

 Eskom	Scope Of Work	Hendrina Power Station
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1. INTRODUCTION

Hendrina Power Station

Hendrina power station is located approximately 40km south of Middelburg at the town of Hendrina in Mpumalanga. At the time it was built it was the largest station to be designed by ESCOM (Electricity Supply Commission), with an ultimate generating capacity of 2 000MW, consisting of ten 200 MW machines.

Hendrina power station units comprises of Fabric filter plants, also known as baghouses or fabric collectors, are essential components in industrial applications for controlling air pollution. They are widely used in various industries such as cement, steel, power generation, pharmaceuticals, and food processing, among others. Fabric filter plants efficiently remove particulate matter from gas streams, making them compliant with environmental regulations and ensuring a clean and safe working environment.

This document defines the contract works to be executed by the successful bidder, of which is evaluated and selected using the open tender process. The Scope of Work (SOW) for this contract entails the repair and refurbishment requirements of Fabric filter plant at Hendrina Power Station.

2. SUPPORTING CLAUSES

2.1 SCOPE & OBJECTIVES

2.1.1 Purpose/Objectives

The purpose of this document is to provide a refurbishment scope of work for the fabric filter plant consumables.

Note: This scope will be activity based which means that cost will be charged per activity.

2.1.2 Applicability

This document shall apply to Eskom Hendrina Power Station Fabric Filter Plant.

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2.1.3 Boundaries of relevant plant

Plant	Start	End	Exclusions	Inclusions
FABRIC FILTER PLANT	FFP inlet damper	FFP outlet damper	• FFP Inlet Damper • FFP Outlet Damper • Ducting between FFP inlet and outlet dampers • Fan motor electrical components • All instrumentation or measuring devices	• Rotating manifolds • Manifold drives • Cell vent fans • Pulse air system – with pneumatic cylinders • Implosion dampers – with pneumatic cylinders • Screens • Vane/deflector plates • All FFP doors and view windows

Replacement of Consumable fabric filter bags and cages

Plant	Start	End	Exclusions	Inclusions
FABRIC FILTER PLANT	FFP inlet damper	FFP outlet damper	• FFP Inlet Damper • FFP Outlet Damper • Ducting between FFP inlet and outlet dampers • Fan motor electrical components • All instrumentation or measuring devices	• Rotating manifolds • Manifold drives • Cell vent fans • Pulse air system – with pneumatic cylinders • Implosion dampers – with pneumatic cylinders • Screens • Vane/deflector plates • All FFP doors and view windows
DUST HOPPERS	FFP roof	Dust hopper square-to-round hopper discharge	• Concrete structure	• Dust hopper liners • Square-to-round reducer

Replacement of Consumable fabric filter bags and cages

Plant	Start	End	Exclusions	Inclusions
FABRIC FILTER PLANT	FFP inlet damper	FFP outlet damper	• FFP Inlet Damper • FFP Outlet Damper • Ducting between FFP inlet and outlet dampers • Fan motor electrical components • All instrumentation or measuring devices	• Rotating manifolds • Manifold drives • Cell vent fans • Pulse air system – with pneumatic cylinders • Implosion dampers – with pneumatic cylinders • Screens • Vane/deflector plates • All FFP doors and view windows
FFP Electrical components	FFP roof	Dust hopper square-to-round hopper discharge	• All instrumentation or measuring devices	• Granting lights • Inspection lights • Ducting between FFP inlet and outlet dampers • Hopper heaters • Gearbox motor • Hopper level detectors

Replacement of Consumable fabric filter bags and cages

Plant	Start	End	Exclusions	Inclusions
FABRIC FILTER PLANT	FFP inlet damper	FFP outlet damper	• FFP Inlet Damper • FFP Outlet Damper • Ducting between FFP inlet and outlet dampers • Fan motor electrical components • All instrumentation or measuring devices	• Rotating manifolds • Manifold drives • Cell vent fans • Pulse air system – with pneumatic cylinders • Implosion dampers – with pneumatic cylinders • Screens • Vane/deflector plates • All FFP doors and view windows
FFP STRUCTURE-CIVIL	FFP roof	Dust hopper square-to-round hopper discharge	• Concrete structure	• Gratings, handrails, and walkways • Impulse lines • Tube plate hangers • Circumferential seal

