नव मंगलुर पत्तन प्राधिकरण
NEW MANGALORE PORT AUTHORITY
यांत्रिक अभियंता विभाग
Mechanical Engineering Department
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Electrical Engineering Division
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No.8/3/2023/Ele. Dvn/EQ/05/01

Date: 02.05.2023

To,

Sir,

Sub:- NMPA–EE (E) - "Third Party Inspection Services for 500 KVA Transformer" - Quotation invited - Reg.

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NMPA intends to engage third party inspection agency for the inspection of 500 KVA, 11KV/0.433KV Indoor Transformer.

Quotation in sealed covers superscribed as "Third Party Inspection Services for 500 KVA Transformer" invited in accordance with the instructions to the Tendered Terms & Conditions as detailed below, may please be submitted addressed to "**The Executive Engineer (Elec.), Electrical Division, Administration Building, New Mangalore Port Authority, Panambur, Mangalore- 575010**" not later than **3.00 PM on or before 09.05.2023**. Quotation will be opened on the same day at 3.30 PM in the presence of the tenderers who wish to be present.

Sl. No.	Description of Work	Qty	Rate (Rs.)	Rate in words	Amount (Rs.)
1	Third Party Inspection of 500KVA, 11KV/0.433KV Indoor Transformer and its accessories as per the Technical Specifications at manufacturer's work site at **M/s. Servokon Systems Limited, AN-6, UPSIDC Industrial Area, Phase III, Masuri –Gulawati Road, Behind Coca Cola Factory, Dasna, Ghaziabad – 201302 (UP)** (Note: Transformer to be opened & inspected to conform Copper windings as per Technical Specification)	2 Nos.			
	Total				
	Applicable GST				
	Grand Total				

TERMS & CONDITIONS:

1) The firm shall have a valid Authorization certificate for carrying out the inspection. i.e, NABCB or equivalent. Copy of the certificate shall be enclosed along with the offer, failing which the offer shall be liable for rejection.

2) TPI shall carryout the inspection of Transformer at respective Manufacturer's work site.

3) Applicable GST will be paid extra as per actual. GST Registration Certificate shall be submitted along with the offer.

4) The tentative days required for Inspection of Transformer shall be 7 days. Payment will be made at the quoted rate for the proposed work.

5) Scope of Inspection shall be as per Technical Specification (Annexure - I), relevant standards, drawings, QAP, Type Test report, etc. During inspection observation if any for compliance shall be communicated to NMPA. After attending observation the equipment shall be inspected again by the Third Party Inspection Agency, then dispatch clearance shall be given if the items are manufactured as per Technical Specification of Tender.

6) The offer rate shall be inclusive of travel expenses, lodging and boarding and other incidental charges etc.

7) All necessary facilities for inspection (instruments, test instruments, drawings etc) shall be arranged by the contractor /manufacturer.

8) After inspection, the TPI Agency shall submit the inspection report to NMPA, TPI agency shall give the dispatch clearance to the manufacturer/Contractor to deliver the inspected items to site at NMPA.

9) Inspection call to your office will be given in advance, two days prior to the date of inspection.

10) Income tax /Statutory taxes as applicable will be deducted at source while releasing the payment.

11) Payment terms
(a) TPI shall submit the invoice along with the complete inspection report.
(b) 100% payment will be made within 15 days from the date of receipt of invoice along with the report

Encl: Technical Specifications

V. M. Ganesh 21/5/23
Executive Engineer (E)
Electrical Division, NMPA

Seal and sign of Tenderer

Annexure - I

Technical Specifications

Scope of Work: Third Party Inspection of 500KVA, 11KV/0.433KV Indoor Transformer and its accessories

i. SCOPE:

This specification covers the requirements of design, manufacture, testing, supply, packing & forwarding, transportation and supervision of erection and commissioning of Indoor type, distribution transformer. This Transformer will be installed under roof sheltered building room.

ii. REFERENCE STANDARDS:

The transformer and its accessories shall conform to the requirements of the latest editions of the relevant Indian Standards, but not limited to the following;
IS-2026 (Part I to IV) : Power Transformers.
IS-3639 : Fittings and Accessories for Power Transformers.
IS-6600 : Guide for Loading of oil immersed transformers.
IS-335 : Insulating oil for transformers and switchgear.
IS-3837 : Dimensions for Porcelain Transformer Bushings.
IS-1271 : Classification of insulation materials.
IS-2090-1973 : Bushing for alternating voltage above 1000V.
IS-3639-2966 : Fitting and accessories for power transformers.
IS-8183-1976 : Bonded material.
IEC-76 : Power transformer.
IEC-216(part-3) : Guide for determination of thermal endurance Properties of electrical insulating material.
IS:2099 : High voltage porcelain bushing serene.
IS :3347 : Dimension for porcelain transformer bushing.
IS : 10028 : Code of practice for selection, installation and maintenance of transformer.
CBIP Manual on transformer-1987

iii. CONSTRUCTION:

