, flexible metal conduit (sprag) is in good condition and securely fixed.		✓						
1.5	Plant labelling	CHECK if all plant labelling and reference labels are provided, properly affixed and legible.				✓				Where plant labelling are not provided, missing or not legible then new replacement labels must be obtained and correctly affixed to the relevant system components.

Table 23: Test Schedule and Record – Sprinkler Systems – Dry Pipe

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
2.1	General system	Testing shall be carried out as per relevant items in Table 20.	See action column.							
2.2	Low air/nitrogen pressure alarm(s)	VERIFY: a) Low air/nitrogen pressure alarm operates at predetermined levels.		✓						kPa
		b) Low air/nitrogen pressure alarm(s) visual indicator and sounders are operational.		✓						kPa
2.3	Local alarm and alarm transmission test simulation	a) SIMULATE operation of dry pipe alarm valve and operate alarms through the bypass valve(s). (Refer to manufacturer's operating manual).		✓						<u>Note:</u> Where multiple control valve assemblies are separately identified at an FIP, only one transmission from the FIP to the monitoring station is required.
		b) OBSERVE correct operation of the alarm from each control assembly or group of control assemblies and verify receipt of the alarm by the monitoring facility.		✓						
	Main drain valve water supply test – Static supply systems or where a site fire pump serves multiple FP systems remote from the pump	a) OPEN the sprinkler control assembly main drain valve. In the case of grouped valve sets, open one only.			✓					Before test water supply pressure kPa
		b) VERIFY that residual water supply pressure, with drain valve open, is within 10% of the value recorded on the pressure gauge schedule.			✓					Stabilize flow water supply pressure kPa
		c) CLOSE main drain valve and record time for pressure recovery.			✓					Time for pressure recoverys
		d) VERIFY that the time for pressure recovery aligns with previously recorded value. NOTE: Where the highest sprinkler is more than 10 m above control valve, care should be taken that the system static pressure does not excessively elevate the residual pressure reading.			✓					
2.4	Alarm valve and auxiliaries, local alarm (water alarm gong)	a) Flush the system piping through the main drain valve before commencing with the test.				✓				

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
	and alarm monitoring test (trip test)	b) Where fitted, CLOSE isolation valve located above alarm valve (to prevent entry of water into system piping).				✓				
		c) OPERATE each alarm valve by releasing air/nitrogen from system.				✓				
		d) CHECK for correct operation of alarms and accelerator or exhausters.				✓				
		e) RECORD times(s) to operation of alarms gong(s) and verify that these do not exceed 180 s.				✓				
		f) OBSERVE correct operation of the transmission of alarms from each control assembly or group of control assemblies and verify receipt of the alarm by the monitoring facility in accordance with the local fire brigade requirements.				✓				Note: Where multiple control valve assemblies are separately identified at an FIP, only one transmission from the FIP to the monitoring station is required.
		g) Where an isolation valve has not been fitted above the alarm valve, the main stop valve should be closed enabling a partial test of the alarm valve.				✓				Note: Consider full testing at the first opportunity (at which time the isolation test valve should be installed)
2.5	Installation pressure	RESTORE system air/nitrogen pressure and verify the alarm valve has re-seated.				✓				
2.6	FIP	RESTORE FIP to operational status.				✓				
2.7	Pressure gauge readings	a) RECORD reading from each pressure gauge.				✓				Installation air.....kPa
		b) VERIFY pressure gauge readings are within the ranges indicated on the pressure gauge schedule.				✓				Below stop valvekPa Water supply 1.....kPa Water supply 2.....kPa
2.8	Control assemblies resetting	RESET and secure all valves and alarm cocks in the open position or the closed position, as labelled.				✓				

Table 24: Preventative Maintenance Schedule and Record – Sprinkler Systems – Dry Pipe

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
3.1	General system	Maintenance shall be carried out as per relevant items in Table 21.	See action column.							
3.2	Water motor alarm gong	CLEAN the strainer and lubricate the working parts of gong mechanism. CLEAN area below alarm gong discharge pipe to ensure free flow of water from the discharge opening.	See action column.							
3.3	Air receiver condensate/ water trap (for air systems)	DRAIN condensation from: a) Condensate trap.		✓						
		b) Air compressor receiver.				✓				
3.4	Valve overhaul	FIT new dry pipe valve seats and seals. Check and clean operating mechanism. Fit new faceplate gasket.					✓			
3.5	Accelerator/exhauster	FIT new seals as appropriate. Check and clean operating mechanism. Fit a new faceplate.					✓			

Table 25: Inspection Schedule and Record – Sprinkler Systems – Pre-Action

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Electrical detection	Inspect in accordance with [5].	See action column.							
1.2	Main Isolation valve and pre-action valve and actuation trim	CHECK that the main Isolation valve(s) and trim valves in each control assembly are secured in the open position, correctly labelled and accessible at all times for emergencies and maintenance. ENSURE that a mimic diagram is provided, securely fixed in position, legible and clean. CONFIRM trim component are labelled and correspond with mimic diagram.	✓							<i>Note: Y-type strainers must be installed in a horizontal position with the basket pointing down wards.</i> Load defect if Y-type strainers are found in vertical position or with baskets pointing up wards when strainer is installed in the horizontal position.
		CHECK a) The system is available at all times - i.e. water supply isolation valves, air supply isolation valves (where applicable), valves that are part of actuation trim (e.g. emergency release valve, alarm test valve, trim shut off valve, gauge valves, flow test valve) and drain valves are all in correct set position.	✓							
		b) The required water and or air pressure are being applied at the inlet and valve actuation trim with no leaks from the water and/or air pipe work	✓							
		c) No physical damage (broken, bent, cracks, worn, jamming), leaks and corrosion on the valves and other components of the actuation trim	✓							
		d) Solenoid valves, if present, are not damaged and are connected	✓							
1.3	Pressure gauges	a) CHECK that correctly ranged pressure gauges are installed and in an operative condition.	✓							Supervisory air pressure.....kPa Diaphragm linekPa
		b) CHECK that gauges are defect free and legible (free from physical	✓							

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		damage, lens clear with no fading, paint, dirt, oil, etc). Where fitted, check that glycerine levels of gauges are at the correct level and no leaks are found.								Below stopkPa
		c) INSPECT stop valves on gauges and ensure it is in the OPEN position.	✓							
		d) RECORD pressures and check that are within the ranges indicated on the pressure gauge schedule). Pressure should be within ±3% of normal operating pressure	✓							
1.4	Pressure Switches	CHECK for mounted securing to pipe work tapping point, physical damage and gland is in place and secure. All removable covers are securely closed and IP rating requirements are still maintained.		✓						
		CHECK that all <u>signal cables</u> are free from physical damage, terminated into the switch, conduit is securely mounted, flexible metal conduit (sprag) is in good condition and securely fixed.		✓						
1.5	Systems fitted with pneumatic, hydraulic or emergency release (where fitted in lieu of electric actuation)	Refer to relevant items in Table 28.	See action column.							
1.6	Electronic release – electronic detection - Solenoid Valves	INSPECT Detection in accordance with [5].	See action column.							
		a) CHECK for mounted securely in position, no physical damage and electric cable gland (where applicable) is in place and secure.								
		b) CHECK that all signal / power cables are free from physical damage, terminated into the solenoid, conduit is securely mounted, flexible metal conduit (sprag) is in good condition and securely fixed.								
1.7	Design and Installation survey	Design Survey CHECK that pre-action sprinkler protection covers full extent of protected				✓				Design survey is initiated when there is a change in the protected risk area (i.e.

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		area.								facility change, equipment layout change/alteration, fire load increase, fuel source change) impacting on the fire protection systems' ability to contain or suppress a fire as per design.
		Installation Survey CHECK: a) Sprinkler piping and detection installation are properly secured throughout protection area. b) Pipe hangers and saddles are secured in position, adequately providing support to full pipe lengths, flanges and connection points at correct spatial intervals. c) Sprinkler heads are not painted, covered in dirt/oil or otherwise physically impaired. No defects visible on deflector plates, correctly rated sprinkler head and type, correctly orientated to the protected risk d) Heat collection plates/heat shields (where applicable / fitted) are orientated horizontally, the sprinkler head is positioned as close to the centre as possible and the clearance between the deflector plate and collection plate does not exceed 75mm. e) Sprinkler head / medium and high velocity spray nozzles spray patterns not obstructed (i.e. beams, columns, other plant and equipment) f) All pipe work for corrosion, leaks, peeling paint, vibration against objects which could lead to damage.				✓				
1.8	Plant labelling	CHECK if all plant labelling and reference labels are provided, properly affixed and legible.				✓				Where plant labelling are not provided, missing or not legible then new replacement labels must be obtained and correctly affixed to the relevant system components.

Table 26: Test Schedule and Record – Sprinkler Systems – Pre-Action

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
2.1	Notification prior to start of test	NOTIFY alarm monitoring station of system testing.		✓						
2.2	Systems interfacing disabled	CHECK that alarm interfacing of systems have been disabled unless part of the test.		✓						
2.3	Air compressor (where fitted).	VERIFY that air compressor operates at specified cut-in and cut-out pressures.		✓						Cut-in.....kPa Cut-out....kPa
2.4	Solenoid valve(s)	TEST solenoid valves for correct operation in accordance with manufacturer's recommendations.		✓						
2.5	Low air pressure alarm(s)	VERIFY: a) Low air pressure alarm operates at predetermined levels.		✓						
		b) Low air pressure alarm(s) visual indicator and sounders are operational.		✓						NOTE: Where fitted, bypass valve may be used for this test.
2.6	Electrical detection	TEST in accordance with [5].	See action column.							
2.7	Pressure gauge readings	RECORD reading from each pressure gauge prior to Items 2.8 to 2.10.		✓						Supervisory air pressure.....kPa Diaphragm line.....kPa Below stop.....kPa Diaphragm linekPa Below stopkPa
2.8	Local alarm and alarm transmission test simulation	a) GENERATE a test of the alarm signalling equipment and local alarm in accordance with the manufacturer's operating manual.		✓						<u>Note:</u> Where fitted, bypass valve may be used for this test.
		b) OBSERVE correct operation of the remote alarm from each pre-action valve or group of pre-action valves and verify receipt of the alarm by		✓						<u>Note:</u> Where multiple pre-action valve

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		the monitoring facility in accordance with local fire brigade requirements.								assemblies are separately identified at the CIE, only one transmission from the CIE to the monitoring station is required.
2.9	Main drain valve water supply test – Static supply systems or where a site fire pump serves multiple FP systems remote from the pump	a) OPEN the main drain valve. In the case of grouped valve sets, open one only.			✓					Before test water supply pressure.....kPa
		b) VERIFY that residual water supply pressure, with drain valve open, is within 10% of the value recorded on the pressure gauge schedule.			✓					Stabilize flow water supply pressure kPa
		c) Slowly CLOSE main drain valve and record time for pressure recovery.			✓					Time for pressure recoverys
		d) VERIFY that the time for pressure recovery aligns with previously recorded value.			✓					
2.10	Pre-action valve and auxiliaries, local alarm and alarm monitoring test (trip test)	a) Flush the system piping through the main drain valve before commencing with the test.			✓					
		b) Where fitted, CLOSE isolation valve located above pre-action valve (prevents entry of water into system piping).			✓					
		c) OPERATE each pre-action valve by releasing the system via electrical detection subsystem.			✓					
		d) CHECK for correct operation of alarm.			✓					
		e) RECORD time(s) to operation of alarms and verify that these do not exceed 180 s.			✓					 s
		f) OBSERVE correct operation of the fire brigade alarm from each pre-action valve or group of pre-action valve assemblies and verify receipt of the alarm by the monitoring facility in accordance with the local fire brigade requirements.			✓					NOTE: Where multiple pre-action valve assemblies are separately identified at the FIP, only one transmission from the FIP to the monitoring station is required.
		g) Where an isolation valve has not been fitted above the pre-action valve, the main stop valve should be closed enabling a partial test of			✓					NOTE: Consider full testing at the first opportunity (at which time the isolation

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		the pre-action valve. Isolating valves are not stuck in one position - this is through physical inspection and is done yearly, refer to Refer to Table 11 of Inspection , Testing and Maintenance of Fire Protection Standard Eskom Standard								test valve should be installed).
2.11	Installation supervisory air-pressure	RESET pre-action valve and restore supervisory air pressure.			✓					
2.12	Electrical control unit (and FIP)	RESTORE units to operational status.			✓					
2.13	Pressure gauge readings	a) RECORD reading from each pressure gauge.			✓					Supervisory air pressurekPa
		b) VERIFY pressure gauge readings are within the ranges indicated on the pressure gauge schedule.			✓					Diaphragm linekPa Below stop valvekPa
2.14	Valves and cocks	SECURE all valves and alarm cocks in the open position or the closed position as labelled.			✓					

Table 27: Preventative Maintenance Schedule and Record – Sprinkler Systems – Pre-Action

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
3.1	Electrical detection	Maintain in accordance with the requirements set out in [5].	See action column.							
3.2	Air receiver condensate	DRAIN condensate from: c) Condensate trap.			✓					
		d) Air compressor receiver.				✓				
3.3	Valve overhaul	FIT new pre-action valve seats and seals. Check and clean operating mechanism. Fit new cover plate gasket.					✓			
3.4	Gauges	CHECK all pressure gauges against a master gauge of known accuracy. Verify that the reading of the gauge under test is within ± 30 kPa of the reading of the master gauge at the nominal pressure indicated on the pressure gauge schedule.						✓		

