

Tender (90/2025)

Line	Description	Quantity	UOM
1	STG2 lube oil separator complete skid	1	Each



Samra Electric Power Co.
Supply of Centrifugal Lube Oil Purifier

1. General Requirements

1.1 Scope of Supply: The supplier shall provide a complete, skid-mounted, automated centrifugal lube oil purification system. The system shall include all necessary components, as detailed in Section 4.0, pre-piped, pre-wired, tested, and ready for connection to plant utilities and the main lube oil tank.

1.2 Purpose: The system is designed for continuous purification of ISO VG 46 steam turbine lube oil. The primary functions are:

- Removal of free and emulsified water.
- Removal of solid contaminants (sludge, wear debris, dirt).
- Maintenance of oil cleanliness and dryness, extending oil and equipment life.

1.3 Design Philosophy: The system shall be designed for **robust, reliable, and safe 24/7 operation** in an industrial power plant indoor environment. It shall require minimal operator intervention.

1.4 Applicable Standards: The system shall be designed, manufactured, and tested in accordance with the latest editions of the standards listed in the attached document, including but not limited to:

- **PED 2014/68/EU** (Category applicable to the pressure vessels and heater)
- **IEC 60204-1** (Safety of Machinery - Electrical Equipment)
- **ISO 13849-1 / IEC 62061** (Functional Safety of Control Systems)
- **ANSI/ASME B16.5** (Pipe Flanges and Flanged Fittings)
- **ISO 4406** (Cleanliness Code)
- **ISO 11500** (Particle Count by Light Extinction)



2. Performance & Capacity Specifications

2.1 Flow Rate: The centrifuge feed pump shall have a nominal capacity of **2,000 – 2,500 Liters per Hour (LPH) @ 50 °C**. The system must be capable of processing the entire 14,000-liter (14 m³) main lube oil tank volume within an 8-hour cycle.

2.2 Separation Efficiency:

- **Solids Removal:**
 - 100% of particles $\geq 10 \mu\text{m}$
 - $\geq 98\%$ of particles $\geq 5 \mu\text{m}$
 - $\geq 90\%$ of particles $\geq 3 \mu\text{m}$
- **Water Removal:**
 - Reduce free water content from $>1\%$ (10,000 ppm) to **$< 0.1\%$ (1,000 ppm) or better**.
 - Significant reduction of emulsified water.

2.3 Outlet Oil Quality (end of cycle):

- **Cleanliness:** Target **ISO 4406:1999 Class 16/14/11** or cleaner under normal operating conditions.
- **Water Content:** Target **$< 500 \text{ ppm}$ (0.05 VOL%)** or better with optimal feed conditions.

3. Detailed Component Specifications

3.1 Centrifuge Separator:

- **Type:** Self-cleaning, solid bowl disc stack centrifuge.
- **Bowl Material:** Duplex Stainless Steel for all wetted parts.
- **Drive Motor:** High-efficiency IE3 class electric motor 7.5 kW to 11 kW
- **Self-Cleaning Mechanism:** Fully automatic sludge ejection based on differential pressure or timer control. Sludge collection tank included.
- **Vibration Monitoring and Protection System:** The centrifuge separator shall be equipped with a comprehensive vibration monitoring system to protect the mechanical integrity of the bowl and drive assembly.



3.2 Feed Pump Unit:

- **Type:** Positive displacement screw pump or similar positive displacement pump.
- **Capacity:** 2,000 – 2,500 LPH @ 6 bar differential pressure.
- **Motor:** IE3, 3-phase, 380V, 50Hz, with overload protection.
- **Inlet Strainer:** Y-type, 100 mesh (150 µm).

3.3 Heating Unit:

- **Type:** Electric Immersion Heater, mounted in a separate heater chamber.
- **Capacity:** Sufficient to heat the full flow (2,000-2,500 LPH) from 20°C to the optimal separation temperature.
- **Control:** Solid-state controller with thyristor unit for smooth, contactor-less operation. Redundant overtemperature protection (primary thermostat and secondary thermal fuse).

3.4 Control System & Instrumentation:

- **Control Panel:** NEMA 4X (IP66) rated enclosure. **PLC** with color **HMI (Touchscreen)** for system visualization, parameter setting, and alarm history.

3.5 Critical Sensors:

- **Oil Temperature:** At heater inlet and centrifuge outlet.
- **Bowl RPM Sensor:** Monitors bowl speed.
- **Level Switches:** For anti-flood tank (preventing water loss) and sludge tank full indication.
- **Pressure Gauge/Transmitter:** On pump discharge.

3.6 Skid & Piping:

- **Skid Frame:** Heavy-duty carbon steel channel.
- **Piping:** Schedule 40 stainless steel. All interconnecting piping on the skid to be ANSI Class 150 flanged.
- **Isolation Valves:** Stainless steel ball valves on all external connections.
- **Painting:** Surface preparation: Blast cleaning. Primer + Finish coat: Industrial-grade epoxy paint.



4. Scope of Supply & Services

4.1 Included Equipment:

1. Self-cleaning disc stack centrifuge with drive motor (7.5 kW – 11 kW)
2. Screw pump unit with motor and baseplate
3. Electric heater unit with controls and safety devices
4. Main control panel with PLC & HMI
5. Anti-flood buffer tank
6. Sludge collection tank
7. Complete skid with all interconnecting piping, valves, and instrumentation
8. Set of special maintenance tools
9. **2-Year** supply of recommended spare parts (O-rings, gaskets, etc.)

4.2 Services:

- **Supervised Installation:** Provision of a qualified commissioning engineer to supervise installation, check connections, and commission the system, Travel, Mobilization, Demobilization, accommodation and food service is scope of supplier.
- **Training:** Comprehensive on-site training for a minimum of **4 operators and 4 maintenance crew**, covering operation, routine maintenance, troubleshooting, disassembly/assembly.
- **Documentation:** Submission of detailed manuals including:
 - General Arrangement and P&ID
 - Electrical Schematics and Wiring Diagrams
 - Parts List and Cross-Sectional Drawings
 - Operation & Maintenance Manual



5. Guarantee & Warranty

5.1 Performance Guarantee: The system shall meet or exceed the performance criteria outlined in Section 2.0 when processing ISO VG 46 oil under specified conditions.

- **Warranty Period:** A comprehensive warranty for a period of **18 months from date of commissioning**.

5.2 Warranty Coverage: Warranty covers all defects in materials and workmanship. The supplier shall provide prompt repair or replacement of faulty components, including all related travel, labor, and parts costs.

