Eskom	Scope of Work	Generation

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1. INTRODUCTION

Duvha Power Station, owned and operated by Eskom is a coal fired power station located in Witbank, Mpumalanga Province. Eskom Duvha Power Station is located about 15 kilometres south-east of Emalahleni in the Nkangala District, Mpumalanga Province. The Power Station has six power generating units with a combined capacity of 3,000MW.

This document details the requirements for the rubber lining of demineralised water trains and Condensate polishing regeneration system vessels at the Duvha Power Station water treatment plant. This document provides the scope for rubber lining of pipes & vessels on as and when required basis for Duvha Power Station for a period of 5 years, project management, commissioning, and performance testing of the entire engineering works to ensure fully functional Demineralised water and Condensate Polishing Regeneration trains at Duvha Power Station.
The *Contractor* must supply prices for the removal & replacement of rubber lining per scope of work after the inspection for each components mentioned in section 4
There are three (3) demineralised water trains, each consisting of cation, degasser, weak base, strong base and mixed bed anion vessels, associated valves, piping and pumping system. Thus there are 12 ion exchange vessels and 3 degassers in total.
There are three (3) condensate polishing regeneration trains, each consisting of cation, anion and a storage vessels, associated valves, piping and pumping system. Thus there are 9 vessels in total on this system.

2. APPLICABILITY

This document applies to Duvha Power Station only.

2.1. NORMATIVE/INFORMATIVE REFERENCES

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

2.1.1 Normative

[1] ISO 9001 Quality Management Systems.

[2] 32-727 - Eskom Safety, Health, Environment and Quality (SHEQ) Policy

[3] Occupational Health and Safety Act No. 85 of 1993,

[4] QM58 - Suppliers contract quality requirements specification

[5] MGM0001 - Maintenance Quality Manual

[6] Duvha Waste Management Procedure ENVP0005

[7] SANS 10120-2 A: General

[8] RTD/MAT/20/136: Corrosion Protection Specification

[9] SAS0012 - Safety, Health & Environmental Specifications for Contractors

[10] 240-62196227 - Eskom Life Saving Rules

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2.1.2 Informative

[1] 474-58 (Rev1): Document and Records Management

3 DEFINITIONS

3.1 DISCLOSURE CLASSIFICATION

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

3.2 ABBREVIATIONS

Definitions	Descriptions
HIRA	Hazard Identification & Risk Assessment
ISO	International Standardisation Organisation
C&I	Control and Instrumentation
EMD	Electrical Maintenance Department
HMD	Heavy Maintenance Department
TSS	Technical Support Services
OHS	Occupational Health and Safety Act 85 of 1993
PPE	Personal Protective Equipment
PU	Polyurethane
QA	Quality Assurance
QC	Quality Control
QCP	Quality Control Plan
QM	Quality Management
SANS	South African National Standards
SHE	Safety, Health, Environment
SHEQ	Safety, Health, Environment and Quality

3.3 ROLES AND RESPONSIBILITIES

Appointed Contractor

- All contractors shall work within the parameter of the job description and scope of work. To keep all instructions/ procedures on hand and supply Eskom power station with reference to be included in this document and supply record and history requirements.
- Contractors must also ensure that the work is performed to the highest standard and in line with Eskom SHEQ policy and applicable OHS regulations.

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- Execute the scope of work safely as per Occupational Health and Safety Act 85 of 1993.
- Execute the scope of work as per the employer's specification and SANS 1253 (latest revision). To ensure quality assurance is done as per QM 58.

Project Manager

To ensure that the supplier execute all the work specified in the scope of work on the set timelines and also ensure that:

- All work is executed in accordance with the legal requirements (Occupational Health and Safety Act 85 of 1993).
- All employees are provided with the prescribed personnel protective equipment (PPE) as required.
- All workers are familiar with the project hazard and risk assessment and relevant control measures.
- The work is carried out by appropriately authorised or competent persons.
- Ensure that all documents are accurately completed and signed before returning the documents like service instruction and information documentation to Work Management Department for capturing and filing.

Maintenance Technician

- Develops the scope of work and ensures execution of work by contractor as per scope of work.
- Ensure quality of work is achieved by following approved quality control plan.
- Inspection of all hold/witness points indicated on the QCP.
- Must ensure work is done to the highest standard and regarding to the safety regulations.
- Must supervise the works during execution.

System Engineer (SE)

- As custodian of the Maintenance Basis, they must ensure all actions required in terms of the reliability base and any other reliability matters are implemented on their systems.
- Must inspect the system after the maintainer has maintained, following the approved quality control plan.
- The SE will review the scope of work developed by maintenance and the work, which will be executed and ensure that quality assurance is adhered to.

4 SCOPE

The purpose of this document is to outline the scope of work of Rubber lining of pipes & vessels at Duvha Power Station on As and when Required for a period of five (5) years.

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4.1 Description of the works

The service is the provision of the rubber lining inside the tank & pipes service to the water treatment plant and its auxiliaries. Rubber lining includes inspecting, testing, rubber removal, sand blasting, rubber lining patch repairs and rubber lining full repairs of equipment.