Table 28: Inspection Schedule and Record – Deluge Water and Foam-Water Spray

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Pumps and water supplies	Inspect in accordance with Section 3.	See action column.							
1.2	Main stop valve, deluge valve including trim valves	CHECK that the main stop valve(s) and trim valves in each control assembly are secured in the open position and correctly labelled. Refer to the system data and trim charts for normal operation position of trim valves.	✓							
1.3	Water motor alarm gong	INSPECT water alarm gong for physical damage and/or defects. INSPECT area below alarm gong discharge pipe to ensure free flow of water from the discharge opening.	✓							
1.4	Pressure gauges	CHECK that all pressure gauge readings are within the ranges indicated on the pressure gauge schedule. Pressure should be within $\pm 3\%$ of normal operating pressure CHECK for & RECORD that gauges are defect free and legible (free from physical damage, broken needles, lens clear with no fading, paint, dirt, oil, etc.). Where fitted, check that glycerine levels of gauges are at the correct level and no leaks are found. INSPECT stop valves on gauges and ensure it is in the OPEN position.	✓							Pilot line.....kPa Diaphragm linekPa Below stopkPa
1.5	Pressure Switches	CHECK for mounted securing to pipe work tapping point, physical damage and gland is in place and secure. All removable covers are securely closed and IP rating requirements are still maintained. CHECK that all <u>signal cables</u> are free from physical damage, terminated into the switch, conduit is securely mounted, flexible metal conduit (sprag) is in good condition and securely fixed.	✓							
1.6	Pneumatic release systems – Air maintenance devices /	a) CHECK all manual valves are in normal operating condition and secured		✓						

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
	station	b) CHECK regulator is locked and set in the correct position in accordance with the pressure gauge schedule.								
1.7	Hydraulic release systems – Pipes and hangers	CHECK that exposed release water piping including pipe supports appears free from corrosion and damage, not subject to external loads and pipework is properly supported.				✓				
1.8	Hydraulic and Pneumatic release systems – Fixed temperature release (pilot sprinkler) condition	a) CHECK that sprinklers appear free from mechanical damage, corrosion and paint on operating elements or cover plates. b) CHECK for poorly fitting or missing escutcheons or cover plates, damaged guards, and attachment of foreign material.				✓				
1.9	Hydraulic and Pneumatic release systems – Rate of temperature rise release (thermostatic)	a) Verify that bottom drain outlet is not plugged. b) CHECK that thermostatic releases appear free from mechanical damage, corrosion and paint.			✓					
1.10	Emergency release	a) Verify that the door of the release is not obstructed and open freely. b) CHECK for signs of mechanical damage and/or corrosion.		✓						
1.11	Hydraulic release systems – Spare pilot sprinklers and sprinkler spanners	CHECK for no. of spare pilot sprinklers and that the correct sprinkler spanners are available.				✓				
1.12	Electrical release – electrical detection (where fitted)	INSPECT in accordance with [5].		✓						
1.13	Foam tank, proportioning equipment and foam concentrate (where fitted)	PERFORM inspection as per relevant items in Table 31.		✓						
1.14	Installation survey – spray nozzle piping	To the extent practicable, CHECK that pipe hangers are secure and spray nozzles are unobstructed. Where applicable, check for missing				✓				

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		nozzle dust plugs/caps.								
1.15	Design survey	CHECK that system layout remains appropriate for protected hazard. Check for possible misalignment of spray nozzles.				✓				
1.16	Plant labelling	CHECK if all plant labelling and reference labels are provided, properly affixed and legible.				✓				Where plant labelling are not provided, missing or not legible then new replacement labels must be obtained and correctly affixed to the relevant system components

Table 29: Test Schedule and Record – Deluge Water and Foam-Water Spray

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
2.1	Pumps and water supplies	Test in accordance with Section 3.	See action column.							
2.2	Electrical detection	Test in accordance with the requirements set out in [5].	See action column.							
2.3	Notification prior to start of test	NOTIFY alarm monitoring station of system testing.				✓				
2.4	Systems interfacing disabled	CHECK that alarm interfacing of systems have been disabled unless part of the test.				✓				
2.5	Pressure gauge readings	RECORD reading from each pressure gauge prior to Items 2.4 to 2.7.				✓				Pilot line.....kPa Diaphragm.....kPa Below stop valve.....kPa
2.6	Deluge valve, alarm gong and alarm monitoring test – test isolation valve downstream of deluge valve	Where test-isolating valve is provided immediately above the deluge valve: a) Flush system piping through the main drain valve before commencing the test. b) CLOSE test-isolating valve, open system drain valve and operate each deluge valve by opening manual operation valve. c) RECORD times(s) to operation of alarm gong(s) and verify that this does not exceed 30 s. d) VERIFY correct operation of the alarm from each deluge valve set and verify receipt of the alarm signal by the monitoring facility. <u>Note:</u> Where multiple deluge valve sets are separately identified at an FIP only one transmission from the FIP to the monitoring station is required. e) CLOSE main stop valve. Open and secure test-isolating valve in open position, close drain and reset manual operating valve. f) RESET deluge valve and restore detector sprinkler line pressure. Open and secure main stop valve.				✓				

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		g) VERIFY that the outlet chamber is free from water and that no water is flowing from the drip check when the plunger is pushed.								
2.7	Alarm gong and alarm monitoring test – no isolation valve downstream of deluge valve and alarm test valve in trim	To test the electric alarm (if provided) and/or mechanical water motor alarm gong (if provided), OPEN the alarm test valve in the deluge valve trim. VERIFY: a) Electric alarm pressure switches (if provided) activate. b) Electric local alarms should be audible. c) The local water motor alarm gong should be audible. d) If equipped with remote alarm transmission facility, verify that the alarm is received. CLOSE the alarm test valve and VERIFY: a) Local alarms stop sounding. b) Remote station alarms are reset. c) Supply water piping to water alarm motor drains. d) VERIFY that the alarm valve is open and the alarm test valve is closed. e) VERIFY that the outlet chamber is free from water and that no water is flowing from the drip check when the plunger is pushed.				✓				
2.8	Deluge trim test – no isolation valve downstream of deluge valve and alarm test valve in trim	Testing of the control trim is conducted with no flow of water to the system. VERIFY: a) Electric alarm pressure switches (if provided) activate. b) Electric local alarms should be audible. c) The local water motor alarm gong should be audible. d) If equipped with remote alarm transmission facility, verify that the alarm is received.					✓			

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		CLOSE the alarm test valve and VERIFY: a) Local alarms stop sounding. b) Remote station alarms are reset. c) Supply water piping to water alarm motor drains. d) VERIFY that the alarm valve is open and the alarm test valve is closed. e) VERIFY that the outlet chamber is free from water and that no water is flowing from the drip check when the plunger is pushed.								
2.9	Main drain valve water supply test –	a) OPEN the main drain valve. In the case of grouped valve sets, open one only.					✓			Before test water supply pressure ... kPa
		b) VERIFY that residual water supply pressure, with drain valve open, is within 10% of the value recorded on the pressure gauge schedule.					✓			Stabilize flow water supply pressure kPa
		c) Slowly CLOSE main drain valve and record time for pressure recovery.					✓			Time for pressure recoverys
		d) VERIFY that the time for pressure recovery aligns with previously recorded value.					✓			
2.10	Full flow trip test	<u>Caution:</u> Performing this test results in operation of the deluge valve. Water will flow from open sprayers or nozzles. a) CONFIRM that precautions have been taken to prevent damage. b) Fully OPEN the flow test or main drain valve to flush away any accumulated foreign matter. CLOSE the flow test valve. c) TRIP the system by operating the release system. Allow water to pass through the deluge valve. d) CONFIRM that water flow alarms operate. e) When test is complete, close the main water supply isolating valve. Close the priming valve. Open the auxiliary drain valve and all system						✓		

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		drain valves to drain water from the spray nozzle water piping f) PERFORM semi-annually maintenance. g) Place the system back into operation by following 2.9.								
2.11	Placing system in service	Follow the manufacturer's instructions to place the valve back into service.			✓	✓	✓			
2.12	Foam tank, proportioning equipment and foam concentrate	PERFORM tests in accordance with the relent items from Table 32.	See action column.							

Table 30: Preventative Maintenance Schedule and Record – Deluge Water and Foam-Water Spray

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
3.1	Electrical detection	Maintain detection in accordance with [5].	See action column.							
3.2	Pumps and water supplies.	Maintain in accordance with Section 3.	See action column.							
3.3	Deluge valve	FIT new deluge valve seats and seals. Check and clean operating mechanism. Fit new faceplate gasket.							✓	
3.4	Diaphragm valve	FIT a new diaphragm on 10 yearly basis	See action column.							
3.5	Foam tank, proportioning equipment and foam quality.	PERFORM maintenance as per Table 33.	See action column.							
3.6	Water motor alarm gong	CLEAN the strainer and lubricate the working parts of gong mechanism. CLEAN area below alarm gong discharge pipe to ensure free flow of water from the discharge opening.							✓	
3.7	Pressure gauges	CHECK all pressure gauges against a master gauge of known accuracy. Verify that the reading of the gauge under test is within ± 30 kPa of the reading of the master gauge at the nominal pressure indicated on the pressure gauge schedule.							✓	

[illegible]

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-Yearly	
1.8	Obstructions	CHECK that the air inlet opening of foam generating devices/nozzles is free from obstruction.		✓						
1.9	Foam Proportioner	CHECK that the proportioning is set to the foam concentrate percentage.		✓						%
1.10	Plant labelling	CHECK if all plant labelling and reference labels are provided, properly affixed and legible.						✓		Where plant labelling are not provided, missing or not legible then new replacement labels must be obtained and correctly affixed to the relevant system components
1.11	Manufacturer's recommendations	Inspect all systems in accordance with. CONFIRM by referring to equipment O&M manuals that all inspection requirements have been included in ITM regime.	See action column.							

Table 32: Test Schedule and Record – Fixed Foam Installations

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
2.1	Pumps and water supplies	TEST in accordance with Section 3.	See action column.							
2.2	Deluge valves and detection/actuation	Test deluge valves and associated detection/actuation devices in accordance with [5] and Table 29.	See action column.							
2.3	Foam concentrate pump start	Functionally TEST automatic and manual pump start devices of foam concentrate pumps.					✓			
2.4	Foam Proportioner test	Functionally TEST the foam concentrate proportioning device using water without the use of foam concentrate (where specified by the manufacturer).					✓			
2.5	Stop valves	TEST the free movement of valves and mechanically operated components.						✓		
2.6	Foam concentrate quality	TESTING of the foam concentrate properties shall be carried out by an approved foam laboratory. Tests shall include: a) foam type b) specific gravity c) PH d) undissolved solids/sediment e) drain time f) foam expansion ratio g) spreading coefficient - film forming foams only h) alcohol burn back test – alcohol resistant foams only						✓		
2.7	Foam proportioning accuracy	TEST the foam proportioner and associated components for correct proportioning at the minimum and maximum system design flow rates. <u>Note:</u> An environmentally compatible foam to be used.						✓		Min. flow.....L/s.....% Max. flow.....L/s.....%

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
2.8	Discharge test	A discharge test to be carried out on each system to VERIFY: a) correct function of system b) nozzles are free from blockage c) correct functioning of valves d) required discharge coverage achieved						✓		
2.9	Premix	TESTING of premix foam solutions shall be carried out by an approved foam laboratory.						✓		
2.10	Manufacturer's recommendations	Test all systems in accordance with. CONFIRM by referring to equipment O&M manuals that all test requirements have been included in ITM regime.	See action column.							

