

Standards and Guidelines for Fire Detection System & Gaseous Suppression System

AREA OF APPLICABILITY

ALL AIRPORTS

Division

**Capital Infrastructure & Asset Management
(Infrastructure Asset Management)**

Next Revision Date:
30th August 2027

**Control Disclosure:
Public**

**Effective Date:
30th August 2024**

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1. Purpose

The standard and guidelines for Fire Detection and Gaseous Suppression Systems document has been prepared to provide guidance on the minimum requirements for the design, installation, and commissioning of the Fire Detection and Gaseous Suppression Systems at Airports Company South Africa SOC Limited

The standards and guidelines manual for Fire Detection and Gaseous Suppression Systems is intended to provide a suitable and uniform approach to Fire Detection and Gaseous Suppression Systems throughout the Organisation. It also seeks to ensure to that there is a level of Fire Detection and Gaseous Suppression Systems standardisation throughout the Company airports. The adoption of a uniform approach and standardisation is aimed at achieving the following:

- Lower spares holding requirements.
- Ease on maintenance activity
- Ease on operator training and maintenance training
- Economies of scale

1.1 Scope of the Standard

This Standards and Guidelines manual for Fire Detection and Gaseous Suppression Systems is aimed at personnel responsible for the design, installation or construction, and modification or upgrades of Fire Detection and Gaseous Suppression Systems within the Company.

2. Definitions and Abbreviations

2.1 Definitions

Alarm Receiving Centre

Continuously manned premises, remote from those in which the fire alarm system is fitted, where the information concerning the state of the fire alarm system is displayed or recorded (or both), so that the fire service can be summoned.

Addressable System

A system in which signals from detectors, manual call points, or any other devices are individually identified at the control and indicating equipment.

Fire Engineering Solution

Application of science and engineering to the achievement of one or more fire safety objectives in such a way that the objectives are achieved without following, in full, prescriptive recommendations of a recognized code of practice.

Networked System

A fire detection and alarm system in which several fire panels are interconnected and able to exchange information.

2.2 Abbreviations

Abbreviation	Description
BS	British Standards
BHS	Baggage Handling Systems
CMMS	Computerised Maintenance Management System
ECSA	Engineering Council of South Africa
FDS	Fire Detection System
GUI	Graphical User Interface
HVAC	Heating, Ventilation, and Air Conditioning
IMC	Infrastructure Management Centre
LED	Light Emitting Diode
MCP	Manual Call Point
SANS	South African National Standards

3. Design Basis, Professionals & Considerations

3.1 Design Basis

The primary design basis for the fire detection and gaseous suppression system is to provide early detection and warning to the outbreak of fire, to allow evacuation and the appropriate firefighting action to be taken before the fire situation gets out of control with intention to:

- Prevent loss of life,
- Prevent destruction to property,
- Prevent business interruption to preserve business continuity.

The secondary design basis for fire detection system shall be satisfaction of relevant legislation whereby the fire detection system forms part of the fire engineering solution, activation of fire protection systems, as well as other systems necessary to ensure early evacuation and attendance to fire incidents by fire services.

3.2 Design Professional

3.2.1 Fire Detection System

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

- 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 Detection System.

It is desirable (not mandatory) that the technicians responsible for the installation, commissioning and servicing of the Fire Detection Systems are registered with SAQCC according to SAQCC rules and levels. The registration with the SAQCC gives individuals credibility that their competence has been evaluated in accordance with the best practices within the fire industry and provide the Company with confidence that the individuals have appropriate competence through qualifications, training, and experience.

3.2.2 Gaseous Suppression System

The design and sign-off of the Gaseous Suppression system shall be conducted by an ECSA registered professional engineer or technologist in the relevant categories (Electronic or Mechanical).

3.3 Design Considerations

The standards and guidelines manual document is primarily based on the following SANS for Fire Detection and Gaseous Suppression:

- SANS 10139:2021: - Code of practice for design, installation, commissioning and maintenance of fire detection and alarm systems in non-domestic premises
- SANS 14520-1:2019: - Gaseous fire-extinguishing systems – Physical properties and system design.