Excluded:

- Supply of Scaffolding
- All C&I works

Included:

- All equipment on the roof top (Pulse air tanks, Valves, Implosion dampers, Manifold Drive, Ventilation fans, Air Pipes)
- Implosion Dampers Control Air Supply Air Receiver, pipework and its valve

Replacement of Consumable fabric filter bags and cages

2.1.3 Required Manpower

- Core services consist of preventative as well as corrective maintenance, and shall be relevant to maintaining plant availability and reliability in a cost effective way.
- Contractor is required to provide Hendrina Power Station a labour force consisting of:
 - Manager and Supervisor
 - Mechanical Fitters
 - B class Welders and Boiler makers as when required
 - Safety officer
 - Fire watcher as when required
 - Assistants
 - Semi-skilled
 - Quality controller as when required
 - Planner
 - Rigger
 - Store man as when required

2.1.4 Scope of works

The Scope consist of the following:

- The contractor ensures that his/her personnel are authorized to take out permits to work in accordance with Plant Safety Regulations within three months of being awarded the contract. At least all the artisans and Supervisor must be authorized.
- The contractor provides a 24 hour service for any plant failures and maintenance intervention (Half loads to replace bags) which includes a standby service with a response time of 0-2 hour during normal office hours and after hours including weekends and public holidays.
- Standby resources, one mechanical fitter, one semi skilled and one assistants will be required for maintenance of the plant.
- Halfload for FFP bags change team: One fitter, two semi skilled and four assistants.
- Complete unit FFP bags change skills on as and when required base
- The contractor supports and assists in promoting the Plant Fundamental Management policies (which can be obtained from the Contract Manager or from Hendrina's document center).
- The contractor compiles a month end report of plant conditions experienced during the month and submit to boiler maintenance supervisor, contract manager and the system engineer.
- The contractor compiles weekly reports for all inspections carried out on the defective FFP bags and cages and all maintenance intervention done on the FFP equipment. **NB. Report to include Picture of severely damaged bags & cages and their exact location in the baghouse. Total number and position of bags replaced.** The weekly report to be submitted to boiler maintenance supervisor, contract manager and the system engineer.
- The contractor originates a list of daily reactive works on as and when required basis.
- The contractor provides daily planning schedule to department planner with a 5 working day target window (T-5).
- The contractor identify, scope, plan and schedule created work orders on SAP system with the planner for the period of 12 weeks i.e. T-12.

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Replacement of Consumable fabric filter bags and cages

- The contractor compiles bills of materials for all spares and consumables 24 hours before commencement of works for stock items (available from Hendrina's stores) and three months before commencement of works for non-stock items (items that are not in Hendrina's stores). The bills of materials are submitted to the service manager.
- The contractor attends to all defects associated with the FFP units 1 to 10.

Filter bags and cages

- Inspect and replace defective bags.
- Inspect and replace defective cages.
- Take bag samples for testing (As and when instructed).
- Mark bags samples location on FFP bag layout map.