Table 33: Preventative Maintenance Schedule and Record – Fixed Foam Installations

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
3.1	Pumps and water supplies	Maintain in accordance with Section 3.	See action column.							
3.2	Foam concentrate strainer (where fitted)	CHECK and clean foam concentrate strainer (fitted upstream of proportioning device)						✓		
3.4	Deluge valves and detection/actuation	Maintain deluge valves and associated detection/actuation devices in accordance with Table 30.	See action column.							
3.4	Foam proportioning and making equipment	Maintain systems in accordance with manufacturer's recommendations. CONFIRM by referring to equipment O&M manuals that all maintenance requirements have been included in ITM regime.	See action column							
3.5	Pressure Gauges	CHECK all pressure gauges against a master gauge of known accuracy. Verify that the reading of the gauge under test is within ± 30 kPa of the reading of the master gauge at the nominal pressure indicated on the pressure gauge schedule.						✓		
3.6	Piping	Inspect piping for any sludge, corrosion or any deposits Flush all foam solution and foam concentrate piping						✓		
3.7	Foam Pourers	Inspect foam pourers for any blockages Clean pourers						✓		

Table 34: Inspection Schedule and Record – Hydrants Systems, Portable Foam Equipment and Portable Equipment Cabinets

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Water supply isolating valves	Inspect accordance with Table 10	See Action Column							
1.2	Hydrant valves (above ground)	CHECK all hydrant valves: a) Are accessible.					✓			
		b) CHECK hydrant valve spindle is in good condition and not rounded, bent, corroded, worn or damaged.					✓			
		c) Hand-wheels are securely fitted.					✓			
		d) Blanking caps, where fitted, are in good condition.					✓			
		e) CHECK hydrant washers (seals) at hydrants inlets for condition or it they are not missing.					✓			
		f) CHECK fire hydrant safety sign is provided, properly fixed in position and in good condition.					✓			
1.3	Hydrant valves (below ground)	CHECK all hydrant valves: a) Are accessible. Valve pits are not flooded with sand or other materials					✓			
		b) Blanking caps and tobies, where fitted, are in good condition.					✓			Tobies is a steel fitting fixed to the spindle head to protect it from wear and tear.
		c) Check cover plate for ease of opening.						✓		
		d) CHECK for leak (valves that are not properly closing)					✓			
		e) CHECK fire hydrant safety sign is provided, properly fixed in position and in good condition					✓			
1.4	Booster assembly (where fitted)	CHECK all booster assemblies: a) Are accessible.					✓			

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		b) CHECK safety sign indicating booster connection is provided, properly fixed in position and in good condition					✓			
		c) Pressure gauges and blanking caps, where fitted, are in good condition.					✓			
		d) For legible labelling indicating maximum system working pressure.					✓			
1.5	Hydrant and booster connections— Compatibility	CHECK that all hydrant and booster connection points are compatible with local fire brigade requirements.					✓			
1.6	Hydrant manifold (where fitted)	CHECK all branch pipes, nozzles and hose couplings are in good condition, compatible with the hydrant valves and properly stowed.					✓			
1.7	Foam concentrate and portable foam making equipment (where provided)	CHECK: a) Foam Equipment provided in the cabinet is in accordance with the cabinet contents list.					✓			
		b) Equipment items are compatible and in good working condition.					✓			
		c) Foam concentrate containers are in good condition, seals are intact and the labels are legible.					✓			Storage of foam concentrate in aggressive environments may require testing or replacement of the concentrate.
		d) Signage is legible and properly fixed in position..					✓			
1.8	Equipment Cabinets	CHECK that all hydrant, booster and foam equipment cabinets are accessible, clear of extraneous materials, no corrosion and peeling paint, clearly and correctly marked and in good functional condition . CHECK that equipment provided in the cabinets is in accordance with the cabinet contents list.					✓			
1.9	Pumps and water supplies	Inspect accordance to Table 15.	See action column.							
1.10	Pressure gauges	a) CHECK that correctly ranged pressure gauges are installed and in an					✓			Installation: kPa

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		operative condition.								Below stop valve: kPa Water supply 1: kPa Water supply 2: kPa
		b) CHECK that all pressure gauges are reading within the ranges indicated on the pressure gauge schedule. Pressure should be within $\pm 3\%$ of normal operating pressure					✓			
		c) CHECK that gauges are defect free and legible (free from physical damage, lens clear with no fading, paint, dirt, oil, etc). Where fitted, check that glycerine levels of gauges are at the correct level and no leaks are found.					✓			
		d) INSPECT stop valves on gauges and ensure are in OPEN position.					✓			
1.11	Plant labelling	CHECK if all plant labelling and reference labels are provided, properly affixed and legible.						✓		Where plant labelling are not provided, missing or not legible then new replacement labels must be obtained and correctly affixed to the relevant system components

Table 35: Test Schedule and Record – Hydrants Systems, Portable Foam Equipment and Portable Equipment Cabinets

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
2.1	Hydrant valves (above ground)	OPEN partially all hydrant valves in the system and prove the presence of water at each point. NOTE: To prevent water damage, it is recommended that a suitable adapter to limit water flow be used for this test on internal hydrants. Each hydrant in the system should be opened separately.						✓		
2.2	Hydrant valves (below ground)	a) OPERATE all underground key-operated valves and subsidiary stop valves (e.g., floor isolation valves). Ensure they are fully open and, where applicable, secured in the open position.						✓		
		b) VERIFY that the valve position indicators are securely mounted and indicate correctly.						✓		
		c) TEST each valve anti-tamper switch by closing and re-opening the valve. Verify correct indication at the CIE.						✓		
2.3	Hydrant manifold (where fitted)	VERIFY all branch pipe, nozzles and hose couplings waterways are unobstructed.						✓		
2.4	All other valves	Test in accordance with Table 10.	See action column.							
2.5	Hydrant flow and pressure test	CONDUCT a hydrant flow at various points on the fire reticulation to verifying that the system flow and pressure requirements meet the design criteria, using either— a) a fixed flow meter test facility; or						✓		
		b) a portable test apparatus at the most hydraulically disadvantaged hydrant points. Typically consider distance away from fire pump room, height of hydrant above fire pump room and supply pipe diameter in relation to distribution mains.						✓		SANS 10400 Part W provide minimum required flow and pressure for fire hydrant systems.

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
2.6	Booster connection flow test (where fitted)	CONDUCT a flow test through booster connection to the required design Standard. NOTE: Conduct the flow test after a satisfactory (pass) hydrostatic test.							✓	
2.7	Hydrostatic test	Where a booster is fitted CONDUCT a hydrostatic pressure test on the entire system at 1.5 times the system working pressure of the required design Standard.							✓	
2.8	Pumps and water supplies	Perform test in accordance with Section 3.	See action column.							
2.9	Remote pump starting	DEPRESSURIZE the hydrant(s) system at the most hydraulically disadvantaged hydrant(s). The pump is required to start.						✓		

Table 36: Preventative Maintenance Schedule and Record – Hydrants Systems, Portable Foam Equipment and Portable Equipment Cabinets

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
3.1	Branch pipes, nozzles and hose couplings (where fitted)	CLEAN all branch pipes nozzles and hose couplings and ensure they are in good condition.						✓		
3.2	Booster assembly	a) CHANGE all washers on booster assembly connection inlets.							✓	
		b) Lubricate internal non-return spring check valves on a 10 yearly basis.	See action column.							
3.3	Hydrant valves	FIT new seatings to all hydrant valves and lubricate spindles. NOTE: This activity should be completed prior to conducting the hydrostatic pressure test.							✓	
3.4	Pumps and water supplies	Maintain in accordance with Section 3.	See action column.							

Table 37: Inspection Schedule and Record – Special Hazard Systems

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
TOTAL FLOODING GAS SUPPRESSION										
1.1	Electrical detection and control systems	Perform inspection activities in accordance with [5].		✓						
1.2	Warning signs (printed signs and labels)	CHECK that all warning signs are fitted in compliance with the system design Standard and OHSA.		✓						
1.3	Gas Suppressant Container enclosure	CHECK the suppressant container enclosure is accessible, adequately illuminated, ventilated and secured against unauthorized entry.		✓						
1.4	Gas Suppressant containers	a) CHECK that all gas containers are secure, accessible, free from damage and mounted to allow free passage of air around the base.		✓						
		b) Record last hydrostatic pressure test or inspection date of gas containers. Report if hydrostatic pressure test or inspection will be due in the next year.						✓		
1.5	Gas Suppressant container pressure	INSPECT and RECORD each container pressure indicator or the manifold pressure indicator (where no individual pressure indicators are present) to check that any loss in pressure is not greater than 10% of the nominal charge pressure. <u>Note:</u> Cylinder contents for non-liquefied agents may be directly determined from the container pressure gauge without the need for weighing the cylinder. Container pressure gauges shall be compared with calibrated device at least annually.		✓						<i>*Note: Where neither an individual container nor a system pressure indicator has been provided by design, an adequately rated pressure indicator for the relevant suppression gas must be permanently retrofitted to the system.</i> MPaMPA
1.6	Mechanical release (including gas container valves and actuators)	a) CHECK that all release anti-tamper seals/pull pins are in place and secure.		✓						
		b) CHECK that all release mechanisms (incl. drop weights) and ancillary		✓						

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		equipment to ensure they are secure, undamaged and unobstructed.								
1.7	Lock-off valve (where fitted)	CHECK that the lock-off valve is correctly labelled and accessible. <u>Note:</u> It is recommended that lock-off valves be retrofitted to gaseous fire extinguishing systems which may result in unsafe concentrations of extinguishing agent developing in occupiable areas (e.g. CO ₂ systems).		✓						
1.8	Detection devices – mechanical e.g. pilot sprinklers, thermostatic rate-of-rise detectors, fusible link, etc.	CHECK all mechanical and pneumatic detection devices for any condition that is likely to adversely affect their function, such as excessive deposition of dust or coating of paint.					✓			
1.9	Manual call point frangible element	Where manual call points use replaceable frangible elements, CHECK that at least one replaceable element is available.					✓			
1.10	Detection device location	CHECK that all mechanical and pneumatic detection devices are spaced and located in accordance with the approved design.						✓		
1.11	Automatic pneumatic controls (where fitted)	CHECK the integrity of all pneumatic piping and fittings. - Missing pipe brackets - Lose pipe supports - Sagging pipe work - Perishing re-enforced rubber hoses					✓			
1.12	Pipework	CHECK that all pipework, flexible connectors and manifolds are free from damage and adequately secured. - Missing pipe brackets - Lose pipe supports - Sagging pipe work - Perishing re-enforced rubber hoses					✓			
1.13	Discharge nozzles	CHECK that all nozzles are unobstructed and correctly aimed and secure.					✓			

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.14	Pressure-relief devices and vent valves	CHECK that the discharge from all pressure-relief devices and vent valves does not create a hazard to personnel.					✓			
1.15	Check valves and directional valves (Non-Return valves)	CHECK that all directional valves and check valves are correctly oriented.					✓			
1.16	Hazard survey	SURVEY the protected area to determine that the hazard has not changed from the original design. If changes occurred, redesign system.					✓			
1.17	Unintentional discharge	CHECK for any condition that could cause inadvertent discharge of the extinguishing agent.						✓		
1.18	Protected Area integrity (gas tight)	INSPECT the perimeter of the protected area to determine whether boundary penetration or other changes to the protected enclosure have occurred that could affect leakage and suppressant performance. If this cannot be determined visually, repeat room enclosure integrity test (fan/door/ damper test).						✓		
1.19	Adjacent areas	INSPECT all areas adjacent to the protected area to ensure that migration of gas does not create a hazard to personnel.						✓		
1.20	Protected Room volume (total flooding systems)	SURVEY enclosure to establish whether the volume of the enclosure has changed. If changes occurred, redesign system.						✓		
1.21	Design concentration or application density	VERIFY design concentration or application density matches baseline data. Introduction of new features i.e. windows, doors, partitioning, etc.						✓		
1.22	Dimensions of protected objects (local application systems)	VERIFY dimensions match the baseline data.						✓		
1.23	Authorised personnel	Check that all personnel who may have to operate the equipment or system are properly trained and authorized to do so, and that the appropriate training records are in place.						✓		

AEROSOL SYSTEMS – ADDITIONAL REQUIREMENTS

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.24	Aerosol generators	CHECK that all aerosol generators have not been discharged and are secure.		✓						
1.25	Aerosol generator moisture seal	CHECK that all aerosol generator moisture seals are secure.		✓						
WATER MIST SYSTEMS – ADDITIONAL REQUIREMENTS										
1.26	Expellant and atomizing gas storage containers	a) Where fitted, inspect each container pressure gauge to CHECK that the contents are within the prescribed limits.		✓						
		b) CHECK that all gas containers are secure, accessible, and free from damage and mounted to allow free passage of air around the base.		✓						
1.27	Water container	CHECK water level is correct; container is secure, accessible, and free from damage and mounted to allow free passage of air around the base. Where the container is permanently pressurized, check that the pressure is within normal operating limits.		✓						
1.28	Container status	CHECK gas containers for evidence of under-pressurization, undercharged, partially discharged or fully discharged.		✓						
1.29	Pressure regulator	CHECK for damage and correct setting.		✓						
1.30	Pumps and water supplies	CHECK in accordance with the requirements of Section 3.		✓						
1.31	Plant labelling (for all above special hazard systems)	CHECK if all plant labelling and reference labels are provided, properly affixed and legible.						✓		Where plant labelling are not provided, missing or not legible then new replacement labels must be obtained and correctly affixed to the relevant system components

Table 38: Test Schedule and Record – Special Hazard Systems

No.	Item	Action Required	Frequency							Additional Comments / Information	
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly		
TOTAL FLOODING GAS SUPPRESSION											
2.1	Prior to testing	a) Inform the relevant personnel that service is to be carried out.					✓				
		b) Advise the Control Room where testing will transmit a fire alarm signal to.					✓				
		c) Engage the system isolate switch and disconnect all suppressant storage container release mechanism and selector valves, where fitted, to ensure that testing or other maintenance procedures cannot cause discharge of suppressant agent. Reconnect the release circuit with a functional device in lieu of each suppressant storage container release mechanism. For electrically actuated release mechanisms, these devices may include suitable lamps, bulbs or circuit breakers. Pneumatically actuated release mechanisms may include pressure gauges. Refer to manufacturer’s recommendations in all cases.					✓				
		d) Set the detection and alarm system in the appropriate test mode and ensure that ancillary facilities, systems and air-handling plant (including smoke exhaust and stairwell pressurisation systems, evacuation warning systems, and the like), where they are not to be tested, are isolated to avoid inadvertent operation					✓				
2.2	Electrical detection and control systems	Perform maintenance activities in accordance with ITM of Fire Detection [5].					✓				
2.3	Automatic pneumatic controls	TEST to ensure correct operation of all pneumatic controls.					✓				
2.4	Mechanical and manual discharge	TEST operation of all manual discharge release systems.						✓			