The user of the standards only has two approaches to Fire Detection Systems:

- Compliance with the requirements and guidelines in the SANS standards.
- Rational Fire Design which deviates from the SANS standards and uses a risk-based approach and follow an acceptable decision-making process using fire engineering principles.

The following shall be considered for the design, supply, installation, and commissioning of the Fire Detection and Alarm system:

- Relevant/applicable codes, standards, methods, and best industry practices.
- Existing Fire Rational Design or Fire Engineering Solution
- Interface with fire protection system and other systems such as HVAC, Lifts, Roller Shutter doors.

- Site Specific requirements (End User requirements): Fire Officer and responsible site engineer.
- Insurance Requirements
- Municipal by-laws
- Airport Development and Expansion plans
- SANS 10400-T: Application of the National Building Regulations - Part T: Fire Protection

It is the responsibility of the Company to ensure that the designer of the Fire Detection and Alarm system is adequately appraised of the objectives of the systems, the existing fire rational design, existing drawings, existing interfaces, airport development and expansion plans, and insurance requirements.

It is also the responsibility of contractor to ensure that the information required to design the Fire Detection System is requested from the Organisation. This is applicable at stage 1 & 2 of the project stage.

3.4 Performance Requirements

The performance requirements for fire detection systems are as follows:

- Availability: 99.5 %
- Life span: 7 years

3.5 Configuration Management and Asset Modification Requirements

The relevant Company Configuration management and [Asset Modification Procedure – D060.020M](#) shall be complied with.

4. Guidelines for Design Trade-offs

The design trade-offs shall take the following into consideration:

- Capital and Operational cost
- Fire rational design

5. Equipment Requirements

5.1 General

The fire detection and alarm systems shall be addressable and digital addressable systems.

The fire detection system components shall be compatible and interoperable with the traditional or existing fire panels and field devices.

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5.2 Fire Panels

The confidence of compliance shall be obtained by the use of equipment that is approved by the Loss Prevention Certification Board or any other accredited SANS 50054-2 product test house.

The configuration and siting of the fire panels shall be decided upon in consultations with the Company's site representatives.

The choice of fire panels to be used shall be agreed upon by the designer and client, according to what is required, what would prove to be useful, the capabilities of the equipment and associated costs.

The Fire panels shall be analogue and/or digital addressable fire panels designed to communicate with the sensors and the field devices. The addressable systems shall be able to identify that the detector or manual call point is in an alarm condition and it enables pinpointing the exact location of fire.

5.3 Manual Call Points

The manual call points shall be prominently sited and distributed in a such manner from any point it is impossible to leave the building without passing a manual call point. Therefore, the MCP shall be placed at all the emergency exits in all occupied buildings and it shall not be possible to exit a building in a case of emergency without passing a manual call point.

The manual call points shall be provided or located only at exit doors that leads to a place of ultimate safety.

The location and placement of MCPs shall be decided upon in consultation with the Enterprise Security department to ensure that there are no security breaches, and the Enterprise Security department shall be made aware of what the relevant standards and regulations requires with regard to the placement MCPs. All MCP shall have an alarm.

5.4 Fire Detection Points

The fire detectors are designed to detect the characteristics of fire, namely heat, smoke, combustion gas (such as carbon monoxide), as well as infrared or ultraviolet radiation. The fire detector comes in multiple forms, namely point detectors, line detectors, and multi-sensor detectors.

The principle of fire detection shall consider the speed of response required to satisfy the fire safety objective, the need to minimize false alarms, and the nature of the fire hazard. Other factors such as the cost, environmental suitability, and maintenance requirements also need to be considered.

The selection and application of fire detectors shall be in accordance with the guidelines provided in Annex D of SANS 10139.

5.5 Audible Alarms

The fire alarm voice sounders are used as alarming devices for warning occupants in a building in case of fire occurrence using a combination of an attention drawing signal and dedicated voice message. Therefore, it is essential that the alarm signals are adequate to warn all the persons to whom the alarms signals are intended for regardless of their location.

The sound pressure and frequency of the alarm signals shall be adequate to provide unambiguous warning of fire regardless of their location.

The contractor shall calculate the sound pressure levels and the calculations shall form part of the design proposal. The sound pressure levels shall be tested in all areas upon installation completion to ensure conformance with the calculations and compliance with SANS 10139.

