

 Eskom	Specification	Matimba Power Station
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Unit 2-6 Diesel Generator

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1. INTRODUCTION

Diesel generators are used for providing back up power to the units and the station in case of a black out. Matimba Power Station has diesel generators as back-up for units and station in case of a system black out, the diesel generators are on stand- by 24 hrs a day. Each unit has its own diesel generator and there's one for the station making it a total of 7 diesel generators on site. They are also used to power up the entire station auxiliaries and unit auxiliaries in the event of black start operation.

The diesel generators are installed on the 0m level just outside and on the Southern side of the turbine building at units 2,3,4,5 and 6. Each diesel generator has its own associated diesel fuel tank each with an approximate capacity of 1000l of diesel.

2. SUPPORTING CLAUSES

2.1 PURPOSE

The purpose of this technical specification is to define the scope of work required to provide a fully functional for automatic fixed fire protection and detection for the unit 's 2,3, 4,5,6 diesel generators and associated diesel day tanks at Matimba Power Station.

2.2 SCOPE

The scope of work covers the following:

- The design review, supply and installation of the designed automatic fixed fire detection and protection on Unit 2, 3,4,5,6 diesel generator and associated day tanks at Matimba Power Station.
- Procurement, supply and fabrication of plant & material necessary to execute the work according to the approved design.
- Delivery of materials to Matimba Site.
- Storage of all plant & material on Matimba Site
- Install automatic fire protection system compliant to the National Fire Protection Association (NFPA 850, 13 and 15) and SANS 10287,1128-2 and 240-54937450 fire protection and life safety standard, 240-54937448 fire detection and life safety design and 240-54937439 fire protection/detection assessment standards
- All structural, civil, builders work, plumbing and drainage, mechanical and electrical, control and instrumentations work required for the protection system.
- All plant & material that requires painting (all to be painted in red).
- Building bund of bricks, mortar and drainage to NFPA and SANS standards.
- Building a fire barrier between units 2 and 3 diesel generators.
- Successful incorporation of new systems into existing fire protection system.

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- Supply, erection and dismantling of all scaffolding required.
- Connecting the pressure/flow switches to the existing fire detection system for alarming purposes in the control rooms and EOD.
- Manufacturing and installation of KKS numbers on all the standard components e.g. valve, flow switches etc.
- Commission and testing of installed fire detection and protection system.

2.3 NORMATIVE/INFORMATIVE REFERENCES

Parties using this document must apply the most recent edition of the documents listed in the following paragraphs.

2.3.1 Normative

- [1] 240-109607332 - Eskom Plant Labelling Abbreviation Standard
- [2] ENS0002 - AKZX Plant Location Coding Standard
- [3] 240-71432150 - Plant Labelling and Equipment Description Standard
- [4] 240-54937450 - Fire Protection & Life Safety Design Standard
- [5] 1017821 Matimba configuration management work instruction for projects
- [6] 1017822 Matimba functional location KKS coding and labelling works instruction
- [7] 240-56737448 Eskom Fire Detection and Life Safety Design Standard
- [8] 240-105020315 - Standard for Low Pressure Valves.
- [9] 240-123801640 - Specification for Low Pressure Pipelines.

2.3.2 Informative

- [10] NFPA 850, NFPA13, NFPA 15 and SANS 10139.
- [11] ASME B31.1 (2000 Edition) – Power Plant Piping.
- [12] SANS standards; GSP36-980; N. PMZ45-392.
- [13] ISO 9001 - Quality Management Systems.
- [14] ISO 14001 - Environmental Management Systems.
- [15] Occupational health and Safety Act, 1993 (Act. No.85 of 1993).

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2.4 DEFINITIONS

Definition	Description
Fire	Rapid chemical reaction that produces heat and light; sustained burning as manifested by any or all the following: light, flame, heat, and smoke; stationary flame with the flammable mixture fed into the reaction zone. Note Hydrogen flames are nearly invisible in daylight and are without smoke, unless other materials are entrained in the flames.
Fire Detection	A device designed to automatically detect the presence of fire and initiate an alarm system and other appropriate action
Fire Protection	Method of providing for fire control or fire extinguishment.
KKS coding	Plant location coding system used at Matimba Power Station as detailed in Matimba Procedure PS/178/003, Plant KKS Coding, Hardware Breakdown Structure and plant labelling
Nozzle	Closed head low velocity devices used in general purpose applications
Sprinkler	Closed head low velocity devices used in general purpose applications

2.5 ABBREVIATIONS

Abbreviation	Description
EOD	Electrical Operating Department
NFPA	National Fire Protection Association
KKS	Kraftwerk-Kennzeichen system
SANS	South African National Standards
FM	Factory Mutual
kPa	Kilopascal

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2.6 ROLES AND RESPONSIBILITIES

Lead Discipline Engineer (LDE) - The role of the Lead Discipline Engineering role is to manage the technical integrity of the design and be accountable for the management of the interfaces within their specific engineering domain.