4.2 *Employer*'s requirements for the *service*

- The *Contractor* provides a crew that will be site per task order issued for repairs per program provided. Monday to Friday will be normal working hours, 8 hours per day.
- The *Contractor* can be requested work on Saturday or Sunday or/and public holidays.
- The *Contractor* provides qualified labour to carry out the service.
- All vessels will be done at Eskom promises.
- For pipes will the done at *Contactor's* site.
- The *Contractor* provides tools, gear, equipment and consumables to carry out the work.
- The *Contractor* ensures the safety of own personnel, other contractors and Eskom employees in the vicinity of the works by complying with the OHS Act No.85 of 1993 and its Regulations.
- The *Contractor* plans and executes the work and provides a detailed plan for each task.
- The *Contractor* performs quality control on own work as per pre-approved quality control plans.
- The *Contractor* performs work within the specified period and to the acceptable quality standard.
- All testing equipment must a have a valid calibrated certificate.

4.3. Core crew and standby arrangement

4.3.1 Core crew

The *service provider* provides a skilled rubber lining crew that will be site based during execution. Project Manager & safety officer will be as when required on site.

Base crew:

1x Project Manager

1x Site Supervisor

1x Safety Officer

2x Rubber liner

2x Rubber liner Assistants

2x Sand bluster

2x Sand bluster Assistants

Overtime shall be approved by the Service *Manager* in writing prior to commencement of such overtime. Overtime hours shall be governed by the Basic Conditions of Employment Act.

4.4 The works consist of the repairs and maintenance of the following:

Rubber lining of pipes & vessels at Duvha Power Station. Rubber lining includes, inspecting, testing, rubber removal, sand blasting, rubber lining patch repairs and rubber lining full repairs of equipment.

The following sub- systems shall be rubber lined be the contractor:

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4.4.1 Demin Cation vessels & pipes

- There are 3 Cation vessels in the demineralisation plant.
  Table: Cation vessel design specification

Parameter	Value	Unit
Height	4.8	m
Diameter	3	m
Shell surface area	45.24	m^2
Top dome surface area	10.6	m^2
Bottom dome surface area	10.6	m^2
Total surface area	66.44	m^2
Vessel Volume	40	m^3
Design P/T	500@50	kPa/^{0}C
Operating P/T	250@50	kPa/^{0}C
Material of Construction	Rubber lined mild steel	-

- The Contractor & Eskom must conduct a detailed visual inspection and pin-hole detection testing (no more than 3 kilovolts per mm) on the existing rubber to check the condition of the rubber lining and identify the defects. Identify and mark-up the defects or the areas requiring the repairs.
- The Contractor must strip & re-rubber line the damaged area the vessel using 6mm Grade A butyl rubber. Sandblast the whole vessel with silica free sand blasting grit.
- The Contractor must ensure that there is a system installed which will remove the dust created during sandblasting and must be exhausted outside the building in a designated area.
- The contractor should take note that this is a demineralisation plant and hence the cleanliness during blasting operations is of outmost importance to prevent contamination during production. Refer specifications on surface preparation and rubber lining.
- Table can be used to determine the rubber lining requirements for the vessel. The supports must also be rubber lined with 6 mm Grade A butyl rubber. The supports must be straightened before rubber lining is done.
- The floor of the vessel must also be rubber lined. The Contractor must take note that the floor is constructed out of cement. After the rubber lining is removed, the floor must be inspected to see if it is level. If it is not level, an additional screed must be put in by Eskom
- The floor must then be lightly sandblasted to create the required blast profile. The floor must be cleaned by using a vacuum prior to rubber lining. The products used for the rubber lining must also be manufactured for use on concrete floors.
- The manholes must also be rubber lined.
- Eskom will be responsible to remove, nozzles, laterals and pipes inside the vessels for access & install back after rubber lining is completed.
- Contractor to rubber line test sample panels shall be (100mm X 200mm X 2mm) will be required per vessel.
- Inlet & outlet pipes that need rubber lining will be removed by Eskom, Contactor will collect from Duvha Power station to their site to re-rubber line and deliver back to the station

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4.4.2 Demin Degasser vessels & pipes.

- There are 3 Degasser vessels in the demineralisation plant.
  Table: Degasser vessel design specification

Parameter	Value	Unit
Height	4.8	m
Diameter	2.5	m
Shell surface area	45.6	m^2
Top dome surface area	7.25	m^2
Total surface area	52.85	m^2
Vessel Volume	40	m^3
Design P/T	Atm.@40	kPa/^{0}C
Operating P/T	Atm.@25	kPa/^{0}C
Material of Contruction	Rubber lined mild steel	-