5.6 Visual Alarms

The visual alarms shall be used to supplement the audible alarms in situations whereby the audible alarms are likely to be ineffective. The visual alarms are mostly deployed in areas of high background noise and are also used as means of giving warning of fire to people with impaired hearing. The visual alarms shall be provided in accordance with SANS 10139.

The visual alarms shall be provided in the areas where the background noise levels in the area exceed 90 dB(A) and in areas where hearing protection is likely to be used under normal circumstances.

The visual alarm shall flash at the rate within the range of 30 to 130 flashes per minute.

The visual alarm shall be clearly distinguishable from any other visual signals used at the airport buildings and shall be white or red, or both red and white in colour. It is recommended that the visual alarms are labelled with the word "Fire" to enable building occupants to distinguish the fire alarm from other alarms.

5.7 Voice Alarms

The audible alarms may also take a form of voice message generated by a voice alarm system.

The voice alarm shall be used for the sound distribution in the form of a public address which in the event of fire, it broadcasts an alarm warning tone followed by a voice message.

The interface of the fire detection system with the public address system and emergency evacuation system shall be implemented in consultation with the ICT department.

The voice alarm system shall be deployed over the fire alarm sounders in the premises or areas occupied by a large number of members of the public such as terminal buildings and in buildings with phased evacuation.

5.8 Fire Detection System Interfaces

The Fire Detection System shall have the interfaces for actuating the other fire protection systems or trigger safety facilities for the purpose of safety of life, protection to the property or assets, as well as the combination of both.

The Fire Detection System interfacing with Fire Protection system and other systems shall be in accordance with the approved Fire Rational Design in the case where it exists and previous designs. The contractor shall ensure that the interface requirements for the Fire Detection System are established and catered for in the design.

The following interfaces shall be considered in the design, installation, and commissioning of the Fire Detection System:

- Smoke extraction fans
- Dampers
- Air Handling Units
- Fresh Air fans
- Lifts
- BHS - Roller Shutter doors
- Emergency Evacuation System
- Fire Escape doors
- Fire Suppression
- Sprinkler systems
- Roof ventilators
- Ducted Air-conditioning units.

The contractor shall ensure that the interconnection between the fire detection systems and other equipment does not jeopardize the reliability of the fire detection systems.

The actuation of the fire protection system and other systems shall conform with the recommendations of any applicable part of SANS 369.

The contractor or designer interface requirements at each airport shall be confirmed with the site engineer and approved by the Chief Mechanical Engineer.

5.9 Networked Systems

The fire panels shall be networked to meet the Company's requirements of centralized monitoring and global reporting to the IMC and the Fire & Rescue department.

The fire panels interconnected by a network shall be fully functional control and indicating panels configured to operate as a stand-alone and continue to operate normally in the event of failure of the communication link between the other panels.

A fault on the communications link between the panels in the networked panels shall not affect the operation of any panel.

The network shall take form a loop or ring configuration to ensure that the network is resilient to communication failures.

The implementation of Networked Systems shall be compliant with SANS 10139.

A cost-effective solution shall be considered in the design and implementation of networked system.

5.10 Radio-Linked Systems

In the case where it is not feasible to connect some fire panels to the network through a physical communication link, radio-linked systems shall be implemented to ensure that the Company's requirements of centralized monitoring and global reporting to the IMC and the Fire & Rescue department are met.

A comprehensive radio survey shall be conducted to ascertain that:

- The radio transmission shall not interfere with other sources of critical radio transmission used for airport operations.
- There are no other sources of radio transmission that could interfere with or block the radio communication between the components of the Fire Detection System.
- There is adequate signal strength for communication both to and from the components of the Fire Detection System as appropriate in all areas of the buildings in which radio-linked components are to be located.

Only the radio survey test equipment approved by the OEM shall be used to carry out the radio survey. The test equipment shall be calibrated in accordance with the

recommendations of the OEM and calibration records/certificates shall be submitted to the Company prior to conducting the survey.

Alternatively, other forms of wireless communication such as GSM shall be considered.

