 Eskom	Specification	Technology
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Title: **Technical Specification for the Supply of Mobile Turbine Oil Purifiers for Kriel Power Station.**

Unique Identifier:

Alternative Reference Number:

N/A

Area of Applicability:

Engineering

Documentation Type:

Specification

Revision:

0

Total Pages:

7

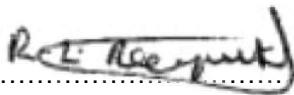
Next Review Date:

N/A

Disclosure Classification:

**CONTROLLED
DISCLOSURE**

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1. INTRODUCTION

Kriel Power Station uses Turbine 46 zinc based oil for lubrication of the main turbine, boiler feed pump turbine and electric feed pumps. This oil is also used on main turbine and boiler feed pump turbine control and safety systems. Environmental conditions results in oil contamination due to ingress of water and particulate. The current fixed turbine oil purifiers are unable to cope with the contamination.

This document states the technical specification for the supply of Mobile turbine oil purifiers for Kriel Power Station.

2. SUPPORTING CLAUSES

2.1 SCOPE

The document covers the technical specification for Mobile turbine oil purifiers for Kriel Power Station.

2.1.1 Purpose

The purpose of the document is to provide technical specification for the supply of Mobile turbine oil purifiers for Kriel Power Station.

2.1.2 Applicability

This document shall apply to Kriel Power Station.

2.2 NORMATIVE / INFORMATIVE REFERENCES

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

2.2.1 Normative

[1] ISO 4406, Hydraulic Fluid Power-Fluids-Method for Coding Level of Contamination by Solid Particles.

2.2.2 Informative

[2] Eskom, 240-56227443, Requirement for Control and Cables for Power Stations Standards.

[3] Eskom, 240-57617975, New Low Voltage Motors Procurement Standard.

2.3 DEFINITIONS

Definition	Description
Mobile oil purifier	Mechanical device that can be easily moved to different locations to separate impurities such as water and solid particles from the oil.

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2.3.1 Disclosure Classification

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

2.4 ABBREVIATIONS

Abbreviation	Description
ISO	International Organisation for Standardisation
ppm	parts per million
l	litres
l/h	litres per hour
VAC	Voltage Alternating Current
Hz	Hertz
PLC	Programmable Logic Controller
COC	Certificate of Compliance

3. MOBILE OIL PURIFIER SPECIFICATION

3.1 REQUIREMENTS

3.1.1 Technical data

Product requirements

The Supplier is requested to submit a proposal for review for design, manufacture and supply of four mobile turbine oil purification plant, capable of removing moisture and suspended particles as specified by the client.

Key product requirements:

- The purifier shall be manufactured in such a way that it can be installed directly on any turbine oil reservoir as a by-pass oil cleaning unit and can be used as a mobile machine.
- Removal of suspended particles to achieve and maintain ISO 4406 cleanliness level of -/15/12 or cleaner.
- Capable of removing moisture (de-mineralised water) from the oil to achieve less than 50 ppm of moisture in oil.
- The moisture removal technology shall be Heat and High Vacuum (vacuum dehydration) to break emulsification, dewater, and remove acid and particles to make the turbine oil clear and transparent.
- The dehydrator shall be capable of removing of excess water at minimum rate of 50 litres per 12 hour shift.
- Circulate conditioned oil at a minimum of 6000 l/h.
- Circulation of heated oil and filling of treated oil in main turbine lubrication oil tank.
- Gas content after purification <0.1% by volume.
- Power supply 380VAC 3 phase 50Hz.
- COC's provided for all electrical and vessels installations.
- Minimum and easy maintenance.

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- System to be mounted on a mobile trailer with minimum 14 inch rubber tyres and capable of being towed by a vehicle.
- The Supplier shall provide training to Kriel Power Station Operating and Maintenance personnel.
- The Supplier shall provide three set of operating and maintenance manuals (hard copy) and one set soft copy.
- The Supplier shall provide 12 months guarantee on the equipment.
- Designed and manufactured to suit the customer's requirement.