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
2.5	Lock-off valve (where fitted)	OPERATE the system lock-off valve and confirm that the system inoperative VWD operates						✓		
2.6	Cylinder contents – liquefiable gases (halocarbons and CO ₂) including expellant containers	CONFIRM by weighing, or using liquid level determination, that each gas container is charged with the correct quantity of extinguishing agent, that is, any mass loss is not greater than 5% of the nominal charge mass in the case of halocarbons, and not greater than 10% of the nominal charge mass in the case of carbon dioxide and , water. <u>Note 1:</u> Where container pressure gauges or weight-monitoring devices are used for this purpose, they shall be compared with calibrated device at least annually. <u>Note 2:</u> Refer to Regulations under Section 44 of the OSH Act for requirements pertaining inspection, testing and maintenance of refillable transportable gas containers.						✓		kg kg kg mm mm mm
2.7	Discharge actuators and directional valves	SIMULATE a system operation and confirm that discharge actuators and directional valves operate correctly.						✓		
2.8	Mechanical automatic discharge, e.g., fusible links	TEST operation of automatic discharge release systems. <u>Note:</u> In certain aggressive environments, such as chemical risks, more frequent testing may be required.						✓		
2.9	Manual release devices	OPERATE the manual release devices and confirm that they operate the audible and visual discharge alarms.						✓		
2.10	System interface test (fire trip)	a) CONDUCT a functional system test with other interfaced fire systems (e.g., HVAC, dampers, etc).						✓		HVAC Power or fuel shut-off..... EWS
		b) VERIFY that the interface functions in accordance with the building's systems interface diagram.						✓		
2.11	Completion of functional	After testing, RECONNECT all suppressant storage cylinder actuation						✓		

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
	tests	mechanisms and directional valves and return the system to design operational mode. Notify the alarm monitoring facility and all personnel concerned that the fire system test is complete and that the system has been returned to full service by following the manufacturer's specifications.								
2.12	Protected Area integrity – total flooding systems	Where the annual protected area inspection revealed new unsealed penetrations or where a full visual inspection cannot be performed: a) COMPLETE a room integrity test (fan door test) in accordance with the system design standard and confirm that the results satisfy the requirements of the original design.						✓		Equivalent leakage aream ²
		b) RECORD pressure at which pressure-relief vent (where required) operates. <u>Note:</u> Pressure relief is generally required on all inert gas systems and possibly on halocarbon and CO ₂ systems. Check design calculations.						✓		Pa
2.13	Ventilation dampers	Test operation of automatically operated ventilation dampers.						✓		<u>Note:</u> For special hazard system interfaces with HVAC systems, see Section 9.
2.14	Post-discharge ventilation	TEST the operation of the post-discharge ventilation system (exhaust or extraction ventilation).						✓		
2.15	Pipework and nozzles	TEST for free and unobstructed flow from each nozzle, using a continuous flow of nitrogen or suitable alternative.							✓	
AEROSOL SYSTEMS – ADDITIONAL REQUIREMENTS										
2.16	Generators and actuators	CHECK that the expiry date will not fall within the next twelve months.						✓		
WATER MIST SYSTEMS – ADDITIONAL REQUIREMENTS										
2.17	Pumps and associated equipment	TEST operational function of pumps and associated equipment in accordance with the requirements of Section 3.					✓			
2.18	Water supply	CONDUCT a full flow test to verify pressure and flow of water supply in						✓		

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		accordance with the requirements of Section								
2.19	Water additives (where used)	DRAW OFF and check representative sample and confirm correct concentration of additive.						✓		
2.20	Air compressor	Where air receivers form part of a water mist system, TEST compressor cut-in/cut-out pressures.						✓		
2.21	Cycling system	TEST cycling system through a complete discharge cycle.						✓		
FIXED DRY CHEMICAL POWDER SYSTEMS – ADDITIONAL REQUIREMENTS										
2.22	Piping – obstructions	VERIFY that discharge piping is not obstructed, using one of the following methods: a) Disassembly of all piping b) Purging of piping with nitrogen or air c) Conducting a full or partial discharge test d) utilising methods recommended by the manufacturer						✓		
2.23	Condition of dry chemical powder	Examine the dry chemical powder for evidence of caking. Where caking is evident, discard chemical powder and recharge.						✓		
2.24	Pressure regulators	Pressure regulators shall be functionally tested to ensure that they meet the manufacturer's recommended static outlet pressure and minimum flow rate tolerances. Defective regulators shall be replaced.						✓		
2.25	Auxiliary pressure cylinders	Auxiliary pressure cylinders that incorporate hand operable valves shall have their pressure checked with a device to verify the cylinder pressure meets the manufacturer's tolerance requirements.						✓		

Table 39: Preventative Maintenance Schedule and Record – Special Hazard Systems

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
TOTAL FLOODING GAS SUPPRESSION										
3.1	Prior to maintenance	a) Inform the relevant personnel that service is to be carried out.							✓	
		b) Advise the Control Room where testing will transmit a fire alarm signal to.							✓	
		c) Engage the system isolate switch and disconnect all suppressant storage container release mechanism and selector valves, where fitted, to ensure that testing or other maintenance procedures cannot cause discharge of extinguishing agent. Reconnect the release circuit with a functional device in lieu of each suppressant storage container release mechanism. For electrically actuated release mechanisms, these devices may include suitable lamps, bulbs or circuit breakers. Pneumatically actuated release mechanisms may include pressure gauges. Refer to manufacturer's recommendations in all cases.							✓	
		d) Set the detection and alarm system in the appropriate test mode and ensure that ancillary facilities, systems and air-handling plant (including smoke exhaust and stairwell pressurisation systems, evacuation warning systems, and the like), where they are not to be tested, are isolated to avoid inadvertent operation							✓	
3.2	Electrical detection and control systems	Perform maintenance activities in accordance with [5].							✓	
3.3	Mechanical gas container actuator	CHECK operation and lubricate as necessary.							✓	
3.4	Mechanical release	LUBRICATE mechanical release and associated cable pulleys. in accordance with the manufacturer's recommendations.							✓	
3.5	Detection system (mechanical)	CHECK operation and lubricate as necessary.							✓	

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-Yearly	
3.6	Detection device (mechanical)	REPLACE any detection device or sensing element that will exceed its listed service life prior to the next scheduled routine service.							✓	
3.7	Pyrotechnic gas container actuator	REPLACE any actuator that will exceed its listed lifetime prior to the next scheduled maintenance.							✓	
3.8	Dampers	CLEAN dampers that are subject to the deposit of contaminants such as dust, ash and PF dust.							✓	<u>Note:</u> In certain aggressive environments, such as chemical risks, more frequent testing may be required.
3.9	Nozzles	CLEAN nozzles that are subject to the deposit of contaminants such as dust, ash and PF dust.							✓	
3.10	Manufacturer's recommendations	Perform additional maintenance as per manufacturer's recommendations.							✓	
3.11	Gas Container pressure test	Hydrostatically pressure TEST cylinders in accordance with the Pressure Equipment Regulations or manufacturer's recommendations.	See action column.							
3.12	Completion of functional tests	After testing, reconnect all suppressant storage cylinder actuation mechanisms and directional valves and return the system to design operational mode. Notify the alarm monitoring facility and all personnel concerned that the fire system test is complete and that the system has been returned to full service by following the manufacturer's specifications.							✓	
3.13	Replacement of gas containers	Replace all under-charged or discharged gas containers after use or as indicated by an inspection, maintenance checks or manufacturer's recommendations.	See action column.							
AEROSOL SYSTEMS – ADDITIONAL REQUIREMENTS										
3.14	Aerosol generators	REPLACE any generator that will exceed its listed service life prior to the next scheduled routine service.							✓	
3.15	Thermal ignition generators and devices	REPLACE if the expiry date falls within the next 12 months.							✓	

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-Yearly	
WATER MIST SYSTEMS – ADDITIONAL REQUIREMENTS										
3.16	Pumps and water supplies	Perform maintenance activities in accordance with Section 3.								
3.17	Line strainers and filter	CHECK and clean line strainers after any system operation and yearly intervals. If condition of line strainer so indicates, also check and clean individual nozzle strainers.						✓		
3.18	Water container	DRAIN and inspect internal condition of container. Refill including any additive if required.						✓		
FIXED DRY CHEMICAL SYSTEMS – ADDITIONAL REQUIREMENTS										
3.19	Piping and hose lines	Following a discharge, and before recharging the system, the piping, hose line and nozzles shall be thoroughly cleaned.	See action column.							

Table 40: Inspection Schedule and Record – Hose Reels Systems

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Location	Check that locations of fire hose reels are marked up correctly on the location plan/register.						✓		
1.2	Record tags	Check record tag.		✓						
1.3	Accessibility	CHECK that the hose reel is readily accessible with no obstacles restricting its access.		✓						
1.4	Signage	CHECK that location signs are correctly located and visible.		✓						
1.5	Operating instructions	CHECK that the operating instructions are legible.		✓						
1.6	Damage	CHECK for any damage or corrosion of components that could adversely affect the operation of the reel.		✓						
1.7	Hose	CHECK all hoses for kinking, excessive damage or wear, or collapse.						✓		
1.8	Cabinet	CHECK that all hose reel cabinets are accessible, clear of extraneous materials, clearly and correctly marked and in good repair.		✓						
1.9	Ancillary equipment	CHECK that any foam branch pipes or other equipment is in good repair and maintained in accordance with the manufacturer's instructions.						✓		
1.10	Obstructions	CHECK that no alterations have been made to the building that impede access to the hose reel, or that restrict the running out of the hose to reach the fire hazard/risk.						✓		
1.11	Connections	CHECK that no unauthorized connections or tapping's have been made to the hose reel water supply piping visible at the hose reel.						✓		

NOTE: Over and above the listed items refer to SANS 10105 Part 2 for reconditioning requirements.

Table 41: Testing & Preventative Maintenance Schedule and Record – Hose Reel Systems

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
2.1	Hose Reels	All testing and maintenance of fire hose reels to be conducted by competent persons as required by SANS1475 Part 2 and registered by SAQCC as service technicians						✓		See action column

Table 42: Inspection Schedule and Record – Fire Extinguishers

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Location	Check that locations of fire hose reels are marked up correctly on the location plan/register.		✓						
1.2	Maintenance record tags/labels	CHECK that the maintenance record tag or label is firmly attached to the extinguisher and that service history is correctly indicated.		✓						
1.3	Accessibility	CHECK that the extinguisher is conspicuous, readily accessible and in its assigned location.		✓						
1.4	Anti-tamper device	CHECK that the anti-tamper device is intact.		✓						
1.5	Exterior and operating instructions	CHECK that the extinguisher is clean and the operating instructions are legible.		✓						
1.6	External damage	CHECK that the extinguisher, including any attachments, is not damaged.		✓						
1.7	External corrosion	CHECK that the exterior of the extinguisher is not pitted, or otherwise damaged, by corrosion.		✓						
1.8	Outlet hose assembly	CHECK that the outlet hose is securely fitted, the nozzle is securely attached, the assembly is free from obstruction, and the hose shows no cracking or other signs of damage or deterioration.		✓						
1.9	Pressure indicator	Where fitted, CHECK that the pressure indicator is legible, registering within the operable range, and is operating correctly.		✓						
1.11	Signage	CHECK that the location sign is visible.		✓						
1.12	Support brackets	CHECK that the appropriate support bracket is securely attached to wall or other suitable feature.		✓						
1.13	Discharge nozzle	CHECK that the appropriate discharge nozzle is fitted and is not blocked or damaged.		✓						

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.14	Carriage assembly	For wheeled extinguishers, CHECK that the carriage assembly is functional and free from corrosion.		✓						
1.15	Operating instructions	CHECK that the operating instructions are legible.		✓						
1.16	Cabinet	CHECK that all extinguisher cabinets are accessible, clear of extraneous materials, clearly and correctly marked and in good repair.		✓						
1.17	Fire hazard	CHECK that the fire hazard/risk to be protected has not changed.						✓		
1.18	Suitability	CHECK that the extinguisher is the correct type, class, size and/or rating for the hazard to be protected.						✓		
1.19	Obstructions	CHECK that no alterations have been made to the building that may impede access to the extinguisher or increase the travel distances.						✓		

Table 43: Testing & Maintenance Schedule and Record – Fire Extinguishers

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
2.1	Fire Extinguishers	All testing and maintenance of fire extinguishers to be conducted by competent persons as required by SANS1475 Part 1 and registered by SAQCC as service technicians						✓		See action column

Table 44: ITM Schedule and Records – Structural Integrity – Protective Systems & Coatings

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Structural member types, locations and required FRLs	CHECK required FRL's of steel, concrete or masonry members such as beams, columns, walls, roofs and floors from as-built drawings/plans.						✓		
1.2	Survey to determine design base	SURVEY to determine FRLs according to DtS provisions of Building Regulations/Design Standards where plans do not exist.						✓		NOTE: Older buildings may require reference to documents such as Building By-Laws. In situations where a fire coating has been provided previously, consideration should be given to the practicalities of obtaining retrospective information on how thick the coating should be, as in many cases, there may not be a product name attached.
		a) Specific FRLs to be designated and recorded.						✓		
		b) Specific fire protection system/coating to be recorded.						✓		
		c) Specific required minimum thickness of coating to be recorded.						✓		
		d) Specific required minimum thickness of concrete elements and cover to reinforcement to be recorded for required FRL according to SANS 10100 If existing FRL's inadequate, modifications to be designed and implemented to achieve required FRL forming a basis for subsequent inspections						✓		
1.3	Fire protection system/coating —Thickness	CHECK visually for areas of non-compliance:						✓		
		a) If mineral coating, loss of adhesion, tap on coating to check for uniform adhesion.						✓		
		b) Mechanical damage						✓		
		c) If intumescent coating, flaking, or mechanical damage.						✓		
		d) If fire protective boards, missing boards, loss of adhesion or mechanical damage.						✓		
1.4	System repair	REPAIR with the same product/system as the existing or approved equivalent.						✓		

Table 45: ITM Schedule and Records – Fire and Smoke Barriers – Walls

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Wall types, locations and fire resistance levels	CHECK against compartmentation drawings that no new fire and/or smoke walls have been added or removed and ensure fire resistance levels and/or smoke leakage requirements are known.						✓		
1.2	Penetration types—Survey	a) CHECK against compartmentation drawings and associated penetration schedules that no new penetrations have been added or removed.						✓		
		b) AMEND compartmentation drawings and penetration schedules to be representative of as installed penetrations.						✓		
1.3	Individual penetrations	CHECK individual penetrations identified on the compartmentation drawings and/or in the penetration schedules.						✓		
1.4	Walls	CHECK that walls continue up to floor or roof above and that the head to wall penetration has no integrity breaches. Check for spalling of concrete or substantial cracks.						✓		
1.5	Masonry walls	CHECK walls for any visible damage such as substantial cracks.						✓		
1.6	Plasterboard walls	CHECK to ensure there is no damage to plasterboard wall barrier such as cracks or openings. Where possible, ensure that adequate number of plasterboards has been installed and that screw spacing and other important attributes are as per manufacturer's recommendations.						✓		
1.7	Dampers	CHECK that the integrity of the fire-resisting construction in the immediate vicinity of the damper is not impaired from the accessible side.						✓		NOTE: See Table 55 for the inspection of obstructions, position, corrosion, thermal link and modifications to fire dampers.