The implementation of Radio-Linked Systems shall be compliant with SANS 10139.

The implementation of Radio-Linked Systems at Company airports shall be in consultation with the ICT department.

5.11 Cables, Wiring and Other Interconnections

It is essential that all the interconnection in the fire detection and alarm system operate in the correct manner in particular the cables linking the fire panels to manual call points, automatic fire detectors, fire alarms, as well as the cables that transmit signals to the IMC and Fire Rescue.

The cables used in the Fire detection and alarm system shall be sized according to the design of the system and shall consider all electrical and mechanical characteristics, such as voltage drops, current carrying capacity, impedance, and mechanical protection. This is often dependant on the type and make of the equipment, as well as the specific environments in which they are installed. This shall be the responsibility of the contractor.

The selection and choice of cables and cable routes shall take into consideration the need to avoid electromagnetic interference (EMI) from other cables and sources of electromagnetic radiation.

The fire detection and alarm system circuits shall be segregated from the cables of other circuits to minimise the potential of other circuits causing malfunction of the fire alarm system arising from:

- breakdown of cable insulation of other circuits, or of the fire detection and alarm system circuits.
- A fire caused by a fault on another circuit.
- Electromagnetic interference to any fire alarm system circuit because of proximity to another circuit.
- Damage resulting from the need for other circuits to be installed or removed from. Ducts or trunking containing fire detection and alarm circuits.

The cables installed in the addressable fire detection system including the fire detector lines and network connections shall be run as Class A circuits using physical conductors. The cables shall also be installed such that the outgoing and return conductor, exiting from and returning to the control unit are routed separately and are not run in the same cable assembly, duct, enclosure, or in the same multicore cable.

Mixture of cable types is not permitted. Cables shall only be supplied from one manufacturer for the entire system to avoid known impedance problems caused by mixing different manufacturers cables.

Cable supports shall have the same fire rating as the cables. The appropriate electrical cable, conduit, and racking standards specific to the site of installation are to be specified and applied. The following shall be included as a minimum:

- Station cabling and racking
- Small power and lighting
- Earthing and lightning protection

Fibre optic cable is recommended for the communications medium between fire panels because it is immune to electromagnetic interference, can pass through hazardous areas without the risk of spark and provides high speed network connectivity.

5.12 Supervisory Control and Data Acquisition (SCADA)

The Fire Detection and Gaseous Suppression shall have a SCADA system for the data acquisition purposes through interfacing with main panel located at the centralised location (i.e., IMC)

The Fire Detection and Gaseous Suppression SCADA systems shall have an operator Graphical User Interface (GUI) located in the centralised location or same room with the main fire panels.

The Fire Detection and Gaseous Suppression SCADA systems shall have a maintenance Graphical User Interface (GUI) located in the maintenance complex or workshop.

The Fire Detection and Gaseous Suppression SCADA systems shall also 100% web-based maintenance Graphical User Interface (GUI) accessible through a web application remotely.

The SCADA system shall be used to manage and monitor the Fire Detection and Gaseous Suppression System remotely.

The SCADA system GUI for the operational personnel shall only be used for providing a real-time graphical overview of the Fire Detection Systems, reporting of the Fire alarm conditions, as well as reporting of the Fire Detection system faults.

The SCADA system GUI for the maintenance personnel shall provide a real-time graphical overview of the Fire Detection System, report the Fire alarms and Fire Detection system faults, and enable acknowledgement of alarms and faults.

The SCADA system GUI for maintenance personnel shall have the data analytics capability to enable better decision-making concerning maintenance actions and to provide insights regarding the performance of the FDS.

The SCADA system shall have the capability to enable storage and download of historical alarms.

The SCADA system configuration program or software shall be intellectual property of the Organisation.

The contractor shall provide a Software copy of the SCADA configuration to enable future developments.

5.13 Fire Detection and Gaseous Suppression in hazardous Locations

The Fire Detection and Gaseous Suppression in hazardous environments shall be in compliance with SANS 14520.