- The Contractor & Eskom must conduct a detailed visual inspection and pin-hole detection testing (no more than 3 kilovolts per mm) on the existing rubber to check the condition of the rubber lining and identify the defects. Identify and mark-up the defects or the areas requiring the repairs.
- The Contractor must strip & re-rubber line the damaged area the vessel using 6mm Grade A butyl rubber. Sandblast the whole vessel with silica free sand blasting grit.
- The Contractor must ensure that there is a system installed which will remove the dust created during sandblasting and must be exhausted outside the building in a designated area.
- The contractor should take note that this is a demineralisation plant and hence the cleanliness during blasting operations is of outmost importance to prevent contamination during production. Refer specifications on surface preparation and rubber lining.
- Table can be used to determine the rubber lining requirements for the vessel. The supports must also be rubber lined with 6 mm Grade A butyl rubber. The supports must be straightened before rubber lining is done.
- The floor of the vessel must also be rubber lined.
- The manholes must also be rubber lined.
- Eskom will be responsible to remove, nozzles, laterals and pipes inside the vessels for access & install back after rubber lining is completed.
- Test sample panels shall be (100mm X 200mm X 2mm) will be required per vessel.
- Inlet & outlet pipes that need rubber lining will be removed by Eskom, Contactor will collect from Duvha Power station to their site to re-rubber line and deliver back to the station

4.4.3 Demin Weak Base vessels & pipes.

- There are 3 Weak Base vessels in the demineralisation plant.
  Table: Weak Base vessel design specification

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Parameter	Value	Unit
Height	2	m
Diameter	2.8	m
Shell surface area	19	m^2
Top dome surface area	6.16	m^2
Bottom dome surface area	6.16	m^2
Total surface area	31.32	m^2
Vessel Volume	40	m^3
Design P/T	650@60	kPa/^{0}C
Operating P/T	400@50	kPa/^{0}C
Material of Construction	Rubber lined mild steel	-

- The Contractor & Eskom must conduct a detailed visual inspection and pin-hole detection testing (no more than 3 kilovolts per mm) on the existing rubber to check the condition of the rubber lining and identify the defects. Identify and mark-up the defects or the areas requiring the repairs.
- The Contractor must strip & re-rubber line the damaged area the vessel using 6mm Grade A butyl rubber. Sandblast the whole vessel with silica free sand blasting grit.
- The Contractor must ensure that there is a system installed which will remove the dust created during sandblasting and must be exhausted outside the building in a designated area.
- The contractor should take note that this is a demineralisation plant and hence the cleanliness during blasting operations is of outmost importance to prevent contamination during production. Refer specifications on surface preparation and rubber lining.
- Table can be used to determine the rubber lining requirements for the vessel. The supports must also be rubber lined with 6 mm Grade A butyl rubber. The supports must be straightened before rubber lining is done.
- The floor of the vessel must also be rubber lined. The Contractor must take note that the floor is constructed out of cement. After the rubber lining is removed, the floor must be inspected to see if it is level. If it is not level, an additional screed must be put in by Eskom
- The floor must then be lightly sandblasted to create the required blast profile. The floor must be cleaned by using a vacuum prior to rubber lining. The products used for the rubber lining must also be manufactured for use on concrete floors.
- The manholes must also be rubber lined.
- Eskom will be responsible to remove, nozzles, laterals and pipes inside the vessels for access & install back after rubber lining is completed.
- Test sample panels shall be (100mm X 200mm X 2mm) will be required per vessel.
- Inlet & outlet pipes that need rubber lining will be removed by Eskom, Contactor will collect from Duvha Power station to their site to re-rubber line and deliver back to the station

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4.4.4 Demin Strong Base vessels & pipes.

- There are 3 Strong Base vessels in the demineralisation plant.
  Table: Strong Base vessel design specification

Parameter	Value	Unit
Height	3	m
Diameter	2.8	m
Shell surface area	22	m^2
Top dome surface area	6.84	m^2
Bottom dome surface area	6.84	m^2
Total surface area	35.68	m^2
Vessel Volume		m^3
Design P/T	650@60	kPa/^{0}C
Operating P/T	270@50	kPa/^{0}C
Material of Construction	Rubber lined mild steel	-

- The Contractor & Eskom must conduct a detailed visual inspection and pin-hole detection testing (no more than 3 kilovolts per mm) on the existing rubber to check the condition of the rubber lining and identify the defects. Identify and mark-up the defects or the areas requiring the repairs.
- The Contractor must strip & re-rubber line the damaged area the vessel using 6mm Grade A butyl rubber. Sandblast the whole vessel with silica free sand blasting grit.
- The Contractor must ensure that there is a system installed which will remove the dust created during sandblasting and must be exhausted outside the building in a designated area.
- The contractor should take note that this is a demineralisation plant and hence the cleanliness during blasting operations is of outmost importance to prevent contamination during production. Refer specifications on surface preparation and rubber lining.
- Table can be used to determine the rubber lining requirements for the vessel. The supports must also be rubber lined with 6 mm Grade A butyl rubber. The supports must be straightened before rubber lining is done.
- The floor of the vessel must also be rubber lined. The Contractor must take note that the floor is constructed out of cement. After the rubber lining is removed, the floor must be inspected to see if it is level. If it is not level, an additional screed must be put in by Eskom
- The floor must then be lightly sandblasted to create the required blast profile. The floor must be cleaned by using a vacuum prior to rubber lining. The products used for the rubber lining must also be manufactured for use on concrete floors.
- The manholes must also be rubber lined.
- Eskom will be responsible to remove, nozzles, laterals and pipes inside the vessels for access & install back after rubber lining is completed.
- Test sample panels shall be (100mm X 200mm X 2mm) will be required per vessel.
- Inlet & outlet pipes that need rubber lining will be removed by Eskom, Contactor will collect from Duvha Power station to their site to re-rubber line and deliver back to the station

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4.4.5 Demin Mixed Bed vessels & pipes.