Table 46: ITM Schedule and Records – Fire and Smoke Barriers – Floors

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Floor types, locations and fire resistance levels	CHECK against compartmentation drawings that no new fire and/or smoke walls have been added or removed and ensure fire resistance levels and/or smoke leakage requirements are known.						✓		
1.2	Penetration types—Survey	a) CHECK against compartmentation drawings and associated penetration schedules that no new penetrations have been added or removed.						✓		
		b) AMEND compartmentation drawings and penetration schedules to be representative of as installed penetrations.						✓		
1.3	Individual penetrations	CHECK individual penetrations identified on the compartmentation drawings and/or in the penetration schedules.						✓		
1.4	Floor – general	CHECK to ensure that the floor is not damaged.						✓		

Table 47: ITM Schedule and Records – Fire and Smoke Barriers – Ceiling and Bulkheads

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Ceiling types, locations and fire resistance levels	CHECK against compartmentation drawings that no new fire and/or smoke walls have been added or removed and ensure fire resistance levels and/or smoke leakage requirements are known.						✓		
1.2	Penetration types—Survey	a) CHECK against compartmentation drawings and associated penetration schedules that no new penetrations have been added or removed.						✓		
		b) AMEND compartmentation drawings and penetration schedules to be representative of as installed penetrations.						✓		
1.3	Individual penetrations	CHECK individual penetrations identified on the compartmentation drawings and/or in the penetration schedules.						✓		

Table 48: ITM Schedule and Records – Hinged and Pivoted Fire-Resistant Door-sets

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Marking— Tags and signage	a) CHECK door leaves and door frames have a tag bearing the information contained in SANS 1253 [16]					✓			
		b) CHECK to ensure relevant signage is applied.					✓			
1.2	Clearances in the closed position	CHECK: a) Top: Gaps between the edge of the door leaf/leaves and the frame do not exceed 3 mm at the head.					✓			
		b) Sides: Total width of the clearances between the vertical sides of the leave of a single-leaf door-set and the frame does not at any cross-section exceed 6 mm. In the case of a double-leaf hinged door, the clearance between one meeting stile and the other, and the clearance between the frame and the leaves shall not exceed 4 mm.					✓			
		c) Bottom: Gaps are not less than 5 mm and not more than 12 mm at the threshold. <u>Notes:</u> 1) Larger gaps may be permissible by incorporation of intumescent or other tested perimeter sealing systems. 2) The use of rubber buffers is not recommended for fire and smoke doors. 3) Floor clearance is taken from the top of a non-combustible covering.					✓			
1.3	Hardware— General	a) CHECK all essential hardware required for suspension, closing and						✓		

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		latching is fitted and is a make and model that has been fire tested for the specific proprietary fire-resistant door construction.								
		b) CHECK all hardware is attached in accordance with the requirements of SANS 1253 and is securely fixed.						✓		
		c) CHECK the door leaf is free from non-approved fittings, fixings or attachments and free from damage caused by relocation of hardware items.						✓		
1.4	Frictional forces and self-closing and self-latching function	a) CHECK that the opening force does not exceed 100 N with pressurization systems operating (where relevant). <u>NOTE:</u> This may require adjustment of hinges, latchbolt, door seals and door closer operating force.						✓		
		b) CHECK that the door-set is self-closing and self-latching in accordance SANS 1253 [16]						✓		
1.5	Doors held in the open position	TEST for fire doors, held in the open position, that require activation of detection system to close, ensuring that the fire doors close satisfactorily upon power failure or detector activation.						✓		
1.6	Locksets and latchsets	a) Operate latchset and VERIFY the latchbolt engages into the striker plate sufficiently to hold the door in the closed position.						✓		
		b) CHECK latch handle(s) and latchbolt(s) are clean and operate freely and smoothly.						✓		
		c) Where passage sets or knobs are incorporated, CHECK that the minimum clearance of 35 mm to the door stop is present.						✓		
1.7	Door closers and pivots	CHECK a) The closer arm and any pivots operate freely and smoothly.						✓		

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		b) The door-set is free from any closer oil leakages.						✓		
		c) The screw fixing and mounting arrangements for door closer are secure to the door leaf and door frame.						✓		
		d) The door closer body is free from obstructions by walls, fixtures and/or fittings at any point throughout its swing.						✓		
		e) The door closes fully and latches.						✓		
		f) Cushioned back-checking action takes place as per the requirements of SANS 1253 [16]						✓		
		g) For doors with magnetic hold-open devices, the door leaf comes to the fully closed and latched position upon release of the hold-open device.						✓		
1.8	Hinges	CHECK:						✓		
		a) Hinges are free from any undue wear and tear and are correctly aligned and operating smoothly and freely.						✓		
		b) Hinges are securely fixed to the door leaf and frame.						✓		
		c) Hinge pins are home.						✓		
1.9	Door seals	CHECK any installed door seals are approved for use on the fire-rated door-set and are functioning as intended and the gaskets are not damaged.						✓		
1.10	Door leaves	CHECK:						✓		
		a) Doors are free from any visible delamination, buckling, warping, bowing, twisting or significant damage.						✓		
		b) Door edges are in good condition and free from any splitting or damage on all sides.						✓		
1.11	Door frames	CHECK:						✓		

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		a) Door frames are adequately anchored to the walling and restrained against rotational movement about their longitudinal axes.								
		b) Steel door frames are back-filled if required for the proprietary door type and FRL.					✓			
		c) Doorstop dimension is 25 mm or ensure that other stop dimension are approved for the proprietary door type and FRL, or that an approved intumescent perimeter seal is not incorporated.					✓			
		d) Doorframe is free from excessive distortion at any point along frame sections.					✓			
		e) To ensure doorframe incorporates a door striker plate.					✓			
		f) Rubber buffers are not present, thus creating an additional gap for smoke spread					✓			
1.12	Vision panels	CHECK:								
		a) Proprietary door type is approved for use of a vision panel (not allowed in Class C & D fire doors)					✓			
		b) Vision panel frame type, glass type and size are consistent with fire-tested approvals.		✓						
		c) Opening size does not exceed 100 mm (±5 mm) x 300 mm (±5 mm) or 200 mm in diameter without incorporation of a fully insulating intumescent type glass.		✓						
		d) To ensure glass is in a sound condition and free from cracks.		✓						
		e) To ensure perimeter trim and framing are secure and in sound condition and that all fixing screws are in place.		✓						
1.13	Fire-rated air transfer grilles or	CHECK:		✓						

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
	fire dampers	a) Proprietary door type is approved for use of a fire-resistant air transfer grille or fire damper.								
		b) For drop shutter type doors, the fusible link is present and is of the correct temperature rating and ensures correct operation of drop shutter mechanism.		✓						
		c) Intumescent type fire dampers and ensure intumescent fire damper is installed behind the cover grilles and that perimeter clearance is not excessive and is filled with intumescent type mastic.		✓						
		d) Cover grilles are not damaged and are securely fixed to door leaf.		✓						
1.14	Kickplates	CHECK to ensure kickplates are securely fixed.		✓						
1.15	Selective sequence for pairs of doors	CHECK to ensure:								
		a) For 'T-Bar type' meeting stiles, or for rebated meeting stiles, that the sequence of door closure is correct.		✓						
		b) The condition of the selective sequence devices is satisfactory.		✓						
		c) The fixings provided are secure.		✓						
1.16	Meeting stiles for pairs of doors	CHECK to ensure any essential meeting stile astragals are installed and in good working order and incorporate the necessary smoke seal.		✓						

Table 49: ITM Schedule and Records – Horizontal Sliding Fire Doors

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Marking— Tags and signage	a) CHECK door leaves and door frames have a tag bearing the information contained in [16].					✓			
		b) CHECK to ensure relevant signage is applied.					✓			
1.2	Clearances and overlaps in the closed position	CHECK clearances and overlaps of door panel(s) are equal to or greater than the minimum nominated in [16].					✓			
1.3	Frictional forces and self-closing and self-latching function	CHECK: a) Operation to ensure the door fully closes from the fully open position and from two intermediary positions including one from not more than 1 m from the closed position)					✓			
		b) Forces to open and close door leaves are below 100 N.					✓			
		c) The flashing (red) lights and warning devices function correctly in accordance with the design and installation specification.					✓			
1.4	Restraint brackets and interlocking steel sections (flame guards)	CHECK restraint brackets and/or interlocking steel sections are as per proprietary fire test approvals and fixed adequately, and are functional.					✓			
1.5	Suspension system including track and carriers	CHECK: a) The track and suspension systems are clean and free of dirt and dust which can affect the smooth operation of the door-set.					✓			
1.6	Closing mechanisms and fittings	CHECK, LUBRICATE and ADJUST as necessary: a) Fusible links, where fitted, are in intact, unpainted, and in a suitable location in the air stream.					✓			
		b) Electromagnetic hold-open device/release device operates satisfactorily					✓			

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		and door closes when power is off.								
		c) Pulley cables are free of fraying, kinks, excessive stretching and corrosion					✓			
		d) Pulleys are free to rotate.					✓			
		e) Counterweight guard (if any) is located with bottom 150 mm from the sill.					✓			
1.7	Door guides, stops and restraints	a) CHECK floor and/or track and/or wall-mounted guides and stops and all travel limiting devices at door open and close locations are adequate and soundly mounted.					✓			
		b) LUBRICATE and adjust as necessary.					✓			
1.8	Other fittings and accessories	CHECK: a) Arrows indicating opening direction are fixed to each side of the door leaves.					✓			
		b) Flush pulls, handles or grips are securely fixed.					✓			
1.9	Door leaf	CHECK: a) Door leaf or leaves are free from any delamination, buckling, warping, bowing, twisting and other damage resulting from incorrect usage.					✓			
		b) All perimeter edge capping is complete and sound.					✓			
		c) Door leaf or leaves is/are free from any non-approved fittings, fixings and attachments.					✓			
1.10	Door frame	CHECK doorframe, where applicable, is adequately anchored to the opening.					✓			
		VERIFY that door frame is free from excessive distortion at any point along frame sections.					✓			

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.11	Other features	CHECK: a) Any maintenance access panels for cavity sliders are suitable and accessible.					✓			
		b) The sill under the door leaf is free from the addition of any combustible covering since installation or previous inspection.					✓			
1.12	Multiple-leaf doors	CHECK: a) The door leaves perform satisfactorily as per instructions above (Item 2.9).					✓			
		b) Overlaps or jointing of individual door leaf panels at meeting stiles are in proper alignment and comply with proprietary fire test approvals.					✓			
1.13	Wicket doors or personnel access doors	CHECK wicket or personnel access doors operate satisfactorily in accordance with the hinged door leaf requirements, but substitute reference to wall to another fire door leaf. NOTE: These doors are usually found integrated within the sliding door leaf or leaves and are typically side-hung doors.					✓			
1.14	Automatic sliding doors	ENSURE automatic sliding doors are maintained in accordance with the manufacturer of the automatic door controllers maintenance instructions.					✓			
1.15	Screw-fixed panels (where applicable)	VERIFY that screw fittings engage in frame securely.					✓			
1.16	Locksets and latches	LUBRICATE the latchbolt where necessary.					✓			
1.17	Door closers and pivots	a) TIGHTEN and/or replace screws where necessary.					✓			
		b) ADJUST closer as necessary to ensure full closure and self-latching, without excessive speed of travel.					✓			
1.18	Hinges	LUBRICATE hinges as necessary to ensure smooth and free operation.					✓			

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.19	Hinged or latched panes	TIGHTEN and/or replace hinge fixing screws where necessary.					✓			
		REPLACE and adjust hinge pins as necessary.					✓			
		LUBRICATE and adjust as necessary.					✓			

