

DOCUMENT NO.:



Kenya Power

SPECIFICATION FOR HIGH VACUUM TRANSFORMER OIL FILTRATION PLANT

A Document of the Kenya Power & Lighting Co. Ltd
February 2025



Kenya Power

TITLE:
**SPECIFICATION FOR HIGH VACUUM
TRANSFORMER OIL FILTRATION
PLANT**

Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 2 of 43

TABLE OF CONTENTS

0.1 CIRCULATION LIST	3
0.2 AMENDMENT RECORD	4
FOREWORD.....	5
1. SCOPE	6
2. NORMATIVE REFERENCES	6
3. DEFINITIONS AND ABBREVIATIONS.....	7
3.1. ABBREVIATIONS.....	7
4. REQUIREMENTS.....	7
4.1. SERVICE CONDITIONS.....	7
4.2. DESIGN, CONSTRUCTION AND OPERATION	8
5. MARKING, LABELLING AND PACKING	20
5.1. MARKING	20
5.2. PACKING	20
APPENDICIES	21
A: TESTS AND INSPECTION (Normative)	21
B: QUALITY MANAGEMENT SYSTEM (Normative)	22
C: DOCUMENTATION AND DEMONSTRATION (Normative).....	22
D: ACCESSORIES (MANDATORY).....	24
E: GUARANTEED TECHNICAL PARTICULARS (Normative)	25

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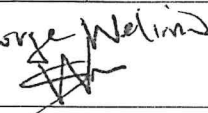
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

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 Kenya Power	TITLE: SPECIFICATION FOR HIGH VACUUM TRANSFORMER OIL FILTRATION PLANT	Doc. No.	
		Issue No.	1
		Revision No.	0
		Date of Issue	2025-02-2
		Page 4 of 43	

0.2 AMENDMENT RECORD

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
0	2025-02-25	New issue	Douglas M. Kanyi 	George Ndlovu 

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Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 3 of 43

0.1 CIRCULATION LIST

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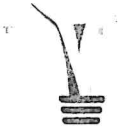
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 Kenya Power	TITLE: SPECIFICATION FOR HIGH VACUUM TRANSFORMER OIL FILTRATION PLANT	Doc. No.	
		Issue No.	1
		Revision No.	0
		Date of Issue	2025-02-2
		Page 5 of 43	

FOREWORD

This specification has been prepared by the E/plant workshop of The Kenya Power and Lighting Company Limited (KPLC) and it lays down requirements for High vacuum transformer oil filtration plant.



The High vacuum transformer oil filtration plant is intended for use by the e/plant workshop for transformer oil filtration.

This specification was prepared to establish and promote uniform requirements for High vacuum transformer oil filtration plant to be used at Kenya Power and Lighting Company Ltd.

There are no other specifications in this series.

This specification stipulates the minimum requirements for High vacuum transformer oil filtration plant acceptable for use in the company and it shall be the responsibility of the suppliers and manufacturer to ensure that the offered design is of the highest quality and guarantees excellent service to KPLC, good workmanship and good engineering practice in the manufacture of the High vacuum transformer oil filtration plant for KPLC.

Users of Kenya Power specifications are responsible for their correct interpretation and application.

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Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 6 of 43

1. SCOPE

- 1.1. This specification is for High vacuum transformer oil filtration plant for use by company's E/plant workshop.
- 1.2. The specification covers requirements, inspection and tests, schedule of Guaranteed Technical Particulars, marking and packaging of High vacuum transformer oil filtration plant.

2. NORMATIVE REFERENCES

The following standards contain provision which, through reference in this text, constitute provisions of this specification. For dated editions the cited edition will apply; for undated editions the latest edition of the referenced document shall apply.

- IEC 61557: Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c - Equipment for testing, measuring or monitoring of protective measures - Part 1: General requirements;
- IEC 60815: Selection and dimensioning of high voltage insulators intended for use in polluted conditions –Part 1: Definitions, information and general principles
- OIML D 11: General Requirements for Measuring Instruments - Environmental Conditions
- IEC 61000: Electromagnetic Compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test; – Part 6-2: Generic standards – Immunity for Industrial environment.
- IEC 60529: Degrees of protection provided by enclosures (IP code)
- ISO 9001: Quality Management systems – Requirements
- ISO/IEC 17025: General Requirements for the competence of testing and calibration laboratories

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3. DEFINITIONS AND ABBREVIATIONS

For the purpose of this specification, the definitions and abbreviations given in the reference standards shall apply together with the following abbreviations.

3.1. ABBREVIATIONS

KPLC- Kenya Power and Lighting Company Limited

ISO – International Organization for Standardization.

LED –Light Emitting Diode

Kg –Kilogram

KV - Kilovolt

IP – Ingress Protection

LV – Low Voltage

EMC – Electromagnetic Compatibility

EU – European Union


4. REQUIREMENTS

4.1. SERVICE CONDITIONS

4.1.1 The High vacuum transformer oil filtration plant shall be suitable for use outdoors in tropical areas and harsh climatic conditions including areas exposed to:


- Altitudes of up to 2200m above sea level;
- Humidity of up to 95%;
- Average ambient temperature of +30°C with a minimum of -1°C and a maximum of +50°C
- Pollution: Degree 2

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Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 8 of 43

4.2. DESIGN, CONSTRUCTION AND OPERATION

4.2.1. Design

4.2.1.1. The High vacuum transformer oil filtration plant shall be rated for continuous operation.

4.2.1.2. The High vacuum transformer oil filtration plant shall be capable of doing the following functions:

- a) Filter, heat, dehumidify and degas the oil at a vacuum level sufficient to condition the oil for the required parameters to the values
- b) Pump the oil from one tank to another by by-passing to purification process, if required

4.2.1.3. The plant shall be capable of processing the oil on single pass basis at rated flow of 3000 LPH to the following specification

- a. Moisture content : Less than 5 PPM
- b. Gas content: Less than 0.1% by volume
- c. Dielectric strength 70 kV across 2.5 mm gap
- d. Filtration: Less than 1 micron
- e. Power factor Tan Delta at 90 °C: 0.002

4.2.1.4. The Plant shall be suitable for treating transformer oil by first heating it and then passing it through specially designed filter vessel. It is then subjected to vacuum treatment, which dehydrates and degasifies the oil to the guaranteed parameters. The set shall be designed for high vacuum and low temperature of oil for achieving the required results

4.2.1.5. The plant shall be suitable for operation on 50Hz, 3 phase system with neutral solidly grounded, the 3 phase voltage supply shall be 415 V \pm 10%. The plant shall be of latest design, sturdy in construction and requiring minimum maintenance.

