

# Minimum Design Requirements & Technical Specifications for Fire Protection Systems Manual

AREA OF APPLICABILITY

**ALL AIRPORTS**

Division

**Corporate Infrastructure & Asset Management**  
(Infrastructure Asset Management)

Next Revision Date:  
**August 2027**

Control Disclosure:  
**Confidential**

**Effective Date: 30<sup>th</sup> August 2024**

## Minimum Design Requirements & Technical Specifications for Fire Protection Systems Manual

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### 1. Purpose

The purpose of these minimum design requirements and technical specifications is to ensure groupwide:

- Prevention of loss of life on the Company's premises due to fire.
- Prevention of damages to the Company and stakeholders' property due to fire.
- Minimisation of business interruption due to fire.
- Legal compliance of the Company's Fire Systems.
- Adoption of fire systems which are maintainable and have suitable Life Cycle Costs.
- Adoption of compatible systems where integration with existing fire systems is required.
- Adoption of fire systems which promote environmental sustainability.
- Adoption of fire system technologies which have a proven track record.
- Adherence to the Company's insurance requirements.

#### 1.1 Scope of the Standard

These minimum design requirements and technical specifications for Fire Protection Systems apply to airports and buildings owned within the Republic of South Africa by Airports Company South Africa SOC Limited.

The fire protection systems for JET A1 fuel storage and reticulation systems including voice evacuation systems, are not included in the ambit of these minimum design requirements and technical specifications.

### 2. Definitions

#### 2.1 Definitions

##### **Rational assessment**

assessment by a competent person of the adequacy of the performance of a solution in relation to requirements including as necessary, a process of reasoning, calculation and consideration of accepted analytical principles, based on a combination of deductions from available information, research and data, appropriate testing and service experience.

##### **Rational Design**

Design by a competent person involving a process of reasoning and calculation and which may include a design based on the use of a standard or other suitable document.

##### **Heating, Ventilation and Air-conditioning - HVAC**

This is the process of controlling indoor air environment in terms of temperature, humidity, air movement and air cleanliness.

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### 2.2 Abbreviations

Abbreviation	Description
ASIB	Automatic Sprinkler Inspection Bureau
BS	British Standards
CCTV	Closed Circuit Television
CMMS	Computerised Maintenance Management System
DTI	Department of Trade and Industry
ECSA	Engineering Council of South Africa
EN	European Norms
HVAC	Heating, Ventilation and Air- Conditioning
PRENG	Professional Engineer
PRTech	Professional Technologist
SAQCC	South African Qualification and Certification Committee for the Fire Industry
SANS	South African National Standards
SCADA	Supervisory Control and Data Acquisition

### 3. Design Basis, Professionals & Considerations

#### 3.1 Design Basis for Fire Systems

The design basis for fire protection systems shall be for prevention of loss of life, prevention of destruction of property and preservation of business continuity.

#### 3.2 Design Professionals

In line with the Engineering Profession Act 46 of 2000 and the Identification of works regulations, the designs shall be conducted and signed-off by an ECSA registered professional engineer or technologist in the relevant categories.

- Fire Protection System shall be conducted and signed-off by an ECSA registered professional mechanical engineer or technologist.
- Fire Detection System shall be conducted and signed-off by an ECSA registered professional electronics/mechatronics engineer or technologist.
- Other professional in other disciplines other than electronics or mechanical shall be authorised by ECSA prior to conducting designs and sign-off of Fire Protection and Fire Detection System.

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### **3.3 Design Considerations for Fire Protection Systems**

The following shall constitute minimum design considerations for fire protection systems:

#### **3.3.1 Classes of Fire**

Anticipated fire types within a building to be protected shall be identified and classified accordingly to enable suitable response systems and identification of a suitable extinguishing medium.

#### **3.3.2 Detection of Fires**

Due consideration shall be given to how detection of identified anticipated fire types shall be performed and notified.

#### **3.3.3 Evacuation**

Due consideration shall be given to how building occupants shall be notified of a detected fire and which systems shall be used for assisting with the process of evacuation.

#### **3.3.4 Suppression**

Due consideration shall be given to how a combination of possible fire classes shall be suppressed.

#### **3.3.5 Single Points of Failure**

Design of fire systems shall not have single points of failure. Due consideration shall be given to how functional continuity shall be preserved in the event of power failures and functional failure by critical components or subsystem of the fire protection system.