6. Deliverable Design Information or Minimum Design Outputs

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

6.1 General

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

6.2 Fire detection System

- 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.
- Operating and control philosophy
- Technical Specifications, Bill of Materials, Data Sheets
- Software copy of the SCADA configuration

6.3 Gaseous Suppression System

As per Annex A of SANS 14520-1:2019:

7. Equipment Technical Specifications

7.1 Fire Detection System

7.1.1 General

The design or manufacturing of Fire Detection System components shall be carried out in accordance with a quality management system which incorporates a set of rules for the design or manufacturing elements of all elements.

7.1.2 Fire Panels

The fire panels shall comply with SANS 10139 and SANS 50054-2.

The fire panels operation and access to manual control functions shall be in accordance with SANS 50054-2. (Whereby Access level 1 has no security and access level 2 requires authorized access)

Each fire panel shall be provided with its dedicated mains supply and back-up power supply in accordance with SANS 50054-4.

The fire panels shall be capable of unambiguously indicating the following conditions as per SANS 50054-2: Quiescent condition, fire alarm condition, fault warning condition, and disablement condition.

The fire panels shall be capable of being simultaneously in any combination of the following functional conditions as per SANS 50054-2: Fire alarm condition, fault warning condition, disablement condition, and test conditions.

The panel shall be capable of grouping signals from points to provide zonal indications.

The transition between the mains supply and the standby supply shall not change any indications or the state of any outputs, except those relating to the power suppliers.

Criteria/Parameter	Minimum Requirement	Reference
Type	Analogue Addressable	
Operating Voltage (Input Voltage)	220V AC \pm 10%, single phase, 50Hz	
Reception and Process of fire signals (from Fire Detectors and MCP)	10 seconds	SANS 50054-2:1997
Minimum Visible Indicators (LED)	Power ON	SANS 50054-2:1997

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	Fire Alarm Condition System Fault Disabled condition Test condition	
Monitoring	<ul style="list-style-type: none"> ➤ Loop wiring Open and short circuit fault. ➤ Earth leakage ➤ Sensor removed and wrong device type 	
Temperature	-5°C to +40°C	
Humidity	up to 95% RH (non-condensing)	
Ingress Protection	IP30 (Indoor installation)	SANS 50054-2:1997 (12.3.1)

The fire panels installed outdoor shall have a protective cover with ingress protection adequate to demonstrate due consideration of environmental conditions to ensure that the panels are adequately protected from dust and water.

7.1.3 Manual Call Points

The manual call points shall be distinguishable from non-fire alarm call points. The manual call points installed shall be adequate to minimise the delay between the discovery of fire and the alarm system.

The implementation of Manual Call Points (MCPs) shall be compliant with the recommendations in SANS 10139.

The method of operation of all manual call points in a system shall be that of type A as specified in SANS 50054-11. All call points shall be identical unless there is a special reason for differentiation.

The MCP shall be fitted with a protective cover that is moveable to gain access to the frangible element.

It is recommended that the Manual Call Points (MCPs) are mounted at a height of 1.4 meters above the finished level. The measurement of the height shall be made between the finished floor level and the centre point of the frangible element of the MCP. The allowable variation from the height of 1.4 meters is 300 mm.

Criteria/Parameter	Minimum Requirement
Type	Addressable
Mounting	Surface/ Flush mounting
Colour	Red
Mounting height	1 400 mm ±300 mm

Monitoring	<ul style="list-style-type: none"> ➤ Open and short circuit fault ➤ Removal and device type
Status Indication	Alarm Red LED
Temperature	-5°C to +55°C
Humidity	up to 95% RH (non-condensing)
Ingress protection	IP24D for surface/flush mounting (Indoor application)

7.2 Fire Detectors

7.2.1 Heat Detectors

Point heat detectors shall conform with the requirements of SANS 50054-5 for Class A1 or A2 detectors, unless the foreseeable maximum ambient temperature in the protected area is 40 °C or above, in which case a Class B-G detector shall be used as appropriate.

The heat detectors shall be constructed such that at least part of its heat sensitive element(s), excluding elements with auxiliary functions, shall be greater than or equal to 15mm from the mounting surface of the detector.

The heat detectors shall have a red LED visual indicator which shall illuminate when the alarm condition is reached.

The visual indicator shall be visible from a distance of 6m directly below the detector at an ambient light intensity of 500 lux.

The detachable heat detectors shall be remotely monitored by the fire panels to detect the removal of the head from the base in order to give a fault signal. (SANS 50054-5, 4.6)

The heat detectors shall have markings indication the standard number complied to, class of the detector, OEM name or trademark, model designation, wiring terminal designation, and other marking as per (SANS 50054-5).

Criteria/Parameter	Minimum Requirement
Type	Addressable
Monitoring	<ul style="list-style-type: none"> ➤ Open and short circuit fault ➤ Removal and device type
Status Indication	Alarm Red LED
Temperature	-5°C to +55°C
Humidity	up to 95% RH (non-condensing)

7.2.2 Smoke Detectors

The preferred type of smoke detectors are the point type detectors which meets the general requirements for indoor detection. The Point type smoke detectors shall comply with SANS 50054-7.

The point type smoke detectors shall have a red LED visual indicator which shall illuminate when the alarm conditions is reached.

The visual indicator shall be visible from a distance of 6m directly below the detector at an ambient light intensity of 500 lux.

The point type smoke detector interfaces with ancillary devices shall not prevent correct operation of the detector especially during open-circuit and short circuit failure of these interface.

The detachable point type detectors shall be remotely monitored by the fire panels to detect the removal of the head from the base to give a fault signal.

The point type heat detectors manufacture’s settings shall only be changes by special means or tools.

The heat detectors shall have markings indication the standard number complied to, class of the detector, OEM name or trademark, model designation, wiring terminal designation, and other marking as per (SANS 50054-5)

Criteria/Parameter	Minimum Requirement
Type	Addressable
Monitoring	<ul style="list-style-type: none"> ➤ Open and short circuit fault ➤ Removal and device type
Status Indication	Alarm Red LED
Temperature	-5°C to +55°C
Humidity	up to 95% RH (non-condensing)

7.2.3 Optical Beam Detectors

The Optical Beam Type Detectors shall comply with SANS 50054-12.

The Optical Beam Type Smoke detectors shall be infra-red type using either a separate transmitter and receiver or a combined transmitter/receiver unit with optical reflectors.

The Optical Beam detectors shall be capable of operating distances up to 100 meters and shall incorporate the facility to accept building movement which

misaligns the receiver/transmitter or receiver/transmitter and reflector by up to 100 mm in any direction.

The Optical Beam Detectors shall be used for indoor use in large open areas such as warehouses, terminal building open areas, aircraft hangers, workshops, especially where the installation of point-type detectors is difficult.

The Optical Beam Detectors transmitters and receivers shall be mounted in the roof space or just below the ceiling whichever is applicable during the installation to ensure correct operation.

The Optical Beam Detectors transmitters and receivers shall be mounted on a solid fixture or construction to ensure that they are not subjected to excessive or unacceptable movement such that fault signals or false alarms occur.

7.2.4 Flame Detectors

The Flame detectors shall comply with SANS 50054-10.

The Flame Detectors shall be either individual infra-red (IR) or ultraviolet (UV) types and if the risk dictates the need, combined UV/IR detectors.

Flame detectors are generally expensive, highly sensitive and maintenance intensive and shall therefore be used with caution when replacing more conventional detector types.

They are useful in areas where fast developing fires are likely, as they could detect a fire before enough smoke or heat is given off for more conventional detectors to detect. (For example: flammable liquids stores).

7.3 Audible Alarms

The fire alarm voice sounders are used as alarming devices for warning occupants in a building in case of fire occurrence using a combination of an attention drawing signal and dedicated voice message. Therefore, it is essential that the alarm signals are adequate to warn all the persons to whom the alarms signals are intended for regardless of their location.

The sound pressure and frequency of the alarm signals shall be adequate to provide unambiguous warning of fire regardless of their location.

The fire alarms sounders and sirens shall conform with SANS 50054-3.

The fire alarm sound pressure levels shall be compliant with SANS 10139. The audibility of sounders can differ quite significantly depending on their location. The fire alarm

sound pressure levels shall not fall outside the given values at the specified locations as indicated in the table below.