4.2.2. Construction

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Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 9 of 43

- 4.2.2.1. The Plant shall be suitable for outdoor use. All components including control panel shall have outdoor weather protected enclosures of sheet metal. The casing shall be provided with large doors for easy access to the various components
- 4.2.2.2. Locking of the casing doors be provided with latching from inside wherever possible. Good locking arrangement for main entry door and also on the doors wherever inside latching is not possible shall also be provided.
- 4.2.2.3. All plant components shall be mounted on a common base frame, including all necessary piping for oil and vacuum as well as electrical wiring
- 4.2.2.4. All bought out components shall be of reputed makes. Manufacturer's test reports for pumps and motors will be supplied
- 4.2.2.5. The plant shall have vacuuming system suitably designed for carrying out degassing function.
- 4.2.2.6. sampling valves in the inlet and outlet pipes of filter press shall be provided
- 4.2.2.7. Flow meter with totalizer in the outlet pipe of filter press shall be provided
- 4.2.2.8. One moisture sensor in the outlet pipe of filter press shall be provided
- 4.2.2.9. Arrangement for reflushing of part of filtered oil and degassed oil shall be provided.
- 4.2.2.10. A valve for draining the oil each from the heater tank, edge filter and filter press shall be provided
- 4.2.2.11. Oil heater, filter vessel, degasser shall be of mild steel construction. The internal and external surface including oil heater, filter vessel, degassifier and structural steel work to be painted and shall be shot or sand blasted to remove all rust and scale of foreign adhering matter or grease. All steel surface in contact with insulating oil shall be painted with two coats of heat resistant oil insoluble, insulating varnish/paint
- 4.2.2.12. All internal painted steel surface shall be given a primary coat for zinc chromate second coat of oil and weather resistant varnish of a colour distinct from primary and final two coats of glossy oil and weather resisting paint

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- 4.2.2.13. All paints shall be carefully selected to withstand heat and extremes of weather. The paint shall not scale off or crinkle or be remove by abrasion due to normal handling
- 4.2.2.14. The external overall dimensions for High vacuum transformer oil filtration plant shall be submitted with tender.
- 4.2.2.15. The gross weight of the High vacuum transformer oil filtration plant shall be submitted with this tender.
- 4.2.2.16. Lifting Hooks for Plant shall be provided to facilitate ease of Plant Loading / Unloading
- 4.2.2.17. High vacuum transformer oil filtration plant shall be fitted with suitable dampers to withstand shocks and vibration during operation and transportation on top of a truck/lorry.
- 4.2.2.18. Scheme drawings for High vacuum transformer oil filtration plant offered and Flow diagram of oil filtration plant, pumps and motors shall be submitted with tender, clearly detailing important dimensions, any special features of the offered design, components, accessories and fittings.
- 4.2.2.19. Complete list of components, instruments and accessories offered with their make and accompanied with catalogue/brochure/pamphlets/literature/write-ups shall be submitted with the tender.

4.2.3. Operation

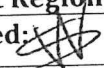
- 4.2.3.1. Operation sequence and dangers sign plates shall also be provided
- 4.2.3.2. Oil shall be taken in through inlet valve
- 4.2.3.3. An inlet pump shall circulate the oil through the heater where the oil temperature shall be raised up to 70°C.
- 4.2.3.4. This oil shall be filtered through a pre filter (10 micron) to remove major portion of coarse dirt and pumped to a vacuum chamber.

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Doc. No.

Issue No.

1

Revision No.

0


Date of Issue

2025-02-2

Page 11 of 43


- 4.2.3.5. Vacuum chamber shall contain permanent dispersion media (PDM), a cylindrical type element. The oil shall flow through the pores of the PDM into shower in order to ensure more exposure of vacuum to the oil particles. This process, shall boil off dissolved water and gases effectively
- 4.2.3.6. Dehydrated oil shall be collected at the bottom of the vacuum chamber and pumped through the fine filter (0.5 micron) to the outlet valve
- 4.2.3.7. At the beginning of the process outlet valve shall be closed and the oil shall circulate through a by-pass valve. This shall make the system stable
- 4.2.3.8. The plant shall be capable of filling transformer oil under full vacuum condition from separate oil storage tank

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Date: 2025-02-12

4.3. TECHNICAL PARTICULARS


4.3.1. OIL PUMP (INLET PUMP)

- 4.3.1.1. The pumps shall be single stage positive displacement gear type.
- 4.3.1.2. The pump motor shall have insulation class-F with IP-54 or better protection.
- 4.3.1.3. Suitable mechanical seals shall be provided to ensure vacuum tightness.
- 4.3.1.4. A built-in pressure relief valve to re-circulate the oil to suction side in case of accidental pressure rise shall be provided.
- 4.3.1.5. Suction lift of the pump shall be at least 5 meters of transformer oil at atmospheric pressure and temperature.
- 4.3.1.6. A separate by pass valve shall be provided across the gear pump so that the flow rate through the filter can be adjusted as required.
- 4.3.1.7. The pumps shall be provided with an interlock with delay such that if there is no oil flow for 30 sec. through the heater, the pump shall trip automatically and also if the pump is not operating the heater will not be energized
- 4.3.1.8. The following oil inlet pump details shall be provided
 - a) Pump Make
 - b) Pump Type
 - c) Pump Capacity
 - d) Motor make and type
 - e) Motor Rating
 - f) Motor type of starter

4.3.2. MAGNETIC STRAINER


- 4.3.2.1. The plant shall be provided with a suitable magnetic strainer with wire mesh to filter all particles of sizes above 0.5 mm and all magnetic particles.
- 4.3.2.2. The strainer shall be installed at the suction of the oil pump described at 4.3.1

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 Kenya Power	TITLE: SPECIFICATION FOR HIGH VACUUM TRANSFORMER OIL FILTRATION PLANT	Doc. No.	
		Issue No.	1
		Revision No.	0
		Date of Issue	2025-02-2
		Page 13 of 43	

4.3.3. **HEATERS**

- 4.3.3.1. The oil heater vessel shall be of mild steel welded construction and insulated with glass/mineral wool.
- 4.3.3.2. The heating elements shall be divided into three banks, each individually controlled by a separate thermostat. For the required oil condition temperature of 70°C these thermostat are set at 50°C, 60°C and 70°C
- 4.3.3.3. Selector switch shall be provided for full load operation of heaters depending upon the desirable temperature of oil.
- 4.3.3.4. Heater shall be capable of heating oil up to 80°C. The recommended operating temperature of oil is 60 to 70°C.
- 4.3.3.5. The heater capacity shall be sufficient to heat up the oil from the ambient temperature to the required operating temperature by indirect heating
- 4.3.3.6. Heater control bank shall be controlled by temperature controller housed on a control panel for easy observation and re-adjustment.
- 4.3.3.7. Selector switch shall be provided for full load operation of heaters depending upon the desirable temperature of oil.
- 4.3.3.8. Heaters shall be interlocked with inlet pump and shall not be in "ON position" unless the inlet pump is working.
- 4.3.3.9. One suitable pressure relief valve shall be fixed on the heater chamber to prevent any pressure rise above the acceptable limit.
- 4.3.3.10. A drain point shall be provided for the heater tank.

4.3.4. **After FILTER (After degassing stage)**

- 4.3.4.1. Cartridge filter shall be provided to ensure maximum particle size to less than 0.5 micron in the filtered oil.
- 4.3.4.2. The filter body shall be fabricated of mild steel and designed for leak tightness at full vacuum and high pressure.
- 4.3.4.3. The oil will flow from dirty oil chamber to clean oil chamber through filter elements.

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Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 14 of 43

4.3.4.4. Cartridge type element used shall be suitable for transformer oil in service and submicronic filtration. The media shall be non-hygroscopic and of high dirt holding capacity.

4.3.4.5. The filter elements shall be easily removable for replacement when required.

4.3.4.6. Compound gauge to indicate pressure across the filter vent and drain with valves and other necessary accessories shall be mounted on the filter for each operation

4.3.5. Pre FILTER PRESS

4.3.5.1. For treating dirty oil, filter press of adequate rating shall be supplied for supplementing the capacity of filter elements.