#### **3.3.6 Environmental Sustainability**

Due consideration shall be given to selection of suppression media with low Ozone Depletion Potential and a low Global Warming Potential.

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### **3.3.7 Corrosion**

The design shall consider the corrosion potential of the area where the fire protection systems are to be deployed to enable suitable selection of construction materials. The Company's preference is for stainless steel piping in sprinkler systems for highly corrosive environments.

### **3.3.8 Integration with Other Systems**

The design shall consider integration with other relevant systems such as HVAC, Vertical circulation assets and the requirements thereof.

### **3.3.9 Theft**

The design shall consider the proliferation of theft to enable suitable selection of robust systems, access control systems and alert systems.

## **3.4 Performance Requirements**

### **3.4.1 Fire Detection System**

The performance requirements for fire detection systems are as follows:

- Availability – 99.5%
- System Design life – 7 years with allowable 5 yearly system refurbishment on field detection devices, sounders and panel batteries

### **3.4.2 Fire Sprinkler System**

The performance requirements for fire detection systems are as follows:

- Availability – 99.5%
- System Design life – 20 years

### **3.4.3 Fire Hydrants and Hose Reels**

The performance requirements for fire hydrants and hose reels are as follows:

- Availability – 99.5%
- System Design life – 20 years

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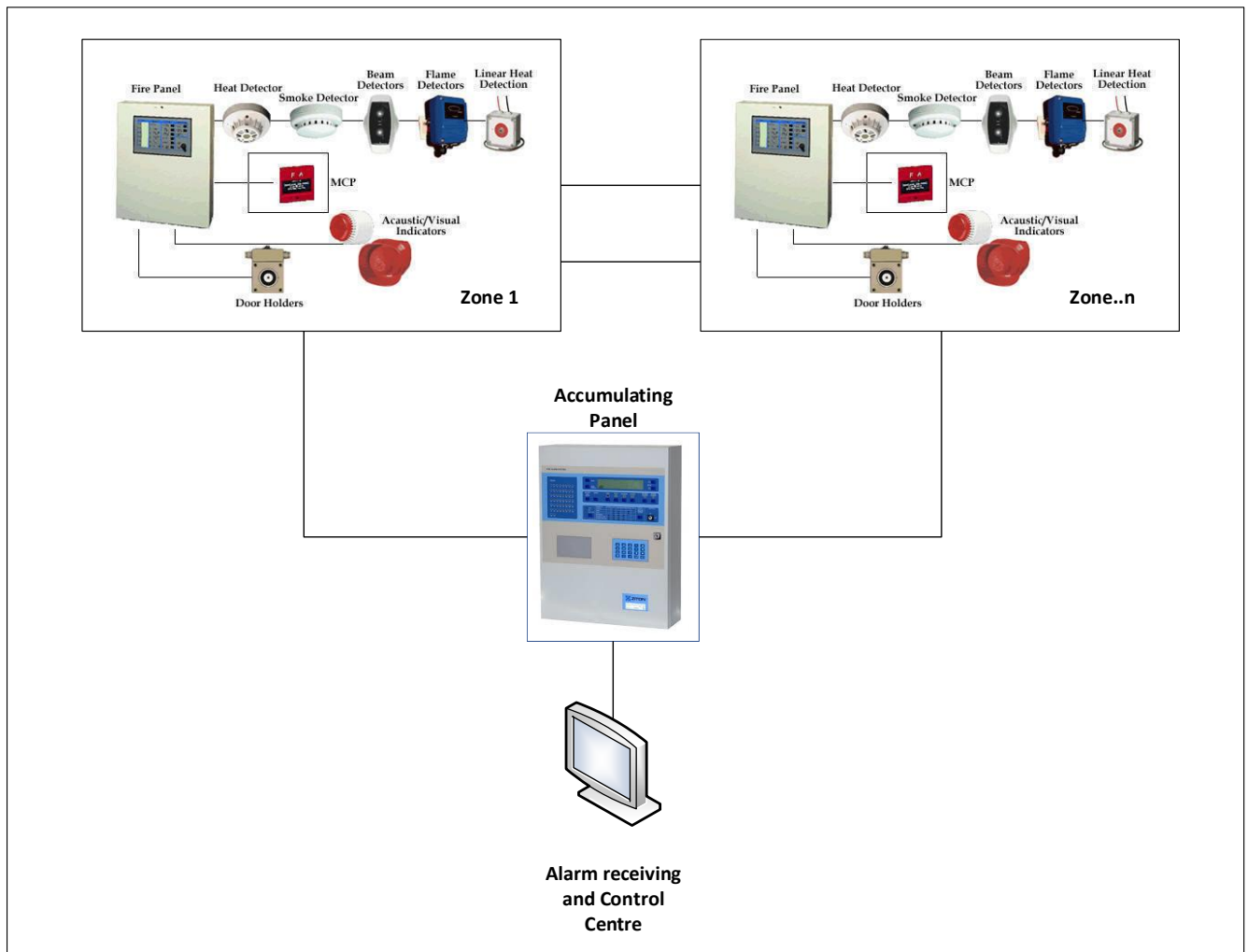
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### 4. Preferred Design Configurations

