



**ODISHA POWER TRANSMISSION CORPORATION LTD
OFFICE OF THE SENIOR GENERAL MANAGER,
CENTRAL PROCUREMENT CELL,
JANPATH, BHUBANESWAR - 751022
TENDER SPECIFICATION
NO. Sr.G.M.-CPC –TENDER-CT-DTR-46/2014-15
FOR PROCUREMENT OF
(E tendering mode only)**

16 KVA, (11 / 0.25 KV) Transformer, 3 Star, AL=83 Nos.

Request for online tender documents – From dt-**11.07.2014 (10.00 AM)** to dt-**31.07.2014(12.30 PM)**

Last date of submission of online tender - dt-**31.07.2014(1.00 PM)**

Date of opening of Tender - **31.07.2014(03.00 PM)**

ODISHA POWER TRANSMISSION CORPORATION LTD.

REGD. OFFICE: JANPATH, BHUBANESWAR – 751 022,

ODISHA

e-TENDER NOTICE NO. CPC-46 / 2014-15

For and on behalf of ODISHA POWER TRANSMISSION CORPORATION LTD, Sr.G.M. [C.P.C.] invites Tenders from reputed manufacturers in two part bidding system for supply of Distribution Transformers. The interested bidders would be required to enroll themselves on the tender portal www.tenderwizard.com/OPTCL. Complete set of bidding documents are available at www.tenderwizard.com/OPTCL from 11.07.2014 at 10.00 A.M to 31.07.2014 at 12.30 P.M.. Interested manufacturers may visit OPTCL's official web site <http://www.optcl.co.in> and www.tenderwizard.com/OPTCL for detail specification.

SENIOR GENERAL MANAGER [C.P.C.]

NOTICE INVITING TENDER
ODISHA POWER TRANSMISSION CORPORATION LTD.,
REGD. OFFICE: JANPATH, BHUBANESWAR – 751 022,
ODISHA, INDIA.

e-TENDER NOTICE NO- CPC- 46 /2014-15.

For and on behalf of the ODISHA POWER TRANSMISSION CORPORATION LTD., the undersigned invites bids under two-part bidding system in e- tendering mode only as per the following details.

Sl. No	Tender Specification No.	Description of equipments/materials	Quantity	Delivery schedule.	Earnest Money Deposit (In Rs.)	Cost of Tender Spec. document (in Rs.)	Last date of receipt & opening of tender
1.	Sr. GM-CPC-Tender-DTR-CPC-46/2014-15.	16 KVA, (11 / 0.23 KV) Transformer, 3 Star, AL	83 Nos.	3 months from the issue of P.O.	29,050/-	6,000/- + 300/- (VAT)	11.07.20 14 (10.00 AM) to dt- 31.07.20 14(12.30 PM) & 31.07.20 14(03.00 PM)

The bidders can view the tender documents from website free of cost.

The bidders who want to submit bid shall have to pay **Rs. 6,300/- (Rupees Six thousand three hundred only)**- non refundable including VAT @ 5%) towards the tender

cost, in the form of Demand draft/Cash only, drawn in favour of the D.D.O Head qrs, OPTCL, Bhubaneswar.

The bidders shall have to pay nonrefundable amount of **Rs. 3371/- (Rupees Three thousand three hundred & seventy one only)** towards the tender processing fee to K.S.E.D.C.Ltd, in e-payment mode. The e-payment of above amount is to be made to enable the bidder to download the bid proposal sheets and bid document in electronic mode.

The bidders shall scan the Demand Draft/Pay order/ Bank guarantee, towards EMD/ notarised hard copy of valid registration as local MSE(if any) and upload the same in the prescribed form in .gif or .jpg format in addition to sending the original as stated above.

The prospective bidders are advised to register their user ID, Password, company ID from website www.tenderwizard.com/OPTCL by clicking on hyper link "Register Me".

Any clarifications regarding the scope of work and technical features of the project can be had from the undersigned during office hours.

Minimum qualification criteria of bidders: AS STIPULATED IN SECTION-II, PART-I (G.T.C.C) OF THE TENDER SPECIFICATION.

SENIOR GENERAL MANAGER

CENTRAL PROCUREMENT CELL

FAX NO.:0674 – 2542964

TELEPHONE NO.:0674 – 2541801

**ODISHA POWER TRANSMISSION CORPORATION LTD.
OFFICE OF THE SR. GENERAL MANAGER
CENTRAL PROCUREMENT CELL**

JANAPATH, BHUBANESWAR – 751022

TENDER SPECIFICATION NO.Sr.G.M.-CPC –TENDER-DTR- CPC-46 / 2014-15

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SECTION – I.

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PART-I

SECTION-I

INSTRUCTIONS TO TENDERER

1. Submission of Bids: -

The bidder shall submit the bid in Electronic Mode only i.e. www.tenderwizard.com/OPTCL. The bidder must ensure that the bids are received in the specified website of the OPTCL by the date and time indicated in the Tender notice. Bids submitted by telex/telegram will not be accepted. No request from any bidder to the OPTCL to collect the Bids in physical form will be entertained by the OPTCL.

The OPTCL reserves the right to reject any bid, which is not deposited according to the instruction, stipulated above. The participants to the tender should be registered under ODISHA Sales Tax, Act, VAT Act / Central sales Tax Act.

1. For all the users it is mandatory to procure the Digital Signatures.
2. Contractors / Vendors / Bidders / Suppliers are requested to follow the below steps for **Registration:**
 - a. Click "Register", fill the online registration form.
 - b. Pay the amount of Rs. 2247/- through DD in Favour of KSEDCL Payable at Bangalore.
 - c. Send the acknowledgment copy for verification.
 - d. As soon as the verification is being done the e-tender user id will be enabled.
3. After viewing Tender Notification, if bidder intends to participate in tender, he has to use his e-tendering User Id and Password which has been received after registration and acquisition of DSCs.
4. If any Bidder wants to participate in the tender he will have to follow the instructions given below:
 - a. Insert the PKI (which consist of your Digital Signature Certificate) in your System.
(Note: Make sure that necessary software of PKI be installed in your system).
 - b. Click / Double Click to open the Microsoft Internet Explorer (This icon will be located on the Desktop of the computer).
 - c. Go to Start > Programs > Internet Explorer.
 - d. Type www.tenderwizard.com/OPTCL in the address bar, to access the Login Screen.
 - e. Enter e-tender User Id and Password, click on "Go".
 - f. Click on "Click here to login" for selecting the Digital Signature Certificate.
 - g. Select the Certificate and enter DSC Password.
 - h. Re-enter the e-Procurement User Id Password
5. To make an request for Tender Document Bidders will have to follow below mentioned steps.
 - Click "Un Applied" to view / apply for new tenders.
 - Click on Request icon for online request.
6. After making the request Bidders will receive the Tender Documents which can be checked and downloaded by following the below steps:

- Click to view the tender documents which are received by the user.
 - Tender document screen appears.
 - Click “Click here to download” to download the documents.
7. After completing all the formalities Bidders will have to submit the tender and they must take care of following instructions.
 - Prior to submission, verify whether all the required documents have been attached and uploaded to the particular tender or not.
 - Note down / take a print of bid control number once it displayed on the screen
 8. Tender Opening event can be viewed online.
 9. Competitors bid sheets are available in the website for all.
 10. **For any e-tendering assistant contact help desk number mentioned below.**
 - Bangalore – 080- 40482000.

The participants to the tender should be registered under ODISHA Sales Tax, Act,VAT Act/Central sales Tax Act.

2. **Division of Specification.**

The specification is mainly divided into two parts viz. Part-I & Part-II.

Part-I Consists of

- | | |
|-------------------|---|
| [i] Section-I | Instruction to Tenderers. |
| [ii] Section-II | General Terms & conditions of contract. |
| [iii] Section-III | Schedules and forms etc. |
| [iv] Section-IV | Technical Specification. |

Part-II Consists of

- [i] Abstract of price components as per Annexure-IV
- [ii] Schedule of prices as per Annexure-V

3. **Tenders shall be in Two Parts.**

The Tenderers are required to submit the tenders in two parts viz. Part-I (Techno commercial) & Part-II (Price bid).

The Tenderers are required to submit the tenders in two parts Part-I, technical and commercial and Part-II “Price Bid”.

4. **Opening of Bids.**

[a] The part-I shall be opened on the date and time fixed by the OPTCL for opening of bids in Electronic mode in presence of such of the Tenderers or their authorized representatives [limited to one person only] on the due date of opening of tender who opt remain present. After scrutiny of the technical particulars and other commercial terms, clarifications, if required, shall be sought for from the bidders. The Tenderers shall be allowed 15 days' time for such activity.

[b] On receipt of technical clarification, the bids shall be reviewed, evaluated and those not in conformity with the technical Specification / qualifying experience, shall be rejected. If any of the technical proposal requires modification to make them comparable, discussion will be held with the participating bidders.

All the responsive bidders shall be given opportunity to submit the revised technical and revised price proposals as a follow up to the clarification (modification if any) on the technical proposals. The qualified bidders shall be given opportunity to submit revised price proposals within 15 days from the date of such discussion or within time frame mutually agreed, whichever is earlier.

[c] When the revised price proposals are received, the original price proposals will be returned to the bidders unopened along with their original technical proposals. Only the revised technical and price proposals will be considered for bid evaluation. The price bids [Part-II] of such of the Tenderers, whose tenders have been found to be technically and commercially acceptable, including those supplementary revised price bids, submitted subsequently, shall be opened in the presence of the bidder's representative on a date and time which will be intimated to all technically and commercially acceptable Tenderers.

[d] The bidders are required to furnish sufficient information to the Purchaser to establish their qualification, capacity to manufacture and/or supply the materials/perform the work. Such information shall include details of bidder's experience, its financial, managerial and technical capabilities.

[e] The bidders are also required to furnish details of availability of appropriate technical staff and capability to perform after sales services. The above information shall be considered during scrutiny and evaluation of bids and any bid which does not satisfactorily meet these requirements, shall not be considered for price bid evaluation.

[f] The price bids of the technically and otherwise acceptable bids shall only be evaluated as per the norms applicable in terms of this Specification.

5. Purchaser's Right Regarding Alteration of Quantities Tendered.

The Purchaser may alter the quantities of materials/equipment at the time of placing orders. Initially the purchaser may place orders for lesser quantity with full freedom to place extension orders for further quantity under similar terms and conditions of the original orders. Orders may also be split among more than one tenderer for any particular item, if considered necessary in the interest of the Purchaser to get the goods/equipment earlier.

6. Procedure and opening time of tenders.

Tenders will be opened in the office of the Senior General Manager [C.P.C.] on the specified date and time in presence of the Tenderers or their authorized representatives [limited to one person only] in case of each bidder who may desire to be present, at the time of opening the bids.

7. Bidder's Liberty to deviate from Specification.

The Tenderer may deviate from the specification while quoting, if in his opinion, such deviation is in line with the manufacturer's standard practice and conducive to a better and more economical offer. All such deviations should however be clearly indicated giving full justifications for such deviation. [Read with Clause-9, Section-II of the Specification].

8. Eligibility for submission of bids.

Only those manufacturers who have deposited the cost of tender specification are eligible to participate in the tender. They should submit the money receipt as a proof of such payment. The local Micro and small Enterprises(MSEs) registered with respective DICs, Khadi, Village, Cottage & Handicrafts Industries, OSIC and NSIC can participate without payment of the cost of tender specification

9. Purchaser's right to accept/reject bids:

The purchaser reserves the right to reject any or all the tenders without assigning any reasons whatsoever if it is in the interest of OPTCL, under the existing circumstances. [Read with clause-10, Section-II of the specification].

10. Mode of submission of Tenders.

[A] Tenders shall be submitted in electronic mode only. (www.tenderwizard.com/OPTCL)

[B] **Telegraphic or FAX tenders** shall not be accepted under any circumstances.

11. Earnest money deposit:

The tender shall be accompanied by Earnest Money deposit of value specified in the notice inviting tenders against each lot / bid. Tenders without the required EMD as indicated at **Annexure-VIII** will be rejected outrightly

The local Micro and small Enterprises(MSEs) registered with respective DICs, Khadi, Village, Cottage & Handicrafts Industries, OSIC and NSIC can participate by submitting Earnest Money Deposit @ fifty percent of the amount indicated in the Notice Inviting Tender.

The earnest money deposit shall be furnished in one of the following forms subject to the conditions mentioned below:

- (a) **Cash:-** Payable to drawing & disbursing Officer, OPTCL (Hd.qrs. Office), Bhubaneswar - 751022
- (b) **Bank Draft:** -To be drawn in favour of Drawing & Disbursing Officer, OPTCL [H.Qrs.Office], Bhubaneswar-751 022.
- (c) Bank Guarantee from any Nationalized/Scheduled Bank strictly as per enclosed proforma vide **Annexure-VI** to be executed on non-judicial stamp paper worth Rs.29.00 or as applicable, as per prevailing laws in force and also to be accompanied by the confirmation letter of the issuing Bank Branch.

NOTE:

- (i). The validity of the EMD in the form of Bank Guarantee shall be at least for 240 days from the date of opening of tender failing which the tender will be liable for rejection.

- (ii) No interest shall be paid on the Earnest Money Deposit.
- (iii) E.M.D. in shape of cash may be submitted up to Rs. 25,000/- (Rupees Twenty-five) Thousand) only. Above Rs. 25,000/- (Rupees Twenty-five thousand) the Earnest Money Deposit shall be furnished in any one of the forms indicated above (i.e. Through Bank Draft, Bank Guarantee/ National Savings Certificate).
- (iv) No adjustment towards EMD shall be permitted against any outstanding amount with the **ODISHA POWER TRANSMISSION CORPORATION LTD.**
- (v) The chart showing particulars of EMD to be furnished by Tenderers of different categories is placed at **Annexure-VIII.**
- (vi) In the case of un- successful tenderer, the EMD will be refunded after the tender is decided. In the case of successful Tenderer, this will be refunded only after furnishing of security money referred to at clause-19of Section-II.
- (vii) Suits, if any, arising out of this clause shall be filed in a Court of law to which the jurisdiction of High Court of ODISHA extends.
- (vii) EMD will be forfeited if the tenderer fails to accept the letter of intent and/or purchase order issued in his favour or to execute the order, placed on them.
- (viii) Tenders not accompanied by Earnest Money shall be disqualified.

12. Validity of the Bids: -

The tenders should be kept valid for a period of **180** days from the date of opening of the tender, failing which the tenders will be rejected.

13. PRICE: -

i)Tenderers are requested to quote-'FIRM' Price. No deviation from **FIRM PRICE** will be entertained irrespective of deviation clause No.7 of this part of the specification.

14. Revision of tender price by Bidders: -

[a] After opening of tenders and within the validity of period, no reduction or enhancement in price will be entertained. If there is any change in price, the tender shall stand rejected and the EMD deposited shall be forfeited.

[b] After opening of price bid if the validity period is not sufficient to place purchase order, the tenderer may be asked by the purchaser to extend the validity period of the bid under the same terms and condition as per the original tender.

However, the tender are free to change any or all conditions including price except delivery period of their bids at their own risk, if they are asked by the purchaser to extend the validity period of the bid prior to opening of price bid.

15. Tenderers to be fully conversant with the clauses of the Specification: -

Tenderers are expected to be fully conversant with the meaning of all the clauses of the specification before submitting their tenders. In case of doubt regarding the meaning of any clause, the tenderer may seek clarification in writing from the Senior General Manager (Central Procurement Cell) OPTCL. This, however, does not entitle the Tenderer to ask for time beyond due date, fixed for receipt of tender.

16. Documents to Accompany Bids.

Tenderers are required to submit tenders in the following manner:

Part-I of the Tender shall Contain the following documents.

- [i] Declaration Form. [As per Annexure-I]
- [ii] Earnest Money. [As per **Annexure-VIII**]
- [iii] Technical specification and Guaranteed Technical Particulars conforming to the Purchaser's Specification along with drawings, literatures and all other required Annexures, duly filled in.
- [iv] Photostat copies of type test certificates of materials/equipments offered as stipulated in the Technical Specification.
- [v] Abstract of Terms & conditions in prescribed proforma as per **Annexure-II.**
- [vi] General Terms & Conditions of supply offer as per Section-II of the Specification.
- [vii] List of orders executed for similar materials/equipments during preceding 2 (two) years indicating the customer's name, Purchase Order No. & Date, date of supply and date of commissioning etc.

- [viii] Data on past experience **as per Clause-7 of Section-II** of the Specification.
- [ix] Sales tax clearance certificate for the previous year. The permanent account number [PAN] of the firm is required under Income tax Act.
- [x] Audited Balance sheet & profit loss accounts of the bidder, for past (3) three years.
- [xi] Schedule of quantity and delivery in the prescribed Proforma vide Annexure, as appended.
- [xii] List of Orders in hand to be executed.
- [xiii] Deviation schedule.

17. Documents/Papers to accompany Part-II Bid.

- (a) Part – II of the tender shall consist of the following
 - (i) Abstract of Price Component, as per Annexure-IV
 - (ii) Schedule of prices in the prescribed proforma as per Annexure-V

18. Conditional Offer:

Conditional offer shall not be accepted.