4.3.5.2. These units shall be designed for quick and easy replacement of media.

4.3.5.3. A sludge outlet for receiving the solid impurities and cleaning the filter plate without opening the unit shall be provided.

4.3.5.4. The unit shall also be provided with vent and drain valves, pressure gauge at inlet and outlet and other necessary accessories.

4.3.6. DEGASSING CHAMBER

4.3.6.1. The degassing chamber shall be of welded construction and shall be suitable for operation under full vacuum. The fill of "rasig" Rings and trays for distribution shall be designed for efficient distribution of oil over large areas.

4.3.6.2. Incoming transformer oil should be spread over these rings in the form of film and a longer surface area, thus achieving better degassing and dehumidification.

4.3.6.3. The degassing chamber shall be double stage type suitable for ensuring the desired oil properties.

4.3.6.4. Arrangement for condensing back lighter fraction (Aromatics) of the insulating oil into the system shall be provided.

4.3.6.5. The degassing channels shall have adequate height to allow long enough free fall for complete degassing.

4.3.6.6. Design shall be such as to minimize foam formation

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
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 Kenya Power	TITLE: SPECIFICATION FOR HIGH VACUUM TRANSFORMER OIL FILTRATION PLANT	Doc. No.	
		Issue No.	1
		Revision No.	0
		Date of Issue	2025-02-2
		Page 15 of 43	

- 4.3.6.7. The degassing chambers shall be provided with suitable level monitor for oil or foam level in the chamber and shall trip the inlet pump when the level rises above the designed maximum level in order to prevent foam to enter the vacuum pumping system.
- 4.3.6.8. The oil inlet pump starts again automatically once the oil level in the degassing chamber falls below the present oil level
- 4.3.6.9. Necessary illuminated sight glass shall be provided through which oil flow through the degasser can be viewed clearly
- 4.3.6.10. The degasser shall be provided with vacuum gauges, vacuum breaking valves, main and auxiliary vacuum connections and other necessary accessories

4.3.7. VACUUM PUMPING SYSTEM FOR OIL FILTRATION

- 4.3.7.1. The pump shall be provided with a suitable vacuum pumping system for creating adequate high vacuum in the degassing chamber.
- 4.3.7.2. The pumping system shall consist of suitable combination of Roots Blower and Rotary vane vacuum pumps with inter stage condensing units.
- 4.3.7.3. The pump motor shall be insulation class-F with IP-54 or better protection
- 4.3.7.4. The Roots blower shall be reputed make. Suitable built in labyrinth packing system, slinger rings, oil return chamber shall be provided between bearings and working chamber to prevent penetration of lubricating oil to the working chamber.
- 4.3.7.5. The pumps motor shall be dynamically balanced. The pumps shall be suitable for starting evacuation form atmospheric pressure and shall be applied with necessary over flow valve.
- 4.3.7.6. The rotary vane vacuum pumps shall be installed after the roots blower.
- 4.3.7.7. An automatic by pass valve across the roots blowers shall permit operation of rotary vane pump alone to operate when so required.
- 4.3.7.8. The rotary vane pumps are provided with gas ballast valve to prevent contamination of vacuum pump oil with moisture.

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4.3.7.9. The vacuum pump shall also be provided with suitable non-return valve device such that in the event of power failure, the vacuum in the degassing chamber shall be maintained and the vacuum pump oil is not sucked back into the degassing chamber.

4.3.7.10. A high vacuum safety valve (piston type) to prevent back streaming of oil and air intrusion shall be provided. The pump motors shall be have return stop device.

4.3.8. OIL EXTRACTION PUMP

4.3.8.1. Suitable pumping system shall be provided for extracting oil from degasser under vacuum and supplying to transformer/reactor.

4.3.8.2. The pump shall be either glandless centrifugal type with canned motors or a combination of gear pump and centrifugal pump with mechanical seals suitable for extracting oil from high vacuum degassing chamber.

4.3.8.3. The discharge pump shall be able to deliver the oil at its rated capacity (2000LPH or more) under full vacuum condition of the degassing chamber with adequate head of 15 meters of water column

4.3.8.4. The oil extraction pump shall be located at a suitable level below the degasser chamber to ensure adequate suction head for the pump.

4.3.8.5. The pump shall be supplied with double check valve assembly and solenoid operated non-return valve.


4.3.8.6. In order to stop reverse flow of oil in case of power failure, the pumping system shall preferably be self-priming type alternatively priming device with safety interlock to protect pump against dry running shall be provided.

4.3.8.7. An interlock logic arrangement shall be provided between low level float switch (located in degassing column) and discharge pump to prevent dry running.

4.3.8.8. Sampling valves shall be provided at the discharge of extraction pump for testing of oil properties


4.3.8.9. Re-circulation line with valves shall be provided to re -circulate a part of the purified oil to the inlet point if necessary during operation

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		Issue No.	1
		Revision No.	0
		Date of Issue	2025-02-2
		Page 17 of 43	

4.3.8.10. The pump motor shall have insulation class-F with IP-55 protection

4.3.9. INSTRUMENTATION AND CONTROL



4.3.9.1. Following minimum instruments shall be provided on the purification plant

- a) Compound gauge at oil pump discharge.
- b) Compound gauge at filter inlet.
- c) Compound gauge at filter outlet.
- d) Pressure gauge at discharge pump outlet.
- e) Pressure gauge at degassifier
- f) Vacuum gauge in between roots vacuum Mcleod Vacuum Gauge at degasser and Sight glass as degassifier.
- g) Temperature indicator (Dial type) at heater
- h) Temperature indicator (Dial type) at heat
- i) Voltmeter.
- j) Oil flow meter (positive displacement type
- k) Ammeter.

4.3.9.2. A centralized electrical panel with auxiliary step down transformer, contactors, back up protection fuses, indicating lamps etc. to be provided with following minimum audio and visual alarms:

- a) High temperature at heater outlet
- b) High differential pressure across filters
- c) Oil pump trip
- d) Vacuum pump trip
- e) Loss of vacuum in degassing chamber
- f) Loss of vacuum in transformer evacuation line
- g) No oil flow through heater
- h) High oil level in degasser.

4.3.9.3. All controls and annunciation equipment shall be suitable for 240 V AC

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PLANT

Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 18 of 43

4.3.9.4. Suitable interlock as described against each equipment shall be provided for safe and trouble free operation.

4.3.9.5. All instrument control hardware and alarms shall be mounted on a suitable control panel.

4.3.9.6. Amimic diagram with indication lamps showing on off status of various equipment shall be provided on the control panel.

4.3.10. HOSES FOR TRANSFORMER OIL AND VACUUMING

4.3.10.1. Reinforced rubber hoses shall be provided for each operation of oil suction and Oil discharge

4.3.10.2. Four pieces of Oil hose of nitrile rubber reinforced with amour 1.5 inch internal diameter. Each piece shall be 15 meters long and shall be with leakage-proof, quick connect couplers for connection to installations under operation.

4.3.10.3. Hose pipes for oil service shall be suitable for transformer oil applicable up to temperature of 100°C. full vacuum and pressure up to 2.5 kg/cm² or 245.2kPa.

4.3.10.4. All oil hoses shall be built up around an earthed core or have built in earthed conductor to avoid static electricity accumulation.

4.3.10.5. Suitable mobile hose racks shall be provided to accommodate the hoses. All pipes fittings and hoses shall be properly labelled and distinctively marked

4.3.11. ELECTRICAL SYSTEM

4.3.11.1. The plant shall receive 415v, 3-phase, 50Hz, 4 wire power supply through flexible cable in the cable in the distribution panel location on the plant. The incoming of the distribution panel shall be switch fuse unit.

4.3.11.2. One length of 30 meters of oil resistant cable with crimped lugs at one end shall be provided for connection of the unit to mains.

4.3.11.3. The length of the cable will be covered in a suitable drum.

4.3.11.4. Provision for earthing the plant at the operating locations with earthing terminals for safety shall be provided.

4.3.11.5. The plant shall be suitably illuminated and ventilated for comfort of the operator

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Date: 2025-02-12



TITLE:
SPECIFICATION FOR HIGH VACUUM
TRANSFORMER OIL FILTRATION
PLANT

Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 19 of 43

4.4. DRAWINGS, DOCUMENTATION AND SUPPORT

4.4.1. Warranty and training

4.4.1.1. The High vacuum transformer oil filtration plant shall be backed by a minimum of 12-months factory warranty.

4.4.1.2. The Bidder shall submit a clause by clause statement of compliance with the specifications together with copies of the manufacturer's catalogues, brochures and technical clearly marked to support each clause, all in English for evaluation. The manufacturer's type reference/designation of the item offered shall be indicated

4.4.1.3. In the case of tender award, technical details for the High vacuum transformer oil filtration plant shall be submitted to the Kenya Power for approval before manufacture commences. The tenderer shall submit all the drawings as following

- a) Schematic drawings of the plant with all piping systems, control systems and instrumentation with reference of the relevant international standards followed for the design and construction of the plant and its components/material
- b) General arrangement plan, section of main and sub-assemblies, with detailed dimensions of the parts and the size of each and every part of the equipment to be supplied under this specification
- c) Complete list of accessories and auxiliaries with their make and accompanied with catalogue/pamphlets/literature/write-ups

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Signed:

Date: 2025-02-12

Authorized by: Head of Department, E/Plant Coast Region

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Date: 2025-02-12



Kenya Power

TITLE:
SPECIFICATION FOR HIGH VACUUM
TRANSFORMER OIL FILTRATION
PLANT

Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 20 of 43

5. MARKING, LABELLING AND PACKING

5.1. MARKING


5.1.1. The following information shall be marked legibly and in a permanent manner on the High vacuum transformer oil filtration plant:

- a) The manufacturer's name or trade mark;
- b) Type, model and serial number;
- c) Nominal input voltage and Frequency
- d) Individual loads ratings e.g Pumps, motors and heaters
- e) Total Power (kW) Consumption
- f) Vacuum pump suction capacity and ultimate vacuum level
- g) Flow diagram from inlet to outlet connection
- h) Letters "PROPERTY OF KENYA POWER"
- i) The instructions for handling and use (in the English Language).

5.2. PACKING


5.2.1. The High vacuum transformer oil filtration plant shall be packed in a carrying case so as to protect it from damage during transportation, handling and storage.

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Date: 2025-02-12

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Date: 2025-02-12

APPENDICIES

A: TESTS AND INSPECTION (Normative)

A.1 High vacuum transformer oil filtration plant shall be inspected and tested in accordance with the requirements of this specification. It shall be the responsibility of the manufacturer to perform or to have performed all the tests specified. Tenderers shall confirm the manufacturer's capabilities in this regard when submitting tenders. Any limitations shall be clearly specified.

A.2 High vacuum transformer oil filtration plant shall be subject to acceptance tests at the manufacturer's works before dispatch. Acceptance tests shall be witnessed by Three Engineers appointed by KPLC and shall include the following

- a) General construction inspection i.e. visual, dimensional and material
- b) Operational test of the plant
- c) Test for Breakdown voltage, moisture and gas content of oil (before & after purification).
- d) Plant capacity test for flow rate
- e) Test for electrical check i.e. Insulation Resistance and High Voltage test of Control panel
- f) Heater consumption on full load
- g) Tests certificates for suction & discharge heads of pumps shall be supplied
- h) Tests for checking correctness of all circuits, interlocks and sequence of operation.
- i) Control Panel check
- j) Any other test which is required to ensure satisfactory operation of the plant shall be performed by the supplier free of cost.

A.3 On receipt of the High vacuum transformer oil filtration plant, Kenya Power will inspect them and may perform or have performed any of the relevant tests in order to verify compliance with the specification. The supplier shall replace without charge to Kenya Power, any High vacuum transformer oil filtration plant which upon examination, test or use fail to meet any or all of the requirements in the specification.

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Date: 2025-02-12

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Date: 2025-02-12


B: QUALITY MANAGEMENT SYSTEM (Normative)

- B.1 The supplier shall submit a quality assurance plan (QAP) that will be used to ensure that the High vacuum transformer oil filtration plant physical properties, tests and documentation, will fulfill the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfill the requirements of ISO 9001: 2015.
- B.2 The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications including copy of valid and relevant ISO 9001:2015 certificate shall be submitted with the tender for evaluation.
- B.3 The bidder shall indicate the delivery time of the equipment, manufacturer's monthly & annual production capacity and experience in the production of the High vacuum transformer oil filtration plant being offered. A detailed list & contact addresses (including e-mail) of the manufacturer's previous customers for similar type of the High vacuum transformer oil filtration plant sold in the last five years as well as reference letters from at least four of the customers shall be submitted with the tender for evaluation.

C: DOCUMENTATION AND DEMONSTRATION (Normative)


- C.1 The bidder shall submit its tender complete with technical documents for tender evaluation. The technical documents to be submitted (all in English language) for tender evaluation shall include the following:
- Fully filled clause by clause guaranteed technical particulars (GTP) signed by the manufacturer;
 - Copies of the Manufacturer's catalogues, brochures, drawings giving all relevant dimensions, Flow/Schematic Diagram and technical data;
 - Sales records for the last five years and at least four customer reference letters;
 - Details of manufacturing capacity and the manufacturer's experience;
 - Manufacturers letter of authorization, ISO 9001 certificate, and other technical documents required in the tender.
 - Manufacturer's warranty and guarantee; subject to 12 months from date of delivery to KPLC stores

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Signed: 

Date: 2025-02-12

**Authorized by: Head of Department, E/Plant
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Date: 2025-02-12

 Kenya Power	TITLE: SPECIFICATION FOR HIGH VACUUM TRANSFORMER OIL FILTRATION PLANT	Doc. No.	
		Issue No.	1
		Revision No.	0
		Date of Issue	2025-02-2
		Page 23 of 43	

g) Operational manual.



h) Service manual.

C.2 The successful bidder (supplier) shall submit the following documents/details to The Kenya Power & Lighting Company for approval before manufacture:

- a) Fully filled clause by clause guaranteed technical particulars (GTP) stamped and signed by the manufacturer;
- b) Drawings of the High vacuum transformer oil filtration plant to be manufactured for KPLC.
- c) Schematic drawings of the plant with all piping systems, control systems and instrumentation with reference of the relevant international standards followed for the design and construction of the plant and its components/material
- d) General arrangement plan, section of main and sub-assemblies, with detailed dimensions of the parts and the size of each and every part of the equipment to be supplied under this specification
- e) Complete list of accessories and auxiliaries with their make and accompanied with catalogue/pamphlets/literature/write-ups
- f) Product manuals, operation manuals and brochures,
- g) Quality assurance plan (QAP) that will be used to ensure that the design, material; workmanship, tests, service capability, maintenance and documentation will fulfill the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfill the requirements of ISO 9001.
- h) All documentation necessary for safety of the plant.
- i) Packaging details (including packaging materials).

C.3. The supplier shall submit recommendations for use, care, storage and routine inspection/testing procedures, all in the English Language, during delivery of the the High vacuum transformer oil filtration plant to KPLC.

C.4. The successful bidder shall demonstrate to KPLC Staff (in Mombasa-Mbaraki) the operation of the High vacuum transformer oil filtration plant.

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Kenya Power

**TITLE:
SPECIFICATION FOR HIGH VACUUM
TRANSFORMER OIL FILTRATION
PLANT**

Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 24 of 43


D: ACCESSORIES (MANDATORY)

The following accessories shall be part of the bid

- 1) Pre-filter Cartridges/elements,10 sets
- 2) After-Filter Cartridges/elements,10 sets
- 3) Heater elements,2 sets
- 4) Heater contactor 2 sets
- 5) Motor contactor ,two sets
- 6) One Set of pressure, compound and Vacuum gauges
- 7) Vacuum pump oil 100 litres


Bidder to indicate any other accessories to be supplied and quote the price of each separately

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Region**

Signed: 

Date: 2025-02-12

**Authorized by: Head of Department, E/Plant
Coast Region**

Signed: 

Date: 2025-02-12



TITLE:
SPECIFICATION FOR HIGH VACUUM
TRANSFORMER OIL FILTRATION
PLANT

Doc. No.	
Issue No.	1
Revision No.	0
Date of Issue	2025-02-2
Page 25 of 43	

E: GUARANTEED TECHNICAL PARTICULARS (Normative)

To be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records for previous five years, four customer reference letters, details of suppliers' capacity and experience; and copies of complete type test certificates and test reports for tender evaluation, all in English Language)

Tender No.

Bidder's name and Address.....

Clause number	Requirement	Bidder's offer
	Manufacturer's Name and address	
	Country of Manufacture	State
	Name and model Number	
1.	Scope	State
2.	Normative References	State
3.	Definitions and Abbreviations	
3.1.	Abbreviations	
4.1.	SERVICE CONDITIONS	
4.1.1	suitable for use outdoors in tropical areas and harsh climatic conditions	
a)	Altitudes	State
b)	Humidity	State
c)	Average ambient temperature	State
4.2.	DESIGN, CONSTRUCTION AND OPERATION	
4.2.1.	Design	
4.2.1.1.	The High vacuum transformer oil filtration plant rated for continuous operation.	State
4.2.1.2.	The High vacuum transformer oil filtration plant capable of doing the following functions:	

Issued by: Head of Section, E/Plant Workshop Coast Region

Signed:

Date: 2025-02-12

Authorized by: Head of Department, E/Plant Coast Region

Signed:

Date: 2025-02-12



Kenya Power

TITLE:
SPECIFICATION FOR HIGH VACUUM
TRANSFORMER OIL FILTRATION
PLANT

Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 26 of 43

Clause number	Requirement	Bidder's offer
a)	Filter, heat, dehumidify and degas the oil at a vacuum level sufficient to condition the oil for the required parameters to the values	State
b)	Pump the oil from one tank to another by by-passing to purification process, if required	State
4.2.1.3.	The plant capable of processing the oil on single pass basis at rated flow of 3000 LPH to the following specification	
a.	Moisture content : Less than 5 PPM	Specify
b.	Gas content: Less than 0.1% by volume	Specify
c.	Dielectric strength 70 kV across 2.5 mmgap	Specify
d.	Filtration: Less than 1 micron	Specify
e.	Power factor Tan Delta at 90 °C: 0.002	Specify
4.2.1.4.	The Plant suitable for treating transformer oil by first heating it and then passing it through specially designed filter vessel. It is then subjected to vacuum treatment, which dehydrates and degasifies the oil to the guaranteed parameters. The set shall be designed for high vacuum and low temperature of oil for achieving the required results	State
4.2.1.5.	The plant suitable for operation on 50Hz, 3 phase system with neutral solidly grounded, the 3 phase voltage supply shall be 415 V + 10%. The plant shall be of latest design, sturdy in construction and requiring minimum maintenance.	State
4.2.2.	Construction	
4.2.2.1.	The Plant suitable for outdoor use. All components including control panel shall have outdoor weather protected enclosures of sheet metal. The casing shall be provided with large doors for easy access to the various components	State
4.2.2.2.	Locking of the casing doors be provided with latching from inside wherever possible. Good locking arrangement for main entry door and also on the doors wherever inside latching is not possible shall also be provided.	State
4.2.2.3.	All plant components mounted on a common base frame, including all necessary piping for oil and vacuum as well as electrical wiring	State
4.2.2.4.	All bought out components are of reputed makes. Manufacturer's test reports for pumps and motors supplied	State
4.2.2.5.	The plant vacuuming system suitably designed for carrying out degassing function.	State
4.2.2.6.	sampling valves in the inlet and outlet pipes of filter press provided	State
4.2.2.7.	Flow meter with totalizer in the outlet pipe of filter press provided	State

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Signed:

Date: 2025-02-12

Authorized by: Head of Department, E/Plant Coast Region

Signed:

Date: 2025-02-12



Kenya Power

TITLE:
SPECIFICATION FOR HIGH VACUUM
TRANSFORMER OIL FILTRATION
PLANT

Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 27 of 43

Clause number	Requirement	Bidder's offer
4.2.2.8.	One moisture sensor in the outlet pipe of filter press provided	State
4.2.2.9.	Arrangement for reflushing of part of filtered oil and degassed oil provided.	State
4.2.2.10.	A valve for draining the oil each from the heater tank, edge filter and filter press provided	State
4.2.2.11.	Oil heater, filter vessel, degasser of mild steel construction. The internal and external surface including oil heater, filter vessel, degassifier and structural steel work to be painted and shot or sand blasted to remove all rust and scale of foreign adhering matter or grease. All steel surface in contact with insulating oil painted with two coats of heat resistant oil insoluble, insulating varnish/paint	State
4.2.2.12.	All internal painted steel surface given a primary coat for zinc chromate second coat of oil and weather resistant varnish of a colour distinct from primary and final two coats of glossy oil and weather resisting paint	State
4.2.2.13.	All paints carefully selected to withstand heat and extremes of weather. The paint shall not scale off or crinkle or be remove by abrasion due to normal handling	State
4.2.2.14.	The external overall dimensions for High vacuum transformer oil filtration plant submitted with tender.	Submit
4.2.2.15.	The gross weight of the High vacuum transformer oil filtration plant submitted with this tender.	Submit
4.2.2.16.	Lifting Hooks for Plant provided to facilitate ease of Plant Loading / Unloading	State
4.2.2.17.	High vacuum transformer oil filtration plant fitted with suitable dampers to withstand shocks and vibration during operation and transportation on top of a truck/lorry.	State
4.2.2.18.	Scheme drawings for High vacuum transformer oil filtration plant offered and Flow diagram of oil filtration plant, pumps and motors submitted with tender, clearly detailing important dimensions, any special features of the offered design, components, accessories and fittings.	State
4.2.2.19.	Complete list of components, instruments and accessories offered with their make and accompanied with catalogue/brochure/pamphlets/literature/write-ups submitted with the tender.	State
4.2.3.	Operation	
4.2.3.1.	Operation sequence and dangers sign plates provided	State
4.2.3.2.	Oil taken in through inlet valve	State
4.2.3.3.	An inlet pump circulate the oil through the heater where the oil temperature raised up to 70°C.	State