Contracts Manager - The contracts manager is responsible to incorporate this Technical Specification into a contractual document.

Project Manager - The Project manager coordinates the execution of the Works to achieve the required cost schedule and quality objectives. The Project manager is delegated authority from the Eskom Employer Representative to manage the defined scope of work.

Contractor - The *Contractor* shall design (to the extent specified in the Contract), execute and complete the Works in accordance with the Contract.

2.7 PROCESS FOR MONITORING

The primary process monitoring will be governed by the scope of work.

2.8 RELATED/SUPPORTING DOCUMENTS

N/A

3. WORKS TO BE PERFORMED BY THE CONTRACTOR

3.1 SCOPE OF THE WORK

The scope of work covers the following:

- The design review, supply and installation of the designed automatic fixed fire detection and protection on Unit 2, 3,4,5,6 diesel generator and associated day tanks at Matimba Power Station.
- Procurement, supply and fabrication of plant & material necessary to execute the work according to the approved design.
- Delivery of materials to Matimba Site.
- Storage of all plant & material on Matimba Site
- Install automatic fire protection system compliant to the National Fire Protection Association (NFPA 850, 13 and 15) and SANS 10287,1128-2 and 240-54937450 fire protection and life safety standard, 240-54937448 fire detection and life safety design and 240-54937439 fire protection/detection assessment standards

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- All structural, civil, builders work, plumbing and drainage, mechanical and electrical, control and instrumentations work required for the protection system.
- All plant & material that requires painting (all to be painted in red).
- Building bund of bricks, mortar and drainage to NFPA and SANS standards.
- Building a fire barrier between units 2 and 3 diesel generators.
- Successful incorporation of new systems into existing fire protection system.
- Supply, erection and dismantling of all scaffolding required.
- Connecting the pressure/flow switches to the existing fire detection system for alarming purposes in the control rooms and EOD.
- Manufacturing and installation of KKS numbers on all the standard components e.g. valve, flow switches etc.
- Commission and testing of installed fire detection and protection system.

3.1.1 Mechanical.

The contractor does not design but review the design and installation of the designed automatic fixed fire protection system in reference to:

- SANS standards; GSP36-980; N. PMZ45-392.
- NFPA 850. NFPA13, NFPA 15 and SANS 10139.
- 11TH Edition ASIB Rules
- ASME B31.1 (2000 Edition) – Power Plant Piping.
- Eskom Manual for fire protection of coal-fired power stations, reference N.PMZ 45- 392 dated 2008-03-28.

Specific fixed fire protection design requirements:

Area	-	Outside Turbine Hall
Design Code	-	NFPA 850
Type of System	-	Deluge System
Nozzles	-	Medium Velocity Sprayers
Detectors	-	68°C Conventional Sprinkler
Sprayer Spacing	-	Purpose Designed
Design Density	-	10,2l/min/m ²
System Interface	-	Connected to Existing Fire Ring Main
Electrical interface	-	Flow / Pressure switch at control valve
Operation	-	Automatic
Minimum Flow	-	59.16 L/min
Minimum Nozzle Pressure	-	140kPa

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The new system must be linked to the existing fire protection system and connect to the fire detection system network through the fire detection panel at all the relevant units. The connection to the fire detection panel must be through the pressure/flow switch.

The newly installed fire protection system must be of such a nature, that it should last the lifetime of the remaining life of Matimba Power Station (35 years), accepting that periodic maintenance and testing could be required on the installation. The system must always be 100% available and reliable.

This system must be installed as a separate fire system with a valve station inclusive of as a minimum an isolation valve, Deluge valve, pressure gauges, pressure/flow switches and alarm gong for each diesel generator. The flow switch or pressure switch must be connected to the fire detection and alarm panel in the all the relevant control rooms for alarming purposes in case of fire.

The new fire protection system pipes and equipment must be installed in such a method, not to hinder existing and obstruct maintenance activities in the diesel generator areas.

3.1.1.1 Sprinkler design

Fire protection systems should be installed for a minimum of (10.2 mm/min) density over an enclosed area of 186m² Sprinklers is preferred to be rated at 68°C, but contractor must confirm temperature rating via ambient measurement of current conditions in areas where the fire protection installed will be installed. Positioning of Sprinklers to avoid obstruction should be as per NFPA 13- Standard for the Installation of Sprinkler Systems.

