Flow capacity of suction filter:

**SUCTION FILTER**

(FILTRATION SYSTEM)

**PLANT CONFIGURATION:** Portable oil filtration & circulating plant shall be suitable for closed loop circulation and filtration of Transformer Oil (As per IS 335) in power transformer at a flow of 12000 LPH and 2500 LPH through a filter. It shall consist of suction filter, oil feed pump, coarse & cartridge filter and a control panel with necessary instrumentation. Complete plant should be mounted on a steel frame structure with suitable 4 nos. wheels lined with polycurathane & mechanical jacks which can be shifted to any location. Four nos. lifting hooks to be provided to facilitate the shifting.

Work piece Material: The facility is required for handling Transformer oil.

The process shall be continued till the particle content of the insulation oil achieves 10,000 particles > 2 microns per liter.

The treatment is carried out to reduce the number of particle content size > 2 microns in the insulation oil below 10,010 particles per liter and also to improve the oil impregnation of the insulation.

A new Portable Transformer oil circulation plant of 12 KL flow rate capacity is required to process & handle low sulphur content transformer oil for manufacturing international quality transformers. The new facility will consist of the following:

### PURPOSE & WORK PIECE MATERIAL:

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<tr>
<th>DESCRIPTION</th>
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<tr>
<td><strong>BHEL REQUIREMENT - 12 / 25 KL PORTABLE OIL FILTRATION &amp; CIRCULATING UNIT</strong></td>
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**NOTE:**

- The offer and all documents attached with offer should be in English language only.
- The offer, inherently / necessarily, implies that the submitted documents will be the basis of the specifications/requirements stated in the document and the Reader and submitter agree with the offer.
- The Reader must admit complete information as per clause no.2 (Qualified Condition). The offer meeting these clauses would only be processed.
INSTRUMENTATION FOR OIL CIRCULATION PLANT

CONTROL PANEL: A frame mounted sheet metal control panel to be provided for operation of circulating pumps complete with indicating lamps, starter, single phasing preventer, MCCB & HRC fuses, step down transformer (if required) & pressure gauges.

ELECTRICAL CONTROL PANEL:

All steel piping shall be sandblasted & painted both internally & externally with oil-resistant epoxy paint.

Necessary 80 NB isolation valves shall be provided at the inlet and outlet of the system.

Flexible steel corrugated hose (02 no) of length 10 meter each flange size of 80 NB with one end fixed flange & other end floating flange for connection with transformer to be provided.

Flow rate

OIL FLOW METER:
The oil flow meter shall be connected at the outlet of the filter to measure the flow of oil from 25000 Ltrs/Hr to 50000 Ltrs/Hr. Flow meter shall be of M/s Teltech make with veeder root counter.

OIL FEED PUMP:
Pump should be of centrifugal type of Mit Jyoti Make. It should be provided with inlet & outlet isolation valves, pressure gauges, flow control valves & pressure relief valves.

CARTRIDGE FILTER:

It should be suitable for filteration of transformer oil. Filter elements shall be housed in two or more filter housings. At the outlet of the housing a 6/8 NB tapping point with valve shall be provided for connection to existing particle counting system. Cartridge filter shall be of MICRO CLEAN TYPE, ZETA PLUS, CUNO Make.

DEVIATIONS

If offered, be offered.

DESCRIPTION FOR BUILT REQUIREMENT

125/5 LITRE PORTABLE OIL FILTRATION & CIRCULATING UNIT

25000 LPH

50-75 Microns

25000 LPH

Vendor to confirm
Notwithstanding anything in this specification, if anything else is required for its functioning, the same shall be specially brought and included in the offer.

Special tools and equipment required for erection and necessary tools like Torque Wrench, Spanners, Keys, grease guns etc for operation and maintenance of the plant should be supplied. List of such tools should be submitted with the offer.