Issued by: Head of Section, E/Plant Workshop Coast Region

Signed:

Date: 2025-02-12

Authorized by: Head of Department, E/Plant Coast Region

Signed:

Date: 2025-02-12



Kenya Power

TITLE:
SPECIFICATION FOR HIGH VACUUM
TRANSFORMER OIL FILTRATION
PLANT

Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 28 of 43

Clause number	Requirement	Bidder's offer
4.2.3.4.	This oil filtered through a pre filter (10 micron) to remove major portion of coarse dirt and pumped to a vacuum chamber.	State
4.2.3.5.	Vacuum chamber contain permanent dispersion media (PDM), a cylindrical type element. The oil shall flow through the pores of the PDM into shower in order to ensure more exposure of vacuum to the oil particles. This process,boil off dissolved water and gases effectively	State
4.2.3.6.	Dehydrated oil collected at the bottom of the vacuum chamber and pumped through the fine filter (0.5 micron) to the outlet valve	State
4.2.3.7.	At the beginning of the process outlet valve closed and the oil shall circulate through a by-pass valve. This shall make the system stable	State
4.2.3.8.	The plant capable of filling transformer oil under full vacuum condition from separate oil storage tank	State
4.3.	TECHNICAL PARTICULARS	
4.3.1.	OIL PUMP (INLET PUMP)	
4.3.1.1.	The pumps single stage positive displacement gear type.	State
4.3.1.2.	The pump motor insulation class-F with IP-54 or better protection.	State
4.3.1.3.	Suitable mechanical seals provided to ensure vacuum tightness.	State
4.3.1.4.	A built-in pressure relief valve to re-circulate the oil to suction side in case of accidental pressure rise provided.	State
4.3.1.5.	Suction lift of the pump at least 5 meters of transformer oil at atmospheric pressure and temperature.	State
4.3.1.6.	A separate by pass valve provided across the gear pump so that the flow rate through the filter can be adjusted as required.	State
4.3.1.7.	The pumps provided with an interlock with delay such that if there is no oil flow for 30 sec. through the heater, the pump trip automatically and also if the pump is not operating the heater will not be energized	State
4.3.1.8.	The following oil inlet pump details shall be provided	State
a)	Pump Make	State
b)	Pump Type	State
c)	Pump Capacity	State
d)	Motor make and type	State
e)	Motor Rating	State
f)	Motor type of starter	State
4.3.2.	MAGNETIC STRAINER	
4.3.2.1.	The plant provided with a suitable magnetic strainer with wire mesh to filter all particles of sizes above 0.5 mm and all magnetic particles.	State

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Signed:

Date: 2025-02-12

Authorized by: Head of Department, E/Plant Coast Region

Signed:

Date: 2025-02-12



Kenya Power

TITLE:
SPECIFICATION FOR HIGH VACUUM
TRANSFORMER OIL FILTRATION
PLANT

Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 29 of 43

Clause number	Requirement	Bidder's offer
4.3.2.2.	The strainer installed at the suction of the oil pump described at 4.3.1	State
4.3.3.	HEATERS	
4.3.3.1.	The oil heater vessel of mild steel welded construction and insulated with glass/mineral wool.	State
4.3.3.2.	The heating elements divided into three banks, each individually controlled by a separate thermostat. For the required oil condition temperature of 70°C these thermostat are set at 50°C, 60°C and 70°C	State
4.3.3.3.	Selector switch provided for full load operation of heaters depending upon the desirable temperature of oil.	State
4.3.3.4.	Heater capable of heating oil up to 80°C. The recommended operating temperature of oil is 60 to 70°C.	State
4.3.3.5.	The heater capacity sufficient to heat up the oil from the ambient temperature to the required operating temperature by indirect heating	State
4.3.3.6.	Heater control bank controlled by temperature controller housed on a control panel for easy observation and re-adjustment.	State
4.3.3.7.	Selector switch provided for full load operation of heaters depending upon the desirable temperature of oil.	State
4.3.3.8.	Heaters interlocked with inlet pump and shall not be in "ON position" unless the inlet pump is working.	State
4.3.3.9.	One suitable pressure relief valve shall be fixed on the heater chamber to prevent any pressure rise above the acceptable limit.	State
4.3.3.10.	A drain point provided for the heater tank.	State
4.3.4.	After FILTER (After degassing stage)	
4.3.4.1.	Cartridge filter provided to ensure maximum particle size to less than 0.5 micron in the filtered oil.	State
4.3.4.2.	The filter body fabricated of mild steel and designed for leak tightness at full vacuum and high pressure.	State
4.3.4.3.	The oil will flow from dirty oil chamber to clean oil chamber through filter elements.	State
4.3.4.4.	Cartridge type element used suitable for transformer oil in service and submicronic filtration. The media shall be non-hygroscopic and of high dirt holding capacity.	State
4.3.4.5.	The filter elements easily removable for replacement when required.	State
4.3.4.6.	Compound gauge to indicate pressure across the filter vent and drain with valves and other necessary accessories mounted on the filter for each operation	State

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Signed:

Date: 2025-02-12

Authorized by: Head of Department, E/Plant Coast Region

Signed:

Date: 2025-02-12



Kenya Power

TITLE:
SPECIFICATION FOR HIGH VACUUM
TRANSFORMER OIL FILTRATION
PLANT

Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 30 of 43

Clause number	Requirement	Bidder's offer
4.3.5.	Pre FILTER PRESS	
4.3.5.1.	For treating dirty oil, filter press of adequate rating supplied for supplementing the capacity of filter elements.	State
4.3.5.2.	These units designed for quick and easy replacement of media.	State
4.3.5.3.	A sludge outlet for receiving the solid impurities and cleaning the filter plate without opening the unit provided.	State
4.3.5.4.	The unit provided with vent and drain valves, pressure gauge at inlet and outlet and other necessary accessories.	State
4.3.6.	DEGASSING CHAMBER	
4.3.6.1.	The degassing chamber of welded construction and suitable for operation under full vacuum. The fill of "rasig" Rings and trays for distribution designed for efficient distribution of oil over large areas.	State
4.3.6.2.	Incoming transformer oil should be spread over these rings in the form of film and a longer surface area, thus achieving better degassing and dehumidification.	State
4.3.6.3.	The degassing chamber double stage type suitable for ensuring the desired oil properties.	State
4.3.6.4.	Arrangement for condensing back lighter fraction (Aromatics) of the insulating oil into the system provided.	State
4.3.6.5.	The degassing channels adequate height to allow long enough free fall for complete degassing.	State
4.3.6.6.	Design such as to minimize foam formation	State
4.3.6.7.	The degassing chambers provided with suitable level monitor for oil or foam level in the chamber and shall trip the inlet pump when the level rises above the designed maximum level in order to prevent foam to enter the vacuum pumping system.	State
4.3.6.8.	The oil inlet pump starts again automatically once the oil level in the degassing chamber falls below the present oil level	State
4.3.6.9.	Necessary illuminated sight glass provided through which oil flow through the degasser can be viewed clearly	State
4.3.6.10.	The degasser provided with vacuum gauges, vacuum breaking valves, main and auxiliary vacuum connections and other necessary accessories	State
4.3.7.	VACUUM PUMPING SYSTEM FOR OIL FILTRATION	
4.3.7.1.	The pump provided with a suitable vacuum pumping system for creating adequate high vacuum in the degassing chamber.	State
4.3.7.2.	The pumping system consist of suitable combination of Roots Blower and Rotary vane vacuum pumps with inter stage condensing units.	State