In addition to different configurations prescribed legally by SANS 10400 Part T, Part W and other requirements prescribed in the ASIB rule books, the Company has preferred design configurations across different fire protection systems.

#### 4.1 Fire Detection

The following fire panel design configuration is preferred to enable inter-zonal monitoring of field devices and thereby increasing the reliability of the system.



**Figure 1 - Preferred Fire Detection Panel Design Configuration**

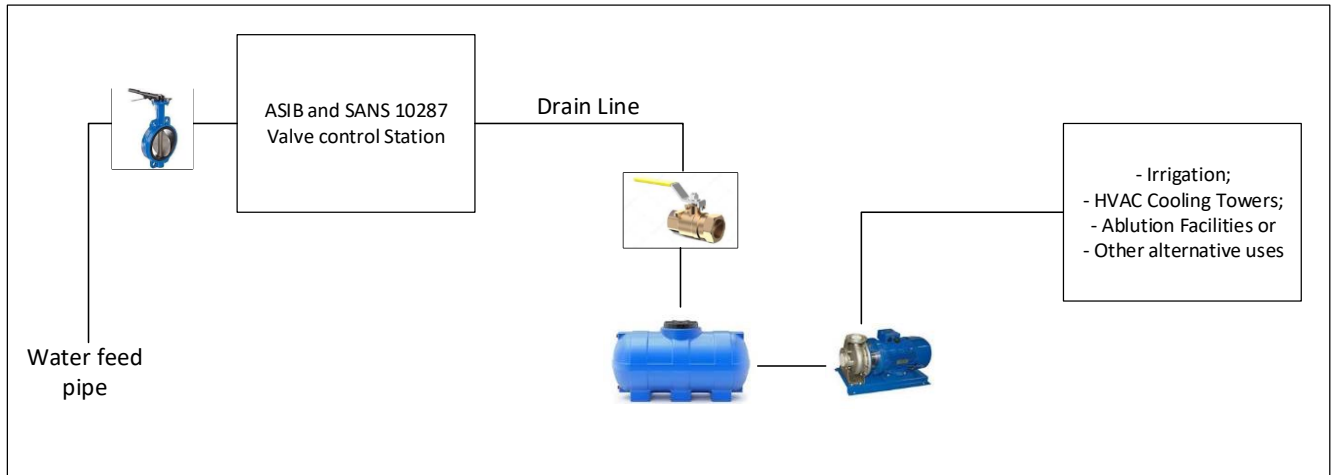
#### 4.2 Fire Sprinkler System

Fire sprinkler valve station design is prescribed by SANS 10287. In addition to the requirements of this standard, it is the Company's preference that a feed pipe to the