Transformer tank shall be of welded sheet steel construction and provided with gaskets &steel cover plates. Base shall be suitably reinforced to prevent any distortion during lifting.. All covers and seals for the tank shall be oil and airtight and shall not be affected by mineral or synthetic oil action. The air release plug shall be provided on the tank. Pocket for Oil temperature indicator (OTI) and Winding temperature indicator (WTI). The magnetic circuit of the core shall be constructed from high-grade cold-rolled grain oriented low loss silicon steel %) lamination. The lamination shall be painted with suitable resin to protect it against corrosion. The insulation between core to bolts and core to fixing clamp should withstand as per IS standard.

The transformer windings shall be made of high conductivity copper winding and shall have minimum insulation level of class A. The winding is subjected shrinking and seasoning process, so that further shrinkage should not be possible during service condition.

The insulating material used for the winding should be non-inflammable, non-hygroscopic and void free properties. The winding shall be in such a way that over-all percentage impedance of the winding shall be 4.5 % with tolerances as allowed by us. The transformer oil should have all the properties conforming to IS 335.

H.V. Termination:
H.V. termination of the winding shall be connected through porcelain bushings with Copper (Tin Plated) bus arrangements of adequate creepage distance for the site installed and operating condition (Saline atmosphere with dust).

H.V. sides shall be fitted with cable box suitable for HT Aluminium XLPE cable termination with heat shrinkable termination kit/cable glands.

H.V. cable box shall be provided with disconnecting/ removable cover. The cable box shall be steel fabricated and weatherproof to IP-55. For fixed portion of the cable box, inspection cover with lifting handle shall be provided.

L.V. Termination:
The L.V terminal flange shall be suitable for full load amps & 433 V TPN Copper (Tin Plated) bus. Terminal chamber for termination shall have a gasketed cover plate bolted to it and shall be weather proof to IP-55. A separate inspection cover with lifting handle shall be provided to facilitate connection and inspection.

L.V. sides shall be fitted with cable box suitable for LT Aluminum XLPE/PVC cable termination with cable glands.

An additional neutral bushing to be provided for connection to ground with 2 Nos. of 50 x 6 Cu. Strip.

Radiators:
Radiators shall be detachable type.
Radiators equipped with air vent, drain plug and lifting lugs shall be provided. Radiators shall be securely braced to prevent undue vibration and shall have detachable type. These radiators shall be provided with cut of valves to permit removal of any radiator unit without emptying the tank.

Marshalling Box and other Tank fitted accessories:
Transformer shall be fitted with marshalling box and it shall have the following;
- Dial type WTI-Winding Temperature Indicator with Alarm and Trip Contacts
- Dial type OTI- Oil Temperature Indicator (OTI) with Alarm and Trip Contacts
- Double float BuchHolz Relay
- 230V AC Power socket and Anti condensation heater with Thermostat control with power isolation 2P MCB
- Conservator shall be fitted with Clearly Viewable from Ground, Oil level indicator (MOLG).

The above devices Alarm and Trip signals shall be independently wired to terminals in the Marshalling Box for external connection to switchgear panel.

A wiring diagram shall be submitted showing complete wiring of the tank mounted accessories and marshalling box internal wiring.

Fastners:
All fasteners, bolts, etc shall be galvanised or zinc passivated. All surfaces to be painted shall be thoroughly cleaned, de-scaled, made free from dust and given two primer coats of rust resisting paint followed by two finishing coats of approved shade. Type of paint shall be epoxy.

Earthing:
All doors and removable parts shall be earthed. The provisions for earthing of main transformer tank, OLTC tank and HT side cable box shall be provided. Different parts of transformers shall be connected by copper flexible for earth continuity purpose.

Nature of Cooling:
The transformer shall ne of ONAN type cooling. The transformer Oil shall confirm to the relevant Indian standard.

Tap Changer:
Transformer shall be provided with OLTC type tap changer on the H.V winding. The Tap changer position shall be clearly marked for each tap including principle tap. The Tap Changer shall be provided with Pad Locking arrangement.