- There are 3 Mixed Bed vessels in the demineralisation plant.
  Table: Mixed Bed vessel design specification

Parameter	Value	Unit
Height	2.25	m
Diameter	2.4	m
Shell surface area	17	m^2
Top dome surface area	6.81	m^2
Bottom dome surface area	6.81	m^2
Total surface area	30.62	m^2
Vessel Volume	13	m^3
Design P/T	650@60	kPa/^{0}C
Operating P/T	140@40	kPa/^{0}C
Material of Construction	Rubber lined mild steel	-

- The Contractor & Eskom must conduct a detailed visual inspection and pin-hole detection testing (no more than 3 kilovolts per mm) on the existing rubber to check the condition of the rubber lining and identify the defects. Identify and mark-up the defects or the areas requiring the repairs.
- The Contractor must strip & re-rubber line the damaged area the vessel using 6mm Grade A butyl rubber. Sandblast the whole vessel with silica free sand blasting grit.
- The Contractor must ensure that there is a system installed which will remove the dust created during sandblasting and must be exhausted outside the building in a designated area.
- The contractor should take note that this is a demineralisation plant and hence the cleanliness during blasting operations is of outmost importance to prevent contamination during production. Refer specifications on surface preparation and rubber lining.
- Table can be used to determine the rubber lining requirements for the vessel. The supports must also be rubber lined with 6 mm Grade A butyl rubber. The supports must be straightened before rubber lining is done.
- The floor of the vessel must also be rubber lined.
- The manholes must also be rubber lined.
- Eskom will be responsible to remove, nozzles, laterals and pipes inside the vessels for access & install back after rubber lining is completed.
- Test sample panels shall be (100mm X 200mm X 2mm) will be required per vessel.
- Inlet & outlet pipes that need rubber lining will be removed by Eskom, Contactor will collect from Duvha Power station to their site to re-rubber line and deliver back to the station

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4.4.7 CPP Cation vessels & pipes

- There are 3 Cation vessels in the Condensate Polishing Regeneration plant.
  Table: Cation vessel design specification

Parameter	Value	Unit
Height	3.25	m
Diameter	2	m
Shell surface area	22	m^2
Top dome surface area	3.5	m^2
Bottom dome surface area	3.5	m^2
Total surface area	29	m^2
Vessel Volume		m^3
Design P/T	1200@80	kPa/^{0}C
Operating P/T	400@40	kPa/^{0}C
Material of Construction	Rubber lined mild steel	-

- The Contractor & Eskom must conduct a detailed visual inspection and pin-hole detection testing (no more than 3 kilovolts per mm) on the existing rubber to check the condition of the rubber lining and identify the defects. Identify and mark-up the defects or the areas requiring the repairs.
- The Contractor must strip & re-rubber line the damaged area the vessel using 6mm Grade A butyl rubber. Sandblast the whole vessel with silica free sand blasting grit.
- The Contractor must ensure that there is a system installed which will remove the dust created during sandblasting and must be exhausted outside the building in a designated area.
- The contractor should take note that this is a demineralisation plant and hence the cleanliness during blasting operations is of outmost importance to prevent contamination during production. Refer specifications on surface preparation and rubber lining.
- Table can be used to determine the rubber lining requirements for the vessel. The supports must also be rubber lined with 6 mm Grade A butyl rubber. The supports must be straightened before rubber lining is done.
- The floor of the vessel must also be rubber lined.
- The manholes must also be rubber lined.
- Eskom will be responsible to remove, nozzles, laterals and pipes inside the vessels for access & install back after rubber lining is completed.
- Test sample panels shall be (100mm X 200mm X 2mm) will be required per vessel.
- Inlet & outlet pipes that need rubber lining will be removed by Eskom, Contactor will collect from Duvha Power station to their site to re-rubber line and deliver back to the station

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4.4.8 CPP Anion vessels & pipes

- There are 3 Anion vessels in the Condensate Polishing Regeneration plant.
  Table: Anion vessel design specification

Parameter	Value	Unit
Height	3.25	m
Diameter	1.5	m
Shell surface area	17	m^2
Top dome surface area	2	m^2
Bottom dome surface area	2	m^2
Total surface area	21	m^2
Vessel Volume		m^3
Design P/T	1200@80	kPa/^{0}C
Operating P/T	400@40	kPa/^{0}C
Material of Construction	Rubber lined mild steel	-