**TOOLS FOR ERECTION, OPERATION & MAINTENANCE:**

- Paint of the machine should be oil/coolant resistant and should not peel off and mix up with coolant.
- If any safety/environmental protection enclosure is required, it should be built in the machine by the vendor.
- Maximum noise level shall be 85 dB(A) at normal load condition, with correction factor for background noise, if necessary. This will be measured as per international standards like DIN 45635-16.
- Supplier to demonstrate compliance to noise level, if so required.

The plant shall conform to the following factors related to environment:

- Oil & water pipe lines should not run with electrical cable in the same tray/trench.
- Emergency Switches at suitable locations as per International Norms are to be provided.
- All the rotating parts used on the machine should be statically & dynamically balanced to avoid undue vibrations.
- All the pipes, cables etc. on the machine should be well supported and protected. These should not create any hindrance to the machine operator’s movement for effective use of the plant.
- A detailed list of all alarms/indications provided on the machine should be submitted by the supplier.
- The machine should have adequate and reliable safety interlocks/devices to avoid damage to the machine, workpiece and the operator due to the malfunctioning or mistakes. Machine functions should be continuously monitored and alarm/warning indications through lights/(on panels) should be available.

**SAFETY ARRANGEMENTS:**

- List of recommended spares with price list to run the plant for 2 years 24 hrs.
- Vendor to confirm and submit standard safety features.

**ENVIROMENTAL PERFORMANCE OF THE PLANT:**

- Motor shall conform to IEC or Indian standards.
- All electrical components in the cabinets should be mounted on DIN Rail.
- All electrical & electronics control cabinets & panels should be dust and vermin proof.

**TROISICALIZATION:**

- All electrical/electronics equipment shall be tropicalized.

**ELECTRICAL SYSTEM DESCRIPTION FOR BHEL REQUIREMENT:**

- 12/25 KL PORTABLE OIL FILTRATION & CIRCULATING UNIT

**DESCRIPTION FOR BHEL REQUIREMENT:**

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The plant, including attachment and accessories, should be made suitable for continuous operation to full capacity for 24 hours a day and 7 days a week throughout. Vendor should ensure and conform to the same.

Thermal Stability of the complete machine should be ensured by the vendor, keeping in view the specified ambient conditions and accuracy requirements of BHEL components. The machine should work trouble-free and efficiently under the following operating conditions and should give specified accuracies.

1. **Power Supply:**
   - Voltage: 415 V ± 10%, +10%
   - Frequency: 50 Hz ± 3%, -3%
   - No. of phases: 3

2. **Ambient Conditions:**
   - Temperature: 5 to 45 degree Celsius
   - Relative Humidity: 95% max.

The complete plant and all supplied items should work trouble-free and efficiently under the following operating conditions.

- **AMBIENT CONDITION & THERMAL STABILITY:**
  - Complete check-out of the plant shall be done by the vendor at BHEL works to the specified accuracy as per the specification para.
  - Material for the check-out shall be provided by BHEL. Vendor shall be fully responsible for carrying out the check-out and commissioning.

- **Accuracy Test:**
  - A schedule of erection and commissioning shall be submitted with the offer.
  - Portion, if any, of the plant, accessories, and other supplied items where paint has rubbed off or peeled during transit or erection should be repainted and merged with the original surrounding paint by the vendor. For this purpose, the vendor should bring the required commissioning spares on returnable basis.
  - Successful proving of the plant by the vendor shall be considered as part of commissioning. All tests mentioned at clause 6 shall form part of the commissioning activity.

- **Erection & Commissioning:**
  - BHEL personnel should be trained at the supplier's works for mutually agreed periods in the area of electrical, electronic, and other supplied equipment.
  - Operating Manuals, Maintenance Manuals, & Catalogues for supplied equipment, Voltage Stabilizer, Isolation Transformer, and all supplied accessories.
  - Detailed specification of all rubber items and hydraulic/tube fittings.
  - Catalogues, O&M Manuals of all bought-out items including drawings, wherever applicable.
  - Detailed Maintenance manual of the plant with all drawings of machine assemblies/sub-assemblies/parts including electrical, pneumatic, hydraulic circuit diagrams. All Assembly/Sub Assembly Drawings shall be supplied with the part list also.
  - Operating manuals of the plant.