19. General: -

- (i) In the event of discrepancy or arithmetical error in the schedule of price, the decision of the purchaser shall be final and binding on the Tenderer.
- (ii) For evaluation, the price mentioned in words shall be taken if there is any difference in figures and words in the price bid.
- (iii) Notice inviting tender shall form part of this specification.
- (iv) The price bids of the technically and otherwise acceptable bids shall only be evaluated. The EMD of others, if any, shall be returned to the bidders.
- (v) Tenderer can offer any lot or all the lots of the tender, if there are more than one lots. But the tender (bid) must be furnished separately for each lot. For each lot, the tenderer has to submit PART-I & PART-II of the bids separately.
- (vi) It should be distinctly understood that the part-II of the bid shall contain only details/documents relating to price, as outlined in clause-17 mentioned herein above. Inclusion of any of the documents/information etc. shall render the bid liable for rejection.

20.0 Expenses in respect of OPTCL's representative for witnessing the inspection & testing of the offered equipment/materials at the inspection and testing site.

The testing and inspection of the equipment/ materials at manufacturer works are in the scope of work of the Contractor/Supplier.

OPTCL inspecting officer, on receipt of offer for inspection from the contractor/supplier, proceeds to the manufacturer works to witness the Type/Acceptance/Routine test.

Important:

It is hereby informed to all the bidders that the relevant clauses of the contract specification, pertaining to inspection and testing of equipment/materials, are hereby supplemented with following additional terms and conditions.

The expenses under the following heads, in respect of OPTCL's representative for witnessing the inspection & testing of the offered equipment/materials at the inspection and testing site, shall be borne by the contractor / supplier.

a) Hotel Accommodation:

I. Single room accommodation in 4 star hotel for the OPTCL inspecting officer of the rank of Assistant General Manager (Grade E-6) and above.

II. Single room accommodation in 3 star hotel for the OPTCL inspecting officer of the rank below Assistant General Manager (Grade E-6).

N.B.: *It is the responsibility of the contractor to arrange the hotel accommodation matching with their inspection and testing schedule, so that the inspecting officer can check-in the hotel one day prior to the date of inspection and check out after the completion of the inspection, subject to availability of the return travel ticket. In case of extended duration of inspection or non-availability of the return travel ticket, Contractor/supplier/manufacturer shall arrange for the extended stay of the inspecting officer in the Hotel accordingly. In case there is no hotel with prescribed standard in and around the place of inspection, the*

contractor/supplier/manufacture shall suggest alternative suitable arrangement at the time of offer for inspection, which is subjected to acceptability of OPTCL inspecting officer.

b) Journey of the inspecting officer:

(i) To and fro travel expenditure from the Head Quarters of the inspecting officer to the place of inspection/testing shall be borne by the contractor/supplier/manufacture. Journey from the Head Quarters of the inspecting officer to the nearest Air Port by train (1st/Ind A.C) & A/C Taxi then by Air to the place of inspection/testing or to the nearest place of inspection/testing and then by train (1st/Ind A.C) & A/C taxi to the place of inspection/testing shall be arranged by the contractor/supplier/manufacture.

(ii) For train journey, inspecting officer of the rank Assistant General Manager and above shall be provided with 1st class AC ticket and inspecting officer below the rank of Assistant General Manager shall be provided with 2nd class AC ticket.

(iii) The Air-ticket / train-ticket booking/cancellation is the responsibility of the contractor / supplier.

(iv) Moreover, if during the journey there is an unavoidable necessity for intermediate travel by road/ waterway/sea-route, the contractor/supplier shall provide suitable conveyance to the inspecting officer for travel this stretch of journey or bear the cost towards this. Any such possibilities shall be duly intimated to OPTCL at the time of their offer for inspection.

c) Local Conveyance:

At the place of the inspection/testing, for local journey of the inspecting officer between Hotel and inspection/testing site and or any other places, Air-conditioned four wheeler vehicle in good condition shall be provided by the contractor/supplier/manufacture.

d) Following points are also to be considered:

(i) All the above expenses shall be deemed to be included in the bidder's quoted price for that supply item. Bidder shall not be eligible to raise any extra claim in this regard.

(ii) Contractor/supplier/manufacture may assume that only in 40% of the inspection and testing offer cases, OPTCL inspecting officer, not below the rank of Assistant General Manager will witness the inspection and testing.

(iii) In case of inspection and testing of some critical equipment/materials like Power transformers, OPTCL may depute more than one inspecting officer. (iv) Contractor/supplier/manufacture shall judiciously plan the inspection/testing schedule and place of inspection/testing, so that optimum number of inspection/testing and minimum time shall be required to cover all the equipment/materials of the relevant contract package.

(v) It shall be the responsibility of the Contractor/Supplier to organize the above tour related matters of OPTCL inspecting officer including the matters related to overseas inspection/testing, if any.

SECTION – II.

GENERAL TERMS AND CONDITIONS OF CONTRACT [G.T.C.C.]

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PART-I

SECTION-II

GENERAL TERMS AND CONDITIONS OF CONTRACT [G.T.C.C.]

1. **Scope of the contract:**

The scope of the contract shall be to design, manufacture, supply of equipments as per the specification at the consignee's site, and rendering services in accordance with the enclosed technical specification and bill of quantity.
- 2.0 **Definition of terms:**

For the purpose of this specification and General Terms and Conditions of contract [GTCC], the following words shall have the meanings hereby indicated, except where otherwise described or defined.

 - 2.1 "The Purchaser" shall mean the Senior General Manager[Central Procurement Cell] for and on behalf of ORISSA POWER TRANSMISSION CORPORATION LTD., Bhubaneswar.
 - 2.2 "The Engineer" shall mean the Engineer appointed by the Purchaser for the purpose of this contract.
 - 2.3 "Purchaser's Representative" shall mean any person or persons or consulting firm appointed and remunerated by the Purchaser to supervise, inspect, test and examine workmanship and materials of the equipment to be supplied.
 - 2.4 "The supplier" shall mean the bidder whose bid has been accepted by the purchaser and shall include the bidder's executives, administrators, successors and permitted assignees.
 - 2.5 "Equipment" shall mean and include all machinery, apparatus, materials, and articles to be provided under the contract by the suppliers.
 - 2.6 "Contract Price" shall mean the sum named in or calculated the bid.
 - 2.7 "General Condition" shall mean these General Terms and Conditions of Contract.
 - 2.8 "The Specification" shall mean both the technical as well as commercial parts of the specification annexed to or issued with GTCC and shall include the schedules and drawings, attached thereto as well as all samples and pattern, if any.
 - 2.9 "Month" shall mean "Calendar month".
 - 2.10 "Writing" shall include any manuscript, type written, printed or other statement reproduction in any visible form and whether under seal or under hand.
 - 2.11 "FOR Destination costs" shall mean the cost of equipment and material at the consignee's store/site. The cost is inclusive of Excise duty, Sales tax and other local taxes, packing, forwarding and insurance and freight charges.
 - 2.12 The term "Contract document" shall mean and include GTCC, specifications, schedules, drawings, form of tender, Notice Inviting Tender, covering letter, schedule of prices or the final General Conditions, any special conditions, applicable to the particular contract.
 - 2.13 Terms and conditions not herein defined shall have the same meaning as are assigned to them in the Indian Contract Act, failing that in the Orissa General Clauses Act.
3. **Manner of execution:**

All equipments supplied under the contract shall be manufactured in the manner, set out in the specification or where not set out, to the reasonable satisfaction of the Purchaser's representative.
4. **Inspection and Testing:**
 - [i] The purchaser's representative shall be entitled at all reasonable times during manufacture to inspect, examine and test at the supplier's premises, the materials and workmanship of all equipments/materials to be supplied under this contract and if part of the said

equipment/material is being manufactured in other premises, the supplier shall obtain for the purchaser's representative permission to inspect, examine and test as if the equipment/material were being manufactured in the contractor's premises. Such inspection, examination and testing shall not relieve the supplier from his obligations under the contract.

- [ii] The Supplier shall give to the purchaser adequate time/notice (at least clear 15 days for inside the state suppliers and 20 days for outside the state suppliers) in writing for inspection of materials indicating the place at which the equipment/material is ready for testing and inspection and shall also furnish the shop Routine Test Certificate, Calibration certificates of Testing instruments, calibrated in Govt. approved laboratory with authenticity letter of that laboratory along with the offer for inspection. A packing list along with the offer, indicating the quantity which can be delivered in full truck load/Mini truck load to facilitate issue of dispatch instruction shall also be furnished.
- [iii] Where the contract provides for test at the Premises of the supplier or any of his sub-vendors, the supplier shall provide such assistance, labour, materials, electricity, fuel and instruments, as may be required or as may be reasonably demanded by the Purchaser's representative to carryout such tests efficiently. The supplier is required to produce shop routine test Certificate, calibration certificates of Testing Instruments before offering their materials/equipment for inspection & testing. The test house/laboratory where tests are to be carried out must be approved by the Govt. A letter pertaining to Govt. approved laboratory must be furnished to the purchaser along with the offer for inspection.
- [iv] After completion of the tests, the Purchaser's representative shall forward the test results to the Purchaser. If the test results conform to the specific standard and specification, the Purchaser shall approve the test results and communicate the same to the supplier in writing. The supplier shall provide at least five copies of the test certificates to the Purchaser.
- [v] The Purchaser has the right to have the tests carried out at his own cost by an independent agency whenever there is dispute regarding the quality of supply.
- [vi] If the firm fails to present the offered items for inspection/testing as per their inspection call due to any reason(s) during the visit of inspecting officer at the testing site ,the firm shall have to bear all expenses towards repetition of inspection and testing of the total offered quantity or part thereof.

5. **Training facilities.**

The supplier shall provide all possible facilities for training of Purchaser's Technical personnel, when deputed by the Purchaser for acquiring first hand knowledge in assembly of the equipment, its erection, commissioning and for its proper operation & maintenance in service, wherein it is thought necessary by the purchaser.

6. **Rejection of Materials.**

In the event any of the equipments/material supplied by the manufacturer is found defective due to faulty design, bad workmanship, bad materials used or otherwise not in conformity with the requirements of the Specification, the Purchaser shall either reject the equipment/material or ask the supplier in writing to rectify or replace the defective equipment/material free of cost to the purchaser. The Supplier on receipt of such notification shall either rectify or replace the defective equipment/material free of cost to the purchaser within 15 days from the date of issue of such notification by the purchaser. If the supplier fails to do so, the Purchaser may:-

- [a] At its option replace or rectify such defective equipments/materials and recover the extra costs so involved from the supplier plus fifteen percent and/or.

- [b] Terminate the contract for balance work/supplies, with enforcement of penalty Clause as per contract for the un-delivered goods and with forfeiture of Performance Guarantee/ Composite Bank Guarantee.
- [c] Acquire the defective equipment/materials at reduced price, considered equitable under the circumstances.

7. **Experience of Bidders:**

The bidders should furnish information regarding experience particularly on the following points:

- [i] Name of the manufacturer:
- [ii] Standing of the firm and experience in manufacture of equipment/material quoted:
- [iii] Description of equipment/material similar to that quoted, supplied and installed during the last two years with the name(s) of the Organisations to whom supplies were made wherein, at least one (1) certificate shall be from a state/central P.S.U.
- [iv] Details as to where installed etc.
- [v] Testing facilities at manufacturer's works.
- [vi] If the manufacturer is having collaboration with another firm [s], details regarding the same.
- [vii] A list of purchase orders of identical material/equipments offered as per technical specification executed during the last two years along with user's certificate. User's certificate shall be legible and must indicate, user's name, address, designation, place of use, and satisfactory performance of the equipment/materials for at least two years from the date of commissioning. Wherein at least one (1) certificate shall be from a State/Central or P.S.U. Bids will not be considered if the past manufacturing experience is found to be unsatisfactory or is of less than 2 (two) years on the date of opening of the bid and bids not accompanying user's certificate will be rejected..

8. **Language and measures:**

All documents pertaining to the contract including specifications, schedule, notices, correspondence, operating and maintenance instructions., drawings or any other writing shall be written in English language. The metric system of measurement shall be used exclusively in this contract.

9. **Deviation from specification:**

It is in the interest of the tenderers to study the specification, specified in the tender schedule thoroughly before tendering so that, if any deviations are made by the Tenderers, (both commercial and Technical), the same are prominently brought out on a separate sheet under heading "Deviations Commercial" and "Deviations Technical".

A list of deviations shall be enclosed with the tender. Unless deviations in scope, technical and commercial stipulations are specifically mentioned in the list of deviations, it shall be presumed that the tenderer has accepted all the conditions, stipulated in the tender specification, notwithstanding any exemptions mentioned therein.

10. **Right to reject/accept any tender:**

The purchaser reserves the right either to reject or to accept any or all tenders if the situation so warrants in the interest of the purchaser. Orders may also be split up between different Tenderers on individual merits of the Tenderer. The purchaser has exclusive right to alter the quantities of materials/ equipment at the time of placing final purchase order. After placing of the order, the purchaser may defer the delivery of the materials. It may be clearly understood by the Tenderer that the purchaser need not assign any reason for any of the above action [s].

11. **Supplier to inform himself fully:**

The supplier shall examine the instructions to tenderers, general conditions of contract, specification and the schedules of quantity and delivery to satisfy himself as to all terms and conditions and circumstances affecting the contract price. He shall quote price [S] according to his own views on these matters and understand that no additional allowances except as otherwise provided there in will be admissible. The purchaser shall not be responsible for any misunderstanding or incorrect information, obtained by the supplier other than the information given to the supplier in writing by the purchaser.

12. **Patent rights Etc.**

The supplier shall indemnify the Purchaser against all claims, actions, suits and proceedings for the infringement of any patent design or copy right protected either in the country of origin or in India by the use of any equipment supplied by the manufacturer. Such indemnity shall also cover any use of the equipment, other than for the purpose indicated by or reasonably to be inferred from the specification.

13. **Delivery:-**

[a] Time being the essence of the contract; the equipment shall be supplied within the delivery period, specified in the contract. The Purchaser, however, reserves the right to reschedule the delivery and change the destination if required. The delivery period shall be reckoned from the date of placing the Letter of Intent/Purchase order, as may be specified in LOI/Purchase order.

[b] The desired delivery period shall be as indicated at Appendix-II (Quantity & Delivery Schedule) of Section-IV (Technical Specification).

14. **Despatch instructions.**

I] The equipments/ materials should be securely packed and dispatched directly to the specified site at the supplier's risk by Road Transport only.

II] **Loading & unloading of Ordered Materials.**

It will be the sole responsibility of the supplier for loading and unloading of materials both at the factory site and at the destination site/store.

The Purchaser shall have no responsibility on this account.

15. **Supplier's Default Liability.**

[i] The Purchaser may, upon written notice of default to the supplier, terminate the contract in circumstances detailed hereunder.

[a] If in the judgement of the Purchaser, the supplier fails to make delivery of equipment/material within the time specified in the contract or within the period for which if extension has been granted by the Purchaser in writing in response to written request of the supplier.

[b] If in the judgement of the Purchaser, the supplier fails to comply with any of the provisions of this contract.

[ii] In the event, Purchaser terminates the contract in whole or in part as provided in Clause-15 (I) of this section, the Purchaser reserves the right to purchase upon such terms and in such a manner as he may deem appropriate in relation to the equipment/material similar to that terminated and the supplier will be liable to the Purchaser for any additional costs for such similar equipment/material and/or for penalty for delay as defined in clause-22 of this section until such reasonable time as may be required for the final supply of equipment.

[iii] In the event the Purchaser does not terminate the contract as provided in clause 15(I) of this Section, supplier shall be liable to the Purchaser for penalty for delay as set out in Clause-22 of this section until the equipment is accepted. This shall be based only on written request of the supplier and written willingness of the Purchaser.

16 **Force Majeure:**

The supplier shall not be liable for any penalty for delay or for failure to perform the contract for reasons of force majeure such as acts of god, acts of the public enemy, acts of Govt., Fires, floods, epidemics, Quarantine restrictions, strikes, Freight Embargo and provided that the supplier shall within Ten (10) days from the beginning of delay on such account notify the purchaser in writing of the cause of delay. The purchaser shall verify the facts and grant such extension, if facts justify .

17. Extension of time:-

If the delivery of equipment/material is delayed due to reasons beyond the control of the supplier, the supplier shall without delay give notice to the purchaser in writing of his claim

for an extension of time. The purchaser on receipt of such notice may or may not agree to extend the contract delivery date as may be reasonable but without prejudice to other terms and conditions of the contract.

18. Guarantee period: - (As per clause 35 of the technical specification.

[i] The stores covered by this specification should be guaranteed for satisfactory operation and against defects in design, materials and workmanship for a period of at least 42 [forty two] months from the last date of delivery or 36 [thirty six] months from the date of commissioning whichever is earlier. The above guarantee certificate shall be furnished in triplicate to the purchaser for his approval. Any defect noticed during this period should be rectified by the supplier free of cost to the purchaser provided such defects are due to faulty design, bad workmanship or bad materials used, within one month upon written notice from the purchaser failing which provision of clause 22 (ii) shall apply.

[ii] Equipment/material failed or found defective during the guarantee period shall have to be guaranteed after repair/replacement for a further period of 36 months from the date of commissioning or 42 months from the date of receipt at the store/site after such repair/replacement which ever is earlier . The Bank Guarantee is to be extended accordingly. Date of delivery as used in this clause shall mean the date on which the materials are received in OPTCL'S stores/site in full & good condition which are released for Despatch by the purchaser after due inspection.

19. B.G. towards security deposit, 100% payment and performance guarantee:

[i] For manufacturers situated Inside & out side the state of Orissa.