- The Contractor & Eskom must conduct a detailed visual inspection and pin-hole detection testing (no more than 3 kilovolts per mm) on the existing rubber to check the condition of the rubber lining and identify the defects. Identify and mark-up the defects or the areas requiring the repairs.
- The Contractor must strip & re-rubber line the damaged area the vessel using 6mm Grade A butyl rubber. Sandblast the whole vessel with silica free sand blasting grit.
- The Contractor must ensure that there is a system installed which will remove the dust created during sandblasting and must be exhausted outside the building in a designated area.
- The contractor should take note that this is a demineralisation plant and hence the cleanliness during blasting operations is of outmost importance to prevent contamination during production. Refer specifications on surface preparation and rubber lining.
- Table can be used to determine the rubber lining requirements for the vessel. The supports must also be rubber lined with 6 mm Grade A butyl rubber. The supports must be straightened before rubber lining is done.
- The floor of the vessel must also be rubber lined.
- The manholes must also be rubber lined.
- Eskom will be responsible to remove, nozzles, laterals and pipes inside the vessels for access & install back after rubber lining is completed.
- Test sample panels shall be (100mm X 200mm X 2mm) will be required per vessel.
- Inlet & outlet pipes that need rubber lining will be removed by Eskom, Contactor will collect from Duvha Power station to their site to re-rubber line and deliver back to the station

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4.4.9 CPP Resin Storage vessels & pipes

- There are 3 Resin Storage vessels in the Condensate Polishing Regeneration plant.
  Table: Resin Storage vessel design specification

Parameter	Value	Unit
Height	2.75	m
Diameter	2	m
Shell surface area	18	m^2
Top dome surface area	3	m^2
Bottom dome surface area	3	m^2
Total surface area	24	m^2
Vessel Volume		m^3
Design P/T	1200@80	kPa/^{0}C
Operating P/T	400@40	kPa/^{0}C
Material of Construction	Rubber lined mild steel	-

- The Contractor & Eskom must conduct a detailed visual inspection and pin-hole detection testing (no more than 3 kilovolts per mm) on the existing rubber to check the condition of the rubber lining and identify the defects. Identify and mark-up the defects or the areas requiring the repairs.
- The Contractor must strip & re-rubber line the damaged area the vessel using 6mm Grade A butyl rubber. Sandblast the whole vessel with silica free sand blasting grit.
- The Contractor must ensure that there is a system installed which will remove the dust created during sandblasting and must be exhausted outside the building in a designated area.
- The contractor should take note that this is a demineralisation plant and hence the cleanliness during blasting operations is of outmost importance to prevent contamination during production. Refer specifications on surface preparation and rubber lining.
- Table can be used to determine the rubber lining requirements for the vessel. The supports must also be rubber lined with 6 mm Grade A butyl rubber. The supports must be straightened before rubber lining is done.
- The floor of the vessel must also be rubber lined.
- The manholes must also be rubber lined.
- Eskom will be responsible to remove, nozzles, laterals and pipes inside the vessels for access & install back after rubber lining is completed.
- Test sample panels shall be (100mm X 200mm X 2mm) will be required per vessel.
- Inlet & outlet pipes that need rubber lining will be removed by Eskom, Contactor will collect from Duvha Power station to their site to re-rubber line and deliver back to the station

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4.4.10 CPP Interface Resin layer Storage vessels & pipes

- There are 2 Interface Resin layer Storage vessels in the Condensate Polishing Regeneration plant.
  Table: Interface Resin layer Storage vessel design specification

Parameter	Value	Unit
Height	1.2	m
Diameter	0.8	m
Shell surface area	3	m^2
Top dome surface area	0.2	m^2
Bottom dome surface area	0.5	m^2
Total surface area	3.7	m^2
Vessel Volume		m^3
Design P/T	1200@80	kPa/^{0}C
Operating P/T	400@40	kPa/^{0}C
Material of Construction	Rubber lined mild steel	-

- The Contractor & Eskom must conduct a detailed visual inspection and pin-hole detection testing (no more than 3 kilovolts per mm) on the existing rubber to check the condition of the rubber lining and identify the defects. Identify and mark-up the defects or the areas requiring the repairs.
- The Contractor must strip & re-rubber line the damaged area the vessel using 6mm Grade A butyl rubber. Sandblast the whole vessel with silica free sand blasting grit.
- The Contractor must ensure that there is a system installed which will remove the dust created during sandblasting and must be exhausted outside the building in a designated area.
- The contractor should take note that this is a demineralisation plant and hence the cleanliness during blasting operations is of outmost importance to prevent contamination during production. Refer specifications on surface preparation and rubber lining.
- Table can be used to determine the rubber lining requirements for the vessel. The supports must also be rubber lined with 6 mm Grade A butyl rubber. The supports must be straightened before rubber lining is done.
- The floor of the vessel must also be rubber lined.
- The manholes must also be rubber lined.
- Eskom will be responsible to remove, nozzles, laterals and pipes inside the vessels for access & install back after rubber lining is completed.
- Test sample panels shall be (100mm X 200mm X 2mm) will be required per vessel.
- Inlet & outlet pipes that need rubber lining will be removed by Eskom, Contactor will collect from Duvha Power station to their site to re-rubber line and deliver back to the station

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4.4.11 Demin Hot Water Tank & pipes

- There is 1 Hot Water Tank in the demineralisation plant.
  Table: Hot Water Tank design specification

Parameter	Value	Unit
Height		m
Diameter		m
Shell surface area		m^2
Top dome surface area		m^2
Bottom dome surface area		m^2
Total surface area		m^2
Vessel Volume		m^3
Design P/T	1200@80	kPa/^{0}C
Operating P/T	400@40	kPa/^{0}C
Material of Construction	Rubber lined mild steel	-

- The Contractor & Eskom must conduct a detailed visual inspection and pin-hole detection testing (no more than 3 kilovolts per mm) on the existing rubber to check the condition of the rubber lining and identify the defects. Identify and mark-up the defects or the areas requiring the repairs.
- The Contractor must strip & re-rubber line the damaged area the vessel using 6mm Grade A butyl rubber. Sandblast the whole vessel with silica free sand blasting grit.
- The Contractor must ensure that there is a system installed which will remove the dust created during sandblasting and must be exhausted outside the building in a designated area.
- The contractor should take note that this is a demineralisation plant and hence the cleanliness during blasting operations is of outmost importance to prevent contamination during production. Refer specifications on surface preparation and rubber lining.
- Table can be used to determine the rubber lining requirements for the vessel. The supports must also be rubber lined with 6 mm Grade A butyl rubber. The supports must be straightened before rubber lining is done.
- The floor of the vessel must also be rubber lined.
- The manholes must also be rubber lined.
- Eskom will be responsible to remove heater element
- Test sample panels shall be (100mm X 200mm X 2mm) will be required per vessel.
- Inlet & outlet pipes that need rubber lining will be removed by Eskom, Contactor will collect from Duvha Power station to their site to re-rubber line and deliver back to the station

4.4.12 CPP Hot Water Tank & pipes

- There is 1 Hot Water Tank in the Condensate Polishing Regeneration plant.
  Table: Hot Water Tank design specification

Parameter	Value	Unit
Height		m

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Diameter		m
Shell surface area		m^2
Top dome surface area		m^2
Bottom dome surface area		m^2
Total surface area		m^2
Vessel Volume		m^3
Design P/T	1200@80	kPa/^{0}C
Operating P/T	400@40	kPa/^{0}C
Material of Construction	Rubber lined mild steel	-

- The Contractor & Eskom must conduct a detailed visual inspection and pin-hole detection testing (no more than 3 kilovolts per mm) on the existing rubber to check the condition of the rubber lining and identify the defects. Identify and mark-up the defects or the areas requiring the repairs.
- The Contractor must strip & re-rubber line the damaged area the vessel using 6mm Grade A butyl rubber. Sandblast the whole vessel with silica free sand blasting grit.
- The Contractor must ensure that there is a system installed which will remove the dust created during sandblasting and must be exhausted outside the building in a designated area.
- The contractor should take note that this is a demineralisation plant and hence the cleanliness during blasting operations is of outmost importance to prevent contamination during production. Refer specifications on surface preparation and rubber lining.
- Table can be used to determine the rubber lining requirements for the vessel. The supports must also be rubber lined with 6 mm Grade A butyl rubber. The supports must be straightened before rubber lining is done.
- The floor of the vessel must also be rubber lined.
- The manholes must also be rubber lined.
- Eskom will be responsible to remove heater element
- Test sample panels shall be (100mm X 200mm X 2mm) will be required per vessel.
- Inlet & outlet pipes that need rubber lining will be removed by Eskom, Contactor will collect from Duvha Power station to their site to re-rubber line and deliver back to the station

4.4.13 Unit 1-6 CPP vessels & pipes

- There are 3 vessels in the Condensate Polishing Regeneration plant per unit, total of 18 vessels.
  Table: CPP vessel design specification

Parameter	Value	Unit
Height		m
Diameter		m
Shell surface area		m^2
Top dome surface area		m^2

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Bottom dome surface area		m^2
Total surface area		m^2
Vessel Volume		m^3
Design P/T	1200@80	kPa/^{0}C
Operating P/T	400@40	kPa/^{0}C
Material of Construction	Rubber lined mild steel	-

- The Contractor & Eskom must conduct a detailed visual inspection and pin-hole detection testing (no more than 3 kilovolts per mm) on the existing rubber to check the condition of the rubber lining and identify the defects. Identify and mark-up the defects or the areas requiring the repairs.
- The Contractor must strip & re-rubber line the damaged area the vessel using 6mm Grade A butyl rubber. Sandblast the whole vessel with silica free sand blasting grit.
- The Contractor must ensure that there is a system installed which will remove the dust created during sandblasting and must be exhausted outside the building in a designated area.
- The contractor should take note that this is a demineralisation plant and hence the cleanliness during blasting operations is of outmost importance to prevent contamination during production. Refer specifications on surface preparation and rubber lining.
- Table can be used to determine the rubber lining requirements for the vessel. The supports must also be rubber lined with 6 mm Grade A butyl rubber. The supports must be straightened before rubber lining is done.
- The floor of the vessel must also be rubber lined.
- The manholes must also be rubber lined.
- Eskom will be responsible to remove, nozzles, laterals and pipes inside the vessels for access & install back after rubber lining is completed.
- Test sample panels shall be (100mm X 200mm X 2mm) will be required per vessel.
- Inlet & outlet pipes that need rubber lining will be removed by Eskom, Contactor will collect from Duvha Power station to their site to re-rubber line and deliver back to the station

4.4.14 Ammonia hydroxide storage vessels & pipes

- There are 2 vessels in the bulk chemical storage area.

Table: CPP vessel design specification

Parameter	Value	Unit
Height		m
Diameter		m
Shell surface area		m^2
Top dome surface area		m^2
Bottom dome surface area		m^2
Total surface area		m^2
Vessel Volume		m^3
Design P/T	1200@80	kPa/^{0}C

When downloaded from the EDMS, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

Operating P/T	400@40	kPa/^{0}C
Material of Construction	Rubber lined mild steel	-

- The Contractor & Eskom must conduct a detailed visual inspection and pin-hole detection testing (no more than 3 kilovolts per mm) on the existing rubber to check the condition of the rubber lining and identify the defects. Identify and mark-up the defects or the areas requiring the repairs.
- The Contractor must strip & re-rubber line the damaged area the vessel using 6mm Grade A butyl rubber. Sandblast the whole vessel with silica free sand blasting grit.
- The Contractor must ensure that there is a system installed which will remove the dust created during sandblasting and must be exhausted outside the building in a designated area.
- The contractor should take note that this is a demineralisation plant and hence the cleanliness during blasting operations is of outmost importance to prevent contamination during production. Refer specifications on surface preparation and rubber lining.
- Table can be used to determine the rubber lining requirements for the vessel. The supports must also be rubber lined with 6 mm Grade A butyl rubber. The supports must be straightened before rubber lining is done.
- The floor of the vessel must also be rubber lined.
- The manholes must also be rubber lined.
- Eskom will be responsible to remove pipes inside the vessels for access & install back after rubber lining is completed.
- Test sample panels shall be (100mm X 200mm X 2mm) will be required per vessel.
- Inlet & outlet pipes that need rubber lining will be removed by Eskom, Contactor will collect from Duvha Power station to their site to re-rubber line and deliver back to the station

4.4.15 Low concentration Ammonia hydroxide vessels & pipes

- There are 2 vessels in the bulk chemical storage area.
  Table: CPP vessel design specification

Parameter	Value	Unit
Height		m
Diameter		m
Shell surface area		m^2
Top dome surface area		m^2
Bottom dome surface area		m^2
Total surface area		m^2
Vessel Volume		m^3
Design P/T	1200@80	kPa/^{0}C
Operating P/T	400@40	kPa/^{0}C
Material of Construction	Rubber lined mild steel	-

When downloaded from the EDMS, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

- The Contractor & Eskom must conduct a detailed visual inspection and pin-hole detection testing (no more than 3 kilovolts per mm) on the existing rubber to check the condition of the rubber lining and identify the defects. Identify and mark-up the defects or the areas requiring the repairs.
- The Contractor must strip & re-rubber line the damaged area the vessel using 6mm Grade A butyl rubber. Sandblast the whole vessel with silica free sand blasting grit.
- The Contractor must ensure that there is a system installed which will remove the dust created during sandblasting and must be exhausted outside the building in a designated area.
- The contractor should take note that this is a demineralisation plant and hence the cleanliness during blasting operations is of outmost importance to prevent contamination during production. Refer specifications on surface preparation and rubber lining.
- Table can be used to determine the rubber lining requirements for the vessel. The supports must also be rubber lined with 6 mm Grade A butyl rubber. The supports must be straightened before rubber lining is done.
- The floor of the vessel must also be rubber lined.
- The manholes must also be rubber lined.
- Eskom will be responsible to remove pipes inside the vessels for access & install back after rubber lining is completed.
- Test sample panels shall be (100mm X 200mm X 2mm) will be required per vessel.
- Inlet & outlet pipes that need rubber lining will be removed by Eskom, Contactor will collect from Duvha Power station to their site to re-rubber line and deliver back to the station

4.4.16 Low concentration Ammonia hydroxide vessels & pipes

- There are 2 vessels in the bulk chemical storage area.
  Table: CPP vessel design specification

Parameter	Value	Unit
Height		m
Diameter		m
Shell surface area		m^2
Top dome surface area		m^2
Bottom dome surface area		m^2
Total surface area		m^2
Vessel Volume		m^3
Design P/T	1200@80	kPa/^{0}C
Operating P/T	400@40	kPa/^{0}C
Material of Construction	Rubber lined mild steel	-

- The Contractor & Eskom must conduct a detailed visual inspection and pin-hole detection testing (no more than 3 kilovolts per mm) on the existing rubber to check the condition of the rubber lining and identify the defects. Identify and mark-up the defects or the areas requiring the repairs.
- The Contractor must strip & re-rubber line the damaged area the vessel using 6mm Grade A butyl rubber. Sandblast the whole vessel with silica free sand blasting grit.