Bags and cages replacement scope

1. Contractor to transport bags and cages from stores to the Unit of concern(Part of site establishment),Bags and cages must be hoisted from ground floor to the FFP landing by the hoist.
2. Contractor to remove rotating manifold arms on all modules (LH and RH) to provide access to bags and cages.
3. Contractor to carry out cages removal on all modules (LH and RH) with the use of specialised bag tools such as a spikes, small forks and big forks to be made available by the Contractor.
4. Contractor to carry out bag removal on all modules (LH and RH)
5. Contractor to carry out bag and cage Replacement on all modules (LH and RH). High temperature bags (PPS) and cages to be supplied by Eskom.
6. Contractor to remove old bags and cages to the bottom level.
7. Contractor to store all the removed bags and cages in separate skip bins. Contractor to supply the environmental FFP bags skip bins during outages and complete bag change per unit.
8. Contractor to transport all removed FFP bags from Hendrina site to approved disposal site for such material.
9. Contractor to provide proof of FFP bags disposal site certificate.
10. Contractor to remove cages from site to the station scrap yards.
11. Contractor to supply lime for coating of the bags which will be utilized during commissioning phase of the plant.
12. Contractor to apply lime to the bags during commissioning of the units. 4 tons of lime should be injected per casing, i.e., a total of 8 tons for both the LH and the RH side applicable to unit 1-5.
13. 6 tons of lime should be injected per casing, i.e., a total of 12 tons for both the LH and the RH side applicable to unit 6-10
14. Final Inspection to ensure that there is no debris around the plant (Good Housekeeping).
15. Site De-establishment.

Manifold drive

- Inspect gearboxes and repair if necessary.
 - Check oil level and leaks.
 - Change oil depending on the condition of the oil.
- Drain oil from drive gearboxes and replace with new.
- Check drive gears for damage and replace if required.
- Replace gasket per manifold drive.

Rotating manifolds

- Inspect and repair defects on the rotating manifold.

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Replacement of Consumable fabric filter bags and cages

- Inspect and repair defects on the air distribution boxes.
- Inspect for tightness on manifold arms bolts.
- Inspect and replace nozzles on manifold arms when damaged.
- Inspect and replace manifold support bearing when damaged.

Pulse Air System

- Inspect and maintain the pulse air tanks.
- Set pressure relief valve.
- Inspect all diaphragm and pilot springs and replace cracked or damaged springs.
- Inspect and replace damaged or non-functioning Isolating valves, NRV, Solenoid valves, drain valves and pressure gages.
- Inspect pulse air piping including the flexible pipes and replace if required.
- Conduct functional test on the solenoid valves.

Air Receiver

- Inspect and maintain the air receiver.
- Set pressure relief valve.
- Inspect and replace damaged or non-functioning Isolating valves, NRV, Solenoid valves, drain valves and pressure gages.
- Inspect pulse air piping and replace if required.

Implosion dampers

- Inspect for leaks on the implosion dampers.
- Perform a functional test the implosion dampers.
- Inspect and replace the cylinders if damaged.
- Inspect and repair the protection cage if damaged.

Cell vent fans

- Lubricate the Damper locking device.
- Inspect the Damper sealing surface and repair/replace if damaged.
- Inspect Motor bracket and repair/replace if damaged.

Dust Hoppers

- Inspect and repair dust hopper walkways and handrails.
- Inspect agitating levers and chains and tension the chains.
- Inspect and replace agitating lever gaskets.
- Inspect hopper inspection and access door seals, and repair/ replace if damaged.
- Inspect internal support structure for damaged stiffener beams and repair.
- Inspect and test dust hopper level detectors for corrosion and blockages, and repair defects.
- Unblocking by poking of blocked dust hoppers and removal of FFP bags
- Poking and removal of clinkers and FFP bags from the dust hoppers
- Opening and closing of dust hopper inspections doors for inspections at all relevant levels
- Removal of the dust hopper elbows to gain access at the bottom of the dust hopper (for poking etc.)
- Installation of the dust hopper elbows after poking and clinkers removal when the dust is flowing

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Replacement of Consumable fabric filter bags and cages

freely.

- Clean excessive dust from the hoppers by washing into the sluiceway / trench.
- Build scaffold around the affected dust hopper.
- Isolate the section of the fabric filter plant where the blockage will be removed.
- Protective equipment and safety harness must be worn all the time while using scaffold, and also when performing the task.
- Barricade surrounding area to limit access to the dust hopper plant where work is being carried out.
- Disassemble hydrovac system elbow.
- Open all inspection doors including the access doors.
- Locate and assess the positioning and stability of the blockage.
- First attempt is to remove the blockage via the hopper inspection door using a poking rod or spikes, to make an opening for dust trapped above the blockage to flow out.
- In case above attempt fails consult with Boiler Engineering.