Other accessories:
Accessories as specified in the Data Sheet shall be included in the scope of supply. Following points shall specifically be noted;

- Conservator shall be complete with oil filling plug and cap, oil drain valve & purging device. The oil drain point shall be brought down to a lower level by an extension pipe.
- Explosion vent shall be able to rotate in all directions and provided with sight gauge, equaliser pipe connection and double diaphragm.
- Bottom drain valve shall be of suitable diameter so as to drain off 90% of the oil in ten minutes. Thermometer pocket shall be complete with mercury in glass thermometer (0-120° C).
- Jacking pads and two sets of lifting lugs - one for complete transformer and other set for top cover with core and coil assembly shall be provided. Tank shall be designed for full vacuum and shall be pressure tested.
- Breather shall be for die cast aluminium body and inside container for silica gel of 500 grams. The breather shall have an inspection window to view the condition of the silica gel.

Core and Windings:
Transformer shall be double wound, core type with cold rolled grain oriented (CRGO) laminations perfectly insulated and clamped to minimise vibration and noise. Care should be taken to insulate core fastening bolts to reduce losses and avoid hot points. All parts of magnetic circuit shall be bonded to earth system.

Windings shall be of **copper only** and shall be designed to withstand the specified thermal and dynamic short circuit stresses during short circuit.

Noise Level:

The noise level of the transformer shall not exceed 5 db above NEMA standard of over 85 db. i.e (Total Noise level 90db).

iv. DRAWINGS AND DOCUMENTS:

Vendor shall submit the following Drawings & documents;

- G.A. Drawing showing all the accessories with details.
- Complete Dimension of the Transformer with all the accessories fitted.
- Foundation Plan for Transformer mounting with wheels.
- HV and LV cable box with details for cabling.
- Transformer cable support details on H.V & L.V side for bottom entry arrangement for Power Cables.
- Rating Plate details.
- Wiring Diagram
- Tank Mounted accessories with Product catalogues for all items
- Installation and maintenance Manual.

v. SPECIAL REQUIREMENT FOR TRANSFORMER:

The transformer shall be offered with detachable type of radiators.

An extra neutral bushing shall be provided on the outside of the LV box for grounding of the transformer neutral. 2 Nos. 50 x 6 mm Copper strips. Strips from this bushing shall be brought down upto the base of the transformer duly supported on 1.0 KV grade pin type insulators.

vi. PAINTING:

Colour shade of final paint shall be RAL 7032. All unpainted steel parts shall be cadmium plated or suitably treated to prevent rust corrosion. If these parts are on moving element, then these shall be greased.

vii. TEST CERTIFICATES:

Following Test Certificates shall be furnished;

- Routine Test Certificate
- Certificate of Oil
- Certificates of all Bought out Items like WTI,OTI, Buchholz Relay

viii. INSPECTION AND TESTING:

These tests shall be performed on the complete assembly at Bidders works. The following test shall be carried out on the transformer;

- Dimensional check.
- Functional check on all the devices mounted on the transformer.
- Measurement of Winding Resistance.
- No Load test and short circuit test for conforming transformer losses.
- High voltage test on HT side & LT side.
- Double frequency test and temperature rise test.
- BDV test of the oil.
- Polarity and voltage ratio test.
- Any other test as per relevant standard.
- Erection / Maintenance Documents before dispatch.

Note:

- It shall be ensured that all the test instruments are duly calibrated and valid.
- The Transformer shall be subjected for witness inspection (routine tests as per IS) before dispatch / during manufacturing by client or his authorised representative.

ix. PACKING:

Equipment shall be dispatched to site packed in wooden case. It shall be wrapped in polythene sheets before putting in cases and it shall be ensured that damage to the equipment does not occur during handling/transportation. Suitable arrangement shall be provided for unloading at site.

x. DATA SHEET:

Description	**Remarks**
Rating	500 KVA
Voltage Ratio	11KV /433 V
Temp Rise	50 C (oil) and 55 C winding
Humidity	100 %
IS Reference	Design as per IS 2026 of 1977, Loading as per IS 6600 of 1972
No. of Phases	3 Phase for HV 3 Phase + Neutral for LV
Connections : HV LV	 Delta Star with Neutral Bought out
Vector Group	Dyn 11
% Impedance	4.5%
Type of Cooling	ONAN
Tap Changer	OFF LOAD tap changer with+ 5% to -5% taps in steps of 2.5 %
Windings	Electrolyte Copper
Termination Arrangements: i) HV ii) LV	 HV cable box with bushings (12KV/250A) LV Cable Box with bushings. LV Neutral brought out through bushings for earthing

V. M. Ganesan 23/5/23

Executive Engineer (E)-I
NMPA, Panambur