A Composite Bank Guarantee as per the Proforma enclosed at Annexure-VII of the specification for 10% [ten percent] of the total FORD cost of the purchase order (In case of successful bidder who is a local Micro and small Enterprise (MSEs) registered with respective DICs, Khadi, Village, Cottage & Handicrafts Industries, OSIC and NSIC 5% (five percent)), shall be furnished from any nationalized/scheduled bank having a place of business at Bhubaneswar, to the office of Sr.General Manager [Central Procurement Cell] OPTCL within 15 days from the date of issue of the purchase order,. The BG shall be executed on non judicial stamp

paper worth of Rs.29.00 [Rupees twenty nine] only or as per the prevalent rules, valid for a period of 2 months more than from guarantee period (as indicated this clause-18 of above) from the last date of stipulated delivery period, for scrutiny and acceptance, failing which the supply order will be liable for cancellation without any further written notices. The BG should be accompanied by a confirmation letter from the concerned bank and should have provision for encashment at Bhubaneswar, before the Bank Guarantee is accepted and all concerned intimated. The B.G should be revalidated as and when intimated to you to cover the entire guarantee period.

[ii] No interest is payable on any kind of Bank Guarantee.

- [iii] In case of non-fulfillment of contractual obligation, as required in the detailed purchase order/Specification, the composite Bank guarantee shall be forfeited.
20. **Import License**
In case imported materials are offered, no assistance will be given for release of Foreign Exchange. The firm should arrange to import materials from their own quota. Equipment of indigenous origin will be preferred.
21. **(A) Terms of Payment.**
- (i) 100% value of each consignment with 100% Excise duty, Entry Tax, if any, and sales tax in full as applicable along with freight & Insurance charges will be paid on receipt of materials in good condition at stores/desired site and verification thereof, subject to furnishing and approval of Composite Bank Guarantee at the rate of 10% (Ten percent) of the cost of supplied materials, as stipulated under clause-19 of this specification & on prior approval of guarantee certificate & Test certificate by the Purchaser.
- (ii) **Payment of Freight & Insurance charges and Entry Tax.**
Freight & Insurance Charges & Entry Tax, incorporated in the Purchase contract shall be paid after receipt of materials at stores/desired site in good condition and on production of authenticated documentary evidence, otherwise no Freight, Insurance charges & entry taxes shall be payable.
[B] The supplier shall furnish Composite Bank Guarantee of appropriate amount to OPTCL covering 10% of F.O.R. Destination cost of the purchase order well in advance (within 15 days from the date of issue of the purchase order) before despatch of materials.
22. **Penalty for Delay in Completion of Contract**
- I) If the Supplier fails to deliver the materials/equipments within the delivery schedule, specified in the contract including delivery time extension, if any, granted thereto, the Purchaser shall recover from the Supplier, penalty for a sum of half percent (0.5 percent) of the Ex-works price of the un-delivered equipment for each calendar week of delay or part thereof. For this purpose, the date of receipted chalan shall be reckoned as the date of delivery. The total amount of penalty shall not exceed five percent (5%) of the ex-works price of the unit or units so delayed. Equipment will be deemed to have been delivered only when all its components and accessories as per technical Specification are also delivered. If certain components & accessories are not delivered in time, the equipment will be considered delayed until such time as the missing parts are delivered.
- II) If the Supplier fails to rectify /replace the equipment/material within 30 days from the date of intimation of the defect, so noticed by the purchaser within the guarantee period then the penalty for sum of one half of the one percent (0.5%) of the total Purchase order amount for each calendar week of delay shall be recovered by the purchaser within the guarantee period. For this purpose, penalty date will start from the 30th. day from the date of issue of letter on defectiveness of equipment/material, so supplied, by the purchaser. The total amount of penalty in this case shall not exceed 10% (TEN PERCENT) of the purchase order amount. The purchase order amount shall mean ex-works price + freight & insurance and all taxes & duties. If the defects so intimated within the guarantee period will not be rectified by the Supplier within the stipulated period as per clause 18 (i), then whole of the B.G. will be forfeited by the purchaser, without any intimation to the Supplier.
23. **Insurance**
The Supplier shall undertake insurance of stores covered by this Specification unless otherwise stated. The responsibility of delivery of the stores at destination in good condition rests with the Supplier. Any claim with the Insurance Company or transport agency arising due to loss or damage in transit has to be settled by the supplier. The

Supplier shall undertake free replacement of materials damaged or lost, which will be reported by the consignee within 30 days of receipt of the materials at destination without awaiting for the settlement of their claims with the carriers and underwriters.

24. Payment Due from the Supplier. All costs and damages, for which the supplier is liable to the purchaser, will be deducted by the purchaser from any money, due to the supplier, under any of the contract (s), executed with OPTCL.

25. Sales Tax clearance certificate and Balance sheet and profit & Loss Account:

- i. Sales Tax clearance certificate for the previous year shall be enclosed with the tender.
- ii. Audited Balance Sheet and Profit & Loss Account of the bidder for the previous three years shall be enclosed to assess the financial soundness of the bidder(s).

26. Certificate of Exemption from Excise Duty/Sales tax.

Offers with exemption from Excise duty including sales tax shall be accompanied with authenticated proof of such exemption. Authenticated proof for this clause shall mean attested Photostat copy of exemption certificate. Any claim towards Excise duty/ Sales Tax shall be paid on actual basis subject to production of authenticated documentary evidence.

27. Supplier's Responsibility.

Notwithstanding anything mentioned in the Specification or subsequent approval or acceptance by the Purchaser, the ultimate responsibility for design, manufacture, materials used and satisfactory performance shall rest with the Tenderers. The Supplier(s) shall be responsible for any discrepancy noticed in the documents, submitted by them along with the bid(s)

28. Validity.

Prices and conditions contained in the offer should be kept valid for a minimum period of 180 days from the date of opening of the tender, failing which the tender shall be rejected.

29. EVALUATION.

(i) Evaluation of bids will be on the basis of the FOR DESTINATION PRICE (By Road Transport) including Excise Duty, sales Tax & other levies as may be applicable. The FORD PRICE shall consist of the following components

- a) Ex-works price.
- b) Packing & Forwarding charges.
- c) Freight
- d) Insurance.
- e) Excise Duty.
- f) Sales Tax.
- g) Other levies.
- h) Mandatory spares, if any for maintenance of equipment. (At the discretion of the purchaser)
- i) Test charges, if any.
- j) Supervision of erection, testing and commissioning charges, if any.
- k) Any other items, as deemed proper for evaluation by the purchaser.
- l) Loading factors will be taken in to account during evaluation if the prices of some of the items, not quoted.

(II) Weightage shall be given to the Following factors in the Evaluation & Comparison of Bids.

In comparing bids and in making awards, the Purchaser will consider other factors such as compliance with Specification, minimum qualification criteria as per clause-30, outright rejection of tenders clause-34 of this tender, relative quality, adaptability of Supplies or services, experience, financial soundness, record of integrity in dealings, performance of materials/equipments earlier supplied, ability to furnish repairs and maintenance services, the time of delivery, capability to perform including available facilities such as adequate shops, plants, equipment and technical organization.

- (III) The local MSE bidders shall be required to furnish their willingness to match their bid price with that of the lowest evaluated bidder without any price preference and in case they agree, they shall be eligible to get up to 30% of the tendered quantity to be distributed suitably among the willing MSE bidders failing which the said 30% of the tendered quantity be awarded to the lowest evaluated bidder.

30. Minimum Qualification Criteria of Bidders.

All the prospective bidders are requested to note that their bids for tendered equipment can only be considered for evaluation if:

- i) The bidder should have manufacture and supply experience of above rated or higher capacity equipments for a minimum period of 3 (three) years as on the date of opening of the tender
- ii) At least 50% of the tendered quantity. of above rated or higher capacity equipment should have been supplied within the above-stipulated period.
- iii) The above rated or higher capacity equipment should have at least 3 (three) years successful performance from the date of commissioning. At least one of the performance certificates shall be submitted from Govt. of India/State Govt.(s) or their undertakings.
- iv) The bidder should have conducted type tests on the tendered equipments in Government approved laboratory within five years from the date of opening of the tender..

31. Jurisdiction of the High Court of Orissa.

Suits, if any, arising out of this contract shall be filed by either Party in a court of Law to which the jurisdiction of High court of Orissa extends.

32. Correspondences.

- i) Any notice to the supplier under the terms of the contract shall be served by Registered Post or by hand at the Supplier's Principal Place of Business.
- ii) Any notice to the Purchaser shall be served at the Purchaser's Principal Office in the same manner.

33. Official Address of the Parties to the Contract

The address of the parties to the contract shall be specified:-

- [i] **Purchaser:** Senior General Manager (Procurement)(CPC) OPTCL
Bhubaneswar-751022 (Orissa)

Telephone No. 0674 - 2541801

FAX No. 0674 - 2542964

- [ii] **Supplier:** Address
Telephone No.
Fax No.

34. Outright Rejection of Tenders

Tenders shall be outrightly rejected if the followings are not complied with.

- [i] The tenderer shall submit the bid in electronic mode only and shall submit the tender cost on or before the date and time of opening of technical bid. In case of local Micro and small

Enterprises(MSEs) registered with respective DICs, Khadi, Village, Cottage & Handicrafts Industries, OSIC and NSIC participating in the tender they have to submit notarised hard copy of valid registration as local MSE as above on or before the date and time of opening of technical bid.

- [ii] The tenderer shall submit the bid in electronic mode only
- [iii] The Tender shall not be submitted telegraphically or by FAX.
- [iv] The prescribed EMD shall be submitted on or before the date and time of opening of technical bid.
- [v] The Tender shall be kept valid for a minimum period of 180 days from the date of opening of tender.
- [vi] The Tender shall be submitted in two parts as specified.
- [vii] The Tenders shall be accompanied by a list of major supplies effected prior to the date of opening of tender. Data of at least 3 (three) years shall be furnished.
- [viii] The tenderer shall upload the scanned copy of latest type test certificates (for the tests, carried out on the tendered equipments, being offered). Such type tests should have been conducted within last five years from the date of opening of this tender in a Government approved laboratory/CPRI in presence of any Government Organisation's representative(s).
- [ix] The schedule of prices should be filled up fully to indicate the break-up of the prices including taxes and duties. Incomplete submission of this schedule will make the tender liable for rejection. Vide Clause-4(ii) of Part-II.
- [x] The Tenderer should quote 'FIRM' price only and the price should be kept valid for a minimum period of 180 days from the date of opening of the tender.
- (xi) The tenderer shall upload the scanned copy legibly written user's certificate to prove the satisfactory operation of the offered equipments/materials for a minimum period of 3 (three) years from the date of commissioning/use as per the tender specification. User's certificate shall include the detailed address of the user with Equipment/Material, Name and type as per this specification, number of years of satisfactory use/operation & date of issue of this user's certificate with official seal written in English only & clearly visible must be furnished. At least one of the user's certificates shall be from state or Central Govt. or their Undertakings.
- (xii) Guaranteed Technical particulars & Abstract of terms and Conditions should be filled in completely.

35. **Documents to be treated as confidential.**

The supplier shall treat the details of the specification and other tender documents as private and confidential and these shall not be reproduced without written authorization from the Purchaser.

36. **Scheme/Projects**

The materials/equipment covered in this specification shall come under "O&M WORKS "

SECTION – III.

SECTION – III.

LIST OF ANNEXURES

[I TO XI]

[PAGE 01 TO 19]

**SECTION – III
[LIST OF ANNEXURES]**

The following schedules and proforma are annexed to this specification and contained in Section-III as referred to in the relevant clauses.

1	Declaration form	ANNEXURE-I
2	Abstract of terms and conditions to accompany Section-II of Part-I	ANNEXURE-II
3	Schedule of Quantity and Delivery	ANNEXURE-III
4	Abstract of price component [to accompany Part-II of this specification]	ANNEXURE-IV
5	Schedule of prices to accompany Part-II	ANNEXURE-V
6	Bank Guarantee form for earnest money deposit	ANNEXURE-VI

7	Composite Bank Guarantee form for security deposit, payment and performance	ANNEXURE-VII
8.	Chart showing particulars of E.M.D.	ANNEXURE – VIII
9.	Data on Experience.	ANNEXURE – IX
10.	Schedule of spare parts.	ANNEXURE-X
11.	Schedule of Installations.	ANNEXURE-XI
12.	Schedule of deviations.	ANNEXURE-XII

ANNEXURE - I **DECLARATION FORM**

To

The Sr. General Manager (CPC)
OPTCL Head Qrs.BBSR,751022

Sub:- Tender Specification No-_____

Sir,

1. Having examined the above specification together with terms & conditions referred to therein * I/We the undersigned hereby offer to supply the materials/equipments covered therein complete in all respects as per the specification and General conditions, at the rates, entered in the attached contract schedule of prices in the Tender.
2. * I/We hereby undertake to have the materials/equipments delivered within the time specified in the Tender.
3. * I/We hereby guarantee the technical particulars given in the Tender supported with necessary reports from concerned authorities.
4. * I/We certify to have submitted the bid electronically by remitting *cash/money order/D.D./remitting the cost of tender, herewith and this has been acknowledged by your letter/ money receipt No. Dated,
5. In the event of Tender, being decided in *my/our favour, * I/We agree to furnish the Composite B.G. in the manner, acceptable to ORISSA POWER TRANSMISSION CORPORATION LTD., and for the sum as applicable to *me/us as per clause-19 of section-II of this specification within 15 days of issue of letter of intent/purchase order failing which *I/We clearly understand that the said letter of Intent/Purchase order will be liable to be withdrawn by the purchaser, and the EMD deposited by us shall be forfeited by OPTCL.

Signed this
Page 26 of 89

day of

2010

Yours faithfully

Signature of the Tenderer with seal of the company

[This form should be dully filled up by the tenderer and uploaded at the time of submission of tender.]

* (Strikeout whichever is not applicable).

ANNEXURE-II**ABSTRACT OF GENERAL TERMS AND CONDITIONS OF CONTRACT [COMMERCIAL] TO ACCOMPANY PART-I**

1	(a) OPTCL Money Receipt No. & Date towards purchase of Tender. (b) Earnest money furnished. (A) Bank Guarantee, (B) Bank Draft.	
2	Manufacturer's supply experience including user's certificate furnished or not.[As per clause No.7 of Section-II.]	Yes/No
3	Deviations to the specification if any[list enclosed or not] [As per clause-9 of the Section-II] (a) Commercial (b) Technical.	Yes/No Yes/No
4	Delivery (period in months from the date of purchase order). (3 months)	
5	Guarantee:- Whether agreeable to OPTCL's terms. [As per clause-18 of Section-II]	Yes/No
6	Whether agreeable to furnish Composite B.G. in case his tender be successful [As per clause-19 of Section-II]	Yes/No
7.	Terms of payment:- Whether agreeable to OPTCL's terms or not [As per clause-21 of Section-II]	Yes/No.
8.	Nature of price:- FIRM	Yes/No
9.	Penalty:- Whether agreeable to OPTCL's terms or not (As per clause-22 of Section-II)	Yes/No
10.	Whether STCC/ P&L A/C, Balance Sheet for the required period are furnish hed as per clause-25 of Section-II	Yes/No
11.	Validity: - Whether agreeable to OPTCL's terms or not [As per clause-28 of Section-II]	Yes/No
12.	Whether recent type test certificates from any Government approved laboratory are furnished or not. [As per clause-34[viii] of section-II]	Yes/No
13.	Whether guaranteed technical particulars in complete shape are furnished or not	Yes/No
14.	Whether dimensional design/drawings furnished or not	Yes/No
15.	Whether materials are ISI/ISO marked.	Yes/No
16.	Manufacturer's name and it's trademark.	Yes/No
17.	Whether registered under ODISHA Sales Tax Act. 1947	Yes/No
18.	Whether declaration form duly filled in furnished or not.	Yes/No.

Place: -
Date: -

Signature of the Tenderer
with seal of the company

ANNEXURE-III
SCHEDULE OF QUANTITY AND DELIVERY

(To be filled up by the tenderer)

SL No	Description of materials	Quantity required	Desired Delivery	Destination	Remarks.
1	2	3	4	5	6
1	16 KVA, (11 / 0.23 KV) Transformer, 3 Star, AL	83	3 months from the P.O.		

Place:

Date:

Signature of Tenderer
with seal of Company.

ANNEXURE-IV

ABSTRACT OF PRICE COMPONENT [TO ACCOMPANY PRICEBID]

1	Price basis	F.O.R. Purchaser's destination Stores/sites.
2	Packing & forwarding	
3	Rate of Insurance charges	
4	Rate of Freight charges	
5	Rate of excise duty	
6	Rate of sales Tax	
7	Rate of other taxes/levies /duties etc.	
8	Rate of entry tax.	
9.	Rate of Service Tax.	
10.	Nature of price.	
11.	Whether MODVAT benefit if any, has been fully passed on to the purchaser.	Yes / No.

Place

Date:

Signature of Tenderer

With seal of company

NB:- Abstract of price component shall be done for equipment/material offered, for testing & commissioning charges, if any. All the above prices will be taken during bid price evaluation.

ANNEXURE-V.

SCHEDULE OF PRICES**TENDER SPECIFICATION No.**

Item No.	Description.	Qty (unit)	Unit Ex-factory Price including transformer oil & other accessories & testing as per spec.	Unit Packing & Forwarding.	Unit Freight Charges.	Unit Insurance Charges.	Unit landing cost at destination store/site excluding ST,ED & Entry tax.
1.	2.	3.	4.	5.	6.	7.	8.

Unit E.D.	Unit S.T.	Unit Entry Tax.	Unit landing Cost including All taxes & Duties.	Total landing cost Including all taxes & duties.
9.	10.	11.	12= (8+9+10+11)	13= (3X12)

Signature of Tenderer

Name, Designation and Seal

NB: -

- The tenderer should fill up the schedule properly and in full in Excel file of e-tender mode.** The tender will be rejected, if the schedule of price is submitted in incomplete form. No post tender correspondence will be entertained on break-up of prices. Also, the supplier should agree for delivery at Stores/ site.
- In case, where F&I components are not specifically indicated in this schedule, 5% of the ex-works price shall be taken towards F&I components for the purpose of comparison of price.
- The Tenderer shall certify in the price bid that MODVAT benefit, if any, has been fully passed on to the purchaser while quoting the tender price.
- Conditional offers will not be acceptable.
- The bidder is to clearly indicate the period up to which the tax holidays are available to them.
- Price bid in any other format will not be acceptable and the offer will be rejected.
- All the above charges will be taken into account, during bid price evaluation.

2. We the _____ do hereby, further undertake
[Indicate the name of the bank]

to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the OPTCL stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the OPTCL by reason of any breach by the said supplier [s] of any of the terms or conditions or failure to perform the said Bid . Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____

3. We undertake to pay the OPTCL any money so demanded not withstanding any dispute or disputes so raised by the contractor [s] in any suit or proceeding instituted/pending before any Court or Tribunal relating thereto, our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the supplier(s) shall have no claim against us for making such payment.

4. We, the _____ further agree that the guarantee
[Indicate the Name of the Bank]

herein contained shall remain in full force and effect during the aforesaid period of 240 days [two hundred forty days] and it shall continue to be so enforceable till all the dues of the OPTCL under or by virtue of the said Bid have been fully paid and its claims satisfied or discharged or till Managing Director, ODISHA POWER TRANSMISSION CORPORATION LTD. certifies that the terms and conditions of the said Bid have been fully and properly carried out by the said Supplier [s] and accordingly discharges this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the _____ we shall be discharged from all liability under this guarantee thereafter.

5. We, the _____ further agree with the OPTCL that
[Indicate the name of the Bank]

the OPTCL shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Bid or to

extend time of performance by the said Supplier [s] from time to time or to postpone for any time or from time to time any of the powers exercisable by the OPTCL against the said supplier [s] and to forbear or enforce any of the terms and conditions relating to the said bid and we shall not be relieved from our liability by reason of any such variation, postponement or extension being granted to the said Supplier [s] or for any forbearance act or omission on the part of the OPTCL or any indulgence by the OPTCL to the said Supplier[s] or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the name, style and constitution of the Bank or the supplier [s].

7. We, _____ lastly undertake not revoke this
[Indicate the name of the Bank]

Guarantee during its currency except with the previous consent of the OPTCL in writing.

8. We the _____ Bank further agree that this guarantee shall also be invokable at our place of business at Bhubaneswar (indicate the name of the branch)in the state of ODISHA.

Not withstanding any thing contained here in.

- 1) Our liability under this bank guarantee shall not exceed Rs.------(Rupees-----).
- 2) The bank guarantee shall be valid up to dt.-----
- 3) We are liable to pay the guaranteed amount or any part there of under this bank guarantee only & only if you serve upon us at -----branch at Bhubaneswar a written claim or demand on or before dt.-----.

Dated _____ Day of _____

For _____

[Indicate the name of Bank]

Witness ((Signature, names & address)

1.

2.

ANNEXURE-VII

PROFORMA FOR COMPOSITE BANK GUARANTEE FOR SECURITY DEPOSIT PAYMENT AND PERFORMANCE

This Guarantee Bond is executed this _____ day of _____ 2012 by us the _____ Bank at _____

P.O. _____ P.S. _____

District _____ State _____

1. WHEREAS the ODISHA POWER TRANSMISSION CORPORATION LTD., a body corporate constituted under the Electricity Act, 2003 [hereinafter called "the OPTCL" which shall include its successors and assigns has placed orders No. _____ Date _____ [hereinafter called "The Agreement"] on M/s. _____ [hereinafter called "The Supplier"] which shall include its successors & assigns for supply of materials.

AND WHERE AS the supplier has agreed to supply materials to the OPTCL in terms of the said agreement AND

WHEREAS the OPTCL has agreed [1] to exempt the supplier from making payment of Security [2] to release 100% payment of the cost of materials as per the said agreement and [3] to exempt from performance guarantee on furnishing by the Supplier to the OPTCL, a Composite bank Guarantee of the value of 10 % [ten percent] of the contract price of the said agreement.

NOW THEREFORE, in consideration of the OPTCL having agreed [1] to exempt the Supplier from making payment of Security [2] releasing 100% payment to the Supplier and [3] to exempt from furnishing performance guarantee in terms of the said agreement as aforesaid, we, the _____ [Bank][hereinafter referred to as 'the

Bank'] do hereby undertake to pay to the OPTCL an amount not exceeding Rs._____ [Rupees_____ against any loss or damage caused to or suffered by or would be caused to or suffered by the OPTCL by reason of any breach by the said Supplier [s] of any of the terms or conditions contained, in the said agreement.

2. We the (_____ Bank) do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on demand from the OPTCL stating that the amount claimed is due by way of loss or damage caused to or suffered by the OPTCL by reason of any breach by the said Supplier [s] of any of the terms or conditions, contained in the said agreement or by reason of the supplier's failure to perform the said agreement. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs._____ [Rupees_____
3. We the_____ Bank} also undertake to pay to the OPTCL any money so demanded notwithstanding any dispute or disputes raised by the supplier [s] in any suit or proceeding instituted/pending before any Court or Tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the Supplier [s] shall have no claim against us for making such payment.

- 4 We, (_____ Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to do so enforceable till all the dues of the OPTCL under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till Managing Director, ODISHA POWER TRANSMISSION CORPORATION LTD. certifies that the terms and conditions of the said agreement have been fully and properly carried out by the said Supplier [s] and accordingly discharges this Guarantee.

Unless a demand or claim under this guarantee is made on us in writing on or before the [Date _____], we shall be discharged from all liability under this guarantee thereafter.

5. We, (_____ Bank) further agree that the OPTCL shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Supplier [s] and we shall not be relieved from our liability by reason of any such variations or extension being granted to the said supplier [s] or for any forbearance, act or omission on the part of the OPTCL or any indulgence by the OPTCL to the said Supplier [s] or by any such matter or thing whatsoever which under the law relating to sureties would but these provisions have effect of so relieving us.
6. This guarantee will not be discharged due to the change in the name , style and constitution of the Bank and supplier [s].
7. We, [_____ Bank] lastly undertake not to revoke this guarantee during its currency except with the previous consent of the OPTCL in writing.
8. We the _____ Bank further agree that this guarantee shall also be invokable at our place of business at Bhubaneswar (indicate the name of the branch)in the state of ODISHA.

Notwithstanding any thing contained here in.

- 1) Our liability under this bank guarantee shall not exceed Rs.------(Rupees-----
-----).
- 2) The bank guarantee shall be valid up to dt.-----
- 3) We are liable to pay the guaranteed amount or any part there of under this bank guarantee only & only if you serve upon us at -----branch at Bhubaneswar a written claim or demand on or before dt.-----.

Dated _____ Day of _____

For _____

[Indicate the name of Bank]

Witness ((Signature, names & address)

1.

2.

ANNEXURE-VIII

CHART SHOWING PARTICULARS OF EARNEST MONEY DEPOSIT FURNISHABLE BY
TENDERERS

1.	Central and State Government Undertakings	Exempted
2.	All other inside & outside state units.	The amount of EMD as specified in the specification /Tender Notice in shape of bank guarantee /DD.

NB: - REFUND OF E.M.D.

[a] In case of unsuccessful tenderers, the EMD will be refunded immediately after the tender is decided. In case of successful tenderer, this will be refunded only after furnishing of Composite Bank Guarantee referred to in clause No.19 of Section-II of this specification.

Suits, if any, arising out of EMD shall be filed in a court of law to which the jurisdiction of High Court of ODISHA extends.

[b] Earnest Money will be forfeited if the tenderer fails to accept the letter of intent/purchase order, issued in his favour or revises the bid price[s] within the validity period of Bid.

ANNEXURE-IX

DATA ON EXPERIENCE

- [a] Name of the manufacturer.
- [b] Standing of the firm as manufacturer of equipment quoted.
- [c] Description of equipment similar to that quoted [supplied and installed during the last two years with the name of the organizations to whom supply was made].
- [d] Details as to where installed etc.
- [e] Testing facilities at manufacturer's works.
- [f] If the manufacturer is having collaboration with another firm, details regarding the same and present status.
- [g] A list of purchase orders, executed during last three years.
- [h] A list of similar equipments of specified MVA rating, voltage class, Impulse level, short circuit rating, Designed, manufactured, tested and commissioned which are in successful operation for at least two years from the date of commissioning with legible user's certificate. User's full complete postal address/fax/phone must be indicated. (Refer clause No.7 of the Part-I, Section-II of the specification).

Place:

Date:

Signature of tenderer

Name, Designation, Seal

ANNEXURE-X

SCHEDULE OF SPARE PARTS FOR FIVE YEARS OF NORMAL OPERATION & MAINTENANCE

SL. No	Particulars	Quantity	Unit delivery rate	Total price

Place:

Date:

Signature of Tenderer

Name, Designation, Seal

ANNEXURE-XI
SCHEDULE OF INSTALLATIONS.

Rated MVA	Rated Voltage	Place of installation and complete postal address	Year of commissioning

Place: -

Date

Signature of Tenderer:

Name, Designation, Seal

ANNEXURE-XII

DEVIATION SCHEDULE.

Tenderer shall enter below particulars of his alternative proposal for deviation from the specification, if any.

A) Technical

SI.No	Clause No. of specification	Particulars of deviations.

Place: -

Date

Signature of Tenderer:

Name, Designation, Seal

B) Commercial deviations.

A) Commercial.

SI.No	Clause No. of specification	Particulars of deviations.

Place: -

Date

Signature of Tenderer:

Name, Designation, Seal

PART – II

PRICE BID

1. PRICE:

- (i) Bidders are required to quote their price(s) for goods offered indicating they are 'FIRM'
- (ii) The prices quoted shall be FOR Destination only at the consignee's site/store inclusive of packing, forwarding, Freight & Insurance. In addition, the break-up of FOR Destination price shall be given as per schedule of Prices in Annexure-V of Section – III. The Tenderer has to certify in the price bid that MODVAT benefit if any, has been fully passed on to the Purchaser, while quoting the tender prices.

2. INSURANCE :

Insurance of materials/equipments, covered by the Specification should normally be done by the Suppliers with their own Insurance Company unless otherwise stated. The responsibility of delivery of the materials/equipments at destination stores/site in good condition rests with the Supplier. Any claim with the Insurance Company or Transport agency arising due to loss or damage in transit has to be settled by the Supplier. The Supplier shall undertake free replacement of equipments/materials damaged or lost which will be reported by the Consignee within 30 days of receipt of the equipments/materials at Destination without awaiting for the settlement of their claims with the carriers and underwriters.

3. CERTIFICATE FOR EXEMPTION FROM EXCISE DUTY/SALES TAX:

Offers with exemption from excise Duty/ Sales tax shall be accompanied with authenticated proof of such exemption. Authenticated proof for this clause shall mean Photostat copy of exemption certificates, attested by Gazetted Officers of State or Central Government.

4. PROPER FILLING UP OF THE PRICE SCHEDULE:

- (i) In case where Freight & Insurance charges are not furnished, 5% of the Ex-works price shall be considered as the freight & Insurance charges.
- (ii) The tenderer should fill up the price schedule (Annexure-V of Section-III) properly and in full. The tender may be rejected if the schedule of price is submitted in incomplete form as per clause-34 (ix) of Section-II of the Specification.

5. NATURE OF PRICE INDICATED IN SPECIFICATION SHALL BE FINAL.

The nature of price indicated in the Clause-13, Section – I of PART –I of the Specification shall be final and binding.

SECTION –IV

TECHNICAL SPECIFICATION

SECTION-IV
TECHNICAL SPECIFICATION
PART 1 : GENERAL

1. SCOPE

1.1 The specification covers the design, engineering, manufacture, stage inspection, testing, pre-delivery inspection, supply, delivery, loading, unloading and performance requirements of 11/0.250 KV non-sealed type aluminum wound distribution transformers for outdoor use in the networks of CESU, NESCO, WESCO & SOUTHCO. The transformers shall be double wound, single phase, CRGO oil immersed with ONAN cooling with Oil filled upto maximum permissible level. The ratings required under this specification are 16KVA with Aluminum windings.

1.2 The equipment offered should have been successfully type tested within five years from date of tender and the designs should have been in satisfactory operation for a period not less than three years as on the date of bid opening. Compliance shall be demonstrated by submitting with the bid, (i) authenticated copies of the type test reports and (ii) performance certificates from the users, specifically from Central Govt./ State Govt. or their undertakings.

1.3 The scope of supply should also include the provision of type test. **The Sr.G.M., (CPC) reserves the right to waive type tests as indicated in the section on Quality Assurance, Inspection and Testing in this specification.**

1.4 The transformer shall conform in all respects to highest standards of engineering, design, workmanship, this specification and the latest revisions of relevant standards at the time of offer and the Purchaser shall have the power to reject any work or material, which, in his judgment, is not in full accordance therewith.

2. CODES & STANDARDS

2.1 Except where modified by this specification, the transformers shall be designed, manufactured and tested in accordance with the latest editions of the following standards. The Bidder may propose alternative standards, provided it is demonstrated that they give a degree of quality and performance equivalent to or better than the referenced standards. Whether to accept or reject any alternative standard shall be adjudged by the Purchaser. The Bidder shall furnish a copy of the alternative standard proposed along with the bid. If the alternative standard is in a language other than English, an English translation shall be submitted with the standard. In the case of conflict the order of precedence shall be 1) IEC or ISO Standards, 2) Indian Standards, 3) other alternative standards.

IEC/ISO	Indian Standard	Subject
IEC 71		Insulation Coordination
IEC 76	IS 2026	Power Transformers.
	IS 1180	Outdoor Single phase Distribution Transformers up to 500 KVA, 11/ 0.433 KV, Non- Sealed Type.
IEC 137	IS 2099	Bushing for Alternating Voltages above 1000V.
IEC 156		Method of determining Electric Strength of Insulating Oils.
IEC 296	IS 335	Specification for Unused Mineral Insulating Oils for Transformers and Switchgear.
	IS 6792	Method of determination of electric strength of insulating oils.
IEC 354	IS 6600	Loading Guide for oil immersed Transformers

IEC 437	Radio Influence Voltage Measurement.
IEC 551	Determination of Transformer and Reactor Sound Levels.
IEC 616	Terminal and Tapping markings for power transformers.
IEC 722	Guide to the Lightning and Switching impulse testing of Power Transformers and Reactors.
ISO 1460/BS 729	Galvanizing

This list is not to be considered exhaustive and reference to a particular standard or recommendation in this specification does not relieve the Supplier of the necessity of providing the goods complying with other relevant standards or recommendations.

3. SERVICE CONDITIONS

The service conditions shall be as follows:

maximum altitude above sea level	1,000m
maximum ambient air temperature	50° C
maximum daily average ambient air temperature	40° C
minimum ambient air temperature	-5° C
maximum temperature attainable by an object exposed to the sun	60° C
maximum yearly weighted average ambient temperature	32° C
maximum relative humidity	100%
average number of thunderstorm days per annum (isokeraunic level)	70
average number of rainy days per annum	120
average annual rainfall	1500 mm
maximum wind pressure	260Kg / m ²

Environmentally, the region where the equipment will be installed includes coastal areas, subject to high relative humidity, which can give rise to condensation. Onshore winds will frequently be salt laden. On occasions, the combination of salt and condensation may create pollution conditions for outdoor insulators.

Therefore, outdoor material and equipment shall be designed and protected for use in exposed, heavily polluted, salty, corrosive, tropical and humid coastal atmosphere.

4. SYSTEM CONDITIONS:

The equipment shall be suitable for installation in supply systems of the following characteristics.

◆	Frequency		50 Hz ± 5%
◆	Nominal system voltages	11 KV System	11 KV
		LV System	250 V
◆	Maximum system voltages	11 KV System	12 KV
		LV System	275 V
◆	Minimum LV voltage	(NEC)	225 V
◆	Nominal short circuit apparent power of the system	11 KV System	500 MVA (IS: 2026)
◆	Insulation levels :		
		1.2/50 μ sec impulse withstand	11 KV System

- ◆ Power frequency one minute withstand (wet and dry) 11 KV System 28 KV (rms)
- ◆ Neutral earthing arrangements : LV System Solidly earthed

PART 2 : TECHNICAL
SPECIFIC TECHNICAL REQUIREMENTS

1	Rated KVA (ONAN rating)	16KVA , 11/0.250 KV
2	No. of phases	single
3	Type of installation	Outdoor
4	Frequency	50 Hz (± 5%)
5	Cooling medium	Insulating Oil (ONAN)
6	Type of mounting	On Channels.
7	Rated voltage	
a)	High voltage winding	11 KV
b)	Low voltage winding	0.250 KV
8	Highest continuous system voltage	
a)	Maximum system voltage ratio (HV / LV)	12 KV / 0.275 KV
b)	Rated voltage ratio (HV / LV)	11 KV / 0.250 KV
9	No. of windings	Two winding Transformers
10	Type of cooling	ONAN (Oil natural / Air natural)
11	KVA Rating corresponding to ONAN cooling system	100%
12	Method of connection:	
	HV:	Series
	LV:	Series/Parallel
13	Connection symbol	Dyn 11
14	System earthing	Neutral of LV side to be solidly earthed.
15	Percentage impedance voltage on normal tap and KVA base at 75 ⁰ C corresponding to HV/ LV rating and applicable tolerances :	<u>% Impedance</u> + <u>Tolerance %</u> 4.0 + 10%
		(No negative tolerance will be allowed)
16	Intended regular cyclic overloading of windings	As per IEC -76-1, Clause 4.2
17	a) Anticipated unbalanced loading	Around 10%
	b) Anticipated continuous loading of windings (HV / LV)	110 % of rated current
18	a) Type of tap changer	NA
	b) Range of taping	No Tap
19	Neutral terminal to be brought out	On LV side only
20	Over Voltage operating capability and duration	112.5 % of rated voltage (continuous)
21	Maximum Flux Density in any part of the core and yoke at rated KVA, rated voltage i.e 11 KV / 0.433 KV and system frequency of 50 HZ	1.5 Tesla
22	Insulation levels for windings :-	

a)	1.2 / 50 microsecond wave shape Impulse withstand (KVP)	HV: 75	LV: N.A.
b)	Power frequency voltage withstand (KV-rms)	HV: 28	LV: 03
23	Type of winding insulation		
a)	HV winding	Uniform	
b)	LV winding	Uniform	
24	Withstand time for single phase short circuit	2 Seconds	
25	Noise level at rated voltage and frequency	As per NEMA Publication No. TR-1.	
26	Permissible Temperature Rise over ambient temperature of 50 ⁰ C		
a)	Of top oil measured by thermometer.	35 ⁰ C	
b)	Of winding measured by resistance.	40 ⁰ C	
27	Minimum HV clearances in air (mm) :-		
a)	Phase to Phase	280	
b)	Phase to ground	140	
28	Bushings & Terminals		
a)	HV winding line end	12 KV highly polluted porcelain type of bushings (Antifog type)	
b)	LV winding	0.25 KV porcelain type of bushing (Antifog type)	
29	Insulation level of bushing	<u>HV</u>	<u>LV</u>
a)	Lightning Impulse withstand (KVP)	75	Not applicable
b)	1 Minute Power Frequency withstand voltage (KV –rms)	28	3
c)	Creepage distance (mm) (minimum)	25 mm/ KV	
30	Material of HV & LV Conductor	EC grade Aluminum	
31	Maximum current density for HV and LV winding for rated current	1.4 Amp/ mm².	
32	Polarisation index i.e ratio of megger values at 600 sec. to 60 sec for HV to earth, L.V to earth and HV to LV.	Shall be greater than or equal to 1.5, but less than or equal to '5'.	
33	Core Assembly	Boltless type	
34	Maximum permissible no load losses at rated voltage & frequency and load losses at rated current & at 75 ⁰ C .		
	Transformer rating	Maximum No. Load Loss at Normal Voltage In watts.	Max. Load Losses at rated Current & at 75 ⁰ C (Watts)
a)	16KVA	55	250

6. TYPE OF TRANSFORMER

6.1 The transformers shall be of core type construction, double wound, single phase, oil

immersed, 11/0.250KV, 50 Hz with natural oil and air cooling (ONAN) to be used as step down transformers for out door use. The design of the tank, fittings, bushings, etc shall be such that it will not be necessary to keep the transformer energised to prevent deterioration as the transformers may be held in reserve, outdoors, for many years.

7. PERFORMANCE , CAPACITY AND SHORT CIRCUIT RATINGS

- 7.1 The following ratings are covered under this specification
 - 16 KVA, 11/0.250 KV, Aluminum wound
- 7.2 The transformer shall be capable of supplying a continuous load equal to its KVA rating, under the following conditions :
 - ◆ continuous steady load;
 - ◆ design at maximum ambient air temperature of 50⁰C;
 - ◆ 40⁰ C average winding temperature rise and 35⁰C top oil temperature rise for conventional breathing transformers.
- 7.3 The transformer may be overloaded during emergency up to 150% of its continuous rating in accordance with IEC Publication 354 or IS: 6600. Bushings and other current-carrying parts shall also be designed for this condition.
- 7.4 The transformer shall be capable of withstanding for two seconds without damage to any external short circuit, with the short circuit MVA available at the terminals of either winding with rated voltage on the other winding. If short circuit tests have been carried out on the particular design of transformer offered, the test results shall be supplied with the bid.
- 7.5 The thermal ability to withstand short circuit shall be demonstrated by calculation.
- 7.6 The transformer shall be capable of withstanding the thermal and dynamic effects of short circuits, as specified in IEC 76-5 or IS: 2026: Ability to withstand short circuits.
- 7.7 The maximum flux density in any part of the core and yoke at rated KVA, Voltage and frequency shall not exceed **1.5 Tesla**.

8. VOLTAGE RATIO & TAPPING RANGE

- 8.1 The transformers shall have the following ratio :-
 - ◆ the nominal voltage ratio shall be 11,000/ 250 V for 16KVA transformers;
 - ◆ tolerance on the voltage ratio shall be ± 0.5%.
- 8.2 The bidder shall state in the technical schedule, the percentage regulation at full load, power factor 1.0 and at full load, power factor 0.85 lagging.
Transformers shall be suitable for parallel operation with each other.

9. PERCENTAGE IMPEDANCE

- 9.1 The Percentage of Impedance at 75⁰ C shall be 4.0+10 % for 16KVA transformers . No negative tolerance on percentage Impedance is allowed.

10 LOSSES

The load losses shall not exceed the values given below:-

KVA Rating	Maximum No Load Loss at Normal Voltage in watts.	Maximum load losses at rated current & at 75 ⁰ C (Watts)	
16 KVA	55	250	

- 10.1 The above losses are maximum allowable and there should not be any positive tolerance.

10.2 The offered transformer(s) should have been type-tested at CPRI/ National Govt. approved laboratory. The bid shall be accompanied with type-test reports (short circuit test and Impulse test) conducted at Central Power Research Institute / National Govt. approved laboratory for the offered transformers within five years from date of tender. The short circuit test report(s) must contain the measured no load loss and load loss, determined by CPRI/ National Govt. approved laboratory.

In case of any doubts, OWNER reserves the right to verify the original type test reports of CPRI/ National Govt. approved Laboratory or ask the supplier to conduct the type tests at CPRI/ National Govt. approved Laboratory at his (supplier's) cost for re-confirmation of the test results particularly no load losses, load losses and percentage impedance.

10.3 If the bidder quotes lower values of losses than the CPRI's measured losses, he has to prove the same by conducting the Impulse & short Circuit tests at CPRI/ National Govt. approved laboratory along with measurement of no load losses and load losses at his own cost in presence of OWNER's authorized representative without any financial liability to OWNER.

10.4 However, if the loss figures will exceed the stipulated values as per specification, the transformer(s) shall be out rightly rejected.

11. VECTOR GROUP

11.1 The transformers shall be connected delta-star, in accordance with vector group reference Dyn11 of IEC - 76/ IS - 2026.

11.2 The LV neutral shall be brought out to a terminal bushing, which shall be identical to the phase bushings in all respects.

12. LOSSES

12.1 Transformers would be out rightly rejected if losses exceed the values indicated at clause-10 above.

13. FLUX DENSITY

The flux density at rated voltage & rated frequency shall not exceed **1.50 Tesla**. The transformer must be capable of operating at 10% over voltage and at frequency of 48.5 Hz without saturation.

14. INSULATION LEVELS

The insulation levels as defined in IEC 76-C/ IS: 2026 Insulation levels and dielectric test shall apply as per Table 2:

Table 2 : Transformer insulation level

	HV Winding	LV Winding
Basic Impulse voltage Level (KVp) (1.2/50 micro. sec. Wave)	75	Not Applicable
Power Frequency voltage withstand level, Wet and Dry (KV)	28	3

Bushings and terminals shall be adequate for the winding insulation tests and shall flash over externally before puncture or internal failure can occur.

15. NOISE LEVEL

The average noise level of the transformers shall not exceed 51db. The measurement shall be carried out in accordance with IEC 551 at a distance of 300mm from the envelope of the transformer.

16. RADIO INFLUENCE VOLTAGE

The maximum radio influence voltage shall be 250 μ V, measured as specified in IEC 437.

17 CORE AND WINDINGS

17.1 Core

- 17.1.1 Stage level inspection for core construction shall be carried out by the owner.
- 17.1.2 Each lamination shall be insulated such that it will not deteriorate due to mechanical pressure and the action of hot transformer oil.
- 17.1.3 The core shall be constructed from high grade, non-ageing, **Cold Rolled Grain Oriented (CRGO) silicon steel** laminations only. No other core materials shall be entertained. Bidders are requested to note that only **PRIME CORE** materials are to be used. In no case, second grade core material is to be used. The purchaser at his discretion, may select samples from the core laminations and get the same tested in CPRI/ Approved National Govt. Laboratory to prove the quality of the core material.
- 17.1.4 For the above purpose, the supplier shall have to offer every batch of core laminations received from his Sub-Vendor along with Invoice of the sub-vendor, Mills test certificate, packing list, Bill of landing, Bill of entry certificate to customs etc. towards proof of prime core materials for verification by the Purchaser's representative without any cost to the Purchaser. Besides, the contractor must mention in his bid about the type of CRGO laminations to be utilized for the offered transformers along with a copy of the specific core loss curve at different flux densities.
- 17.1.5 Core materials should be directly procured either from the manufacturer or through their accredited marketing organization of repute, but not through any agent.
The core and winding shall be capable of withstanding shocks during transport, installation and service. Provision shall be made to prevent movement of the core and windings relative to the tank during these conditions and also during short circuits.
- 17.1.6 The design shall avoid the presence of pockets which would prevent the complete emptying of the tank through the drain valve. The core material offered in the tender to be checked for its correctness before core coil assembly. For this, the tenderer must ask for core and coil inspection before its tanking.
- 17.1.7 The laminations shall be free of all burrs and sharp projections. Each sheet shall have an insulating coating resistant to the action of hot oil.
- 17.1.8 The insulation structure for the core to bolts and core to clamp plates, shall be such as to withstand 2000 V DC voltage for one minute.
- 17.1.9 The completed core and coil shall be so assembled that the axis and the plane of the outer surface of the core assemble shall not deviate from the vertical plane by more than 25mm.
- 17.1.10 All steel sections used for supporting the core shall be thoroughly shot or sand blasted, after cutting, drilling and welding.
- 17.1.11 The finally assembled core with all the clamping structures shall be free from deformation and shall not vibrate during operation.
- 17.1.12 The core clamping structure shall be designed to minimize eddy current loss.
- 17.1.13 The framework and clamping arrangements shall be securely earthed.
- 17.1.14 The core shall be carefully assembled and rigidly clamped to ensure adequate mechanical strength.
- 17.1.15 Oil ducts shall be provided, where necessary, to ensure adequate cooling inside the core. The welding structure and major insulation shall not obstruct the free flow of oil through such ducts.
- 17.1.16 The design of magnetic circuit shall be such as to avoid static discharges, development of short circuit paths within itself or to the earth clamping structure and production of flux component at right angle to the plane of the lamination, which may cause local heating. The supporting framework of the cores shall be so designed as to avoid the presence of pockets, which would prevent complete emptying of the tank through the drain valve or cause trapping of air during filling.
- 17.1.17 The construction is to be of boltless core type. The core shall be provided with lugs suitable for

lifting the complete core and coil assembly. The core and coil assembly shall be so fixed in the tank that shifting will not occur during transport or short circuits.

17.2 INTERNAL EARTHING

17.2.1 All internal metal parts of the transformer, with the exception of individual laminations and their individual clamping plates shall be earthed.

17.2.2 The top clamping structure shall be connected to the tank by a copper strap. The bottom clamping structure shall be earthed by one or more the following methods:

- a) By connection through vertical tie-rods to the top structure.
- b) By direct metal to metal contact with the tank base.
- c) By a connection to the structure on the same side of the core as the main earth connection to the tank.

17.2.3 The magnetic circuit shall be connected to the clamping structure at one point only and this shall be brought out of the top cover of the transformer tank through a suitably rated insulator. A disconnecting link shall be provided on transformer tank to facilitate disconnections from ground for IR measurement purpose.

17.2.4 Coil clamping rings of metal at earth potential shall be connected to the adjacent core clamping structure on the same side as the main earth connections.

17.3 Windings

17.3.1 Winding shall be subjected to a shrinking and seasoning process, so that no further shrinkage occurs during service. Adjustable devices shall be provided for taking up possible shrinkage in service.

17.3.2 All low voltage windings for use in the circular coil concentric winding shall be wound on a performed insulating cylinder for mechanical protection of the winding in handling and placing around the core.

17.3.3 Winding shall not contain sharp bends which might damage the insulation or produce high dielectric stresses. No strip conductor wound on edge shall have width exceeding six times the thickness.

17.3.4 The winding insulation shall be free from insulating compounds which are liable to soften, ooze out, shrink or collapse. It shall be non catalytic and chemically inert in hot transformer oil during normal service.

17.3.5 The stacks of windings are to receive adequate shrinkage treatment.

17.3.6 The windings and connections are to be braced to withstand shocks during transport, switching, short circuit or other transient conditions.

17.3.7 Permanent current carrying joints in the windings and leads shall be welded or brazed. Clamping bolts for current carrying parts inside oil shall be made of oil resistant material which shall not be affected by acidity in the oil steel bolts, if used, shall be suitably treated.

17.3.8 Terminals of all windings shall be brought out of the tank through bushings for external connections.

17.3.9 The windings shall be uniformly insulated and the L.V neutral points shall be insulated for full voltage.

17.3.10 The completed core and coil assemble shall be dried in vacuum at not more than 0.5mm of mercury absolute pressure and shall be immediately impregnated with oil after the drying process to ensure the elimination of air and moisture within the insulation. Vacuum may be applied in either vacuum over or in the transformer tank.

17.3.11 The winding shall be so designed that all coil assembles of identical voltage ratings shall be interchangeable and field repairs to the winding can be made readily without special equipment. The coils shall have high dielectric strength.

17.3.12 Coils shall be made of continuous smooth high grade electrolytic copper or aluminium conductor, shaped and braced to provide for expansion and contraction due to temperature changes.

- 17.3.13 Adequate barriers shall be provided between coils and core and between high and low voltage coil. End turn shall have additional protection against abnormal line disturbances.
- 17.3.14 The insulation of winding shall be designed to withstand voltage stress arising from surge in transmission lines due to atmospheric or transient conditions caused by switching etc
- 17.3.15 Tapping shall not be brought out from inside the coil or from intermediate turns and shall be so arranged as to preserve as far as possible magnetic balance of transformer at all voltage ratios.
- 17.3.16 Magnitude of impulse surges transferred from HV to LV windings by electro magnetic induction and capacitance coupling shall be limited to BIL of LV winding.
- 17.3.17 The winding conductor shall be of Aluminium. The current density shall not exceed **1.4 Amp/ mm²** for aluminium at normal full load current.

18. BUSHINGS AND TERMINATIONS

18.1 Bushings

- 18.1.1 Bushings shall be of the outdoor type and easily replaceable. Cemented in types will not be accepted. They shall be sufficiently robust to withstand normal transport and erection hazards and shall conform to IEC 137 /IS 3347 and 2099.
- 18.1.2 All bushings shall have a minimum creepage distance of 25 mm /KV and shall have a continuous rating of 200% of the transformer rating. The protected creepage distance shall not be less than 50% of the total.

The following minimum 11 KV clearance shall be provided:

	External (Air) for 11 KV
Phase to phase	280 mm
Phase to earth	140 mm

- 18.1.3 The 11 KV bushings of transformers shall be provided with a bi-metallic terminal connector or suitable device to receive 35 –100 mm² AAAC or ACSR conductor directly without any bi-metallic action.
- 18.1.4 The secondary bushings of transformers shall be fitted with non ferrous threaded terminals. With the exception of brass the terminals shall be protected from atmospheric deterioration by suitable tinning or by some other approved coating.
- 18.1.5 The terminals are to be supplied with one 16mm bolt, one conic spring washer, one matching flat washer, one nut and one lock nut for each hole in the terminal plate.

18.2 Bushing Labels

- 18.2.1 The HV bushings shall be labeled U, V and W and the LV bushing u, v, w and n. Marking letters shall be at least 12 mm high. The means of marking shall be either,
 - ◆ engraved metal plate; or
 - ◆ etched anodized aluminum.

Phase identification by adhesive stickers shall not be acceptable.

- 18.2.2 If labeling is to be carried out on the tank, it is preferred that one plate be used rather than individual markings for each phase, in order to prevent incorrect phase markings.

Labels shall conform to the requirements of the section on labels in this specification.

18.3 Earthing Terminals

All transformers shall be provided with two earthing terminals conforming to relevant Standards and M12 ISO metric bolt and nut which shall be non ferrous. It shall include a spring washer and lock washer.

18.4 LIGHTNING ARRESTORS

9 KV, 5KA metal oxide lightning arresters of reputed make conforming to IS-3070 Part-III, one number per phase shall be provided.(Under the HV bushing with GI earth strip 25x4 mm connected to the body of the transformer with robust clamping arrangement). Lightning arrestors with polymer insulators in conformance with relevant IEC can also be used.

19 TANK FABRICATION

19.1 All transformer sizes, the tank shall be of bolted type construction in accordance with IS 1180 (Part 2).

- The tank shall be at atmospheric pressure at an internal temperature of 10⁰ C;
- The tank shall be designed for an internal pressure of 100 Kg/ m² at 50⁰ C ambient conditions. It shall be capable of withstanding an unlimited number of 24 hours cyclic variations of internal pressure from atmospheric to this value.
- The tenderer shall state the top oil temperature at which the tank internal pressure shall reach the value of 100 kN/ m² and the value of steady load which will result in this top oil temperature with an ambient temperature of 45⁰ C.
- Adequate space shall be provided at the bottom of the tank for collection of sediments.

19.2 Transformer tanks of all types shall be designed so that the completed transformer can be lifted and transported without permanent deformation or oil leakage. Stiffeners provided on all the four side walls for rigidity should be so designed that there is no accumulation of water.

19.3 The Tank shall be of rectangular shape with round edges fabricated from tested quality mild steel plates with minimum thickness of 3.15 mm. for the side walls while top cover and the bottom plate of the tank shall have a minimum thickness of 5 mm. The transformer tank and the top cover shall be designed in such a manner as to leave no external pockets in which water can log, or any internal pocket where air/ gas can accumulate.

19.4 All sealing washers / gaskets shall be made of oil and heat resistant neoprene rubber or neoprene bonded cork seals suitable for temperature as stipulated in this specification. Surfaces at gasketed joints shall be such that an even face is presented to gasket, thereby eliminating the necessity for the gasket to take up surface irregularities.

19.5 All pipes, radiators, stiffeners or corrugations which are welded to the tank wall shall be welded externally and shall be double welded wherever possible. All welds shall be stress relieved.

19.6 The transformer tank shall be complete with all accessories, lifting lugs etc. and shall be designed to allow the complete transformer filled with oil to be lifted by crane or jacks without risk of any damage and can be transported by Rail/ Road without straining any joints and without causing any leakage of oil.

20 PRESSURE RELIEF DEVICE

Transformers shall be fitted with a pressure relief device in the form of explosion vent. The tenderer shall state the pressure at which it is designed to operate.

21 OIL LEVEL GAUGE

A suitable oil level gauge (Magnetic type) shall be fitted on the transformers and so located that it can be easily read from ground level. The gauge fitted with the conservator shall be graduated for temperatures of 5⁰ C, 30⁰ C and +98⁰ C.

22 CONSERVATORS AND BREATHERS

All the transformers shall be provided with a conservator tank.

- 22.1 The conservator tank shall be so designed and located as to eliminate any trapping of air in the transformer or pipe work. It shall be inclined at an angle of about 5 degrees to the horizontal towards the drain plug and the pipe connecting the main tank to the conservator should project about 20 mm above the bottom of the conservator so as to create a sump for the collection of impurities. Minimum oil level corresponding to 5⁰ C shall be well above the sump level.
- 22.2 All transformers shall be fitted with a silica gel breather of weatherproof design at a convenient height with oil seal at the bottom, draw in plug and filling holes with covers to isolate the silica gel from the atmosphere. The breather pipe should be connected at top of the conservator tank with two bends at right angles. The cover of the main tank and bushings turrets shall be provided with air release plug to enable the trapped air to be released.

23 FITTINGS AND ACCESSORIES

23.1 The following standard fittings and accessories shall be provided :

- ◆ rating, diagram and terminal marking plate.
- ◆ two earthing terminals .
- ◆ lifting lugs/ platform lugs.
- ◆ pressure relief device or explosion vent.
- ◆ silica gel breather.
- ◆ a magnetic or prismatic oil level gauge for all transformers indicating three position (3) of oil - minimum. 5⁰ C, 30⁰ C and 98⁰ C.
- ◆ Top filter valve with locking arrangement.
- ◆ Bottom filter valve with locking arrangement.
- ◆ Air release plugs at transformer top cover, bushing turrets etc.
- ◆ Set of Radiators.
- ◆ Conservator Tank

Bi-metallic terminals on the bushings for connection with over head ACSR/ AAAC conductor. The Specification and brief details of the salient features of these terminals should be stated.

25 TRANSFORMER OIL

The transformers shall be supplied complete with first filling of transformer oil upto maximum permissible level. The quantity of oil required for the first filling of the transformer and its full specification shall be stated in the bid. The complete first filling shall be of new oil free from inhibitors and additives up to maximum permissible level for the supplied Transformer. The bidder shall quote the price of transformer including the cost of Transformer Oil required for initial filling.

The insulating oil for the transformer shall be of EHV grade, generally conforming to IEC: 296/ BS: 148/ REC: 39/ 1993 or latest version of IS: 335/ 1983 whichever is more stringent. No inhibitors shall be used in the oil. The dielectric strength of the oil shall not be less than 60 KV at 2.5 mm. gap when tested in accordance with IS: 6792/ 1972. If an anti-oxidant inhibitor is recommended, its use shall be subject to the purchaser's approval.

The design and materials used in the construction of the transformer shall be such as to reduce the risk of the development of acidity in the oil.

The contractor shall warrant that oil furnished is in accordance with the following specifications.

S.No	Characteristic	Requirement	Method of Test
01	Appearance	The oil shall be clear & transparent & free from suspended matter or sediment	A representative sample of oil shall be examined in a 100 mm thick layer at ambient temp.
02	Density at 20 ⁰ C	0.89 g/cm ³ Max.	IS:1448
03	Kinematic Viscosity at 27 deg. C Max	27 CST	IS:1448

04	Interfacial tension at 27deg.C Min.	0.03 N/m	IS:6104
05	Flash Point	136 °C	IS:1448
06	Pour Point Max.	-6 °C	IS:1448
07	Nautralisation Value (Total Acidity) Max.	0.03 mg KOH/gm	IS:335
08	Electric strength Breakdown (voltage) Min.	72.5 KV	IS:6792
09	Dielectric dissipation factor tan delta at 90 ⁰ C	0.03 Max	IS:6262
10	Min specific resistance (resistively) at 90 deg.C	35X10 ¹² ohm cm (min.)	IS:6103
11	Oxidation stability		
12	Neutralization value after oxidation	0.40mg KOH/g	
13	Total sludge after oxidation	0.10% by weight max.	
14	Presence of oxidation Inhibitor	The oil shall not contain anti-oxidant Additives.	IS:335
15	Water content Max:	Less than 25ppm	IS:2362

26 RATING AND CONNECTION PLATE

Each transformer shall be provided with a rating plate of weatherproof material showing the following items indelibly marked :

- ◆ type of transformer
- ◆ standard to which it is manufactured (preferably IEC 76)
- ◆ manufacturer's name
- ◆ transformer serial number
- ◆ year of manufacture
- ◆ rated frequency in Hz (50)
- ◆ rated voltages in KV (11/0.250)
- ◆ number of phases (1)
- ◆ rated power in KVA
- ◆ type of cooling (ONAN)
- ◆ rated currents in A
- ◆ vector group symbol (Dyn11)
- ◆ 1.2/50µs wave impulse voltage withstand level in KVp
- ◆ power frequency withstand voltage in KV
- ◆ impedance voltage at rated current and frequency in percentage at 75⁰ C at normal tap
- ◆ Measured load loss in KW at rated current and at 75⁰ C at normal tap
- ◆ Measured no-load loss in KW at rated voltage and rated frequency

- ◆ continuous ambient temperature at which ratings apply in °C
- ◆ top oil and winding temperature rise at rated load in °C
- ◆ winding connection diagram
- ◆ total weight in kg with complete oil filled.
- ◆ total weight of the transformer with out oil
- ◆ volume of oil in litres.
- ◆ weight of core and windings in kg; and
- ◆ name of the purchaser (OWNER)

The rating plate shall conform to the requirements of the section of Labels in this specification.

27. BASE MOUNTING ARRANGEMENT

The under base of all transformers up to 100 KVA capacity shall be provided with two 75x40 mm channels, 460 mm long with holes of 14 mm dia at a centre to centre distance of 415 mm to make them suitable for fixing on a platform or plinth.

- 27 (a) PUNCHINGS:** Punching and embossing of Volume of oil in litres, name of the Purchaser-OWNER, Orissa, Name of the Supplier – M/s ----- , Year of Manufacture, Guarantee Period (i.e 3 years from the date of installation)and Sl. No. of each transformer is to be made on top core channel, top cover, side walls and name plates of transformers.

28. PAINTING

- 28.1 All paints shall be applied in accordance with the paint manufacturer's recommendations. Particular attention shall be paid to the following:
- 28.2
- a) Proper storage to avoid exposure as well as extremes of temperature.
 - b) Surface preparation prior to painting.
 - c) Mixing and thinning
 - d) Application of paints and the recommended limit on time intervals between coats.
 - e) Shelf life for storage.
- 28.3 All paints, when applied in normal full coat, shall be free from runs, sags, wrinkles, patchiness, brush marks or other defects.
- 28.3.1 All primers shall be well marked into the surface, particularly in areas where painting is evident, and the first priming coat shall be applied as soon as possible after cleaning. The paint shall be applied by airless spray according to the manufacturer's recommendations. However, wherever airless spray is not possible, conventional spray be used with prior approval of purchaser.
- 28.3.2 The supplier shall, prior to painting protect nameplates, lettering gauges, sight glasses, light fittings and similar such items.
- 28.4 **Cleaning and Surface Preparation**
- 28.4.1 After all machining, forming and welding has been completed, all steel work surfaces shall be thoroughly cleaned of rust, scale, welding slag or spatter and other contamination prior to any painting.
- 28.4.2 Steel surfaces shall be prepared by Sand/Shot blast cleaning or Chemical cleaning by Seven tank process including Phosphating to the appropriate quality.
- 28.4.3 The pressure and Volume of the compressed air supply for the blast cleaning shall meet the work requirements and shall be sufficiently free from all water contamination prior to any painting.

28.4.4 Chipping, scraping and steel wire brushing using manual or power driven tools cannot remove firmly adherent mill-scale and shall only be used where blast cleaning is impractical.

28.5 Protective Coating

28.5.1 As soon as all items have been cleaned and within four hours of the subsequent drying, they shall be given suitable anticorrosion protection.

28.6 Paint Material

Followings are the type of paints that may be suitably used for the items to be painted at shop and supply of matching paint to site:

- i) Heat resistant paint(Hot oil proof) for inside surface.
- ii) For external surfaces one coat of Thermo Setting Paint or 2 coats of Zinc chromate followed by 2 coats of Synthetic Enamel paint. The color of the finishing coats shall be dark admiral grey conforming to No.632 or IS 5:1961.

28.7 Painting Procedure

28.7.1 All painting shall be carried out in conformity with both specifications and with the paint manufacture's recommendations. All paints in any one particular system. Whether shop or site applied, shall originate from one paint manufacturer.

28.7.2 Particular attention shall be paid to the manufacture's instructions on storage, mixing, thinning and pot life. The paint shall only be applied in the manner detailed by the manufacturer e.g. brush, roller, conventional or airless spray and shall be applied under the manufacturer's recommended conditions. Minimum and maximum time intervals between coats shall be closely followed.

28.7.3 All prepared steel surfaces should be primed before visible re-rusting occurs or within 4 hours whichever is sooner. Chemical treated steel surfaces shall be primed as soon as the surface is dry and while the surface is warm.

28.7.4 Where the quality of film is impaired by excess film thickness,(wrinkling, mud cracking or general softness) the supplier shall remove the unsatisfactory paint coatings and apply another. As a general rule, dry film thickness should not exceed the specified minimum dry film thickness by more than 25% . In all instances, where two or more coats of the same paints are specified, such coatings may or may not be of contrasting colors.

28.7.5 Paint applied to items that are not to be painted, shall be removed at supplier's expense, leaving the surface clean, un-stained and undamaged.

28.8 Damages to Paints Work

Any damage occurring to any part of the painting scheme shall be made good to the same standard of corrosion protection and appearance as that originally employed.

Any damaged paint work shall be made as follows:

- a) The damaged area, together with an area extending 25mm around its boundary, shall be cleaned down to bare metal.
- b) A priming coat shall immediately applied, followed by a full paint finish equal to that originally applied and extending 50mm around the perimeter of the originally damaged.

The repainted surface shall present a smooth surface. This shall be obtained by carefully chamfering the paint edges before & after priming.

28.9 Dry Film Thickness

To the maximum extent practicable, the coats shall be applied as a continuous film of uniform

thickness and free of pores. Over-spray, skips, runs, sags and drips should be avoided. The different coats may or may not be same color.

Each coat of paint shall be allowed to harden before the next is applied as per manufacture's recommendations. Particular attention must be paid to full film thickness at edges.

The requirement for the dry film thickness(DFT) of paint and the material to be used shall be as given below:

Sl. No	Paint Type	Area to be painted	No of Coats	Total Dry film thickness(Min)
1.	Powder Paint (2) Thermo setting powder	Inside outside	01 01	30 Micron 60 Micron
2.	Liquid paint a) Epoxy (Primer) b) P.U. Paint (Finish Coat) c) Hot Oil paint / Varnish	Out side Out side inside	01 02 01	30 micron 25 each 35/10 micron

29 SEALING GASKETS

All sealing washers / gaskets shall be made of oil and heat-resistant Nitrile/ Neoprene rubber/ synthetic rubber bonded cork type RC-70C gaskets. Gaskets made of natural rubber or cork sheet are not permissible.

30 SUPPRESSION OF HARMONICS

The transformer shall be designed with attention to the suppression of harmonic voltage, especially the third and fifth.

31 TESTS

31.1 Routine Tests

Routine tests shall be carried out on all transformers and the tests shall be conducted in accordance with relevant National/ International Standards. No sampling is allowed. In addition, tank tests in accordance with IS:1180 shall be carried out.

The following routine measurements and tests shall be carried out in presence of Purchaser's authorized representative(s):

- a) measurement of winding resistance.
- b) voltage ratio measurement and check of polarity and vector group. Bushing positions shall have permanent markings at this stage of production;
- c) measurement of impedance voltages/ short circuit impedance at rated current and frequency
- d) measurement of load loss at full load and 75⁰C;
- e) measurement of neutral unbalance current;
- f) temperature rise test on one transformer of each rating and measurement of hot resistance.
- g) measurement of no-load loss and no-load currents at full, 50%, 75%, 90%, 110%, 112.5% and 120% of rated voltages;
- h) induced over voltage withstand test at 22KV for 60 sec on the HV windings;
- i) power frequency voltage withstand tests on HV and LV windings;
- j) magnetic balance test
- k) Polarization Index test P.I. value shall be not less than 1.5. P.I. = IR at 600 sec / IR at 60 sec.

l) oil leakage test : The criterion of leakage shall be discoloration by oil of whitewash applied externally to suspected parts at an oil temperature of 90⁰C or other method, as approved by the Purchaser;

m) pressure test on transformer tank on one unit for each rating.

Bushings and oil shall be subject to the following routine tests.

n) bushing routine test: in accordance with IEC 137/IS 3347;

o) oil dielectric and moisture content test: conforming to IEC 156 or IS 335.

Routine test certificates shall include in addition to the test results, the purchaser's order number, the transformer serial number, outline drawing number and transformer KVA rating.

Any other applicable tests shall be conducted at the discretion of the Purchaser without any extra cost to Purchaser.

31.2 Type Tests

31.2.1 The measurements and tests should be carried out in accordance with the standard specified in each case as indicated in the following table if the same tests were not conducted earlier at CPRI or any Govt. approved Laboratory on the transformers of the offered design.

Table 6 : Transformer type tests

Type Test	Standard
Temperature Rise Test	IEC 76/IS 2026
Impulse Voltage Withstand Test, including Full Waves and Chopped Waves as listed below	IEC 76/IS 2026
Noise Level Measurement	IEC 551
Short Circuit Test	IEC 76 / IS 2026

In accordance with IEC 76-3 the following sequence of impulses should have been/ should be applied;

- one full wave at 50% BIL;
- one full wave at 100% BIL;
- one chopped wave at 50% BIL;
- two chopped waves at 100% BIL and
- two full waves at 100% BIL.

31.2.2 Even if the Type test report(s) confirm(s) the Purchaser's specification, the Purchaser at his discretion may ask the Supplier to repeat any or all specified type tests at CPRI/ National Govt. approved laboratory on sample(s), selected at random by the purchaser's representative(s) out of the offered quantity (first lot i.e. minimum one third of the total ordered quantity). The type test(s) are to be test-witnessed by the Purchaser's representative(s). For such type of repetition of type tests, the Bidder may quote Type Test Charges in the enclosed Price Schedule or conduct the tests free of cost.

31.2.3 The supplier shall furnish calculations in accordance with IS: 2026 to demonstrate the Thermal ability of the transformers to withstand Short Circuit forces.

31.3 CHALLENGE TESTING:

The manufacturer can also request challenge testing for any test based on the specification and measurement of no load losses, load losses & impedance at 75⁰C. The challenger would request for testing with testing fees. The challenge test fees are proposed to be at least three times the cost of testing. This is likely to deter unnecessary challenges. The challenger would have the opportunity to select the sample from the store and any such challenge should be made within the guarantee period. The party challenged, challenger and the utility could witness the challenge testing.

The challenge testing would cover the following tests:

1. Measurement of magnetizing current & No Load losses at rated voltage & frequency.
2. Load Losses at more than 50% loading to determine the Full Load losses & percentage impedance at 75⁰C and neutral unbalance current.
3. Temperature Rise Test.

The challenge test could be conducted at NABL Laboratory like ERDA and CPRI. If the values are within the limits the product gets confirmed else not confirmed. No positive tolerances in losses is permitted. If the product is not confirmed the manufacturer would pay the challenge fee and the challenger would get the fee refunded. However as a redressal system the challenged would be allowed to ask for fresh testing of two or more samples from the store and the same be tested in NABL Laboratory or CPRI in presence of the party challenged, challenger and the utility.

If any one of the above two samples does not confirm the test, then the product is said to have failed the test. In such cases the manufacturer will be declared as unsuccessful manufacturer for the said product with wide publicity and would not be allowed to compete in tenders of the OWNER for a period of at least three years and heavy penalty would be imposed.

31.4 TEST VOLTAGE

Transformers shall be capable of withstanding the Power frequency and Impulse test voltage as described below:

Nominal system voltage	Highest System voltage	Impulse Test voltage	Power frequency test voltage
250 V (rms)			3 KV (rms)
11 KV (rms)	12 KV (rms)	75 KV (Peak)	28 KV (rms)

32 COMPLIANCE WITH SPECIFICATION

The transformers shall comply in all respects with the requirements of this specification. However, any minor departure from the provisions of the specification shall be disclosed at the time of tendering in the Non Compliance Schedule as in Annexure-3, Section- V of this document.

33 COMPLIANCE WITH REGULATIONS

All the equipment shall comply in all respects with the Indian Regulations and acts in force.

The equipment and connections shall be designed and arranged to minimize the risk of fire and any damage which might be caused in the event of fire.

34 INSPECTION AND TESTING

- 34.1 The Purchaser shall have free entry at all times, while work on the contract is being performed, to all parts of the manufacturer's works which concern the processing of the equipment ordered. The manufacturer shall afford the Purchaser without charge, all reasonable facilities to assure that the equipment being furnished is in accordance with this specification. After approval of Drawings by the Purchaser, the manufacture shall manufacture a Prototype Model as per the Approved Drawing and offer the same for inspection. The Inspection of the Prototype Model shall be carried out as per the Format prescribed at Clause 41, Section-IV of our Tender Specification. The Supplier shall offer the core, windings and tanks of each transformer for inspection by the Purchaser's representative(s). During stage inspection of the Prototype Model, all the measurements like diameter, window, height, leg centre, stack width, stack thickness,

thickness of laminations etc for core assembly, conductor size, insulation thickness, I.D., O.D., Winding height, major and minor insulations for both HV and LV windings, length, breadth, height and thickness of plates of transformer tanks, the quality of fittings and accessories will be taken/ determined.

The Inspection Report for the Tests conducted by our Authorized Inspectors in presence of the manufacturer's representative, for the Prototype Model offered for inspection with suggested modifications, if any shall be submitted to the undersigned for approval.

After Inspection, the Prototype Model shall be kept sealed, in the premises of the manufacturer till the completion of delivery of final consignment, for future reference during subsequent Inspections.

The Supplier can offer for final inspection of the transformers subject to clearance of the stage inspection report by the Purchaser.

34.2 The equipment shall successfully pass all the type tests and routine tests mentioned in the above Clauses and those listed in the most recent edition of the standards given in Clause 2, of this specification.

34.3 The Purchaser reserves the right to reject an item of equipment if the test results do not comply with the values specified or with the data given in the technical data schedule.

34.4 Routine tests shall be carried out by the Supplier at no extra charge at their works.

Adequate facility with calibrated testing equipment must be provided by the manufacturer free of cost to carry out the tests. Type test certificates must be furnished along with the tender for reference of the Purchaser.

34.5 The Purchaser will witness all required tests. In order to facilitate this, the Supplier shall give the Purchaser a minimum of two weeks notice as mentioned in clause-7(ii) of General Terms and Condition of Contract (GTCC) that the materials are ready for testing. If the Purchaser does not indicate his intention to participate in the testing, the manufacturer may proceed with the tests only after receipt of written confirmation to this effect from the Purchaser and shall furnish the results thereof to the Purchaser consequent upon such testing.

34.6 Full details of the proposed methods of testing, including connection diagrams, shall be submitted to the Purchaser by the Supplier for approval, at least one month before testing.

All costs in connection with the testing, including any necessary re-testing, shall be borne by the Supplier who shall provide the Purchaser with all the test facilities which the latter may require, free of charge. The Purchaser shall have the right to select the samples for test and shall also have the right to assure that the testing apparatus is duly calibrated and correct. Measuring apparatus for routine tests shall be calibrated at the expense of the Supplier at an approved laboratory and shall be approved by the Purchaser.

34.7 The supplier shall submit to the Purchaser five signed copies of the test certificates, giving the results of the tests as required. No materials shall be dispatched until the test certificates have been received by the Purchaser and the Supplier has been informed that they are acceptable.

The test certificates must show the actual values obtained from the tests, in the units used in this specification, and not merely confirm that the requirements have been met.

In the case of components for which specific type tests or routine tests are not given in this specification or in the quoted standards in Clause 2, of this specification, The Supplier shall include a list of the tests normally required for these components. All materials used in the Contract shall withstand and shall be certified to have satisfactorily passed such tests.

34.8 The Purchaser at his discretion may re-confirm the Routine Test Results, particularly no load losses, load losses and percentage impedance in his own laboratory or laboratory of his choice.

No inspection or lack of inspection or passing by the Purchaser's Representative of equipment or materials whether supplied by the Supplier or sub-supplier, shall relieve the Supplier from his liability to complete the contract works in accordance with the contract or exonerate him from any of his guarantees.

35 GUARANTEE

The supplier shall guarantee the following:

- ◆ Quality and strength of materials used;
- ◆ Satisfactory operation during the guarantee period of **36 months** from the date of commissioning, or **42 months** from the date of acceptance of the equipment by the Purchaser following delivery, whichever is earlier;
- ◆ Performance figures as supplied by the tenderer in the schedule of guaranteed particulars;
- ◆ The offered surface treatment shall protect the treated metal from corrosion for a period of not less than five years from the date of delivery.

36 PACKING AND SHIPPING

36.1 Packing

The equipment and any supporting structures are to be transported adequately sealed against water ingress. All accessories and spares shall be packed and securely clamped against movement in robust, wooden, non returnable packing cases to ensure safe transit in rough terrain, cross country road conditions and in heavy rains from the manufacturer's works to the work sites/ earmarked destinations.

- 36.1.1 All accessories shall be carefully packed so that they are fully protected during transport and handling operations and in storage. Internal surfaces of loose accessories shall be sealed by means of gaskets and blanking off plates. All parts liable to rust shall receive an anti-rusting coat and shall be suitably protected. It shall be the responsibility of the Supplier to make good any damage caused through insufficient packing.

Each packing case shall be indelibly marked, on two adjacent sides and on the top, with the following:

- ◆ Individual serial number;
- ◆ Purchaser's name;
- ◆ Contract number;
- ◆ Destination;
- ◆ A colour coded marking to indicate destination;
- ◆ Supplier's name;
- ◆ Name and address of supplier's agent in Orissa;
- ◆ Description and numbers of contents;
- ◆ Manufacturer's name;
- ◆ Country of origin;
- ◆ Case measurements;
- ◆ Gross and net weight in kilograms: and
- ◆ All necessary slinging and stacking instructions.

- 36.1.2 Each crate or container shall be marked clearly on the outside of the case to show TOP and BOTTOM positions with appropriate signs to indicate where the mass is bearing and the correct positions for slings. All component parts which are separately transported shall have permanent identification marks to facilitate correct matching and assembly at site. Welded parts shall be marked before welding. Six copies of each packing list shall be sent to the Purchaser prior to dispatching the equipment.

36.2 Transportation

The Supplier shall be responsible for the transport of all plant and equipment supplied by them and for the transport of all goods to the various specified destinations including all road clearance, offloading, warehousing and insurance.

The Supplier shall inform himself fully as to all relevant transport facilities and requirements and loading gauges and ensure that the equipment as packed for transport conform to these limitations. The Supplier shall also be responsible for verifying the access facilities specified.

The Supplier shall be responsible for the transportation of all loads associated with the contract works and shall take all reasonable steps to prevent any highways or bridges from being damaged by his traffic and shall select routes, choose and use vehicles and restrict and distribute loads so that the risk of damage shall be avoided. The Supplier shall immediately report to the Purchaser any claims made against the Supplier arising out of alleged damage to a highway or bridge.

All transport accessories, such as riding lugs, jacking pads or blanking off plates shall become the property of the Purchaser.

All items of equipment shall be securely clamped against movement to ensure safe transit from the manufacturer's facilities to the specified destinations.

The Supplier shall advise the storage requirements for any plant and equipment that may be delivered to the Purchaser's stores. The Supplier shall be required to accept responsibility for the advice given in so far as these arrangements may have a bearing on the behavior of the equipment in subsequent service.

37 Hazardous substances

The Supplier shall submit safety data sheets for all hazardous substances used with the equipment. The Supplier shall give an assurance that there are no other substances classified as hazardous in the equipment supplied. No oil shall be supplied or used at any stage of manufacture or test without a certificate acceptable to the Purchaser that it has a PCB content of less than 2 mg/ kg. The Supplier shall accept responsibility for the disposal of such hazardous substances, should any be found.

The Supplier shall also be responsible for any injuries resulting from hazardous substances due to non compliance with these requirements.

38 SUBMITTALS

38.1 Submittals required with the bid

The following shall be required with each copy of the bid :

- Completed technical data schedule;
- Descriptive literature giving full technical details of equipment offered;
- Outline dimensions drawing for each major component, general arrangement drawing showing component layout and general schematic diagram;
- Type test certificates (short circuit withstand test and impulse test) of the offered transformers conducted at CPRI/ or any National Govt approved Laboratory without which tender will be out rightly rejected.
- Sample routine test reports;

Detailed reference list of customers already using equipment offered along with performance certificates of such equipment, during the last 3 (three) years with particular emphasis on units of similar design and rating;

- Details of manufacturer's quality assurance standards and programme and ISO 9000 series or equivalent national certification;
- Deviations from this specification. Only deviations approved in writing before award of contract shall be accepted;
- List of recommended spare parts and consumable items for five year of operation with prices and spare parts catalogue with price list for future requirements.

38.2 Submittals required after contract award

38.2.1 Programme

Five copies of the programme for production and testing

38.2.2 Technical Particulars

Within 30 days of contract award five bound folders with records of the technical particulars relating to the equipment. Each folder shall contain the following information:

- ◆ General description of the equipment and all components, including brochures;
- ◆ Technical data schedule, with approved revision;
- ◆ Calculations to substantiate choice of electrical, structural, mechanical component size/ ratings;
- ◆ Detailed dimension drawing for all components, general arrangement drawing showing detailed component layout and detailed schematic and wiring drawings for all components; along with core-coil assembly drawings, showing details of core such as grade, thickness, window height, leg centre, diameter, step width, step thickness and details of windings such as I.D., O.D , thickness , Conductor size, No. of turns, major and minor insulations, winding height etc.
- ◆ Detailed loading drawing to enable the Purchaser to design and construct foundations for the transformer;
- ◆ Statement drawing attention to all exposed points in the equipment at which copper / aluminium or aluminium alloy parts are in contact with or in close proximity to other metals and stating clearly what protection is employed to prevent corrosion at each point;
- ◆ Detailed installation and commissioning instructions;

At the final hold point for Purchaser approval prior to delivery of the equipment the following shall be submitted ;

- ◆ Inspection and test reports carried out in the manufacturer's works;
- ◆ Operation and maintenance instructions as well as trouble shooting charts.

38.2.3 **Operation and Maintenance Instructions**

A copy of installation and commissioning instructions and of the operation and maintenance instructions and troubleshooting charts shall be supplied with each transformer.

38.3 Drawings

38.3.1 Within 15 days of award of contract, the Supplier shall submit 4 complete sets of drawings as

detailed below describing equipment in details. These drawings would be duly approved by the Purchaser after due scrutinisation and approval will be communicated within 15 days of receipt of these drawings. After the drawings are approved and communicated to the supplier, he would supply ten complete sets of final drawings.

- 38.3.2 All detail drawings submitted for approval shall be to scale not less than 1:20. All important dimensions shall be given and the material of which each part is to be constructed shall be indicated on the drawings. All documents and drawings shall be submitted in accordance with the provisions of this specification and shall become the property of the Purchaser.
- 38.3.3 All drawings and calculations, submitted to the Purchaser, shall be on international standard size paper, either A0, A1, A2, A3 or A4. All such drawings and calculations shall be provided with a contract title block, which shall include the name of the Purchaser and shall be assigned an unique project drawing number; the contract title block and project numbering system shall be agreed with the Purchaser.
- 38.3.4 Script sizes and thickness of scripts and lines be selected so that if reduced by two stages the alphanumeric characters and lines are still perfectly legible so as to facilitate microfilming.
- 38.3.5 For presentation of design drawings and circuit documents IEC Publication 617 or equivalent standards for graphical symbols are to be followed. The drawing approval will be communicated within 15 days from the receipt of drawings from the tenderer and for any delay in furnishing the drawings, if delivery period will be delayed, no extension of delivery time will be granted due to this.
- 38.3.6 The following drawings for each item are to be submitted as part of this Contract.
- a. Out line dimensional drawings of transformers and accessories
 - b. Assembly drawings and weights of main component parts.
 - c. Transportation drawings showing dimensions and weights of each package.
 - d. Drawings giving the weights for foundations each .
 - e. Drawing showing details such as clamping arrangements of core, core assembly showing oil duct section of HT and LT coils with conductor size showing insulation arrangements of windings and their reinforcement to withstand short circuit stresses, in side tank dimensions showing core assembly. Details of core and windings, as enumerated at Cl. No. 33.2.2 of this part of Specification shall be indicated in the above drawings.
 - f. Schematic diagram showing the flow of oil in the cooling system as well as each limb and winding. Longitudinal and cross- sectional views showing the duct sizes, cooling pipe etc. for transformer/ heat exchanger, drawn to scale shall be furnished.
 - g. Large Scale drawings of high and low tension winding of the transformers showing the nature and arrangements of insulation and terminal connection.
 - h. Name plate drawing showing details as per Cl. 23 of Part-2 of Technical Specification.
 - i. Test Reports

39 FASTENERS

- 39.1 All bolts, studs, screw threads, pipe threads, bolt heads and nuts shall comply with the appropriate Indian Standards for metric threads, or the technical equivalent.
- 39.2 Bolts or studs shall not be less than 6 mm in diameter except when used for small wiring terminals. All nuts and pins shall be adequately locked.

- 39.3 Wherever possible, bolts shall be fitted in such a manner that in the event of failure of locking resulting in the nuts working loose and falling off, the bolt will remain in position.
- 39.4 All ferrous bolts, nuts and washers placed in outdoor positions shall be of anti-corrosive materials except high tensile steel bolts and spring washers which shall be electro-galvanized to service condition stated elsewhere in the Specification. Appropriate precautions shall be taken to prevent electrolytic action between dissimilar metals where bolts are used on external horizontal surfaces and where water can collect, methods of preventing the ingress of moisture to the threads shall be provided. Each bolt or stud shall project at least one thread but not more than three threads through the nut, except when otherwise approved for terminal board studs or relay stems. If bolts nuts are placed so that they are inaccessible by means of ordinary spanners, special spanners shall be provided. The length of the screwed portion of the bolts shall be such that no screw thread may form part of a shear place between members. Taper washers shall be provided where necessary. Protective washers of suitable material shall be provided front and back on the securing screws.

40. LABELS

- 40.1 All apparatus shall be clearly labelled indicating, where necessary, its purpose and service positions. The material of all labels and plates, their dimensions, legend and the method of printing shall be subject to approval of the Purchaser. The surfaces of all labels and plates shall have a mat or satin finish to avoid dazzle from reflected light. Colours shall be permanent and free from fading. Labels mounted on black surfaces shall have white lettering. Danger plates shall have white lettering on a red background. All labels and plates for outdoor use shall be of in-corrodible material. Where the use of enameled iron plates is approved, the whole surface including the back and edges, shall be properly covered and resistant to corrosion. They shall be engraved in English. Name plates shall be white with black engraved lettering and shall carry all the applicable information specified in the applicable items of the Standards. No scratching, corrections or changes will be allowed on name plates.
- 40.2 Name plates shall be provided of white background with black engraved lettering carrying all the applicable information specified in the standards and other details as required by the Purchaser. The name plate inscription and the size and lettering shall be submitted to the Purchaser for approval.

41. PROFORMA FOR STAGE INSPECTION OF DISTRIBUTION TRANSFORMERS

(A) GENERAL INFORMATION:

- 1. Name of Firm :
- 2. Order No and Date :
- 3. Rating –wise quantity offered :
- 4. Details of offer
 - (a) Rating
 - (b) Quantity
 - (c) Serial Numbers
- 5. Details of last stage inspected lot :
 - (a) Total quantity inspected
 - (b) Serial Numbers
 - (c) Date of stage inspection
 - (d) Quantity offered for final inspection of

6. (A) Inspection of Embossing / Punching requirement: whether satisfies the Specification :
deviation if any to be mentioned :

(B) AVAILABILITY OF MATERIAL FOR OFFERED QUANTITY :

Details to be filled in

(C) POSITION OF MANUFACTURING STAGE OF THE OFFERED QUANTITY :

- (a) Complete tanked assembly
- (b) Core and coil assembly ready
- (c) Core assembled
- (d) Coils ready for assembly
 - (i) HV Coils
 - (ii) LV Coils

NOTE:

- (i) A quantity if more than 100 nos. shall not be entertained for stage inspection
- (ii) The stage inspection shall be carried out in case:-
 - (a) At Least 25% quantity offered has been tanked and
 - (b) Core coil assembly of further at least 30% of the quantity offered has been completed.
- (iii) Quantity offered for stage inspection should be offered for final inspection within 15 days from the date of issuance of clearance for stage inspection, otherwise stage inspection already cleared shall be liable for cancellation.

SI.No	Particulars	As Offered				As observed				Deviation and Remarks			
D	INSPECTION OF CORE												
(i)	Core material												
1	Manufacturer's Characteristic Certificate in respect of grade of lamination used. (Please furnish test certificate)												
2	Remarks regarding Rusting and smoothness of core												
3	Whether laminations used for top and bottom yoke are in one piece.												
(ii)	Core Construction:												
1	No of steps												
2	Dimension of Steps												
	Step No. 1	2	3	4	5	6	7	8	9	10	11	12	
	As Offered												
	W mm												
	T mm												

As found												
	W mm											
	T mm											
3	Core Dia (mm)											
4	Total Cross Section area of core											
5	Effective cross Sectional area of core											

6	Clamping arrangement											
(i)	Channel Size											
(ii)	Bolt size and No											
(iii)	Tie Rods											
(iv)	Painting											
(a)	Channels.											
(b)	Tie Rods.											
(c)	Bolts											
7	Whether top yoke is cut for LV connection											
8	If yes, at 7 above, whether Reinforcement is done											
9	Size of support Channels provided for Core base and bottom yoke (Single Piece of channels are only acceptable)											
10	Thickness of insulation provided between core base and support channel											
11	Core length (leg center to leg centre)											
12	Window height											
13	Core height											
14	Core weight only (without channel etc.)											
(E)	INSPECTION OF WINDING											
(I)	Winding material											
1	Material used for											
	(a) HV Winding											
	(b) LV Winding											
2	Grade of material for											
	(a) HV Winding											
	(b) LV Winding											

3	Test certificate of manufacturer (enclosed copy) for winding material of :			
	(a) HV			
	(b) LV			
(II)	CONSTRUCTIONAL DETAILS			
1	Size of Cross Sectional area of conductor for:			
	(a) HV Winding			
	(b) LV Winding			
2	Type of insulation for conductor			
	(a) HV Winding			
	(b) LV Winding			
3	Diameter of wire used for delta formation (mm)			
4	Diameter of coils in:			
A	LV Winding			
(i)	Internal dia (mm)			
(ii)	Outer dia (mm)			
b	HV Winding			
	Internal dia (mm)			
	Outer dia (mm)			
5	Current Density of winding material used for			
	(a) HV			
	(b) LV			
6	Whether neutral formation on top			
7	HV Coils/ Phase			
a)	Number			
b)	Turns/ coil			
c)	Total turns			
8	LV Coils/ Phase			
a)	Number			
b)	Turns/coil			
c)	Total turns			
9	Method of HV Coil Joints			
10	Total weight of coils of			
	(a) HV Winding (Kg)			
	(b) LV Winding (Kg)			
F	INSULATION MATERIALS:			
(I)	MATERIAL			

1	Craft paper			
a)	Make			
b)	Thickness (mm)			
c)	Test certificate of manufacturer (enclosed copy)			
2	Press Board			
a)	Make			
	Thickness (mm)			
	Test certificate of manufacturer (enclosed copy)			
3	Material used for top and bottom yoke and insulation			
II	Type and thickness of material used: (mm)			
a)	Between core and LV			
b)	Spacers			
c)	Interlayer			
d)	Between HV & LV winding			
e)	Between phases			
f)	End insulation			
G	CLEARANCES			
(I)	Related to core and winding			
1	LV to Core (Radial)			
2	Between HV and LV (Radial)			
3	(i) Phase to phase between HV Conductor			
	(ii) Whether two Nos Press Board each of minimum 1 mm ;thick provided to cover the tie rods			
4	Thickness of locking spacers between LV coils (mm)			
5	Axial wedges between HV and LV coils / phase (Nos)			
6	No. of radial spacers per phase between HV coils			
7	Size of duct between LV and HV winding (mm)			
(II)	Between core-coil assembly and tank: (mm)			
1	Between winding and body			

	a) Tank lengthwise			
	b) Tank breadth wise			
2	Clearance between top cover and top yoke upto 100 KVA and between top cover and top most live part of tap changing switch for 200 KVA and above.			
H	TANK			
1	Constructional details:			
	1) Rectangular shape			
	2) Thickness of side wall (mm)			
	3) Thickness of top and bottom plate (mm)			
	4) Provision of slopping top cover towards HV bushing			
	5) Tank internal dimensions(mm)			
	(a) Length			
	(b) Breadth			
	(c) Height			
	(i) On LV side			
	(ii) On HV side			
(II)	General Details			
	1) Inside painted by varnish/ oil corrosion resistant paint (please specify which type of coating done)			
	2) Gasket between top cover and tank			
	(i) Material			
	(ii) Thickness(mm)			
	(iii) Joint over laps (mm)			
	3) Reinforcement of welded angle (Specify size and No. of angle provided) on side walls of tank			
	4) Provision of lifting lugs:			
	a) Numbers			
	b) Whether lugs of 8 mm thick MS plate provided			
	c) Whether reinforced by welded plates edge wise below the lug up to reinforcing angle of the tank done			

	5) Pulling lug of MS Plate			
	a) Nos			
	b) Thickness (mm).			
	c) Whether provided on breadth side or length side			
	6) Provision of air release plug			
	7) Provision of galvanized GI Nuts Bolts with 1 No Plain and 1 No spring washer			
	8) Deformation of length wise side wall of tank when subject to:			
	a) Vacuum of (-) 0.7 Kg/sq cm for 30 minutes			
	b) Pressure of 0.8 Kg/sq cm for 30 minutes			
(I)	RADIATORS			
	1. Fin radiators of 1.25 mm thick sheet			
	a) Dimension of each fin (LxBxT)			
	b) Fins per radiators			
	c) Total No. of radiators			
	2. Verification of manufacturer's test certificate regarding Heat dissipation (excluding Top and Bottom) in w/sq m			
	3. Verification of position of radiator with respect to bushing			
(J)	CONSERVATOR			
	1. Dimensions (L x D) (in mm)			
	2. Volume (m3)			
	3. Inside dia of Conservator tank			
	4. Whether conservator outlet pipe is projected approx.20 mm inside the conservator tank			
	5. Whether arrangement made so that oil does not fall on the active parts			
	6. Whether die cast metal oil level gauge indicator having three positions at (-5° C, 30° C and 98 ° C is provided.			

	7. Whether drain plug and filling hole with cover is provided			
	8. Inner side of the conservator tank painted with.			
(K)	BREATHER			
	1. Whether Die cast Aluminium body breather for silica gel provided			
	2. Make			
	3. Capacity			
(L)	TERMINALS			
1	Material whether of Brass Rods/ Tinned Copper			
	a) HV			
	b) LV			
2	Size (dia in mm)			
	a) HV			
	b) LV			
3	Method of Star connection formed on LV side of 6mm thick (Should use Al./ Cu. Flat bolted/ brazed with crimped lugs on winding alternatively for 63 and 100 KVA rating brazed is done covered with tubular sleeve duly crimped) Please state dimensions of Al/Cu flat or tubular sleeve used (mm)			
4	Method of Connection of LV of winding to LV bushing (end of winding should be crimped with lugs(Al/Cu) and bolted with bushing stud)			
5	Method of Connection of HV winding to HV bushing (Copper joint should be done by using silver brazing alloy and for Aluminium, brazing rod or with tubular connector crimped at three spots).			
6	Whether SRB P tube/ insulated paper used for formation of Delta on HV			
7	Whether Empire sleeves used on the portion of HV winding joining to HV bushing			

8	Whether neutral formation is covered with cotton tape			
(M)	BUSHING			
1	Whether HV bushing mounted on side walls.			
2	Whether sheet metal pocket used for mounting bushing (pipe are not acceptable)			
	a) HV			
	b) LV			
3	Whether arrangement for studs for fitting of HV bushing are in diamond shape (so that Arcing Horns are placed vertically)			
	4. Position of mounting of LV bushing			
	5. Bushing Clearance: (mm)			
	a) LV to Earth			
	b) HV to Earth			
	c) Between LV Bushings			
	d) Between HV Bushings			
(N)	TANK BASE CHANNEL/ROLLERS:			
1	Size of channels(mm)			
2	Whether channels welded across the length of the tank			
3	Size and type of roller (mm)			
(O)	OIL			
1	Name of Supplier			
2	Break down voltage of oil:(KV)			
	i) Filled in tanked Transformers			
	In storage tank (to be tested by Inspecting Officer).			
	3. Supplier's test certificate (Enclosed)			
(P)	ENGRAVING / PUNCHINGS			
	1. Engraving of Sl.No and name of firm			
	i) On bottom of clamping channel of core-coil assembly			

	ii) On side wall and top cover of tank along with date of despatch. / Guarantee Period			
(Q)	i) MS plate of size 125 x 125 mm welded on width side of stiffner			
	ii) Following details engraved (as per approved GTP)			
	(a) Serial Number			
	(b) Name of Firm			
	(c) Order No. and Date			
	(d) Rating			
	(e) Name of Inspecting Officer			
	(f) Designation			
	(g) Date of dispatch			
(R)	NAME PLATE DETAILS			
	Whether Name Plate is as per approved drawing			
(S)	Colour of Transformer			
	1. Tank body with dark green colour			
	2. Conservator with white colour			
(T)	CHECKING OF TESTING FACILITIES			
	(Calibration certificate also to be checked for its validity)			
	TESTS			
	1. No Load Current			
	2. No Load Loss			
	3. % Impedance			
	4. Load Losses			
	5. Insulation Resistance Test			
	6. Vector Group Test (phase relationship)			
	7. Ratio and Polarity test relationship			
	8. Transformer oil Test (Break down Voltage)			
	9. Magnetic Balance			
	10. Measurement of winding resistance (HV and LV both)			

	11. Induced over voltage withstand test (Double voltage and Double frequency)			
	12. Separate source power frequency withstand test at 28 KV for HV and 3 KV for LV (one minute)			
	13. Air Pressure/ Oil leakage Test			
	14. Vacume Test			
	15. Unbalanced current test			
	16. Temperature rise(Heat Run) test			
(U)	We have specifically checked the following and found the same as per G.T.P./ deviations observed as mentioned against each.			
	i) Rustlessness of CRGO laminations used			
	ii) Core Steps			
	iii) Core Area			
	iv) Core Weight			
	v) Winding cross section area			
	a) LV			
	b) HV			
	vi) Weight of windings			
	vii) Clearance between winding and wall of tank (mm)			
	a) Length-wise			
	b) Breadth- wise			
	viii) Clearance between top of yoke top most live part of tap changer to tank cover			
	ix) Details of Neutral formation			
	x) Connections to bushings			
	a) LV			
	b) HV			
	xi) Slope of tank top			
	xii) Position of mounting of bushings			

COMPANY INSPECTING OFFICER

FIRMS
REPRESENTATIVE

DATE OF INSPECTION

PROFORMA FOR PRE-DELIVERY INSPECTION OF DISTRIBUTION , TRANSFORMERS

1	Name of the Firm		
2	Details of Offer made		
	i) Order No and Date		
	(ii) Rating		
	(iii) Quantity		
	(iv) Sl.No of transformers		
3	Date of stage inspection of the lot		
4	Reference of stage inspection clearance		
5	Quantity offered and inspected against the order prior to this lot		

(A) ACCEPTANCE TESTS TO BE CARRIED OUT

Sl.No	PARTICULARS	OBSERVATION
1	(a) Ratio Test	AB/an

		BC/bn
		CA/cn
	(b) Polarity Test	
2	No load loss measurement	
		W1
		W2
		W3
	TOTAL	
	Multiplying Factors:-	
	CT	
	Watt meter	
	Total X MF	
	NET LOSS	
3	LOAD loss measurement	
		W1
		W2
		W3
	TOTAL	

SI.No	PARTICULARS	OBSERVATION
	Multiplying Factors:-	
	CT	
	Watt meter	
	PT	
	Total X MF	
	Loss at ambient temperature(watt)	
	Loss at 75 ° C (with calculation sheet) (watt)	
4	Winding Resistance:	
	H.V. (In Ohms)	
	(a) At Ambient temperature of _____ ° C	A - B
		B - C
		C - A
	(b) Resistance at 75 ° C	A - B
		B - C
		C - A
	L.V. (in Ohm)	
	(a) At Ambient temperature of _____ ° C	a- b

21	Whether engraving of name of firm, SI.No. and Rating of Transformer, Order No. and date and Date of dispatch on MS Plate	
22	Copy of calibration certificates of metering equipments be enclosed.	

(B) POINTS TO BE SEEN /DIMENSIONS TO BE NOTED AT THE TIME OF DISMANTLING OF TRANSFORMERS

SI.No	PARTICULARS	OBSERVATION
1	Details of the transformer dismantled for physical verification	
	(a) Rating (kVA)	
	(b) SI.No	
2	Whether GI Nut Bolts with one spring one plain washer provided for tightening the tank cover	
3	Details of gasket used between top cover and tank Material:	
	(i) Thickness(mm)	
	(ii) Type of joints	
4	Whether core is earthed properly with copper strip (one end should be tightened in between the core laminations and other end bolted on core clamping channel)	
5	Connections from winding to bushings (describe the manner in which it has been done)	
	(a) HV	
	(b) LV	
	(c) Formation of Star connection on LV side.	

6	Winding wire dia and cross sectional area:	
	(a) HV	
	(i) Dia (mm)	
	(ii) Area (sq mm)	
	(B) LV	
	(i) L x W x Nos of layer	
	(ii) Area (sq mm)	
7	Thickness of press board (s) provided between HV coils to cover the tie rods	
8	Whether painted with oil and corrosion resistant paint/ varnish	
	(a) Inside of the tank	
	(b) Inside of the conservator tank	
	(c) Core clamping and core base channels	
	(d) Tie rods	
	(e) Core bolts	
9	Whether tie rods and core bolts insulated, if yes, material of insulation	
10	Whether flap on inner side of top cover provided to prevent direct falling of oil on core-coil assembly.	

Sl.No	PARTICULARS	OBSERVATION
11	Method of joints	
	(a) Between HV coils	
	(b) Between tap coils	
	(c) For tap changer	
12	Whether engraving of Sl. No. and name of firm done on bottom channel of core coil assembly.	
13	Diameter of Copper wire, used for formation of delta (should not be less than 1.5 times the dia of conductor). (mm)	
14	Whether empire sleeves provided upto the end portion of HV winding joining to bushing.	
15	HV Coils:	
	(a) Inner dia (mm)	
	(b) Outer dia (mm)	
16	LV Coils:	
	(a) Inner dia (mm)	
	(b) Outer dia (mm)	
17	Core dia	
18	Core height including base channel and insulation in between (mm)	

19	Leg Center of core	
20	Clearances between	
	(a) Core and LV (mm)	
	(b) HV and LV (mm)	
	(c) Phase to phase of HV coils (mm)	
	(d) Core coil assembly and tank body (mm)	
	(i) Length- wise	
	(ii) Width-wise	
	(e) Top of yoke and top cover (mm)	
	(f) Top most live part of tap changer and top cover.	
21	Weight of core only (kg)	
22	Weight of windings (kg)	
	(a) LV	
	(b) HV	
23	Whether core laminations are in one piece, used for	
	(a) Bottom yoke	
	(b) Top yoke	
24	Specific remarks regarding smoothness and rusting of core used.	
25	Volume of oil filled (to be done once against the order)	
	(a) In conservator tank	

SI.No	PARTICULARS	OBSERVATION
	(b) In tank of the transformer	
26	Weight of transformer (inclusive of all fittings, accessories, oil etc. complete)	
27	Inner dimensions of the tank	
	(a) Length	
	(b) Width	
	(c) Height	
	(i) LV Side	
	(ii) HV side	
28	Remarks, if any:	

Note: Please ensure that complete details have been filled in the proforma and no column has been left blank.

SIGNATURE OF INSPECTING OFFICER
(with name and designation)

SIGNATURE OF FIRM'S REPRESENTATIVE
(with name and designation)

DATE OF INSPECTION: _____

SOURCE OF MATERIALS/ PLACES OF MANUFACTURE, TESTING AND INSPECTION

Sl. No.	Item	Source of Materials	Place of Manufacture	Place of testing and inspection
1	Laminations			
2	Copper Conductor			
3	Insulated winding wires			
4	Oil			
5	Press boards			
6	Kraft paper			
7	MS Plates/ Angles/ Channels			

8	Gaskets			
9	Bushing HV/LV			
10	Paints			

42. NON COMPLIANCE SCHEDULE

On this schedule the bidder shall provide a list of non compliance with this specification, documenting the effects that such non compliance is likely to have on the equipment’s life and operating characteristics. Each non compliance shall refer to the relevant clause of the specification.

Where there are no deviations from specifications, the bidder shall so indicate by stating “No deviations” in this schedule.

Clause No.	Non Compliance

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43. TEST CERTIFICATES SCHEDULE

On this schedule a list of the test certificates included with the bid shall be provided. The list should include type test certificates and sample routine test reports. Each certificate listed shall be referred to the relevant specification clause and item of equipment to which the test applies.

Clause No.	Type Test Certificate or Routine test Report

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APPENDIX-II

QUANTITY & DELIVERY SCHEDULE.

Description of the Equipment	Quantity	Delivery Schedule	Destination.
16 KVA, (11 / 0.23 KV) Transformer, 3 Star, AL	83 Nos.	3 Months from the date of the placement of the Purchase order.	Any stores/ sites within Odisha State, same will be indicated in the purchase order/ release order,

Signature of the Tenderer
with seal and date