Plant conditions:

- Main turbine lubrication oil tank volume to be purified 47000 litres.
- Oil specification – Engen/Petronas Gencirc 46.
- The main turbine lubrication oil tank is elevated 7 m above ground level.
- The current connection point to permanent coalescer is 1 inch pipe with a 1 inch brass gate valve.
- The Supplier shall be required to visit Kriel Power Station to verify information required to supply the purifiers.

PURIFIER BASIC LAYOUT

Oil transfer and circulation system

1. Shall mainly consists of oil circulation pump necessary valves and piping to ensure easy operation and maintenance.
2. Complete system shall be vacuum tight to ensure leak proof operation.
3. The Supplier shall state hydraulic hose connection type and size.

Heating system

1. The heater shall be capable of heating the oil from 30°C to 70°C for removal of moisture.
2. The heater shall contain insulated electric heat exchanger with indirect low watt density dry type heaters.
3. The oil temperature shall be controlled with thermostat or PLC.
4. Suitable oil distribution system shall be provided to ensure uniform flow over oil heaters.
5. Safety thermostat trip shall be provided to prevent overheating.
6. Circuit breaker shall be provided to isolate the heater.

Pre filter

1. The inlet strainer shall be metallic.
2. The strainer shall be able to remove coarse suspended particles to protect the pump from damage due to abrasion.

Inline filters

1. The filters shall be capable of removing suspended particles to achieve cleanliness of -/15/12 ISO 4406 or cleaner.
2. The filter element shall be Pleated Paper type cartridge.
3. The filter element shall be multilayer construction,
 - Pleat separator layer.
 - Coarse paper layer.
 - Fine paper layer.
 - Coalescer trigger layer.
4. The filter cartridges shall be easily replaceable.
5. The filter cartridge shall have long service life.

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6. The filter cartridge shall have β_x ratio ≥ 2000 .

Degassing and dehydration chamber

1. Oil dispersing system shall provide sufficient exposure of oil to vacuum during filtration.
2. Oil level shall be controlled with float switch. An alternative shall be considered subject to information provided.

Flexible hydraulic hose

1. The hydraulic hose shall be compliant to SAE100R4.
2. The hydraulic hose shall be flexible and 2 pieces of 50 metre length each for each purifier.

Power cable

1. The power cable shall be compliant to Eskom standard, 240-56227443.
2. The power cable shall be flexible and 50 metres in length for each mobile purifier.
3. The power cable shall be supplied with plug.

Vacuum system

Rotary oil-sealed vacuum pump or combination of mechanical booster pump and rotary oil-sealed pump shall be provided to achieve and maintain working vacuum during filtration.

Control panel

Centralised control panel shall be provided with necessary contactors, overload relays, fuses, push buttons, indicating lamps, main switch etc. for easy operation of the plant.

Suppliers shall specific the following in tender documents

1. Design flow rate specification.
2. Operating flow rate specification.
3. Absolute filter mesh size and β_x ratio specification.
4. Dirty holding capacity of the filters specification.
5. Service life of the filters specification.
6. Operating pressure specification.
7. Design pressure specification.
8. Operating temperature specification.
9. Maximum filter differential pressure specification.
10. Moisture separation capacity specification.
11. Filter manufacturer and filter specifications.
12. Pump manufacturer and type specification.
13. Motor manufacturer and insulation specification.
14. Heater manufacturer, type, maximum heat flux and power specification.
15. Flexible hydraulic hose, connection type and size specification.
16. Mass of the unit specification.
17. Trailer specification.
18. Flexible power cable and plug specification.

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4. AUTHORISATION

This document has been seen and accepted by:

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5. REVISIONS

Date	Rev.	Compiler	Remarks
January 2022	0	Rahendra Neerputh	Technical specification for mobile oil purifiers for Kriel Power Station.

6. DEVELOPMENT TEAM

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

None.

7. ACKNOWLEDGEMENTS

None.

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