Issued by: Head of Section, E/Plant Workshop Coast Region

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Authorized by: Head of Department, E/Plant Coast Region

Signed:

Date: 2025-02-12



Kenya Power

TITLE:
SPECIFICATION FOR HIGH VACUUM
TRANSFORMER OIL FILTRATION
PLANT

Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 31 of 43

Clause number	Requirement	Bidder's offer
4.3.7.3.	The pump motor insulation class-F with IP-54 or better protection	State
4.3.7.4.	The Roots blower reputed make. Suitable built in labyrinth packing system, slinger rings, oil return chamber provided between bearings and working chamber to prevent penetration of lubricating oil to the working chamber.	State
4.3.7.5.	The pumps motor dynamically balanced. The pumps suitable for starting evacuation form atmospheric pressure and applied with necessary over flow valve.	State
4.3.7.6.	The rotary vane vacuum pumps installed after the roots blower.	State
4.3.7.7.	An automatic by pass valve across the roots blowers permit operation of rotary vane pump alone to operate when so required.	State
4.3.7.8.	The rotary vane pumps are provided with gas ballast valve to prevent contamination of vacuum pump oil with moisture.	State
4.3.7.9.	The vacuum pump provided with suitable non-return valve device such that in the event of power failure, the vacuum in the degassing chamber shall be maintained and the vacuum pump oil is not sucked back into the degassing chamber.	State
4.3.7.10.	A high vacuum safety valve (piston type) to prevent back streaming of oil and air intrusion provided. The pump motors have return stop device.	State
4.3.8.	OIL EXTRACTION PUMP	
4.3.8.1.	Suitable pumping system provided for extracting oil from degasser under vacuum and supplying to transformer/reactor.	State
4.3.8.2.	The pump either glandless centrifugal type with canned motors or a combination of gear pump and centrifugal pump with mechanical seals suitable for extracting oil from high vacuum degassing chamber.	State
4.3.8.3.	The discharge pump able to deliver the oil at its rated capacity (3000LPH or more) under full vacuum condition of the degassing chamber with adequate head of 15 meters of water column	State
4.3.8.4.	The oil extraction pump located at a suitable level below the degasser chamber to ensure adequate suction head for the pump.	State
4.3.8.5.	The pump supplied with double check valve assembly and solenoid operated non-return valve.	State
4.3.8.6.	In order to stop reverse flow of oil in case of power failure, the pumping system preferably be self-priming type alternatively priming device with safety interlock to protect pump against dry running provided.	State
4.3.8.7.	An interlock logic arrangement provided between low level float switch (located in degassing column) and discharge pump to prevent dry running.	State

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TRANSFORMER OIL FILTRATION
PLANT**

Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 32 of 43

Clause number	Requirement	Bidder's offer
4.3.8.8.	Sampling valves provided at the discharge of extraction pump for testing of oil properties	State
4.3.8.9.	Re-circulation line with valves provided to re -circulate a part of the purified oil to the inlet point if necessary during operation	State
4.3.8.10.	The pump motor insulation class-F with IP-54 or better protection	State
4.3.9.	INSTRUMENTATION AND CONTROL	
4.3.9.1.	Following minimum instruments provided on the purification plant	
a)	Compound gauge at oil pump discharge.	State
b)	Compound gauge at filter inlet.	State
c)	Compound gauge at filter outlet.	State
d)	Pressure gauge at discharge pump outlet.	State
e)	Pressure gauge at degassifier	State
f)	Vacuum gauge in between roots vacuum Mcleod Vacuum Gauge at degasser and Sight glass as degassifier.	State
g)	Temperature indicator (Dial type) at heater	State
h)	Voltmeter.	State
i)	Oil flow meter (positive displacement type	State
j)	Ammeter.	State
4.3.9.2.	A centralized electrical panel with auxiliary step down transformer, contactors, back up protection fuses, indicating lamps etc. to be provided with following minimum audio and visual alarms:	
a)	High temperature at heater outlet	State
b)	High differential pressure across filters	State
c)	Oil pump trip	State
d)	Vacuum pump trip	State
e)	Loss of vacuum in degassing chamber	State
f)	Loss of vacuum in transformer evacuation line	State
g)	No oil flow through heater	State
h)	High oil level in degasser.	State
4.3.9.3.	All controls and annunciation equipment shall be suitable for 240 V AC	State
4.3.9.4.	Suitable interlock as described against each equipment provided for safe and trouble free operation.	State
4.3.9.5.	All instrument control hardware and alarms mounted on a suitable control panel.	State
4.3.9.6.	Amimic diagram with indication lamps showing on off status of various equipment provided on the control panel.	State

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TRANSFORMER OIL FILTRATION
PLANT

Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 33 of 43

Clause number	Requirement	Bidder's offer
4.3.10.	HOSES FOR TRANSFORMER OIL AND VACUUMING	
4.3.10.1.	Reinforced rubber hoses provided for each operation of oil suction and Oil discharge	State
4.3.10.2.	Four pieces of Oil hose of nitrile rubber reinforced with amour 1.5 inch internal diameter. Each piece 15 meters long and with leakage-proof, quick connect couplers for connection to installations under operation.	State
4.3.10.3.	Hose pipes for oil service suitable for transformer oil applicable up to temperature of 100°C. full vacuum and pressure up to 2.5 kg/cm2 or 245.2kPa.	State
4.3.10.4.	All oil hoses built up around an earthed core or have built in earthed conductor to avoid static electricity accumulation.	State
4.3.10.5.	Suitable mobile hose racks provided to accommodate the hoses. All pipes fittings and hoses properly labelled and distinctively marked	State
4.3.11.	ELECTRICAL SYSTEM	
4.3.11.1.	The plant shall receive 415v, 3-phase, 50Hz, 4 wire power supply through flexible cable in the cable in the distribution panel location on the plant. The incoming of the distribution panel shall be switch fuse unit.	State
4.3.11.2.	One length of 30 meters of oil resistant cable with crimped lugs at one end shall be provided for connection of the unit to mains.	State
4.3.11.3.	The length of the cable covered in a suitable drum.	State
4.3.11.4.	Provision for earthing the plant at the operating locations with earthing terminals for safety provided.	State
4.3.11.5.	The plant suitably illuminated and ventilated for comfort of the operator	State
4.4.	DRAWINGS, DOCUMENTATION AND SUPPORT	
4.4.1.	Warranty and training	
4.4.1.1.	The High vacuum transformer oil filtration plant backed by a minimum of 12-months factory warranty.	State
4.4.1.2.	The Bidder submit a clause by clause statement of compliance with the specifications together with copies of the manufacturer's catalogues, brochures and technical clearly marked to support each clause, all in English for evaluation. The manufacturer's type reference/designation of the item offered shall be indicated	State
4.4.1.3.	In the case of tender award, technical details for the High vacuum transformer oil filtration plant shall be submitted to the Kenya Power for approval before manufacture commences. The tenderer shall submit all the drawings as following	