3.1.1.2 Pipe work and Support

The installation of the pipe and flanges must be able to withstand an operating pressure of 1200Kpa. The pipes must be supported at intervals not exceeding 2.5 m for piping up to 50 mm Nominal Bore (NB) and all other piping shall be supported at 4.5 m intervals. The sprinkler spacing must be according to SANS 10287: Automatic sprinkler installations for fire-fighting purposes.

It must be possible to isolate any system so that the fire protection can be removed to allow for unhindered access for maintenance in that area. The fire mains must not hamper the access to any other equipment on site, including the existing fire protection equipment.

3.1.1.3 Valves

The control valve design is Factory Mutual (FM) approved for equipment standardization. The isolation valves must have rising spindles. In both cases the valves (Inbal valves & Butterfly Valve (if used)) must be FM approved. Water will be provided to the new system from new 80mm diameter deluge control valves located in the vicinity of the diesel generators.

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3.1.2 Civil works

The new installation must include all civil work required. Civil works as a minimum include the foundation slab for the control valve station, bunding where required and drainage facilities. All foundation slabs must be to the concrete strength of 25MPa and designed in accordance with SANS 1200G.

3.1.3 C&I Works

The contractor is responsible for installing and the layout of all C&I Cabling installation required. All cables must be rated 2-hour fire resistant (PH120). The required installed cabling must be from the pressure switch to the closest fire detection panel, which is at the relevant unit control room, though the alarms must be relayed to EOD using the building management interface

3.1.4 Testing and Commissioning

After completion of installation, the Contractor shall carry out commissioning and performance testing of the fixed fire protection and detection system installed on the diesel generators. Commissioning shall include verification of correct installation, functional testing of all detection devices, control valves, alarms, manual and automatic actuation, and all interfaces with existing plant systems. System integrity, pressure and continuity tests shall be conducted. All commissioning activities shall be undertaken in accordance with Eskom standards, relevant SANS/NFPA requirements, and approved design documentation. Commissioning records, test reports, as-built drawings, compliance certificates, and operation and maintenance manuals shall be submitted to the Employer for review, witnessing, and final acceptance.

3.1.5 As-built drawings, operating manuals and maintenance.

On completion of the installation the Contractor shall present the as-built design to the Employer for approval. As a minimum the following documentation will be included when the design is presented to the Employer:

- Piping and instrumentation diagrams
- General arrangement and layout drawings
- Detail design drawings
- System description
- Operating and control philosophy
- Technical specifications
- Design calculations
- Equipment lists
- Number of sprinklers per system
- Installation Sequence
- Complete bill of materials
- Temperature rating of detection bulbs

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3.1.6 Training

The Contractor provides training on the equipment and systems included as part of the works to the various categories of the Employer's technical staff (operators, maintenance, and engineering personnel) for the duration of the works.

Training provided by the Contractor is directly applicable to the actual equipment supplied for the works. Generalised training based on similar equipment is not acceptable. The local facilities for training provided by the Employer is a suitably sized air-conditioned room, as well as trainee and trainer desks, an overhead projector and flipchart or white board. The number of personnel to be trained is as per the table below:

Department	Number of personnel to be trained
Operators	4
Maintenance	4
Engineering	1

3.1.6.1 Training of Maintenance Personnel

Maintenance personnel will be trained in all components and functions of the Plant i.e., Method of maintenance, fault finding, correction, routine maintenance. Training will include familiarisation with documentation (maintenance plan, procedures etc.).

3.1.6.2 Training of Maintenance Operators

Operators will be trained and declared competent on the new systems. This will include familiarisation with documentation including drawing configuration logic, as well as operator interface familiarisation e.g., operational functions, alarms etc.

3.1.6.3 Engineering Training

Formal engineering training will be provided on basic Plant design, capabilities, and procedures upfront, prior to design freeze. Thereafter, training will be on-job training throughout the design process. The overview design and control/interface functions will be covered by this training. The engineering team should be trained sufficiently to enable them to work as part of the implementation team on and off site.

3.1.7 Quality Requirements

- All QCPs must be submitted to the employer for review and approval before any work commences.
- The Contractor shall provide welding procedures, welder qualifications, non-destructive testing reports, coating inspection reports, material certificates and hydrostatic test certificates.

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- Updated as-built drawings reflecting all modifications, valve locations and elevations shall be submitted in both hard copy and electronic format.

4. ACCEPTANCE

This document has been seen and accepted by:

Name & Surname	Designation
Sizwe Buthelezi	Fire Protection System Engineer
Gift Nkuna	Auxiliary Engineering Manager
Jacky Mathobela	Engineering Manager

5. REVISIONS

Date	Rev.	Compiler	Remarks
March 2026	2	SM Buthelezi	No signed scope of document available.

6. DEVELOPMENT TEAM

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

- Sizwe Buthelezi

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