Table 50: ITM Schedule and Records – Fire Shutters

No.	Item	Action required & pass/fail criterion	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Marking— Tags and signage	CHECK fire shutter has a tag bearing the information contained in [16].						✓		
1.2	Bracket fixings and barrel assembly	CHECK: a) Brackets are securely fixed to the walls.						✓		
		b) The barrel assembly is mounted so that the rolled-up curtain on the barrel sits higher than the top level of the guide tracks.						✓		
1.3	Guide track fixings	CHECKS: a) Guide tracks are securely fixed to the walls.						✓		
		b) Guide tracks are mounted such that the curtain overlaps equally the jamb on each side of the opening.						✓		
		c) The gap between the end of the slats, including end clips and the guide track, is no more than 10 mm.						✓		
		d) The curtain moves freely in the guide tracks without jamming under normal operation.						✓		
1.4	Curtain	CHECK that the curtain is of a length to ensure that when the bottom rail is in contact with the threshold, the curtain is in contact with not less than 50% of the circumference of the barrel assembly.						✓		
1.5	Threshold	CHECK that the threshold is of concrete or similar approved material deemed non-combustible.						✓		
1.6	Fusible link	CHECK that the fire shutter is fitted with a fusible link of not greater than 80°C (57°C in the case of a drenched fire shutter) and the fusible link is in good and operational condition.						✓		
1.7	Operation test	CHECK that under simulated automatic operation the fire shutter curtain						✓		

No.	Item	Action required & pass/fail criterion	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		descends to the threshold at an average speed of between 0.15 m/s and 0.3 m/s.								
		CHECK that under simulated automatic operation the curtain does not rebound creating a gap of greater than 25 mm between the bottom rail and the threshold.						✓		
1.8	Sensing device	CHECK: a) Any sensing device, in addition to that of a fusible link, is of a type suitable for that particular application and complies with appropriate Standards.						✓		
		b) That any sensing device is in good and operational condition.						✓		
		CHECK for impact crazing or cracking over entire surface area of glass.						✓		
1.9	Plant labelling	CHECK if all plant labelling and reference labels are provided, properly affixed and legible.						✓		Where plant labelling are not provided, missing or not legible then new replacement labels must be obtained and correctly affixed to the relevant system components

Table 51: ITM Schedule and Records – Fire Rated Glazing

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Location	IDENTIFY all glazing requiring a FRL from plans or approved documents.						✓		
1.2	Identity	FIND label/tag identifying tested system & FRL. NOTE: Label should be clearly visible on either frame or glass and the identity of the manufacturer and FRL of the system shown.						✓		
		CHECK glass and frame complies with tested system.						✓		
1.3	Glass	CHECK for any crazing or cracking around perimeter of glass.						✓		
		CHECK for impact crazing or cracking over entire surface area of glass.						✓		
1.4	Frame	CHECK the frame material type is as per the tested system.						✓		
		VERIFY that frame is free from distortion at any point along the frame section.						✓		
		CHECK frame is securely anchored and free from any visible defects or corrosion.						✓		
		CHECK perimeter to ensure no through gaps are visible and the frame has been fire stopped correctly where it meets bounding construction.						✓		
1.5	Seals	CHECK: a) Glazing seals are present and have not deteriorated.						✓		
		b) Seals form part of the tested system.						✓		
1.6	General— Repairs	REPAIR or REPLACE as necessary with the same or similar products. Replacement fire window to meet the required FRL.						✓		Where glass only is replaced, the replacement fire glass must have been tested or assessed in the frame installed.

Table 52: ITM Schedule and Records – Access Panels

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Access panel label	CHECK access panel type from label on back is appropriate.						✓		
1.2	Access panel or leaf	CHECK: (a) Panel is free of any visible delamination, buckling, warping, bowing, twisting or significant damage.						✓		
		(b) Panel edges are in good condition and free from any splitting or damage on all sides.						✓		
1.3	Frame	CHECK: (a) Access panel frame is adequately anchored to the wall and restrained against rotational movement about its longitudinal axis.						✓		
		(b) Frames are installed correctly for the proprietary access panel type and FRL.						✓		
		(c) That frame stop dimension is approved for the proprietary access panel type and FRL, and that an approved intumescent perimeter seal is incorporated.						✓		
		(d) VERIFY that frame is free from distortion at any point along the frame section.						✓		
1.5	Screw-fixed panels (where applicable)	(a) CHECK to ensure screws fixings are all present and are in good working order.						✓		
		(b) VERIFY that screw fittings engage in frame securely.						✓		
1.6	Hinged and/or latched panels (where applicable)	CHECK: (a) To ensure hinges are in good working order and latches (if any) are operational						✓		
		(b) No visible through gap is created around lock/latch, and that the correct						✓		

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		number of hinges and locks are present.								
1.7	Additions	CHECK any added laminates or hardware do not interfere with the performance of the access panel.						✓		
1.8	Smoke, acoustic or weather seals	CHECK that any installed smoke, acoustic or weather seals are approved for use on the respective access panel and are functioning as intended and the gaskets are not damaged.						✓		

Table 53: ITM Schedule and Records – Ceiling Hatches

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Hatch label	CHECK access hatch type from label on back is appropriate.						✓		
1.2	Application	CHECK hatch type has the required FRL for the application and is installed in the correct plane. NOTES: 1 Test reports should be sought from manufacturer to verify fire rating.						✓		

Table 54: ITM Schedule and Records – Fire-Rated Ductwork

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Fire-rated ductwork, locations and FRLs	(a) CHECK ductwork requiring FRL from plans. If plans are not available, conduct a SURVEY to determine FRLs according to SANS 10400 deemed-to-satisfy requirements. Specific FRLs to be designated and recorded.						✓		
		(b) RECORD the purpose of the duct e.g., smoke exhaust, pressurization, dual ventilation/smoke exhaust etc.						✓		
		(c) RECORD existing duct fire protection system.						✓		
		(d) RECORD minimum design thickness of protection system/coating.						✓		
1.2	System coating	CHECK existing fire protection system/coating as follows:						✓		
		(a) Record thickness.						✓		
		(b) Loss of adhesion. If mineral spray, check for dryness.						✓		
		(c) Fire protective boards for dislodgement.						✓		
		(d) Record any mechanical damage.						✓		

Table 55: ITM Schedule and Records – Fire Dampers – Mechanical and Intumescent

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Obstruction— Mechanical dampers	CHECK and ensure that the fire damper is in place, open and free from obstruction.						✓		
1.2	Operation— Mechanical dampers	For mechanical fire dampers, remove or release the thermal link to ensure closure (and latching).						✓		
1.3	Obstruction— Intumescent dampers	CHECK and ensure that the fire damper is in place, free from obstruction and is capable of operation.						✓		
1.4	Corrosion	CHECK fire dampers including casing, retaining flanges and fusible links for corrosion.						✓		
1.5	Tampering and modifications	CHECK for signs of tampering or modifications. The building owner is to confirm that modifications comply with the manufacturer's requirements or a registered testing authority's confirmation of operation.						✓		
1.6	Thermal link	After 20 years, TEST a representative sample of the thermal link and thereafter every five years, test a different sample. REPLACE all thermal links throughout the building if any one of the representative samples fails.	See action column.							
1.7	Fire-stopping	Inspect fire stopping around damper.						✓		
1.8	Plant labelling	CHECK if all plant labelling and reference labels are provided, properly affixed and legible.						✓		Where plant labelling are not provided, missing or not legible then new replacement labels must be obtained and correctly affixed to the relevant system components

NOTE: Tagging, labelling or a logbook may be necessary for verification.

Table 56: ITM Schedule and Records – Fire Dampers – Motorised

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Obstruction	CHECK and ensure that the fire damper is in place, open and free from obstruction.						✓		
1.2	Operation	CHECK that the damper is capable of operating from fully open to fully closed.						✓		
1.3	Operation of thermal link (if applicable)	For dampers fitted with supplementary thermal links, remove or release the thermal link to ensure closure (and latching).						✓		
1.4	Fail-safe operation	ENSURE damper moves to its fail-safe position on removal of power source.						✓		
1.5	Leakage	CHECK that there is no excessive leakage past dampers when in the closed position.						✓		
1.6	Corrosion	CHECK fire dampers including casing, retaining flanges and fusible links (if applicable) for corrosion.						✓		
1.7	Bearings	CHECK linkage and damper bearings.						✓		
1.8	Tampering and modifications	CHECK for signs of tampering or modifications. The building owner is to confirm that modifications comply with the manufacturer's requirements or a registered testing authority's confirmation of operation.						✓		
1.9	Fire-stopping	Inspect fire stopping around damper.						✓		
1.10	Plant labelling	CHECK if all plant labelling and reference labels are provided, properly affixed and legible.						✓		Where plant labelling are not provided, missing or not legible then new replacement labels must be obtained and correctly affixed to the relevant system components

NOTE: Tagging, labelling or a logbook may be necessary for verification.

Table 57: ITM Schedule and Records – Fire Stopping & Intumescent Coatings

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Fire-stopping around the fire dampers	(a) CHECK that each fire damper penetration has been logged on the compartmentation drawings and/or in penetration schedules (logbooks).					✓			
		(b) AMEND documentation as appropriate.					✓			
		(c) CHECK that the fire-stopping system used has fire test evidence, and can achieve the required FRL.					✓			
		(d) CHECK that fire-stopping to each damper is labelled correctly according to register.					✓			
		(e) CHECK the integrity of the fire-stopping of the damper penetration from the accessible side. This includes both the wall or floor and the fire stopping materials employed.					✓			
1.2	Electrical services penetrations	(a) CHECK that each electrical penetration has been logged on the compartmentation drawings and/or in penetration schedules (logbooks).					✓			
		(b) AMEND documentation as appropriate.					✓			
		(c) CHECK that the fire-stopping system used has fire test evidence, and can achieve the required FRL.					✓			
		(d) CHECK that fire-stopping to each electrical penetration is labelled correctly according to the register.					✓			
		(e) CHECK fire-stopping system is undamaged or has been installed correctly (as per fire test drawing or other documentation).					✓			
		(f) IDENTIFY any new penetration work that is unprotected.					✓			
1.3	Plumbing penetrations	(a) CHECK that each plumbing penetration has been logged on the compartmentation drawings and/or in penetration schedules (logbooks).					✓			

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		(b) AMEND documentation as appropriate.					✓			
		(c) CHECK that the fire-stopping system used has fire test evidence, and can achieve the required FRL:					✓			
		(d) CHECK that fire-stopping to each plumbing penetration is labelled correctly according to the register.					✓			
		(e) CHECK fire-stopping system is undamaged or has been installed correctly (as per fire test drawing or other documentation).					✓			
		(f) IDENTIFY any new penetration work that is unprotected.					✓			
1.4	Control joints and fire wall junctions	(a) CHECK that each control joint and fire wall junction has been logged on the compartmentation drawings and/or in penetration schedules (logbooks).					✓			
		(b) AMEND documentation as appropriate.					✓			
		(c) CHECK that the fire-stopping system used has fire test evidence, and can achieve the required FRL.					✓			
		(d) CHECK that fire-stopping to each plumbing penetration is labelled correctly according to the register.					✓			
		(e) CHECK fire-stopping system is undamaged or has been installed correctly (as per fire test drawing or other documentation).					✓			

Table 58: ITM Schedule and Records – Fire Traps

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Fire traps	(a) CHECK that each fire trap has been indicated on the civil drawings of the drainage system.						✓		
		(b) AMEND documentation as appropriate.						✓		
		(c) CHECK that the fire trap has no physical obstructions likely to impede performance and is in a satisfactory condition which includes corrosion, distortion, seating, etc.						✓		Fire Trap – ensure the following components are checked: Mentis grating, down pipe with seat plate, fire trap pit and discharge pipe.
1.2	Fire traps	(a) TEST discharge from bund / sump through fire trap to confirm no obstruction exists in the drainage system.						✓		Drainage system flow test can also be checked during the full flow test of the deluge system as per Table 29 where applicable.

Table 59: ITM Schedule and Records – Fans and Motors – Supply, Exhaust Spill or Return Air Used in Day-to-Day Operation

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Obstructions	CHECK there are no physical obstructions likely to impede performance.				✓				
1.2	Noise, overheating or vibration	CHECK motor and all bearings for noise, overheating and excessive vibration.				✓				
1.3	Flexible connections	CHECK flexible connections, where fitted, for leaks, tearing or fraying.				✓				
1.4	Fan belts (wear)	CHECK fan belts for wear.				✓				
1.5	Guards and other safety features	CHECK for satisfactory condition.								
1.6	Bearings	CHECK lubrication of bearings.		✓						
1.7	Couplings	CHECK couplings for tightness.				✓				
1.8	Fan belt (tension)	CHECK for correct tension				✓				
1.9	Pulley wheels and couplings	CHECK pulley wheels and couplings for alignment.				✓				
1.10	Casing guards and impeller	CHECK casing, guards and impeller for corrosion.				✓				
1.11	Electrical	CHECK electrical connections, isolators and terminal box.				✓				
1.12	Plant labelling	CHECK if all plant labelling and reference labels are provided, properly affixed and legible.				✓				Where plant labelling are not provided, missing or not legible then new replacement labels must be obtained and correctly affixed to the relevant system components

Table 60: ITM Schedule and Records – Fans and Motors – Supply, Exhaust Spill or Return Air Used in Fire Mode Only

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Obstructions	CHECK there are no physical obstructions likely to impede performance.				✓				
1.2	Noise, overheating or vibration	CHECK motor and all bearings for noise, overheating and excessive vibration.				✓				
1.3	Flexible connections	CHECK flexible connections, where fitted, for leaks, tearing or fraying.				✓				
1.4	Fan belts (wear)	CHECK fan belts for wear.				✓				
1.5	Guards and other safety features	CHECK for satisfactory condition.				✓				
1.6	Bearings	CHECK lubrication of bearings.		✓						
1.7	Couplings	CHECK couplings for tightness.				✓				
1.8	Fan belt (tension)	CHECK for correct tension				✓				
1.9	Pulley wheels and couplings	CHECK pulley wheels and couplings for alignment.				✓				
1.10	Casing guards and impeller	CHECK casing, guards and impeller for corrosion.				✓				
1.11	Electrical	CHECK electrical connections, isolators and terminal box.				✓				
1.12	Plant labelling	CHECK if all plant labelling and reference labels are provided, properly affixed and legible.				✓				Where plant labelling are not provided, missing or not legible then new replacement labels must be obtained and correctly affixed to the relevant system components

Table 61: ITM Schedule and Records – Control Dampers – Motorised

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Obstruction	CHECK and ensure that the fire damper is in place, open and free from obstruction.						✓		
1.2	Operation	CHECK that the damper is capable of operating from fully open to fully closed.						✓		
1.3	Operation of thermal link (if applicable)	For dampers fitted with supplementary thermal links, remove or release the thermal link to ensure closure (and latching).								
1.4	Fire mode position	ENSURE damper(s) moves to its fire mode position upon removal of power source.						✓		
1.5	Leakage	CHECK that there is no excessive leakage past dampers when in the closed position. (Only where dampers are required to close fully.)						✓		
1.6	Corrosion	CHECK fire dampers including casing, retaining flanges and fusible links (if applicable) for corrosion.						✓		
1.7	Bearings	CHECK linkage and damper bearings.								
1.8	Tampering and modifications	CHECK for signs of tampering or modifications.						✓		
1.9	Fire-stopping	Inspect fire stopping around damper.						✓		
1.10	Plant labelling	CHECK if all plant labelling and reference labels are provided, properly affixed and legible.						✓		Where plant labelling are not provided, missing or not legible then new replacement labels must be obtained and correctly affixed to the relevant system components

NOTE: Tagging, labelling or a logbook may be necessary for verification.