- **Documentation:**
  - Five sets of the following documents (hard copies) in English language should be supplied along with the plant:
  
1. **DESCRIPTION FOR BHEL REQUIREMENTS:**
   - 12 / 25 KL PORTABLE OIL FILTRATION & CIRCULATING UNIT

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**Vendor to confirm:**

Vendor to specify

Vendor to confirm

Vendor to confirm

Vendor to confirm

Vendor to confirm

Vendor to confirm

Vendor to confirm

Vendor to confirm

Vendor to confirm

Vendor to confirm
QUALIFYING CONDITION

Painting of plant/electrical panels: RAL 6011 APPLE GREEN (POLYURETHANE PAINT)

GUARANTEE:

Standard & rigid packing for all items of complete plant, all accessories and other supplied items to avoid any damage/loss in transit. When machine is despatched in containers, all small loose items shall be suitably packed in boxes.

PACKING:

Training of MEI, machine operators in operation of complete machine & accessories etc by the supplier’s experts/engineers during their stay at BHEL works,

Two weeks supervision of independent operation of machine by BHEL after job proveout.

Demonstration by actual use of all supplied attachments and accessories to their full capacity.

Demonstration of all features of the machine, control system & accessories to the satisfaction of BHEL for efficient and effective use of the machine as per para 2.0.

The plant should be tested for continuous running of 48 hours. If any breakdown occurs during this test, it should be repeated for 48 hours from that time.

Full load test to demonstrate the maximum power & pressing/dismantling capacity of the plant.

Tests/Activities to be carried out at BHEL works while commissioning the plant:

Demonstration of all features of the plant & all accessories as per para 2.0.

The plant should be tested for continuous running of 48 hours. If any breakdown occurs during this test, it should be repeated for 48 hours from that time.

Tests/Activities to be carried out at supplier’s works on the machine before dispatch:

PLANT ACCEPTANCE: (Tests/Activities should be Performed by Vendor)

Vendor shall be responsible for any deviation/rejection in proveout of plant due to wrong operation or malfunctioning of the plant during proveout and also for the delay in operation. The cost of such deviation/rejection, if any shall be refunded by the vendor to BHEL.

Complete proveout of plant shall be done by vendor at BHEL works to the specified accuracy as per para 2.0.

Material for the proveout of plant shall be provided by BHEL. Vendor shall be fully responsible for proveout of plant as per drawing and other requirements specified by BHEL to the full satisfaction of BHEL. Clarifications, if any required by vendor, regarding accuracy requirements of plant, whether specified or not, should be discussed and cleared by vendor during initial technical discussions.

DESCRIPTION FOR BHEL REQUIREMENTS:

PROVEOUT OF BHEL COMPONENTS:

DESCRIPTION FOR BHEL REQUIREMENTS:

DEVIATIONS TO SPECIFICATIONS:

OFFERED DEVIATIONS

CONFIRMED BY VENDOR

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BHEL reserves the right to verify information submitted by the vendor. In case the information is found to be false/incorrect, the offer shall be rejected.

List of companies where supplied in the last 2 years with address, name of contact person, and phone number.

Details of test facilities available at the manufacturer's works.

Details of manufacturing facilities available at the manufacturer's works.

**DESCRIPTION FOR BHEL REQUIREMENT**

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<tbody>
<tr>
<td>Name: Anil Singh</td>
</tr>
<tr>
<td>Position: Manager (TM)</td>
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<tr>
<td>Name: V.K. Dwivedi</td>
</tr>
<tr>
<td>Position: Sr. Manager (WEX)</td>
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