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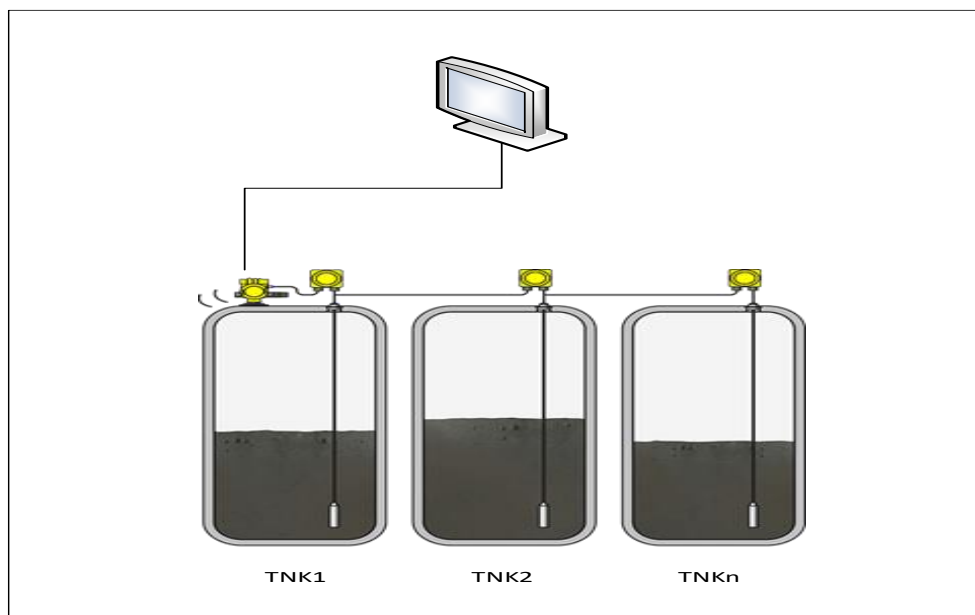
valve station be fitted with an isolation butterfly valve to enable maintenance work. The drain line of the valve station shall be routed to a water storage tank or water recovery system to limit water wastage during flow testing and valve servicing. The typical configuration is shown in Figure 2 below.



**Figure 2 - Preferred Feed and Drain Configurations at Sprinkler Valve Stations**

### 4.3 Fire Hydrant and Hose Reels

Each Diesel motor for fire pumps shall have its dedicated diesel storage tank. These tanks shall be fitted with level sensors and the data thereof transmitted to the Airport Infrastructure Monitoring and Control Centre to promote visibility of the diesel levels.



**Figure 3 – Typical Preferred Diesel Storage Tank Configuration**

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### **4.4 Minimum Data Retention for Fire Systems**

Where data about performance of fire systems and error logs exist, such information shall be retained for a minimum of 90 calendar days local to the system. It shall be made possible for such data to be retrieved online, via a RS232-USB2.0 Cable and via Bluetooth.

It is preferred that operation and testing of fire water pumps and drive motors (diesel or electrical) be system based and a report thereof be generated automatically with a time stamp and recorded parameter values. This is to demonstrate the objectivity of the process and authenticity of fire protection systems performance data during group insurance audits.

### **4.5 CCTV Monitoring**

Closed circuit television monitoring shall be installed in fire water pump stations to enable visual operation by Airport Infrastructure Monitoring staff. Where practical, it shall be made possible for designated maintenance personnel to have access to the camera live feed via a mobile app.

## **5. Guidelines For Design Trade-Offs**

The following may be the basis for design trade-offs:

- The outcomes of a rational fire design process
- Space constraints
- The availability of capital and
- Hazard classification of a building.

## **6. Local Content**

### **6.1 Fire Sprinkler Systems, Fire Hydrants and Hose Reels**

The DTI designated products for local production in fire systems such as valves, pipes, pumps, motors and cables shall be sourced locally in compliance with minimum local content thresholds. Only hose reels manufactured in accordance with SANS 1475-2 shall be installed.

### **6.2 Fire Detection System**

Back-up panel batteries and manual call stations shall be sourced locally. Other components of the system such as panels, smoke detectors, flame detectors etcetera shall to an extent practically possible be sourced locally.

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### **6.3 Fire Extinguishers**

Fire extinguishers and extinguisher boxes shall be sourced locally and shall comply with the requirements of SANS 1475-1.

## **7. Deliverable Design Information or Minimum Design Outputs**

The following information shall be deliverable at the end of FIPDM Stage 3 and 4:

### **7.1 General**

- Rational fire design report showing all fire zones.
- Hazard classification of protected buildings.