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- The Contractor must ensure that there is a system installed which will remove the dust created during sandblasting and must be exhausted outside the building in a designated area.
- The contractor should take note that this is a demineralisation plant and hence the cleanliness during blasting operations is of outmost importance to prevent contamination during production. Refer specifications on surface preparation and rubber lining.
- Table can be used to determine the rubber lining requirements for the vessel. The supports must also be rubber lined with 6 mm Grade A butyl rubber. The supports must be straightened before rubber lining is done.
- The floor of the vessel must also be rubber lined.
- The manholes must also be rubber lined.
- Eskom will be responsible to remove pipes inside the vessels for access & install back after rubber lining is completed.
- Test sample panels shall be (100mm X 200mm X 2mm) will be required per vessel.
- Inlet & outlet pipes that need rubber lining will be removed by Eskom, Contactor will collect from Duvha Power station to their site to re-rubber line and deliver back to the station

Notes:

- It is the Contractor's responsibility to verify all quantities before delivery.
- Each material or equipment that will be delivered or used must meet the standard as per requirement.

5 PROJECT REQUIREMENTS

The Quality Control Plan shall consist of the following as a minimum and shall be accepted by the *Quality representative* of the *Contractor* prior to commencement of work and shall be sent to Eskom Project Manager for approval. The QCP will also include painting/PU procedures where applicable.

A covering page, table of contents and QCP which includes and makes provision for the following but not limited to:-

- QCP unique number.
- Revision number.
- Page number
- Provision for QCP approval signatures by the *Contractor* (Supervisor and Quality Controller) and Eskom System Engineer and/ or Eskom QC.
- Provision to incorporate all inspection reports or any form of records to prove conformity to requirements.
- High level description of work in execution including Item/ component/ system/ sub-system.
- Provision for nomination of intervention points for each activity as per SOW.
- Provision for review and approval signatures and dates by the *Contractor* (Supervisor and Quality Controller) and Eskom System Engineer and/ or Eskom QC.

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- Provision for final acceptance/ releases approval signatures by the *Contractor* (Supervisor and Quality Controller) Eskom System Engineer and/ or Eskom QC.

5.1 TEST REPORTS

- Where tests are performed, they shall be recorded and the positions of measurements are traceable to the specific area of testing against the records. Therefore, the Contractor will submit all test reports that has been performed in the form of Data Pack.

5.2 QUALITY

- The Contractor shall ensure adherance to Supplier Quality Management QM 58 240-105658000.

5.3 HEALTH AND SAFETY

- The Contractor shall prepare and submit the SHE file to Safety Risk Management Department for review and acceptance before work commences.
- The Contractor shall provide their personnel with appropriate and adequate PPE for the plant area and work to be carried out.
- The Contractor shall adhere to Occupational Health and Safety Act No 85 of 1993 while executing the works.
- All work to be carried out to be in line with 32-727 – Eskom Saftey, Health, Enviromental and Quality (SHEQ) Policy
- The Contractor to comply with Eskom's Life Saving Rules
- SHE Plan and Project Baseline Risk Assessment shall be in line with the scope of work and not be generic.
- The Contractor shall have competent persons amongst their team members on site, and they shall have competency and the supervisor's, and site manager shall be trained in HIRA and SHE Legal or OHS Legal Liability.
- A safe work procedure shall be compiled for the safe execution of the scope of work.

5.4 ENVIRONMENTAL

Procedure for environmental handling of waste including redundant and obsolete equipment (ENVP 0016)

5.5 PERMIT TO WORK

Refer to Generation Plant Safety Regulations 240-150642762

5.6 DATA BOOKS

The *Contractor* submits signed off Data Books to the *Supervisor* for his acceptance. Data books include the following, as a minimum (where applicable):

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- Document List;
- Instruction for Work/ Purchase Order;
- Approved QCP's;
- Risk assessments;
- Material Certificates;
- Technical Queries, Engineering Responses and communications with *Project Manager/ Employer;*
- Non-conformance reports;
- Internal Release Notes;
- Transport notifications;
- Calculations for any temporary works that may be required for the safe execution of the *works;*

6 RELATED/SUPPORTING DOCUMENTS

None

7 STAKEHOLDER ENGAGEMENT

This document has been seen and accepted by:

Name & Surname	Designation	Signature
Kuhlula Baloyi	Senior Supervisor	
Mapelo Gqwede	Technician	

8 AUTHORISATION

This document has been seen and accepted by:

Name & Surname	Designation

9 REVISIONS

Date	Rev.	Compiler	Remarks
July 2025	0	S Xaba	Draft document
March 2026	0	S Xaba	Final Document

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