Table 62: ITM Schedule and Records – Makeup Air and Relief Vent – Motorised

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Visual inspection	CHECK the control centre and actuator (and air line in the case of pneumatic lines) for signs of damage.				✓				
1.2	Power supply	CHECK the power supply indicator is functioning.				✓				
1.3	Air filter – pneumatic systems	DRAIN any fluid that has accumulated in the air filter.				✓				
		CLEAN or REPLACE the filter element. If any damage or fault is discovered, correct immediately.						✓		
1.4	Vents and airlines—Pneumatic systems	CHECK all vents and connecting air lines to ascertain unauthorized alterations, damage or corrosion.				✓				
1.5	System pressure—Pneumatic systems	CHECK system pressure against manufacturer's requirements, and RECORD.						✓		kPa
1.6	Vents	(a) CHECK vents for damage, wear or corrosion.					✓			
		(b) REMOVE any foreign matter from the blades.					✓			
		(c) REMOVE any debris from the internal rain channel.					✓			
		(d) CHECK that the drain holes are clear.					✓			
		(e) CHECK the vents for signs of damage, wear and tear or corrosion.					✓			
		(f) For pneumatic systems, ENSURE cylinder ram dust covers are in place.					✓			
1.7	Open/close switch	CHECK the manual function by operating the open/close manual switch.					✓			
1.8	Operating time	CHECK operating time of system. NOTE: Closing times in excess of 20 s should be investigated.					✓			
1.9	Rain sensor	CLEAN the face of the sensing head with soapy water, ensuring abrasives or					✓			

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		harsh detergents are not used. With the manual switch in the 'open' position, check the automatic operation of the rain sensor by wiping the surface with a clean cloth, observing the following three actions: (a) THE VENT SHOULD CLOSE. Continue with the wetted surface and switch the rain sensor override to the 'override position. (b) THE VENTS SHOULD OPEN. Return the switch to 'normal'. (c) THE VENTS SHOULD CLOSE AGAIN. Reset system to normal								
1.10	Thermal links	If equipped, CHECK the thermal release links for type and temperature rating and replace release links that have been coated with paint or similar coatings.						✓		
1.11	Thermal links—Sample test	After 20 years, test a representative sample (greater of 5% or 5 links) of the thermal links and thereafter every five years, test a different sample. REPLACE all thermal release links throughout the building if any one of the representative samples fails.	See action column.							
1.12	Plans	ENSURE installation plans include current information.						✓		
1.13	Plant labelling	CHECK if all plant labelling and reference labels are provided, properly affixed and legible.					✓			Where plant labelling are not provided, missing or not legible then new replacement labels must be obtained and correctly affixed to the relevant system components

Table 63: ITM Schedule and Records – Smoke Curtains

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Operation	CHECK there are no physical obstructions likely to impede operation.					✓			
1.2	Manual operation	CHECK manual deployment of curtain via switch at control panel.						✓		
1.3	Automatic operation	CHECK automatic deployment of curtain via smoke detection equipment.						✓		
1.4	Fail-safe operation	CHECK fail-safe deployment of curtain by disconnecting power to control panel						✓		
1.5	Battery	CHECK battery backup supply.						✓		

Table 64: ITM Schedule and Records – Automatic Smoke and Heat Vents

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Obstruction	CHECK and ensure that the vents and all components such as pulleys, hinges, latches, cables, window actuators, etc., are free from obstruction and capable of operation.					✓			
1.2	Visual inspection	CHECK the control centre and actuator (and air line in the case of pneumatic lines) for signs of damage. This includes window actuators for natural smoke extraction...					✓			
1.3	Air filter – pneumatic systems	DRAIN any fluid that has accumulated in the air filter					✓			
		CLEAN or REPLACE the filter element. If any damage or fault is discovered, correct immediately.					✓			
1.4	Vents and airlines—Pneumatic systems	CHECK all vents and connecting air lines to ascertain unauthorized alterations, damage or corrosion.					✓			
1.5	System pressure—Pneumatic systems	CHECK system pressure against manufacturer's requirements, and RECORD.					✓			
1.6	Vents	(a) CHECK vents for damage, wear or corrosion.					✓			
		(b) REMOVE any foreign matter from the blades.					✓			
		(c) REMOVE any debris from the internal rain channel.					✓			
		(d) CHECK that the drain holes are clear.					✓			
		(e) CHECK the vents for signs of damage, wear and tear or corrosion.					✓			
		(f) For pneumatic systems, ENSURE cylinder ram dust covers are in place.					✓			
1.7	Operating time	For pneumatic or electrically actuated vents, CHECK operating time of system.					✓			
1.8	Thermal links	CHECK the thermal release links for type and temperature rating and REPLACE release links that have been coated with paint or similar coatings.						✓		

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.9	Thermal links—Sample test	After 20 years, test a representative sample (greater of 5% or 5 links) of the thermal links and thereafter every five years, test a different sample. REPLACE all thermal release links throughout the building if any one of the representative samples fails.	See action column.							
1.10	Control centres and supply lines	CHECK all control centres and supply lines for damage or deterioration.					✓			
1.11	Plans	ENSURE installation plans include current information.						✓		

Table 65: ITM Schedule and Records – Outdoor Air Intakes

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Obstruction	CHECK that the intake area is free from obstructions (both sides).					✓			
1.2	Fire hazards	REMOVE any combustible material from the vicinity of the louvre.					✓			
1.3	Corrosion	CHECK intake louvres for corrosion and damage.					✓			
1.4	Insect screens	CHECK and clean insect screens, replace if damaged.					✓			

Table 66: ITM Schedule and Records – Draught Curtains / Smoke baffles / Smoke Reservoirs

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Integrity	CHECK that there are no new unsealed penetrations through draught curtains.						✓		
1.2	Fire hazards	REMOVE any combustible material from underneath draught curtains.						✓		
1.3	Corrosion	CHECK draught curtains for corrosion (where applicable) and damage.						✓		

Table 67: ITM Schedule and Records – Smoke Control Features – Fire Fan Control Panel (FFCP)

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Vented batteries (where fitted)	INSPECT the battery enclosure for corrosion.				✓				
1.2	FFCP latching and reset	CHECK that after initiation by a signal from FIP, FFCP systems remain operating in fire mode until reset by reset switch on FFCP.				✓				
1.3	Override controls	CHECK that manual override ON and OFF both operate. NOTE: Manual override should function in normal mode and fire mode.				✓				
1.4	Airflow fault indicator	CHECK the operation of the airflow fault indicator.				✓				
1.5	Open-circuit fault indicator	CHECK the operation of the air handling equipment interconnecting cable open-circuit fault indicator.				✓				
1.6	Closed-circuit fault indicator	CHECK the operation of the air handling equipment interconnecting cable closed-circuit fault indicator.				✓				
1.7	Electrical	CHECK the operation of the electricity phase-fail fault indicator.				✓				
1.8	Fan-running indicator	CHECK the operation of the fan-running indicator.				✓				
1.9	Fan-stopped indicator	CHECK the operation of the fan-stopped indicator.				✓				
1.10	Fan fault indicator	CHECK the operation of the fan-fault indicator.				✓				

Table 68: ITM Schedule and Records – Smoke Control Features – Variable Frequency Inverters (VFIs)

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Dust and dirt	CHECK for dust and accumulated dirt on vents and circuit boards and clean where necessary. Where there is evidence of moisture, inspect on a monthly basis or replace enclosure with one having an appropriate IP rating.				✓				
1.2	Electrical	CHECK electrical connections and tighten where necessary.				✓				
1.3	Cooling fans	CHECK the operation of all cooling fans.				✓				
1.4	Damage and overheating	CHECK for evidence of damage or overheating and clean or repair where necessary.					✓			
1.5	Calibration	CHECK calibration and set point of all adjustable components including customer settings and correct if necessary.						✓		
1.6	Fire-mode override	CHECK operation of fire-mode override functions and correct if necessary.						✓		

Table 69: ITM Schedule and Records – Smoke Control Systems –Emergency Staircase Pressurisation

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Alterations	SURVEY system to ensure that HVAC additions and removals, building work or unintentional obstructions have not affected functionality or performance of original system.							✓	
1.2	Partial simulation	Partially SIMULATE the fire/smoke situation to effect operation of the pressurization system. Check fans, dampers and indicator lamps operate in fire mode as documented. Check for excessive noise, ease of opening doors and correct movement of air from each pressurised area through a selected open door.					✓			
		(a) Fan operation					✓			
		(b) Damper operation					✓			
		(c) Indicator lamps					✓			
		(d) Noise					✓			
		(e) Ease of door opening					✓			
		(f) Air movement					✓			
NOTES: 1 The purpose of a simulated testing routine is to check the functioning of the pressurization system and not the detectors themselves. The recommended practice in this case is to simulate activation of the system by initiating the fire alarm via the switch in the FIP. 2 This test is initiated in the fire panel to verify the integrity of the interface between fire and mechanical systems 3 For the purpose of simulation in accordance with this Item (1.1), the use of elementary sensing methods is sufficient to verify functionality of fans or dampers as well as the pressurization system, e.g., fan function may be verified by hearing it start or observing change in status of an indicator lamp, and pressurization systems may be assessed by the use of tell-tale ribbons in doorways, and operator's judgement of noise or door-opening force. 4 In order to assess the performance of the system, it is recommended that the same door and the same measuring technique be used every time.										

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.2	Non-fire mode	SWITCH all systems back to 'normal' and check that all equipment and indicator lamps are in the correct non-fire mode.				✓				
1.3	Full simulation	Fully SIMULATE a fire/smoke situation from any device such as a sprinkler, thermal or smoke detector, to effect operation of the pressurization and all other systems required to operate in fire mode. CHECK that the following parameters meet the performance requirements:						✓		
		(a) Airflow velocity across all required doorways.						✓		
		(b) The force required to open each door.						✓		
		(c) The noise level at typical doorways and those identified as subject to the highest noise level.						✓		
		(d) Time taken for door opening force and airflow velocity to be restored, after opening and re-closing two successive doors adjacent to the test door (test door(s) to be that identified as having the longest restoration time).						✓		
		(e) When smoke is introduced to the supply smoke sensor of any air-pressurization system, the associated pressurization fan is shut down.						✓		
		(f) Operation of the manual switch provided for fire brigade personnel starts and stops fans supplying air to the pressurized fire-isolated escape routes.						✓		
		(g) Check indicator lamps change status when fan starts or stops.						✓		
		(h) With all air-pressurization and other systems operating simultaneously, check that any specific air relief is fully operational and enables the required airflow from pressurized areas to be sustained.						✓		
		NOTES:								

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		1 Any fan starting and stopping checks should be carried out in such a manner to avoid overheating motors due to excessively frequent starts. 2 The number of doors required to be tested in Item 1.3 may be reduced, provided the building owner has confirmed, in writing, that there have been no changes to the building structure, internal layout, partitioning and air-handling systems in the period since the last test. In such cases, a representative number of doors is to be tested. Test doors should be selected at the extremes of the system performance criteria, i.e. high noise level, high opening force and low air velocity. When testing is carried out on a representative number of doors less than the full number, the same doors should be selected and tested each time.								
1.4	Revert system to normal	SWITCH system to 'normal' and check that all equipment and indicator lamps are in the correct non-fire mode.						✓		

Table 70: ITM Schedule and Records – Smoke Control Systems – System Change-Over Under Fire Conditions