### **7.2 Fire Sprinkler, Fire Hydrant and Hose Reel Systems**

- Hydraulic calculations and models where applicable
- Drive power requirements for pumps and performance specifications
- Layout drawings and Sprinkler block diagrams showing pipe sizes
- Operating and Control Philosophy
- Electrical designs
- Civil engineering designs

### **7.3 Fire Detection**

- Zone layout of fire detection system showing position of detection devices, manual call stations, signal accumulation panels and sounders.
- Zone Schedule of equipment where fire detection interface is required. These may include Lifts, Smoke extraction fans, dampers, Air Handling Units, fresh air fans, voice evacuation system, roof ventilators and fire escape doors.
- Operating and control philosophy

### **7.4 Fire Extinguishers**

- Class(es) of fire anticipated
- Type of fire extinguishing medium
- Selected location of fire extinguishers

## **8. Equipment Specifications**

All new Buildings shall be compliant with SANS 204: 2011, clause 4.3 Building Design.

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### 8.1 Fire Sprinkler Systems

- Pumps shall comply to requirements of SANS 10287
- Diesel motors shall comply to requirements of SANS 10287
- Notwithstanding the requirements of SANS 10287, the fire sprinkler installation shall conform with requirements of the latest edition of ASIB rule book which would be in force at the stage of the sprinkler design.
- Electrical motors shall comply to requirements of SANS 1804-3.

### 8.2 Fire Detection System

- All Fire detection components shall comply with the requirements of SANS 10139.
- In addition, fire detection system shall be placed on essential power
- The detection devices shall be addressable.
- The SCADA shall be of an industrial type showing zones and floors.

### 8.3 Fire Hose Reels and Hydrants

- Hose reels and fire hydrants shall conform to SANS 543, SANS 1128-1 and SANS 1475-2.

### 8.4 Fire Equipment Signage

- Fire-fighting equipment signage shall comply with SANS 1186-1.

### 8.5 Fire Extinguishers

- Fire extinguishers shall conform to SANS 1475-1
- Fire extinguisher boxes shall be fitted with a detection system to detect, sound an alarm and notify relevant maintenance personnel whenever an extinguisher is removed from the box. This shall only be applicable in remote installation areas where theft is rife.

## 9. Commissioning, Maintenance and Handover Requirements

### 9.1 Commissioning

#### 9.1.1 Commissioning of Fire Sprinkler System, Fire Hydrants and Hose Reels

The Commissioning of fire sprinklers shall be according to SANS 10287 clause 5 and 10. The commissioning shall further satisfy the requirements of the relevant municipal Council. Such commissioning shall be conducted by a fire practitioner registered with ECSA as a practitioner for water-based systems.

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The documentation required shall include but not limited to commissioning and acceptance tests documents in terms of SANS 10287 Clause 10.

Fire hydrant tests shall include but not limited to the static water pressure tests in terms of SANS 1475-2 Annexure C.

Hose reels tests shall include flow tests and results thereof recorded.

### 9.1.2 Commissioning of Fire Detection Systems

The Commissioning of fire detection systems shall be according to SANS 10139 clause 11. The commissioning shall further satisfy the requirements of the relevant municipal Council. Such commissioning shall be conducted by a fire practitioner registered with ECSA as a practitioner for fire detection systems or a SAQCC authorised person for fire detection. Where fire detection is being used as activation mechanism for gas suppression, a ECSA registered fixed gaseous systems practitioner or a SAQCC authorised person for gas suppression shall commission such a gas suppression system.

## 9.2 Maintenance and Handover Requirements

Handover documentation for all fire protection systems shall include but not limited to the following:

- As-built drawings signed off by the relevant PRENG or PRTECH
- Soft copies of drawings in DWG format
- Council approvals
- Engineer's certificate (Form 4 of SANS 10400)
- Commissioning documentation
- PDF Datasheets of all equipment installed
- PDF schedule of all equipment installed
- Maintenance and Operating Manuals
- List of critical spares
- Training records of designated Maintenance Personnel
- [Asset Retirement & Disposal form – FIN 016](#) where applicable
- Proof of asset loading in CMMS
- Warranty documentation
- Proof of Capitalisation of the installed asset and subsequent entry into the [Fixed Assets Capitalisation Form – FIN 005](#)

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### 10. Process for Monitoring

The effective implementation and monitoring of this procedure shall be done through relevant committees and reviews. Self-assessment by Maintenance Engineering (level 1) and Operational Governance (level 2) shall be conducted to determine compliance, implementation and effectiveness of this procedure. In order to ensure compliance to statutory requirements, audits on annual basis or per audit plan shall be conducted to determine compliance status.