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TRANSFORMER OIL FILTRATION
PLANT

Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 34 of 43

Clause number	Requirement	Bidder's offer
a)	Schematic drawings of the plant with all piping systems, control systems and instrumentation with reference of the relevant international standards followed for the design and construction of the plant and its components/material	State
b)	General arrangement plan, section of main and sub-assemblies, with detailed dimensions of the parts and the size of each and every part of the equipment to be supplied under this specification	State
c)	Complete list of accessories and auxiliaries with their make and accompanied with catalogue/pamphlets/literature/write-ups	State
5	MARKING, LABELLING AND PACKING	
5.1.	MARKING	
5.1.1.	The following information shall be marked legibly and in a permanent manner on the High vacuum transformer oil filtration plant:	
a)	The manufacturer's name or trade mark;	State
b)	Type, model and serial number;	State
c)	Nominal input voltage and Frequency	State
d)	Individual loads ratings e.g Pumps, motors and heaters	State
e)	Total Power (kW) Consumption	State
f)	Vacuum pump suction capacity and ultimate vacuum level	State
g)	Flow diagram from inlet to outlet connection	State
h)	Letters "PROPERTY OF KENYA POWER"	State
i)	The instructions for handling and use (in the English Language).	State
5.2.	PACKING	
5.2.1.	The High vacuum transformer oil filtration plant shall be packed in a carrying case so as to protect it from damage during transportation, handling and storage.	State
	APPENDICES	
A:	TESTS AND INSPECTION (Normative)	
A.1	High vacuum transformer oil filtration plant shall be inspected and tested in accordance with the requirements of this specification. It shall be the responsibility of the manufacturer to perform or to have performed all the tests specified. Tenderers shall confirm the manufacturer's capabilities in this regard when submitting tenders. Any limitations shall be clearly specified.	State
A.2	High vacuum transformer oil filtration plant shall be subject to acceptance tests at the manufacturer's works before dispatch. Acceptance tests shall be witnessed by Three Engineers appointed by KPLC and shall include the following	State

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TRANSFORMER OIL FILTRATION
PLANT**

Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 35 of 43

Clause number	Requirement	Bidder's offer
a)	General construction inspection i.e. visual, dimensional and material	State
b)	Operational test of the plant	State
c)	Test for Breakdown voltage, moisture and gas content of oil (before & after purification).	State
d)	Plant capacity test for flow rate	State
e)	Test for electrical check i.e. Insulation Resistance and High Voltage test of Control panel	State
f)	Heater consumption on full load	State
g)	Tests certificates for suction & discharge heads of pumps shall be supplied	State
h)	Tests for checking correctness of all circuits, interlocks and sequence of operation.	State
i)	Control Panel check	State
j)	Any other test which is required to ensure satisfactory operation of the plant shall be performed by the supplier free of cost.	State
A.3	On receipt of the High vacuum transformer oil filtration plant, Kenya Power will inspect them and may perform or have performed any of the relevant tests in order to verify compliance with the specification. The supplier shall replace without charge to Kenya Power, any High vacuum transformer oil filtration plant which upon examination, test or use fail to meet any or all of the requirements in the specification.	State
B:	QUALITY MANAGEMENT SYSTEM (Normative)	
B.1	The supplier shall submit a quality assurance plan (QAP) that will be used to ensure that the High vacuum transformer oil filtration plant physical properties, tests and documentation, will fulfill the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfill the requirements of ISO 9001: 2015.	State
B.2	The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications including copy of valid and relevant ISO 9001:2015 certificate shall be submitted with the tender for evaluation.	State
B.3	The bidder shall indicate the delivery time of the equipment, manufacturer's monthly & annual production capacity and experience in the production of the High vacuum transformer oil filtration plant being offered. A detailed list & contact addresses (including e-mail) of the manufacturer's previous customers for similar type of the High vacuum transformer oil filtration plant sold in the last five years as well as reference letters from at least four of the customers shall be submitted with the tender for evaluation.	State

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TRANSFORMER OIL FILTRATION
PLANT**

Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 36 of 43

Clause number	Requirement	Bidder's offer
C:	DOCUMENTATION AND DEMONSTRATION (Normative)	State
C.1	The bidder shall submit its tender complete with technical documents for tender evaluation. The technical documents to be submitted (all in English language) for tender evaluation shall include the following:	State
a)	Fully filled clause by clause guaranteed technical particulars (GTP) signed by the manufacturer;	State
b)	Copies of the Manufacturer's catalogues, brochures, drawings giving all relevant dimensions, Flow/Schematic Diagram and technical data;	State
c)	Sales records for the last five years and at least four customer reference letters;	State
d)	Details of manufacturing capacity and the manufacturer's experience;	State
e)	Manufacturers letter of authorization, ISO 9001 certificate, and other technical documents required in the tender.	State
f)	Manufacturer's warranty and guarantee; subject to 12 months from date of delivery to KPLC stores	State
g)	Operational manual.	State
h)	Service manual.	State
C.2	The successful bidder (supplier) shall submit the following documents/details to The Kenya Power & Lighting Company for approval before manufacture:	State
a)	Fully filled clause by clause guaranteed technical particulars (GTP) stamped and signed by the manufacturer;	State
b)	Drawings of the High vacuum transformer oil filtration plant to be manufactured for KPLC.	State
c)	Schematic drawings of the plant with all piping systems, control systems and instrumentation with reference of the relevant international standards followed for the design and construction of the plant and its components/material	State
d)	General arrangement plan, section of main and sub-assemblies, with detailed dimensions of the parts and the size of each and every part of the equipment to be supplied under this specification	State
e)	Complete list of accessories and auxiliaries with their make and accompanied with catalogue/pamphlets/literature/write-ups	State
f)	Product manuals, operation manuals and brochures,	State
g)	Quality assurance plan (QAP) that will be used to ensure that the design, material; workmanship, tests, service capability, maintenance and documentation will fulfill the requirements stated in the contract documents, standards, specifications and regulations.	State

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PLANT**

Doc. No.

Issue No.

1

Revision No.

0

Date of Issue

2025-02-2

Page 37 of 43

Clause number	Requirement	Bidder's offer
	The QAP shall be based on and include relevant parts to fulfill the requirements of ISO 9001.	
h)	All documentation necessary for safety of the plant.	State
i)	Packaging details (including packaging materials).	State
C.3	The supplier shall submit recommendations for use, care, storage and routine inspection/testing procedures, all in the English Language, during delivery of the the High vacuum transformer oil filtration plant to KPLC.	State
C.4.	The successful bidder shall demonstrate to KPLC Staff (in Mombasa) the operation of the High vacuum transformer oil filtration plant.	State
D:	ACCESSORIES (MANDATORY)	
	The following accessories shall be part of the bid	
1)	Pre-filter Cartridges/elements,10 sets	State
2)	After-Filter Cartridges/elements,10 sets	State
3)	Heater elements,2 sets	State
4)	Heater contactor 2 sets	State
5)	Motor contactor ,two sets	State
6)	One Set of pressure, compound and Vacuum gauges	State
7)	Vacuum pump oil 100 litres	State
	Bidder to indicate any other accessories to be supplied and quote the price of each separately	State

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Manufacturer's Name, Signature, Stamp and Date

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