Criteria/Parameter	Minimum Requirement
Maximum Sound level	120 dB(A)
Minimum Sound level (General Areas)	65 dB(A) OR 5 dB(A) above background noise
Minimum Sound level (Stairways, enclosed spaces, and ae of limited extended within general areas)	60 dB(A)
Frequency	500 Hz to 1000 Hz

Where the sound pressure level of background noise is greater than 60 dB(A), the sound pressure level of the fire alarm signal shall be 5 dB above the sound pressure level of the background noise. The typical background noise pressure level at airports as contained in Annex C of SANS 10139 are shown in table below.

Location	Min dB (A)	Max dB (A)
Check in, arrivals and departures concourses gate rooms	59	72
Pier walkways	54	62
Baggage reclaim	63	71
Channels	59	70
Departure lounge	49	64

7.4 Cables

The FR20 cables shall not be used for Fire Detection and alarm wiring.

The standard fire-resisting cables for general use shall meet the PH 30 classification and shall have a duration of survival of 30 minutes when tested in accordance with EN 50200.

The enhanced fire resisting cables shall meet the PH 120 classification when tested in accordance with EN 50200 and the 120 min survival time when tested in accordance with BS 8434-2.

Parameter	Specification
Conductor size (minimum)	≥1 mm ²
Insulation	Mineral insulated copper sheathed cables
Voltage (minimum)	≥300/500V

Performance	Standard fire-resisting: PH30: Enhanced fire resisting: PH 120
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7.5 Power Requirements

The mains power supply to the Fire Detection Systems shall be in accordance with the recommendations in SANS 10139.

The back-up supply to the Fire Detection Systems shall be in accordance with the recommendations in SANS 10139.

Power supply equipment shall conform with SANS 50054-4. (SANS 10139. 8.42.2)

The power supply circuits to the Fire Detection and Alarm system shall conform to the requirements of SANS 10142-1

7.6 Gaseous Suppression System

The design, installation, servicing and maintenance of gaseous suppression systems shall be carried out in accordance with SANS 14520.

The Company would like to move away from CO2 to more environmentally friendly gaseous suppression. Confirm with the SANS

The rooms where fire gaseous suppression is deployed shall be sealed of the rooms to ensure the deployment of the Gaseous suppression does not escape the room.

8. Commissioning, Maintenance and Handover Requirements

8.1 Installation and Commissioning Requirements

The following requirements shall be complied with:

- It is strongly recommended that installation and commissioning be undertaken in accordance with the recommendations of clause 10 and clause 11 of SANS 10139:2020 respectively.
- Installation certificate shall be provided in accordance with SANS 10139:2020 Appendix F.2
- Commissioning certificate shall be provided in accordance with SANS 10139:2020 Appendix F.3
- Acceptance certificate shall be provided in accordance with SANS 10139:2020 Appendix F.4
- Verification that the system complies with SANS 10139 shall be carried out, on completion, in accordance with SANS 10139:2020:

8.2 Maintenance and Handover Requirements

The requirements at project close out phase for any fire detection systems related works are tabulated below.

Item No	Description of Handover requirement	Requirement Met	
		Yes	No
1	As-built drawings signed-off by a Professional Electronic Engineer or Professional Electronic Technologist.		
2	Soft copies of drawings in DWG format		
3	Installation Certificate		
4	Commissioning certificate		
5	Acceptance certificate		
6	Maintenance and Operating Manuals		
7	Datasheets of all equipment installed		
8	List of Critical Spares (with OEM names and OEM part numbers)		
9	Warranty Documentation		
10	List of Critical Spares		
11	Certificates of Compliance		
12	Software copy of the SCADA to enable future developments.		
13	CMMS Data		

The CMMS Data is the information required for each asset you install, as assets shall be reduced to the maintainable assets. The CMMS data format shall be as follows:

- Asset information
 - Description
 - Model
 - Manufacturer
 - Serial number [if you do not have serial number, then some means to uniquely identify – if there is not, then let me know so that I can arrange the barcodes for you]
 - Building [for example CTB, Western Precinct, Control Tower etc.]
 - Installation location [for example ground floor, GPS location is also a good idea]
- Failure information
 - Failure description
 - Failure cause
 - Failure resolution

- Maintenance information
 - Maintenance type [for example inspection, maintenance, calibration, certification etc.]
 - Frequency [for example daily, weekly, on a Monday etc.]
 - List of tasks to perform the maintenance: for each task
 - Describe the task [for example check oil levels and top up if required]
 - Skills required [for example electrician, fitter, plumber etc.]
 - Time estimate in minutes to complete the task
 - Tool(s) required

9. 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	Chief Electrical Engineer	Ad-hoc
Internal Audits	Determine the effectiveness of the procedure and test the outcome of the manual.	Internal Audit	Annually
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 procedure 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.

10. Accountabilities and Responsibilities

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10.1 Accountabilities

The overall accountability for the development of this standard and guidelines lies with the Group Executive: Capital Infrastructure & Asset Management with the support of the Lead: Infrastructure Asset Management. However, in the absence of the designated person the acting person shall assume responsibility as per delegation of authority. The overall accountability for the effective implementation and adherence of this manual lies with the Group Executive: Operations Management with the support of the Group 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>

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 responsibility for approval and authorisation	<i>Responsible</i>	<i>Informed</i>	<i>Accountable</i>	<i>Responsible</i>	<i>Informed</i>	-
Communicate the standard to all impacted stakeholders or employees.	<i>Accountable</i>	<i>Responsible</i>	-	-	<i>Responsible</i>	<i>Informed</i>

10.2 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 Company employee, 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 the relevant sections of this document before commissioning.
- Handover checklist to be signed off as per section 9.2 of this document.

11. Reporting of Non-Conformance

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](#).

12. Related Policy Documents

Document Control Procedure - Z001 006M

Record Keeping Requirements Procedure - Z001 008M

Minimum Design Requirements and Technical Specifications for Fire Protection Manual – D104MAN

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13. Related Legislation and Standard

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

SANS 10139:2021 - Code of practice for design, installation, commissioning and maintenance of fire detection and alarm systems in non-domestic premises

SANS 369-1:2004 - Code of practice for the operation of fire protection measures. Part 1: Electrical actuation of gaseous total flooding extinguishing systems

SANS 50054-2:1997 - Fire detection and fire alarm systems. Part 2: Control and indicating equipment.

SANS 50054-3:2001 - Fire detection and fire alarm systems. Part 3: Fire alarm devices — Sounders

SANS 50054-5:2000 - Fire detection and fire alarm systems Part 5: Heat detectors — Point detectors

SANS 50054-7:2000 - Fire detection and fire alarm systems Part 7: Smoke detectors — Point detectors using scattered light, transmitted light or ionization.

SANS 50054-10:2010 - Fire detection and fire alarm systems Part 10: Flame detectors — Point detectors

SANS 50054-11:2001 - Fire detection and fire alarm systems Part 11: Manual call points

SANS 50054-12:2021 - Fire detection and fire alarm systems Part 12: Smoke detectors — Line detectors using an optical light beam

SANS 14520-1:2019 - Gaseous fire-extinguishing systems - Physical properties and system design

SANS 10142-1:2021 - The wiring of premises Part 1: Low-voltage installations

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

14. Change Control and Verification Procedure

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

15. 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
Standards and Guidelines for Fire Detection and Gaseous Suppression Systems	Enterprise Asset Management Department	D107MAN	Group Manager: Enterprise Asset Management	Five (5) Years

16. Revision History

Date last revised	Revision Status	Compiler	Summary of changes
12 th August 2024	Version: 1	Chief Engineer: Electrical Engineer Name and Surname Tabane Montwedi	1 st Issue

17. Endorsement (See Master in Policy Management Storage Room)

Activity	Name	Signature	Date
Compiler	Chief Engineer: Electrical Name and Surname Tabane Montwedi		13 May 2024
Quality Assurance Department	Policy Assurance & Ethics Specialist Name and Surname Thabana Mahlo		16 August 2024
Supported by	Group Manager: Maintenance Engineering Name and Surname Peter Sibande		21 August 2024
Supported by	Acting Lead: Infrastructure Asset Management Name and Surname Riaaz Essack		10 Sept 2024
Authorised by	Group Executive: Capital Infrastructure & Asset Management Name and Surname Charles Shilowa		04 October 2024