MONITORING CONTROLS	PURPOSE	RESPONSIBLE	FREQUENCY
COE Oversight Compliance Matrix	Oversight compliance	Group Manager: ME (as delegated)	Real Time
Internal Audits	Determine the effectiveness of the procedure and test the outcome of the manual.	Internal Audit	Annually
CIAM Manco	Measure adequacy and implementation of the manual	Group Executive: CIAM	Planned Interval
Operations Management Manco	Measure adequacy and implementation of the manual	Operations Management	Planned Interval

**Note:** This manual shall be reviewed in three (3) years cycle and if there is a need to review the manual before three (3) years cycle laps due to any circumstances being legal requirements, changes in the businesses, the need to reflect current practices or activities, the manual shall be unlocked for review accordingly.

**Disclaimer:** In instances where document links are not accessible, directly access the documents on the Policy Management Document Store on the Airports Company South Africa SOC Limited intranet.

### 11. Accountabilities and Responsibilities

#### 11.1 Accountabilities

The overall accountability for the development of this standard and guidelines lies with the Group Executive: Corporate Infrastructure & Asset Management with the support of the Group Manager: Enterprise Asset Management. However, in the absence the designated person the acting person shall assume responsibility as per delegation of

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authority. The overall accountability for the effective implementation and adherence of this procedure lies with the Group Executive: Operations Management with the support of the Senior Manager: Maintenance Engineering. However, in the absence the designated person the acting person shall assume responsibility as per delegation of authority.

Authorities	Lead: Infrastructure Asset Management	Regional General Manager	Group Executive: Capital Infrastructure & Asset Management	Group Executive: Operations Management	Group Manager: Maintenance Engineering	Employees (Standard role players)
Has overall accountability for development of this standard	<i>Responsible</i>	-	<i>Accountable</i>	<i>Responsible</i>	<i>Consulted</i>	<i>Consulted</i>
Has overall responsibility for implementation and adherence of this standard	<i>Responsible</i>	<i>Responsible</i>	<i>Accountable</i>	<i>Responsible</i>	<i>Responsible</i>	<i>Responsible</i>
Consulted at the time of an exception and adherence of this standard.	<i>Consulted</i>	<i>Consulted</i>	<i>Consulted</i>	<i>Consulted</i>	<i>Consulted</i>	<i>Consulted</i>
Has overall responsibility for adherence, implementation and performance of a given task.	<i>Responsible</i>	<i>Responsible</i>	<i>Responsible</i>	<i>Responsible</i>	<i>Responsible</i>	<i>Responsible</i>
Has responsibility for approval and authorisation	<i>Responsible</i>	<i>Informed</i>	<i>Accountable</i>	<i>Responsible</i>	<i>Informed</i>	-

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Authorities	Lead: Infrastructure Asset Management	Regional General Manager	Group Executive: Capital Infrastructure & Asset Management	Group Executive: Operations Management	Group Manager: Maintenance Engineering	Employees (Standard role players)
Communicate the standard to all impacted stakeholders or employees.	<i>Accountable</i>	<i>Responsible</i>	-	-	<i>Responsible</i>	<i>Informed</i>

### 11.2 Roles and Responsibilities

#### Senior Site Manager

- Line Manager shall ensure that all works adhere to this standard

#### Employees

- The representative of an employee can be a site engineer, approved consultant, or design engineer.
- Ensure that all work (new design or retrofit) adhere to the minimum requirements of this standard and guidelines
- Ensure that all works conforms to section 9 of this document before commissioning
- Handover checklist to be signed off as per section 9.2 of this document

### 12. Non-Conformance Management

Any deviation from this manual shall be identified and registered with corrective and preventative measures for continual improvement in accordance with [Reporting of Non-Conformance Procedure Document - Z001 001M](#).

### 13. Related Policy Documents

Document Control Procedure - Z001 006M

Record Keeping Requirements Procedure - Z001 008M

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### 14. Related Legislation and Standard

SANS 10400 Part T - Application of the National Building Regulations - Part T: Fire Protection

SANS 10400 Part W - Application of the National Building Regulations - Part W: Fire Installation

SANS 193 and 1238 - Fire dampers

EN 12101 - Smoke and heat control systems

BS7974 - Application of fire safety engineering principles to the design of buildings –Code of practice

SANS 10139 - Fire detection and alarm systems for buildings - System design, installation and servicing

SANS10287 - Automatic sprinkler installations for fire-fighting purposes

SANS 10105-1 - The use and control of fire-fighting equipment Part 1: Portable and wheeled (mobile) fire extinguishers

SANS 10105-2 - The use and control of fire-fighting equipment Part 2: Fire hose reels and above-ground hydrants

SANS 1475 – 1 - The production of reconditioned fire-fighting equipment Part 1: Portable and wheeled (mobile) rechargeable fire extinguishers

SANS 1475 – 2 - The production of reconditioned fire-fighting equipment Part 2: Fire hose reels and above-ground hydrants

SANS 1850 - The design and manufacture of commercial kitchen extraction

SANS 246 - Fire protection for electronic equipment installations – Code of practice

SANS 530-9 - Fire detection and fire alarm systems for buildings Part9: Code of Practice for the design, installation, commissioning, and maintenance of emergency voice communication systems

SANS 1066 - Remote centres receiving signals from fire and security systems

Occupational Health and Safety Act no 85 of 1993 and Regulations

Applicable Site Insurance Requirements

Applicable Approving Council's Bylaws and requirements

Engineering Profession act 46 of 2000

Identification of Engineering Work Regulations of 2021

Quality Management System ISO 9001

### 15. Change Control and Verification Procedure

This manual shall only be verified and changed with the authorisation of the Group Executive: Corporate Infrastructure & Asset Management and in accordance with [Change Control and Verification Procedure – Z001 003M.](#)

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### 16. Records

Each Process Owner as identified is responsible for maintaining, storage and protection of their respective documents. Records shall be identifiable, easily retrievable and shall follow retention times as regulated or required by the organisation, statutory or regulatory requirements. Refer [Record Keeping Requirements Procedure – Z001 008M](#)

Record Name	Storage Location	Record Number	Responsible Person	Retention Time
Soft Copy Drawings	Enterprise Asset Management Department	N/A	Group Manager: Enterprise Asset Management	Five (5) Years
Engineers Certificate – Form 4 of SANS 10400	Enterprise Asset Management Department	N/A	Group Manager: Enterprise Asset Management	Five (5) Years
PDF Datasheets of Equipment Installed	Enterprise Asset Management Department	N/A	Group Manager: Enterprise Asset Management	Five (5) Years
PDF Schedule of Equipment Installed	Enterprise Asset Management Department	N/A	Group Manager: Enterprise Asset Management	Five (5) Years
Training Records of Maintenance Personnel	Enterprise Asset Management Department	N/A	Group Manager: Enterprise Asset Management	Five (5) Years
Asset Retirement & Disposal Form	Finance	FIN 016	Senior Manager: Fixed Assets & Projects	Five (5) Years
Fixed Assets Capitalisation Form	Finance	FIN 005	Senior Manager: Fixed Assets & Projects	Five (5) Years
Minimum Design Requirements & Technical Specifications for Fire Protection Systems Manual	Enterprise Asset Management Department	D104MAN	Group Manager: Enterprise Asset Management	Five (5) Years

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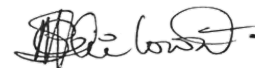
### 17. Revision History

Date last revised	Revision Status	Compiler	Summary of changes
13 <sup>th</sup> August 2024	Version: 1	<b>Chief Engineer:</b> Mechanical  <b>Name and Surname</b> Samuel Moeng	1 <sup>st</sup> Issue

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### 18. Endorsement (See Master in Policy Management Storage Room)

Activity	Name	Signature	Date
Compiler	<b>Chief Engineer:</b> Mechanical  <b>Name and Surname</b> Samuel Moeng		10 Jan 2024
Quality Assurance Department	<b>Policy Assurance &amp; Ethics Specialist</b>  <b>Name and Surname</b> Thabana Mahlo	 	16 August 2024
Supported by	<b>Group Manager:</b> Maintenance Engineering  <b>Name and Surname</b> Peter Sibande		02 July 2024
Supported by	<b>Group Manager:</b> Enterprise Asset Management  <b>Name and Surname</b> Riaaz Essack		10 Sept 2024
Authorised by	<b>Group Executive:</b> Corporate Infrastructure & Asset Management  <b>Name and Surname</b> Charles Shilowa		04 October 2024

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