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Alterations	SURVEY system to ensure that HVAC additions and removals, building work or unintentional obstructions have not affected functionality or performance of original system.						✓		
1.2	Partial simulation	Partially SIMULATE the fire/smoke situation (for each system or zone where relevant) to effect change over from normal mode to fire mode or shutdown as appropriate. Check fans, dampers and indicator lamps operate in fire mode as documented.				✓				
		NOTES: 1 The purpose of a simulated testing routine is to check the functioning of the air handling changeover system and not the detectors themselves. The recommended practice in this case is to simulate activation of the system by initiating the fire alarm via the switch in the FIP. 2 This changeover test is initiated in the fire panel to verify the integrity of the interface between fire and mechanical systems. 3 Verification of fan or damper operation may use elementary testing procedures. e.g., hearing fan start, observation of indicator lamp change of status, feeling of air movement across doorway, grille, duct, etc.								
1.3	Revert to normal	SWITCH system back to 'normal' and check that all equipment and indicator lamps are in the correct non-fire mode				✓				
1.4	Full simulation	CONDUCT a full simulation of a fire/smoke situation (for each system or zone where relevant) to effect change-over from normal mode to fire mode or shutdown as appropriate.						✓		
		CHECK fans, dampers and indicator lamps operate in fire mode as documented.						✓		
		NOTES: 1 The purpose of an automatic testing routine is to check the functioning of the air-handling changeover system by the activation of a field device (detector or sprinkler). The recommended practice in this case is bringing a heat, flame or smoke source to a detector or operating a sprinkler								

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		valve to activate flow/pressure switches. 2 This changeover test is initiated in the field device to verify the end-to-end integrity of the interface between field device and mechanical systems								
1.5	Fans start and stop at Fire fan control panel (FFCP)	OPERATE the manual switches at the FFCP. Check that fans start and stop and dampers, if applicable, open and close as documented						✓		
1.6	System shutdown	Where supply air systems are fitted with a smoke detector(s), check system shuts down when the detector is automatically activated as documented.						✓		

Table 71: ITM Schedule and Records – Smoke Control Systems – Smoke Exhaust

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Alterations	SURVEY system to ensure that HVAC additions and removals, building work or unintentional obstructions have not affected functionality or performance of original system.						✓		
1.2	Partial simulation	Partially SIMULATE a fire/smoke situation to effect operation of the smoke exhaust system. Check fans, dampers and indicator lamps operate in fire mode as documented. Check for excessive noise and correct movement of air				✓				
		NOTES: 1 The purpose of a partial simulation testing routine is to check the functioning of the smoke exhaust system and not the detectors themselves. The recommended practice in this case is to initiate the fire alarm via the switch in the FIP. 2 This test is initiated in the fire panel to verify the integrity of the interface between fire and mechanical systems. 3 Verification of operation may use elementary testing procedures, e.g., hearing fan start, observation of indicator lamp change of status, etc., and the use of elementary sensing methods is sufficient to verify noise and air movement, e.g., operators judgment of sound, tell-tale ribbon in doorway, etc.								
1.3	Revert to normal	SWITCH system back to 'normal' and check that all equipment and indicator lamps are in the correct non-fire mode.				✓				
1.4	Full simulation	CONDUCT a full simulation of a fire/smoke situation from any device such as a sprinkler, thermal or smoke detector, to effect operation of the smoke exhaust system and all other systems required to operate in fire mode.						✓		
		CHECK:						✓		
		(a) Exhaust airflow rate from the space.						✓		
		(b) Indicator lamps change status when fan starts or stops.						✓		
		(c) That operation of the manual switch provided for fire brigade personnel						✓		

No.	Item	Action Required	Frequency							Additional Comments / Information
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		starts and stops smoke exhaust fans.								
		(d) The maximum noise level in the space.						✓		
		NOTES: 1 The purpose of an automatic testing routine is to check the functioning of the air-handling changeover system by the activation of a field device (detector or sprinkler). The recommended practice in this case is bringing a heat, flame or smoke source to a detector or operating a sprinkler valve to activate flow/pressure switches. 2 This changeover test is initiated in the field device to verify the end-to-end integrity of the interface between field device and mechanical systems.								
1.5	Fans start and stop at Fire fan control panel (FFCP)	OPERATE the manual switches at the FFCP. Check that fans start and stop and dampers, if applicable, open and close as documented						✓		
1.6	System shutdown	Where supply air systems are fitted with a smoke detector(s), check system shuts down when the detector is automatically activated as documented.						✓		

Table 72: ITM Schedule and Records – Smoke Control Systems – HVAC System Shutdown

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
1.1	Alterations	SURVEY system to ensure that HVAC additions and removals, building work, or unintentional obstructions have not affected functionality or performance of original system.						✓		
1.2	Partial simulation	Partially SIMULATE a fire/smoke situation to effect operation of the smoke exhaust system. Check fans, dampers and indicator lamps operate in fire mode as documented. Check for excessive noise and correct movement of air				✓				
		NOTES: 1 The purpose of a partial simulation testing routine is to check the functioning of the smoke exhaust system and not the detectors themselves. The recommended practice in this case is to initiate the fire alarm via the switch in the FIP. 2 This test is initiated in the fire panel to verify the integrity of the interface between fire and mechanical systems. 3 Verification of operation may use elementary testing procedures, e.g., hearing fan start, observation of indicator lamp change of status, etc., and the use of elementary sensing methods is sufficient to verify noise and air movement, e.g., operators judgment of sound, tell-tale ribbon in doorway, etc.								
1.3	Revert to normal	SWITCH system back to 'normal' and check that all equipment and indicator lamps are in the correct non-fire mode.				✓				
1.4	Full simulation	CONDUCT a full simulation of a fire/smoke situation from any device such as a sprinkler, thermal or smoke detector, to effect operation of the smoke exhaust system and all other systems required to operate in fire mode.						✓		
		CHECK:						✓		
		(a) Exhaust airflow rate from the space.						✓		
		(b) Indicator lamps change status when fan starts or stops.						✓		
		(c) That operation of the manual switch provided for fire brigade						✓		

No.	Item	Action Required	Frequency							Additional Information / Comments
			Weekly	Monthly	2 Monthly	Quarterly	6 Monthly	Yearly	Five-yearly	
		personnel starts and stops smoke exhaust fans.								
		(d) The maximum noise level in the space.						✓		
		NOTES: 1 The purpose of an automatic testing routine is to check the functioning of the air-handling changeover system by the activation of a field device (detector or sprinkler). The recommended practice in this case is bringing a heat, flame or smoke source to a detector or operating a sprinkler valve to activate flow/pressure switches. 2 This changeover test is initiated in the field device to verify the end-to-end integrity of the interface between field device and mechanical systems								
1.5	Fans start and stop at Fire fan control panel (FFCP)	OPERATE the manual switches at the FFCP. Check that fans start and stop and dampers, if applicable, open and close as documented						✓		
1.6	System shutdown	Where supply air systems are fitted with a smoke detector(s), check system shuts down when the detector is automatically activated as documented.						✓		

Table 73: Example Interface Test Schedule – Sprinkler/Deluge System

No.	Item	Action required & pass/fail criterion	Records		
			Pass / Fail	Portion of plant/building affected	Result/Comments
1.1	Sprinkler test valve	Perform the six-monthly valve or flow switch test as applicable and check the operation of the following interfaced system as applicable.			
1.2	Fire indicator panel	CHECK that sprinkler operation is indicated correctly.			
1.3	Fire door release	CHECK that fire and smoke doors have closed correctly (e.g. correct sequencing for double leaf doors).			
1.4	Security door release	CHECK that security doors have unlocked correctly.			
1.5	Roof vents	CHECK that interfaced roof vents open correctly.			
1.6	Warning system	CHECK that warning systems operate correctly.			
1.7	Plant shutdown	CHECK that plant shuts down correctly.			
1.8	Fuel shut-off	CHECK that the shut-off valves function.			
1.9	Elevator override	CHECK that the elevator override operates correctly.			
1.10	Other systems	CHECK that other systems operate correctly.			
1.11	Stair pressurization system	CHECK that the fire-isolated exit pressurization operates correctly.			
1.12	Smoke control	CHECK that the smoke control system operates correctly.			
1.13	Smoke exhaust	CHECK that the smoke exhaust operates correctly.			
1.14	Air-handling	CHECK that the air handling system operates correctly.			
1.15	Systems faults	Simulate faults on each interfaced system and check that the fault is indicated. <u>Note:</u> This is normally indicated at the fire indicator panel (CIE.)			
1.16	Special hazards	CHECK that the special hazards system operates correctly.			
1.17	Standby generator	Where a standby generator is provided, switch primary power supply off to test start-up of generator and systems operation during switchover. Confirm that switchover time is less than 10s.			

Table 74: Example Interface Test Schedule – Fire Detection System

No.	Item	Action required & pass/fail criterion	Records		
			Pass / Fail	Portion of plant/building affected	Result/Comments
1.1	Detection device activation and manual control functions	Initiate appropriate detection devices and controls according to test plan and check the correct operation of the interfaced functions. <u>Note:</u> This test is intended to check that the fire detection system and interfaced system perform in accordance with the approved cause-and-effect statements/matrices. This test would normally require detectors to be activated in various detection zones to confirm operation of systems. Activation of detectors in secondary detection zones may also be required where these could result in a change in system operation (e.g. exhaust and supply fan operation may change). Operation of manual call points should also be verified.			
1.2	Pre-action sprinkler or deluge system	Check that the pre-action sprinkler or deluge system valve operates correctly.			
1.3	Fire door release	CHECK that fire and smoke doors have closed correctly (e.g. correct sequencing for double leaf doors).			
1.4	Security door release	CHECK that security doors have unlocked correctly.			
1.5	Roof vents	CHECK that interfaced roof vents open correctly.			
1.6	Warning system	CHECK that warning systems operate correctly.			
1.7	Plant shutdown	CHECK that plant shuts down correctly.			
1.8	Fuel shut-off	CHECK that the shut-off valves function.			
1.9	Elevator override	CHECK that the elevator override operates correctly.			
1.10	Other systems	CHECK that other systems operate correctly.			
1.11	Stair pressurization system	CHECK that the fire-isolated exit pressurization operates correctly.			
1.12	Smoke control	CHECK that the smoke control system operates correctly.			
1.13	Smoke exhaust	CHECK that the smoke exhaust operates correctly.			
1.14	Air-handling	CHECK that the air handling system operates correctly.			

No.	Item	Action required & pass/fail criterion	Records		
			Pass / Fail	Portion of plant/building affected	Result/Comments
1.15	Systems faults	Simulate faults on each interfaced system and check that the fault is indicated. <u>Note:</u> This is normally indicated at the fire indicator panel (CIE.)			
1.16	Special hazards	CHECK that the special hazards system operates correctly.			
1.17	Standby generator	Where a standby generator is provided, switch primary power supply off to test start-up of generator and systems operation during switchover. Confirm that switchover time is less than 10s.			

Table 75: Example Interface Test Schedule – Special Hazard System

No.	Item	Action required & pass/fail criterion	Records		
			Pass / Fail	Portion of plant/building affected	Result/Comments
1.1	System operation	Simulate the operation of the special hazard system and controls according to test plan and check the correct operation of the interfaced functions in accordance with the cause-and-effect statement/matrix.			
1.2	Fire door release	CHECK that fire and smoke doors have closed correctly (e.g. correct sequencing for double leaf doors).			
1.3	Security door release	CHECK that security doors have unlocked correctly.			
1.4	Warning system	CHECK that warning systems operate correctly.			
1.5	Plant shutdown	CHECK that plant shuts down correctly.			
1.6	Fuel shut-off	CHECK that the shut-off valves function.			
1.7	Other systems	CHECK that other systems operate correctly.			
1.8	Dampers	Check that the dampers operate correctly.			
1.9	Air-handling	CHECK that the air handling system operates correctly.			
1.10	Systems faults	Simulate faults on each interfaced system and check that the fault is indicated. <u>Note:</u> This is normally indicated at the fire indicator panel (CIE.)			
1.11	Standby generator	Where a standby generator is provided, switch primary power supply off to test start-up of generator and systems operation during switchover. Confirm that switchover time is less than 10s.			

Table 76: Example Interface Test Schedule – Fire Fan Control Panel

No.	Item	Action required & pass/fail criterion	Records		
			Pass / Fail	Portion of plant/building affected	Result/Comments
1.1	Fire fan control panel (FFCP)	Ensure that all functions are in the normal state without being isolated or disabled and then initiate appropriate detection devices and controls according to test plan and check the correct operation of the interfaced functions in addition to those controlled by the fire detection and alarm system.			
1.2	Fire door release	CHECK that fire and smoke doors have closed correctly (e.g. correct sequencing for double leaf doors).			
1.3	Security door release	CHECK that security doors have unlocked correctly.			
1.4	Warning system	CHECK that warning systems operate correctly.			
1.5	Plant shutdown	CHECK that plant shuts down correctly.			
1.6	Fuel shut-off	CHECK that the shut-off valves function.			
1.7	Other systems	CHECK that other systems operate correctly.			
1.8	Elevator override	CHECK that the elevator override operates correctly.			
1.9	Dampers	Check that the dampers operate correctly.			
1.10	Air-handling	CHECK that the air handling system operates correctly.			
1.11	Fire-isolated exit pressurization system	CHECK that the fire-isolated exit pressurization operates correctly.			
1.12	Smoke control	CHECK that the smoke control system operates correctly.			
1.13	Smoke exhaust	CHECK that the smoke exhaust operates correctly.			
1.14	Systems faults	Simulate faults on each interfaced system and check that the fault is indicated. <u>Note:</u> This is normally indicated at the fire indicator panel (CIE.)			
1.15	Special hazards	CHECK that the special hazards system operates correctly.			

No.	Item	Action required & pass/fail criterion	Records		
			Pass / Fail	Portion of plant/building affected	Result/Comments
1.16	Standby generator	Where a standby generator is provided, switch primary power supply off to test start-up of generator and systems operation during switchover. Confirm that switchover time is less than 10s.			