Note:

In case where high pressure washing is used, care must be taken that the water does not escape to the filter bags as this will have adverse impact on the performance of the bags.

- Ensure that no dust hopper heater elements are damaged during poking. The people doing the poking must ensure that they do not hit directly on the hopper inner plate but pokes directly onto the clinker.
- Continue poking until the blockage is removed, then allow dust to flow.
- To control and suppress the dust flowing out of the hopper/s, use fire hydrant hoses in the vicinity of the blocked dust hopper, with the assistance of the Hendrina emergency team.
- Continuously remove dust on top of the scaffold to avoid scaffold overloading and collapse.
- Inspect the dust hopper and ensure that it is empty and free of blockages.
- Close the hopper inspection door.
- Reassemble the hydrovac system.
- Remove scaffold and all the equipment.
- Clean the surrounding dust hopper area where work was carried out with water.

Note:

- The scaffold must be erected in such a way that it does not block the escape route in case of an emergency.
- Before any other methods are tried the first attempt is to try to break the blockage by poking.

Civil and Structures

- Visually inspect interior and exterior of FFP casing (Concrete structure).
- Visually inspect water sealing on FFP roof.
- Replace/Repair damaged dust hopper liner.
- Visually inspect external walkway gratings and handrail, if defect is noted repair.
- Inspect and replace damaged inlet screens.
- Inspect and repair turning vanes, baffles and deflector and repair panels that are holed.
- Inspect tube plate hangers and repair defects.
- Inspect tube plate for sagging/ deflection, weld cracks, holes and repair defects.
- Inspect and repair circumferential seal leaks, also open up the seal assembly and inspect the primary seal. Repair leaks if noted.
- Inspect and replace all leaking and worn out door seals.

C & I Impulse Pipework

- Inspect and repair damaged C & I pipework.

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2.2 NORMATIVE/INFORMATIVE REFERENCES

2.2.1 Normative

- [1] ISO 9001 Quality Management Systems.
- [2] ISO 45001 Occupational Health & Safety Management Systems
- [3] ISO 14001 Environmental Management System
- [4] SANS 1200 Standardised Specification for Civil Engineering Construction

2.2.2 Informative

- [5] Eskom Hendrina Power Station sewer reticulation
- [6] National Environmental Management Act, 1998 (Act No.107 of 1998)
- [7] Occupational Health and Safety Act (OHSA) Act 85 of 1993: Construction regulations.
- [8] SANS 1200DB Earthworks Pipe Trenches
- [9] National Building Regulations SANS10400
- [10] National Home Builders Registration Council (NHBR)

2.3 DEFINITIONS

2.3.1 Disclosure Classification

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

2.4 ABBREVIATIONS

Abbreviation	Description
FFP	Fabric Filter Plant
ISO	International Organization for Standardization
KPI	Key Performance Index

Abbreviation	Description
N/A	Not Applicable
QIP	Quality Inspection Plan
QCP	Quality Control Plan
SANS	South African National Standards
Employer	The organization (Eskom) to which the supplier will be contracted for this tender and contracts that may result therefrom
Employer's Premises	Hendrina Power Station
Industrial Storage Facility	Physical space suitable for the storage of the items specified in the scope of work
Spares	Parts that can be used for replacement

2.5 ROLES AND RESPONSIBILITIES

Boiler Engineering – Compile scope of work

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Contractor – Execute all scope of work from the employer

2.6 PROCESS FOR MONITORING

Not applicable

2.7 RELATED/SUPPORTING DOCUMENTS

Not applicable

3. AUTHORISATION

This document has been seen and accepted by: