Western Electricity Supply Company of Odisha Limited

TENDER SPECIFICATION FOR

PROCUREMENT OF POWER TRANSFORMER

( FOR CAPEX PROGRAMME)

TENDER NOTICE No. WESCO / CAPEX / POWER TRANSFORMER/ 33
Date: 12.02.2013

1. DATE OF OPENING OF TENDER: 06.03.2013.

2. TIME: 5 PM

3. PLACE: Registered Office of NESCO, WESCO & SOUTHCO, N 1/22, IRC Village, Nayapalli, Bhubaneswar – 751015
Western Electricity Supply Company of Odisha Ltd. (WESCO)  
Registered Office:  
N 1/22, IRC Village, Nayapalli, Bhubaneswar – 751015  
Ph. No. 0674-2558737, Fax: 0674-2558343  
**********************************************************************

TENDER NOTICE NO: wesco /CAPEX / Power Transformer / 33 Date: 12.02.2013

Material Name: 33/11 KV , 8 MVA Power Transformers

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TENDER NOTICE

Tender Notice No. **WESCO /CAPEX / Power Transformer / 33** Date: 12.02.2013

For and on behalf of the Western Electricity Supply Company of Odisha Ltd. (WESCO) the undersigned invites sealed tenders in duplicate on two part bidding system from the eligible bidders, who comply to the terms and conditions for the supply of following materials superscribing the Tender Specification No., Name of the material & date of opening (as mentioned in the notice).

The tender papers can be had from the undersigned at the above address on payment of the cost of Tender Paper indicated below in shape of Account Payee Bank Draft drawn on any public Sector bank in favour of the Western Electricity Supply Company of Odisha Ltd. payable at Bhubaneswar. The cost of tender paper is non-refundable.

**SCHEDULE OF MATERIALS TENDERED:**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of Materials</th>
<th>Rating</th>
<th>Unit</th>
<th>Quantity</th>
<th>Cost of Tender Paper (Rs.)</th>
<th>EMD (Rs.in lacs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>33 / 11 KV Power Transformer</td>
<td>8 MVA</td>
<td>No</td>
<td>19</td>
<td>15,000.00+VAT 5%=15,750.00</td>
<td>7.74</td>
</tr>
</tbody>
</table>

**TIME SCHEDULES:-**

<table>
<thead>
<tr>
<th></th>
<th>Last Date &amp; Time for selling of tender papers</th>
<th>04.03.2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Last Date &amp; Time for submission of Bid document</td>
<td>06.03.2013 up to 1.00 PM</td>
</tr>
<tr>
<td>3</td>
<td>Last Date &amp; Time for Opening of Tender</td>
<td>06.03.2013 at 5 PM</td>
</tr>
</tbody>
</table>

The intending bidders can also download the tender document from our website [www.wescoodisha.com](http://www.wescoodisha.com). However the bidder has to furnish a Account Payee Bank Draft drawn on any Public sector Bank in favour of the Western Electricity Supply Company of Odisha Ltd. payable at Bhubaneswar for the cost of the Tender Paper indicated above, along with his bid, failing of which the bid will be rejected outright. In the event of any specified date for the sale, submission or opening of bids being declared as holiday for WESCO the bids will be sold / received / opened up at the appointed time on the next working day. WESCO also reserves the right to accept or reject any or all tenders without assigning any reason thereof, if the situation so warrants.

For detail Tender Specification & Terms and Conditions, please visit our website [www.wescoodisha.com](http://www.wescoodisha.com)

(sd/-)
SECTION – I

INVITATION FOR BIDS (IFB)
INVITATION FOR BIDS (IFB)

FOR SUPPLY OF

33/11 KV 8 MVA Power Transformer

(COMPETITIVE BIDDING)

TENDER NOTICE NO: wesco /CAPEX / Power Transformer / 33 Date: 12.02.2013

SECTION –I

1.0 For and on behalf of the WESCO, the undersigned invites bids under two part bidding system in sealed cover in duplicate duly superscribed with tender Notice no. WESCO /CAPEX/Power Transformer/ 33 Dt. 12.02.2013 and date of opening 06.03.2013 from the reputed manufacturers only for design, manufacture, supply, type testing, inspection, loading at factory, transportation to & unloading at site / stores including guaranteed obligation for supply of 33/11 KV Power Transformer.

2.0 Submission of the Bids:

2.1 The Bidders are required to submit a detailed and comprehensive bid, consisting of Technical and Commercial Proposal and conditions / schedule of non-compliance, if any. The submission of the Bids shall be in the manner specified in the instruction to Bidders. The due date of submission shall be 06.03.2013 up-to 1.00 PM.

3.0 WESCO will not be responsible for any costs or expenses incurred by bidders in connection with the preparation and delivery of bids.

3.1 WESCO reserves the right to cancel, postpone, withdraw the invitation for Bids without assigning any reason thereof and shall bear no liability whatsoever consequent upon such a decision if the situation so warrants.

4.0 E.M.D & TIME SCHEDULES:

<table>
<thead>
<tr>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last date for sale of tender papers</td>
<td>04.03.2013</td>
</tr>
<tr>
<td>Submission of Tenders</td>
<td>06.03.2013 up to 1.00 PM</td>
</tr>
<tr>
<td>Opening of Technical Bid</td>
<td>06.03.2013 at 5 PM</td>
</tr>
<tr>
<td>Completion of the delivery</td>
<td>180 days from the date of issue of Purchase Order as per delivery schedule.</td>
</tr>
<tr>
<td>Cost of Tender Paper (Non-Refundable)</td>
<td>Rs. 15,750.00 (Rupees Fifteen Thousand Seven Hundred and Fifty only) in shape of Cash/ Account Payee demand draft issued in favour of the Western Electricity Supply Company of Odisha Ltd. payable at Bhubaneswar only.</td>
</tr>
</tbody>
</table>
NB: Cost of Tender shall be fully exempt for the local SSI Units located in the State of Odisha having valid registration in D.I.C/NSIC on the date of submission of the tender. It is also applicable for Consortium of SSI Units.

Amount of E.M.D payable
In shape of account payee demand draft / Bank Guarantee in favour of the “Western Electricity Supply Company of Odisha Ltd.”. For details, please refer clause no. 9.2 of ITB (Page-12)

NOTE: Local SSI Units located in the state of Odisha having valid registration in D.I.C/NSIC on the date of submission the tender shall be allowed to deposit 25% of the EMD amount as prescribed above. It is also applicable for Consortium of SSI Units.

NB: Bidders are free to quote for single or multiple items. But EMD is to be furnished for each item separately.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of Materials</th>
<th>Unit</th>
<th>Quantity</th>
<th>Cost of Tender Paper (Rs.)</th>
<th>EMD (Rs. in Lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8 MVA Power Transformer</td>
<td>No</td>
<td>19</td>
<td>15,000/- + 5% VAT = 15,750.00</td>
<td>7.74</td>
</tr>
</tbody>
</table>

5.0 SCHEDULE OF REQUIREMENTS & DELIVERY:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Description of material</th>
<th>Units</th>
<th>Quantity</th>
<th>Delivery quantity from the date of Acceptance of the Order</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Within 120 days (Consignment-I) Within 150 days (Consignment-II) Within 180 days (Consignment-III)</td>
</tr>
<tr>
<td>2</td>
<td>8 MVA 33/11 KV Power Transformers</td>
<td>No</td>
<td>19</td>
<td>7 6 6</td>
</tr>
</tbody>
</table>

*Note: WESCO may re-schedule the due date of delivery as per their requirement.*

6.0 QUALIFICATION OF BIDDERS:

6.1 Criteria for qualification:

6.1.1 Technical:

a) The bidder should be a manufacturer of **33/11 KV Power Transformer** for which he submits his offer.

b) The bidder has to quote at least 50% of the tendered quantity of the material covered under this notification. The bidder should have supplied Power Transformers of same size or higher sizes/voltage rating minimum 50% of the quoted/offered quantity during any one of the financial year out of the immediate past three financial years. Bidders shall submit self attested copies of P.O.’s executed successfully for the relevant years and abstract thereof to prove the quantity as supplied.

c) The bid shall be accompanied by user’s certificate from any Distribution Utility/ Reputed Private Organization/ State Govt./ Central Govt. or their undertaking(s) in support of satisfactory performance of their above materials supplied earlier to them.
d) (i) The offered materials should have been type-tested at CPRI/ NABL accredited laboratory. The bid shall accompanying with type-test reports conducted at Central Power Research Institute / NABL accredited laboratory for the offered materials conducted within five years before the date of opening of the tender.

(ii) If the bidder do not have valid type test report for the offered Power Transformers within last 5 years, but possess adequate supply experience of the tendered Transformers or higher rating both in voltage/capacity, they have to furnish an undertaking to conduct the Type Test of the Power Transformer offered by them in their own cost at CPRI/NABL Accredited Laboratory and produce the said Type Test report along with the drawings duly approved by the Type Testing Agency within 90 days of placement of the order.

e) The bidders who have earlier failed to execute the Purchase Order(s) of WESCO and or blacklisted by the WESCO /any of the distribution Utility shall not be eligible to participate in this tender.

f) WESCO reserves the right to waive minor deviation, if they do not materially effect the capacity of the bidder to perform the contract.

6.1.2 Financial:

The minimum average annual turnover of the intending bidder should not be less than two times of the estimated cost of the quantity offered by the bidder during best three financial years out of immediate past 5 financial years.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Description of Materials</th>
<th>Minimum Qualifying requirement for 100% Tender quantity (Rs. in Cr.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8 MVA Power Transformer</td>
<td>15.48 Cr.</td>
</tr>
</tbody>
</table>

NB: Bidders must furnish self attested audited Annual Accounts of past 3 best financial year/5 years to establish their Turnover requirement.

6.1.3 Participation of SSI Units by forming a CONSORTIUM:

Two or more SSI Units having been manufacturer of tender items as per this tender specification, may form a Consortium among themselves and apply against this specification, provided they fulfill the following eligible criteria;

a) They should have legally valid consortium agreement as per the prescribed format for the purpose of participation in the bidding process. The total no of a consortium shall be limited to four members.

b) All members of the Consortium should be the eligible manufacturer(s) of the materials / equipments tendered.

c) Each member should have valid statutory license to use ISI Mark/BEE three star or more level Certification/Type tested report from NABL accredited laboratory conducted within last five years for the tendered materials/equipments as applicable for the tender.

d) Consortium as a whole shall meet the qualifying norms specified in the tender, they participate.

e) The lead member of the Consortium should meet at least 50% of the qualifying norms in respect of the supply experience.

f) Besides the lead member, other member (s) of the Consortium should meet at
least 15% of the qualifying norms in respect of the supply experience.

g) All the Consortium member(s) shall authorize the lead partner by submitting a
power of Attorney as per the prescribed format duly signed by the authorized
signatories. The lead partner shall be authorized to receive instructions for and
on behalf of all partners of the Consortium and entire execution of the contract.

h) The Consortium and its members shall be jointly and severally responsible and
be held liable for the purpose of guaranteed obligation and any other matter as
required under the contract.

i) Any member of the Consortium member(s) shall not be eligible either in an
individual capacity or part of any other consortium to participate in the tender,
where the said consortium participates.

j) Separate Purchase Orders will be placed to each members of the Consortium
considering their offer quantity and ability to supply.

k) The prescribed formats for Consortium Agreement (Annexure – VII) and Power
of Attorney (Annexure – VIII) are provided in the tender specification as
enclosures.

6.1.4. Documentation:

6.1.4.1. Bidder shall furnish copies of original documents defining the constitution or legal status,
place of registration and principal place of business namely of Memorandum and Article of
Association.

6.1.4.2. Written power of attorney / Board Resolution of the authorized signatory of the bid.

6.1.4.3. Bidders shall submit their audited financial reports for best three financial years out of last
five years. In case the Bidder is in existence for less than 5 years the audited financial
report/s from the date of its incorporation should be furnished.

6.1.4.4. Copies of Purchase order successfully executed, Users Performance Certificate, type Test
Report if any.

7.0 All correspondence with regard to the above shall be made to the following address:

CAPEX CELL WESCO
Registered Office: NESCO, WESCO & SOUTHCO
N 1/22, IRC Village, Nayapalli, Bhubaneswar – 751015
Ph. No. 0674-2558737, Fax: 0674-2558343
Email: capex@odishadiscoms.com
SECTION –II

INSTRUCTION TO BIDDERS (ITB)
SECTION –II

INSTRUCTION TO BIDDERS (ITB)

1. SOURCE OF FUNDS:

1.1 WESCO hereinafter referred to as the “Purchaser” is desirous of procurement of materials for strengthening and improvement of distribution network under WESCO from the funds available under Capex Programme of Govt. of Odisha.

2. SCOPE OF WORK:

2.1 The scope of work in brief shall include design, manufacture, type testing, inspection, supply, loading at factory, transportation to site / stores, unloading at site/stores including guaranteed obligation of complete supply of materials in conformity to the technical specification enclosed herewith in Section – IV.

3. DISCLAIMER:

3.1 This Document includes statements, which reflect various assumptions, which may or may not be correct. Each Bidder should conduct its own estimation and analysis and should check the accuracy, reliability and completeness of the information in this Document and obtain independent advice from appropriate sources in their own interest.

3.2 Neither Purchaser nor its employees will have any liability whatsoever to any Bidder or any other person under the law or contract, the principles of restitution or unjust enrichment or otherwise for any loss, expense or damage whatsoever which may arise from or be incurred or suffered in connection with anything contained in this Document, any matter deemed to form part of this Document, provision of Services and any other information supplied by or on behalf of Purchaser or its employees, or otherwise arising in any way from the selection process for the Supply / provision of Services for the Project.

3.3 Though adequate care has been taken while issuing the Bid document, the Bidder should satisfy himself that documents are complete in all respects. Intimation of any discrepancy/doubt shall be sent to the Purchaser address for speedy response.

3.4 This document and the information contained herein are Strictly Confidential and are for use of only the person(s) to whom it is issued/ downloaded from the website. It may not be copied or distributed by the recipient to third parties (other than in confidence to the recipient’s professional advisors).

4. COST OF BIDDING:

4.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid and Purchaser will in no case be responsible or liable for those costs.

5. BIDDING DOCUMENTS:

5.1 The Scope of Work, Bidding Procedures and Contract Terms are described in the Bidding Documents. In addition to the covering Letter accompanying Bidding Documents, the Bidding documents include:

(a) Invitation of Bids (IFB) - Section –I
(b) Instruction to Bidders (ITB) - Section –II
(c) General Terms and Conditions of Contract (GTCC) - Section –III
(d) Technical Specification - Section –IV
(e) List of Annexure - Section –V
The Bidder is expected to examine the Bidding Documents, including all Instructions, Forms, Terms and Specifications. Failure to furnish all information required in the Bidding documents or submission of a Bid not substantially responsive to the Bidding Documents in every respect will / may result in the rejection of the Bid.

6. **AMENDMENT OF BIDDING DOCUMENTS:**

6.1 At any time prior to the deadline for submission of Bids, the **Purchaser** may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by way of issuing an addendum.

6.2 The Amendment/ Addendum shall be part of the Bidding Documents, pursuant to Clause 6.1, and it will be binding on the bidders.

6.3 In order to afford prospective Bidders reasonable time in which to take the amendment into account in preparing of their Bids, the **Purchaser** may, at its discretion, extend the deadline for the submission of Bids.

7. **LANGUAGE OF BID:**

The Bid, prepared by the Bidder, and all correspondence and documents relating to the Bid exchanged by the Bidder and the **Purchaser**, shall be written in the English Language. Any printed literature furnished by the Bidder may be written in another Language, provided that the literature is accompanied by an English translation, in which case, for purposes of interpretation of the Bid, the English translation shall govern.

8. **DOCUMENTS COMPRISING THE BID:**

8.1 The Bid prepared and submitted by the Bidder shall comprise of two parts i.e. Part-I (Techno-Commercial Bid), & Part-II (Price Bid).

(A) **The Part-I (Techno-Commercial Bid) must contain the following documents:**

(a) Bid Document signed by the bidder in every page, all other Schedules / Formats enclosed in the Bid-Document (i.e. Annexure-I, II, IV, V, VI (A), VI (B), VII, VIII, IX, X, XI) duly filled in & signed by the bidder with seal in a separate envelop superscribed as Techno Commercial Bid. **Bids containing information in formats other than our prescribed formats shall not be acceptable and may make the bid non-responsive.**

(b) Requisite Earnest Money Deposit (E.M.D) as per clause No. 4 of Section –I, IFB in a separate envelop superscribed as “EMD” **failing which the bid may be treated non-responsive.**

(c) Following Documentary evidence establishing in accordance with Clause-29, ITB, that the Bidder is qualified to perform the Contract if the Bid is accepted;

(i) Self attested copies of Purchase Orders executed in last 3 Years.

(ii) Self attested copies of Performance Certificates / Successful contract completion Certificates from the buyers preferably from Electricity Distribution Utilities / Government Organisations.

(iii) Type Test Reports from CPRI or NABL Accredited Testing Laboratory for the offered equipments along with the copies of drawings duly approved by the Type Testing Agency for the tests conducted not before 5 years from the date of opening of Bids.

(iv) Copies of Profit & Loss Accounts & Audited Balance sheet indicating Turnover for best 3 financial years out of last 5 financial years.

(d) Power of Attorney / Board resolution indicating that the person(s) signing the Bid have the authority to sign the Bid and as such the Bid is binding upon the Bidder during the full period of its validity, in accordance with clause 14.
Requisite Cost of Tender Document as per clause 4 of Section –I, IFB in shape of account payee Bank draft from a Public Sector Bank in favour of “The Western Electricity Supply Company of Odisha Ltd.” Payable at Bhubaneswar is to be enclosed along with the Bid, if the document is downloaded from our web-site.

Or else, the Original Copy of Money Receipt for the payment made towards the cost of Tender Document is to be enclosed along with Bid, if the document is directly purchased from our Cash Counter at our Regd. Office.

(B) Part-II (Price Bid):

The Price Bid shall contain the price schedules as per the prescribed format enclosed as (Annexure-V) duly filled in & signed by the bidder with seal.

(This shall be submitted in a double sealed envelop separately duly superscribed as “Price Bid”)

9. SUBMISSION OF BID:

9.1 The Bidder shall complete and submit the Bid Document in duplicate enclosing all documents at clause “8” above in two sealed envelops for Original & Duplicate separately, superscribing the Tender Notice No. WESCO /CAPEX/Power Transformer / 33 Date 12.02.2013 Date of Opening 06.03.2013 & Description of Material.

9.2 E.M.D:

9.2.1 The bidder shall submit E.M.D as a part of the bid in the prescribed manner for the amount mentioned in Clause No.4 of Section –I.

9.2.2 The E.M.D is required to protect the Purchaser against the risk of bidder’s conduct, which would warrant the security’s forfeiture.

9.2.3 The E.M.D shall be in the following form:

A/C payee demand draft in favour of Western Electricity Supply Company of Odisha Ltd. issued by a Public Sector bank payable at Bhubaneswar.

OR

Bank Guarantee in favour of “Western Electricity Supply Company of Odisha Ltd.” issued by a Public sector bank encashable at local branch at Bhubaneswar only. The BG shall be strictly as per the format enclosed at Section – V, Annexure – X.

NB: In case of any deficiency such as the ownership of the security bond (other than the issuing bank), deviation from the approved format, absence of signature of witness etc. found in the EMD Bank Guarantee, the same shall be liable for rejection upfront. The bidder will not be given any chance to rectify the same.

9.2.4 Unsuccessful bidder’s E.M.D shall be refunded back as promptly as possible, but not later than thirty (30) days after the expiry of the period of bid validity. The successful bidder’s E.M.D shall be discharged upon furnishing of the performance security.

9.2.5 The E.M.D may be forfeited due to following reasons:

1) If the bidder withdraws bid during the period of bid validity specified by the bidder in the bid form.

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2) In case the successful bidder fails to sign the contract in specified time and / or fails to submit the requisite performance Bank guarantee.

3) In case of failure to supply the materials / equipment during the contractual delivery period.

10. **BID PRICE:**

10.1 Bidders have to quote for the entire quantity of materials/equipment covered under this specification strictly as per the enclosed format in Section –V. The total Bid Price shall also cover all the Supplier’s obligations mentioned in or reasonably to be inferred from the Bidding Documents in respect of Design, Supply, testing, inspection, Transportation to site/stores, all in accordance with the requirement of Tender Documents. **The Bidder shall complete the appropriate Price Schedules enclosed herein at Annexure – V, stating the Unit Price for each item, all other livable taxes & duties, freight & insurance separately and thereby arriving at the total amount.**

10.2 In case there is any increase in the number of units as compared to those mentioned in the IFB, the Contract Price shall be subject to increase proportionately on pro-rata basis.

10.3 The Price offered shall be inclusive of all costs as well as Duties, Taxes and Levies paid or payable during implementation of the contract. If the Bidder is exempted from Excise duties, Concession in the Sales tax, levy of entry tax, same should be clearly mentioned supported with documentary evidence.

10.4 Prices quoted by the Bidder shall be “Firm” and not subject to any price adjustment during the performance of the Contract. **A Bid submitted with variable Price or an adjustable price clause shall be treated as non-responsive and rejected out rightly.**

11. **CONTRACT PRICE:**

11.1 The Ex-Works Prices quoted for the Contract shall remain FIRM as per the above Parameters and Purchaser shall not compensate Bidder for any variations. However any variation in the taxes & duties within the schedule date of delivery shall be borne by the Purchaser, else the same shall be borne by the bidder.

11.2 In case the Purchaser, revise the scope of works, bidders shall be compensated based on the Unit Rate (Ex-Works) agreed upon before Order placement or as per mutually acceptable rates.

12. **BID CURRENCIES:**

12.1 Prices shall be quoted in Indian Rupees Only.

13. **DOCUMENTS ESTABLISHING CONFORMITY TO THE BIDDING DOCUMENTS:**

13.1 The bidder shall confirm by documentary evidence of the Good’s conformity to the Bidding Documents by submitting materials/equipment data sheets.

14. **PERIOD OF VALIDITY OF BIDS:**

14.1 Bids shall remain valid for **180 days** from the date of opening of commercial Bids.

14.2 Notwithstanding Clause 14.1 above, the **Purchaser** may solicit the Bidder’s consent to an extension of the Period of Bid Validity. The request and the responses thereto shall be made in writing or by Fax.

15. **ALTERNATIVE BIDS:**

15.1 Bidders shall submit Bids, which comply with the Tender Documents. Alternative bids shall not be considered for evaluation. However, if the bidder(s) prefer to submit the revised price bid before the due date of opening of the price bid, the revised price bid shall be considered
16. **FORMAT AND SIGNING OF BID:**

16.1 The original Bid Form and accompanying documents (as specified in Clause 9), clearly marked “**Original Bid**”, plus one copy of the Techno-Commercial Proposal must be received by the **Purchaser** at the date, time and place specified pursuant to Clauses 17 and 18. The Price Bid in Original should be submitted in a separate sealed envelope marked as “**Price Bid**”.

In the event of any discrepancy between the original and the copies, the original shall govern.

16.2 The original and the duplicate copy of the Bid shall be typed or written legibly and shall be signed by the Bidder or a person or persons duly authorised to sign on behalf of the Bidder. Such authorisation shall be indicated by written Power-of-Attorney/ Board Resolution accompanying the Bid.

16.3 The Bid shall contain no interlineations, erasures, overwriting except as necessary to correct errors, made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the Bid.

17. **SEALING AND MARKING OF BIDS:**

17.1 Bid submission: One Original, One Copy of all the Bid Documents shall be sealed and submitted to the Purchaser before the last date & time for submission of the bid.

17.2 The Bid proposal should be divided into two parts and should be submitted in two separate sealed envelopes, addressed to Purchaser. All the envelopes should bear the Name and Address of the Bidder and marking is made for the Original and the duplicate copy. The envelopes should be superscribed with the title of its contents, as follows:

i) **TECHNO-COMMERCIAL BID ENVELOPE:** Shall contain the Bid Security (EMD), Cost of Tender Document, all supporting documents for qualifying requirement of this tender, duly filled in formats Abstract of General Terms & Conditions, Declaration Form, Technical Data Schedule, Technical & Commercial Deviations formats, Un-quoted blank Price Schedule etc. enclosed at Annexure I, II, IV, V, VI (A), VI (B),VII, VIII, IX & X at Section-V of this document.

ii) **PRICE BID ENVELOPE:** Shall contain the Price schedule duly filled in & signed as per Annexure –V at Section-V of this document. (This shall be submitted in a double sealed envelope separately.)

17.3 The inner and outer envelopes shall:

a) Be addressed to the **Purchaser** at the following address:

CAPEX CELL WESCO , Registered Office: N 1/22, IRC Village, Nayapalli, Bhubaneswar – 751015

Bear the Project name as: “**Design, Manufacture, Testing, Inspection and Supply of 8 MVA Power Transformer** as per **Schedule of Requirement in Section-I**) – Tender Notice No. **WESCO /CAPEX/Power Transformer/33** Dt. 12.02.2013

In addition to the information required in sub clause (a) and (b) above, the outer envelope shall indicate the name and address of the Bidder to enable the Bid to be returned unopened in case it is declared “Late” pursuant to Clause 20.
17.4 The Bidders have the option of sending the Bids by Post/ Courier services or in person. Bids submitted by Telex/Telegram/Fax will not be accepted. No request from any Bidder to the Purchaser to collect the proposals from Airlines/ Cargo/Courier Agents etc. shall be entertained by the Purchaser.

18. **DEADLINE FOR SUBMISSION OF BIDS:**

18.1 The original Bid together with required copies, must be received by the Purchaser at the address specified in Clause 17.3 not later than **13.00 Hrs.** (IST) on/before the due date as indicated in the invitation for bids.

18.2 The Purchaser may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Documents, in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended.

19. **ONE BID PER BIDDER:**

19.1 Each Bidder shall submit only one Bid either by himself, or as a partner in a Joint Venture/Consortium. A Bidder who submits or participates in more than one Bid for the same item, either individually or jointly, will cause all those Bids to be rejected out rightly.

20. **LATE BIDS:**

20.1 Any Bid received by the Purchaser after the deadline for submission of Bids prescribed by the Purchaser, pursuant to Clause 18, will be declared “Late” and will be rejected out rightly and will be returned unopened to the Bidder.

21. **MODIFICATION AND WITHDRAWAL OF BIDS:**

21.1 The Bidder may modify or withdraw his Bid after the Bid’s submission, provided that written notice of the modification or withdrawal is received by the Purchaser prior to the deadline prescribed for submission of Bids.

21.2 The Bidder’s modification or withdrawal notice shall be prepared, sealed, marked and dispatched in accordance with the provisions of Clause 17 & 18. A withdrawal notice may be sent by fax but must be followed by an original signed confirmation copy.

21.3 No Bid can be modified subsequent to the deadline for submission of Bids.

21.4 No Bid can be withdrawn in the interval between the deadline for submission of Bids and the expiry of the period of Bid validity specified by the Bidder on the Bid form as per clause 14.

22.0 **EVALUATION OF BID:**

22.1 **PROCESS TO BE CONFIDENTIAL:**

Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process. Any effort by a Bidder to influence the Purchaser’s processing of Bids or award decisions may result in the rejection of the Bidder’s Bid.

23. **CLARIFICATION OF BIDS:**

To assist in the examination, evaluation and comparison of Bids, the Purchaser may, at its discretion, ask the Bidder for a clarification of its Bid. All responses to requests for clarification shall be in writing and no change in the price or substance of the Bid shall be
sought, offered or permitted.

24. **PRELIMINARY EXAMINATION OF BIDS / RESPONSIVENESS:**

24.1 Purchaser will examine the Bids to determine whether they are complete, whether any computational error have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the Bids are generally in order.

24.2 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price per item that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price per item will be corrected. If there is a discrepancy between the total amount and the sum of the total price per item, the sum of the total price per item shall prevail and the Total Amount will be corrected.

24.3 Prior to the detailed evaluation, pursuant to Clause 25, the Purchaser will determine the substantial responsiveness of each Bid to the Bidding Documents including production capability and acceptable quality of the materials offered, pursuant to Clause 13. Substantially responsive Bid is one, which conforms to all the terms and conditions of the Bidding Documents without material deviation.

24.4 A Bid determined as not substantially responsive will be rejected by the Purchaser and will not subsequently allowed to be made responsive by the Bidder by correction of the non-conformity.

25 **EVALUATION AND COMPARISON OF BIDS:**

25.1 The evaluation of Bids shall be done basing on the delivered cost competitiveness basis for each item separately.

25.2 The evaluation of the Bids shall be a stage-wise procedure. The following stages are identified for evaluation purposes:

In the first stage, the Bids would be subjected to a responsiveness check as detailed in the clause 24. The Technical Proposals and the Commercial terms & conditions of the Bidders would be evaluated and discussed as per clause 26 of this document.

Subsequently, the Financial Proposals along with Supplementary Financial Proposals, if any, of Bidders with Techno-commercially Acceptable Bids submitted prior to final evaluation shall be considered.

25.3 The Purchaser’s evaluation of a Bid will take into account, in addition to the Bid price, the following factors, in the manner and to the extent indicated in this Clause:

a) **Delivery Schedule:**

b) **Deviations from Bidding Documents as mentioned in Non-Compliance Schedule.**

c) **Past performance and capability to execute the contract.**

d) **Type test reports from CPRI/ NABL Accredited Laboratories.**

Bidders shall base their Bid price on the terms and conditions specified in the Bidding Documents. The Cost of all quantifiable deviations and omissions from the specification, terms and conditions, specified in Bidding Documents shall be evaluated. The Purchaser will make his own assessment of the cost of any deviation for the purpose of ensuring fair
26.0 AWARD OF CONTRACT:
In normal circumstances the Purchaser will generally award the Contract to the successful Bidder whose Bid has been determined to be the lowest evaluated responsive Bid, provided further that the Bidder has been determined to be qualified to perform the Contract satisfactorily. If the lowest evaluated price (L1) of more than one responsive bidder(s) is same, then in such event the tender quantity shall be awarded in equal proportion.

However, for timely completion of the project, the purchaser may distribute the order among the bidders (maximum three) at L1 rate. In case of distributing between two bidders, the ratio shall be 70% (L1): 30% (L2) or the quantity offered/quoted by the bidders whichever is less. Similarly in case of distributing among 3 bidders, the ratio shall be 50% (L1):30% (L2):20 (L3).

In case L2 & L3 bidders does not agree to match the L1 prices, negotiation can be held with other techno-commercially responsive L4, L5 ……bidders in sequence to match L1 price (Landed cost).

26.1 CONTACTING THE PURCHASER:
26.1.1 From the time between Bid opening to award of contract, if any Bidder wishes to contact the Purchaser on any matter related to the Bid, he should do so in writing.

26.1.2 Any effort by a Bidder to influence the Purchaser and / or in the Purchaser’s decisions in respect of Bid evaluation, Bid comparison or Contract of Award, will result in the rejection of the Bidder’s Bid.

26.2 THE PURCHASER’S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS OR TO RELAX ANY TERMS AND CONDITIONS:
26.2.1 The Purchaser reserves the right to accept or reject any Bid and to annul the Bidding process and reject all Bids at any time prior to award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders regarding the grounds for the Purchaser’s action.

26.2.2 In the interest of work, the Purchaser reserves the right to relax any terms and conditions without affecting the quality & price of the equipments.

26.3 The Purchaser will award the Contract to the successful Bidder whose Bid has been determined to be the lowest- evaluated responsive Bid, provided further that the Bidder has been determined to be qualified to perform the Contract satisfactorily. The Purchaser at its option/ discretion may split the total quantity to be supplied between two or more Techno-Commercially responsive Bidders in case of the bid prices are same and early delivery is required by the purchaser.

26.4 THE PURCHASER’S RIGHT TO VARY QUANTITIES:
The Purchaser reserves the right to vary the quantity i.e. increase or decrease the number of materials without any change in terms and conditions at the time of placing the orders or during the execution of the Contract.

26.5 LETTER OF INTENT / NOTIFICATION OF AWARD:
26.5.1 The letter of intent / Notification of Award shall be issued to the successful Bidder(s) whose bid(s) have been considered responsive, techno-commercially acceptable and evaluated to be the Lowest (L1). The successful Bidder shall be required to furnish a letter of acceptance to it within 7 days of issue of the letter of intent / Notification of Award by Purchaser.

27.0 PERFORMANCE SECURITY:

27.1 Within 10 days of the receipt of Notification of Award / Letter of Intent from the Purchaser, the successful Bidder shall furnish the Performance Security in the form of Bank Guarantee executed on non-judicial stamp paper worth Rs.100/- (Rupees One hundred only) issued by a Public Sector Bank in favour of the Purchaser encashable at Bhubaneswar only for an amount of 10% (ten percent) of the Contract Price in accordance with the General Conditions of Contract in the Performance Security Form provided in Section –V of Bidding Documents. The Bank Guarantee shall be valid for a period not less than 90 days over and above the guarantee period.

28. CORRUPT OR FRAUDULENT PRACTICE:

28.1 The Purchaser requires that the Bidders observe the highest standard of ethics during the procurement and execution of the Project. In pursuance of this policy, the Purchaser:

a) Defines, for the purposes of this provision, the terms set forth below as follows:

(i) “Corrupt practice” means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving, or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and

(ii) “Fraudulent practice” means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Purchaser, and includes collusive practice amount Bidders (prior to or after Bid submission) designed to establish Bid prices at artificial non-competitive levels and to deprive the Purchaser of the benefits of free and open competition.

b) Purchaser will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practice in competing for the contract in question.

c) Purchaser will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded an contract if he at any time determines that the firm is engaged in corrupt or fraudulent practice in competing for, or in executing, the Contract.

28.2 Further more, Bidders shall be aware of the provision stated in the General Terms and Conditions of Contract.

30.0. LITIGATION HISTORY:

The Bidder should provide accurate information on any litigation or arbitration resulting on contracts completed or under execution by him over the last three (3) years. A consistent history of awards involving litigation against the Bidder or any Partner of the joint venture may result in disqualification of Bid.
SECTION –III

GENERAL TERMS AND CONDITIONS OF CONTRACT (GTCC)
1.0 GENERAL INSTRUCTIONS:
1.01 All the Bids shall be prepared and submitted in accordance with these instructions.
1.02 Bidder shall bear all costs associated with the preparation and delivery of its Bid, and the Purchaser will in no case shall be responsible or liable for these costs.
1.03 The Bid should be submitted by the Bidder in whose name the bid document has been issued and under no circumstances it shall be transferred / sold to the other party.
1.04 The Purchaser reserves the right to request for any additional information and also reserves the right to reject the proposal of any Bidder, if in the opinion of the Purchaser, the data in support of Tender requirement is incomplete.
1.05 The Bidder is expected to examine all instructions, forms, terms & conditions and specifications in the Bid Documents. Failure to furnish all information required in the Bid Documents or Submission of a Bid not substantially responsive to the Bid Documents in every respect may result in rejection of the Bid. However, the Purchaser’s decision in regard to the responsiveness and rejection of bids shall be final and binding without any obligation, financial or otherwise, on the Purchaser.

2.0 DEFINITION OF TERMS:
2.01 NESCO/WESCO/SOUTHCO shall mean the “Purchaser” on whose behalf this bid enquiry is issued by its authorized representative / officers.
2.02 “Bidder” shall mean the firm who quotes against this bid document issued by the Purchaser.
2.03 “Contractor / Seller” shall mean the successful Bidder(s) whose bid has been accepted by the Purchaser and shall include his heirs, legal representatives, successors and permitted assigns.
2.04 “Site” shall mean the Electricity Distribution Area of the Purchaser.
2.05 “Specification” shall mean collectively all the terms and stipulations contained in those portions of this bid document known as Instruction to Bidder, Bid form and other forms as per Section –V, General Conditions of Contract, Specifications and the Amendments, Revisions, Deletions or Additions, as may be made by the Purchaser from time to time.
2.06 “Letter of Intent” shall mean the official notice issued by the Purchaser notifying the Contractor that his proposal has been accepted and it shall include amendments thereto, if any, issued by the Purchaser. The “Letter of Intent” issued by the Purchaser shall be binding on the “Contractor”. The date of detailed Purchase Order shall be taken as the effective date of the commencement of contract.
2.07 “Month” shall mean the calendar month and “Day” shall mean the calendar day.
2.08 “Offer Sheet” shall mean Bidder’s firm offer submitted to Purchaser in accordance with the specification.
2.09 “Contract” shall mean the “Detailed Purchase Order” issued by the Purchaser.
2.10 “Contract Price” shall mean the Price referred to in the “Detailed Purchase Order”.
2.11 “Contract Period” shall mean the period during which the “Contract” shall be executed as agreed between the Contractor and the Purchaser in the Contract inclusive of extended
contract period for reasons beyond the control of the Contractor and / or Purchaser due to force majeure.

2.12 “Goods/Materials” shall mean all items to be supplied under Purchase Order whether raw materials, processes materials, equipment, fabricated Materials, drawings or other documents etc. as applicable.

2.13 “Store” shall mean the Purchaser’s Store as given in the tender document.

2.14 “Project / Unit” shall mean supply of Materials as per enclosed technical specification.

3.0 CONTRACT DOCUMENTS & PRIORITY:

3.01 Contract Documents: The Specification, terms and conditions of the contract shall consist solely of these Tender conditions and offer sheet.

3.02 Priority: Should there be any discrepancy between any terms hereto and any term of the offer sheet, the terms of this tender document shall prevail.

4.0 SCOPE OF WORK:

4.01 The “Scope of Work” shall be on the basis of Bidder’s responsibility, completely covering the obligations, responsibility and workmanship, provided in this Bid Enquiry whether implicit or explicit.

4.02 The Purchaser reserves the right to vary the quantity i.e increase or decrease, at the time of placing order or during project execution.

4.03 All relevant drawings, data and instruction manuals and other necessary inputs shall be under the scope of contract.

5.0 GENERAL REQUIREMENTS:

5.01 The seller shall supply, deliver best quality Goods/Materials/Equipments & conduct the testing at their works of highest standards.

6.0 The seller shall be responsible & shall comply with the provisions of all statutory acts i.e Electricity Act 2003, Indian Electricity Rules 1956, Income Tax Act-1961 etc.

7.0 INSPECTION & TESTING:

i) The Purchaser’s representative shall be entitled at all reasonable times during manufacture to inspect examine and test on the Contractor’s premises the materials and workman-ship of all equipment to be supplied under this contract and if part of the said equipment is being manufactured else where in any Sub-Contractor’s premises, the Contractor shall obtain for the Purchaser’s representative, permission to inspect, examine and test as if the equipment were being manufactured on the Contractor’s premises. Such inspection, examination and testing shall not release the Contractor from his obligations under the contract.

ii) The Contractor shall give to the Purchaser adequate time/ notice (minimum of two weeks time) in writing for inspection of materials indicating the place at which the equipment is ready for testing and inspection and shall also furnish the Routine Test Certificates and Packing List along with offer for inspection to the Purchaser indicating the quantity which can be delivered in full truck load / Mini truck load to facilitate issue of dispatch instruction.

iii) Where the contract provides for test on the Premises of the Contractor or of any of his Sub-Contractors, the Contractor 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 Contractor is required to produce Shop Routine Test Certificates before offering their materials for inspection.
iv) After completion of the tests as indicated above, the Purchaser’s representative shall forward the test results to the Purchaser. If the test results confirm to the specific standard, the Purchaser shall approve the test results and communicate the same to the Contractor in writing. The Contractor shall provide at least three copies of the test certificates to the Purchaser.

v) The Purchaser has the right to have the test carried out at his own cost by an independent agency whenever there is a dispute regarding the quality of supply.

vi) The Purchaser at its discretion may re-test the Materials/Equipment at its own laboratory or laboratory of his choice for reconfirmation of the test results, particularly no load losses, load losses and percentage impedance, etc.

vii) Besides the above, the Third Party Independent Evaluation Agency (TPIEA) engaged by GRIDCO shall have right to conduct the pre & post dispatch inspection (as explained above) of the equipment/material procured by the Purchaser jointly along with the representative of purchaser/independently by the TPIEA as the case may be.

8.0 TRAINING FACILITIES:

The Contractor 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 and for it’s proper operation and maintenance in service.

9.0 REJECTION OF MATERIALS:

In the event, any of the materials / equipment supplied by the Contractor 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 materials / equipment or ask the Contractor in writing to rectify the same. The Contractor on receipt of such notification shall either rectify or replace the defective materials/equipment free of cost to the Purchaser. If the Contractor fails to do so, the Purchaser may :-

a) At its option replace or rectify such defective materials/equipment and recover the extra costs so involved from the Contractor plus (15%) fifteen percent and / or.

b) Terminate the contract for balance work / supplies with enforcement of penalty Clause as per contract for the un-delivered materials and with forfeiture of Performance Guarantee/Composite Bank Guarantee.

c) Acquire the defective equipment / materials at reduced price considered equitable under the circumstances.

10.0 EXPERIENCE OF BIDDERS:

10.1 The bidder(s) should furnish information regarding experience particularly on the following points:
i) Name of the manufacturer :

ii) Standing of the firm for manufacture of equipment/material quoted :

iii) Description of materials/equipment supplied during the last 3 (three) years with the name (s) of the party (s) to whom supplies were made.

iv) Testing facilities at manufacturer’s work with copies of calibrated certificates of the major testing equipment.

v) If the manufacturer is having collaboration with other firm(s), details regarding the same:

vi) A list of Purchase orders, executed during the last three years along with user’s certificate and copies of Purchase orders.

10.2 Bids may not be considered if the past manufacturing experience is found to be unsatisfactory as mentioned under clause -6 of the IFB

11.0 **LANGUAGE AND MEASURES :**

All documents pertaining to the contract including Specifications, Schedule, Notice, Correspondence, Operating & 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.

12.0 **DEVIATION FROM SPECIFICATION :**

It is in the interest of the Bidders to study the Specification, drawing etc. specified in the tender document thoroughly before tendering so that, if any deviations are made by the Bidders, the same are prominently brought out on a separate sheet in the Technical & Commercial Deviation Formats enclosed at Annexure VI (A) & VI (B) in this document. Deviation mentioned in any other format or any other part of the offer document shall not be considered as a deviation & in such case it will be presumed that the bidder has accepted all the conditions, stipulated in the tender Specification, notwithstanding any exemptions mentioned therein.

13.0 **PRICE BASIS:**

13.01(a) Bidder shall quote “**FIRM**” price.

The breakup of prices shall indicate all types of Taxes, Duties and other Levies of whatsoever nature indicated separately and clearly, Packing & forwarding, transportation to site/store including transit insurances and entry tax etc. Exemption from any duties/taxes, if any, shall be supported with relevant documentary evidence.

(b) The above Prices shall also include loading at factory site & unloading at Purchaser’s site/stores. Price evaluation will be based on total landing cost, taking into account all taxes and duties.

(c) CST / VAT clearance certificate, Copy of PAN card.

14.0 **TERMS OF PAYMENT:**

100 % value of each consignment will be paid within 30 days of receipt of materials in good conditions at stores/ desired destination and verification there of subject to approval of the Guarantee certificates & Test Certificates and submission & acceptance of Performance
Bank Guarantee equivalent to 10% of Total Contract Price on non-judicial stamp paper worth Rs.100 in the prescribed format from a Public Sector Bank encashable at Bhubaneswar only.

Or else an equivalent amount of 10% of the Total Contract Price shall be deducted from the invoice of the first consignment & the same shall be refunded after submission and approval of the required Performance Bank Guarantee or expiry of Guarantee Period whichever is earlier.

15.0 **PRICE VALIDITY:**

15.01 All bids submitted shall remain valid, firm and subject to unconditional acceptance by Purchaser for 180 days post bid date. For award of Contract, the prices shall remain valid and firm till contract completion.

16.0 **GUARANTEE:**

16.01 The bidder shall guarantee for satisfactory performance of the equipments/materials for a minimum period of 66 months from the date of Commissioning or 60 months from the date of receipt of last consignment whichever is earlier. In the event of any defect in the equipment/materials arising out of faulty design, inferior quality of raw material used or bad workmanship within the guarantee period, the Seller shall guarantee to replace/repair to the satisfaction of the Purchaser the defective equipments free of cost. Should however, the manufacturer fails to do so within a reasonable time, the Purchaser reserves the right to recover the amount from the seller either from the bills pending or may recover from the Performance Guarantee submitted by the firm. **Seller shall give a Performance Bank Guarantee in favour of the Purchaser for 10% of the order value valid for 90 days over and above the guarantee obligation.**

16.02 If during the defect liability period any services performed found to be defective, these shall be promptly rectified by seller at its own cost (including the cost of dismantling and reinstallation) on the instruction of Purchaser.

17.0 **RELEASE:**

The seller’s Performance Bank Guarantees / Assignable Bank Guarantee will be released without interest within thirty (30) days from the last date up to which the Performance Bank Guarantee has to be kept valid (as defined in Clause 16.01).

18.0 **TECHNICAL INFORMATION / DATA:**

The Purchaser and the Contractor, to the extent of their respective rights permitting to do so, shall exchange such technical information and data as is reasonably required by each party to perform its obligations and responsibilities. The Purchaser and the Contractor agree to keep each other in confidence and to use the same degree of care as he uses with respect to his own proprietary data to prevent its disclosure to third parties of all technical and confidential information. The technical information, drawings, records and other document shall not be copied, transferred, traced or divulged and/or disclosed to third party in full/part nor misused in any other form. This technical information, drawing etc. shall be returned to the Purchaser with all approved copies and duplicates. In the event of any breach of this Contract, the Contractor shall indemnify the Purchaser against any loss, cost of damages of claim by any party in respect of such breach.

19.0 **EFFECTIVE DATE OF COMMENCEMENT OF CONTRACT:**

19.01 The date of the issue of the detailed Purchase Order shall be treated as the effective date of
the commencement of Contract.

20.0 The bidder shall quote the basic price as well as all taxes & duties as per the enclosed format for bid prices.

21.0 PENALTY:

21.01 If supply of materials / equipments is delayed beyond the supply schedule as stipulated in Purchase order, then the seller shall be liable to pay to the Purchaser as penalty for delay, a sum of **0.5% (half percent)** of the contract price for every week delay or part thereof.

21.02 The total amount of penalty for delay under the contract will be subject to a maximum of **five percent (5%)** of the contract price.

21.03 The Purchaser may, without prejudice to any method of recovery, deduct the amount for such damages from any amount due or which may become due to the seller or from the Performance Bank Guarantee or file a claim against the seller.

22. VALIDITY OF THE ORDER:

The Order is valid for **10 weeks** beyond the schedule date of delivery, unless otherwise extended by the Competent Authority. The Order shall stand cancelled automatically beyond the validity period without any correspondences and liabilities to the purchaser.

23. PACKING:

The materials / equipments shall be packed by the seller suitably as per the standard procedure for safe transport to the site / store. The cases shall be clearly marked showing distinctly the name and address of the consignee. In case of special instructions, such as “this end up”, “fragile”, “handles with care” etc., the same shall be clearly displayed on the cases.

24.0 COMMISSIONING SPARES:

The seller shall replace, free of cost, any spares which may be found defective by the buyer during commissioning.

25.0 DISPUTE RESOLUTION & JURISDICTION OF CONTRACT:

25.1 Any dispute arising out of this contract shall be referred to the MD/CMD, OPTCL who shall decide the case as sole arbitrator

25.2 For the purpose of dispute resolution, this agreement shall be governed by the provision of Arbitration & Conciliation Act, 1996.

25.3 All disputes shall be subject to exclusive jurisdiction of the Court at Bhubaneswar and Writ jurisdiction of Hon’ble High Court of Odisha at Cuttack.

26.0 EVENTS OF DEFAULT:

26.1 Events of Default. Each of the following events or occurrences shall constitute an event of default (“Event of Default”) under the Contract:

(a) Seller fails or refuses to pay any amount due under the Contracts.

(b) Seller fails or refuses to deliver Commodities conforming to his Bid document/specifications, or fails to deliver Commodities and, or execute the works assigned to them within the period specified in P.O or any extension thereof.
(c) Seller becomes insolvent or unable to pay its debts when due, or commits any act of bankruptcy, such as filing any petition in any bankruptcy, winding-up or reorganization proceeding, or acknowledges in writing its insolvency or inability to pay its debts; or the Seller’s creditors file any petition relating to bankruptcy of Seller;

(d) Seller otherwise fails or refuses to perform or observe any term or condition of the Contract and such failure is not remediable or, if remediable, continues for a period of 30 days after receipt by the Seller of notice of such failure from Purchaser.

27.0 CONSEQUENCES OF DEFAULT:

(a) If an Event of Default occurs and would be continuing, Purchaser may forthwith terminate the Contract by written notice.

In the Event of Default, Purchaser may, without prejudice to any other right granted to it by law, or the Contract, take any or all of the following actions;

i) present for payment, to the relevant bank the Contract Performance Bank Guarantee;

ii) Recover any losses and / or additional expenses, Purchaser may incur as a result of Seller’s default.

28.0 FORCE MAJEURE:

28.01 The term “Force Majeure” as employed herein include, acts of God or force of nature, landslide, earthquake, flood, fire, lightning, explosion, major storm (hurricane, typhoon, cyclone etc.) or major storm warning, tidal wave, shipwreck and perils of navigation, act of war (declared or undeclared) or public enemy, strike (excluding employee strikes, lockouts or other industrial disputes or action solely among employee of Contractor or its subcontractors) act or omission of Sovereign States or those purporting to represent Sovereign States, blockade, embargo, quarantine, public disorder, sabotage, accident or similar events beyond the control of the parties or either of them.

Force Majeure shall not include occurrences as follows:

1. Late delivery of materials caused by congestion of Seller’s facilities or elsewhere, and oversold condition of the market, inefficiencies, or similar occurrences.

2. Late performance by Seller and / or Sub-Seller caused by unavailability of raw materials, supervisors or labour, inefficiencies of similar occurrences.

3. Mechanical breakdown of any item of Seller’s or its Sub-Seller’s equipment, plant or machinery.

4. Delays due to ordinary storm or inclement weather or

5. Non-conformance by Sub-Seller.

Unless the delay arises out of a Force Majeure occurrence and is beyond both Seller’s and Sub-Seller’s control and an alternate acceptable source of services, equipment or material is unavailable. Additionally, Force Majeure shall not include financial distress of Seller or any Sub-Seller.

28.02 In the event of either party being rendered unable by Force Majeure to perform any obligation required to be performed by them under the Contract, the relative obligation of the party affected by such Force Majeure shall be suspended for the period during which such cause lasts. Time for performance of the relative obligation suspended by Force Majeure shall then stand extended by the period for which the cause lasts.
28.03 Upon the occurrence of any Force Majeure event, the party so affected in the discharge of its obligation shall promptly, but no later than seven (7) days give written notice of such event to the other party. The affected party shall make every reasonable effort to remove or remedy the cause of such Force majeure or mitigate its effect as quickly as possible. If such occurrence results in the suspension of all or part of the work for a continuous period of more than 10(ten) days, the parties shall meet and determine the measures to be taken.

28.04 Any delay or failure in performance by either party hereto shall not give rise to any claims for damages or loss of anticipated profits if and to the extent, such delay or failure is caused by Force Majeure.

29 **EMBOSSING / PUNCHING / CASTING**

29.1 The all equipments and materials supplied under the CAPEX Programme shall bear distinct mark of “Name of the Purchaser, GoO, CAPEX Programme, PO Order No. & Date” by a way of embossing / punching / casting etc. This should be clearly visible to naked eye.

30 **INDEMNIFY**

30.1 The Vendor, its successor and assignee shall indemnify the Purchaser, its successor and assignee from all current & future liabilities that may arise out of purchase contract(s) entered into between the vendor & the Purchaser under this CAPEX Programme. The Purchaser in term shall indemnify the GoO & GRIDCO.
SECTION –IV

TECHNICAL SPECIFICATIONS

FOR 8 MVA, 33/11KV ONAN

POWER TRANSFORMERS
1. **SCOPE**

1.1 This Specification provides for design, engineering, manufacturing, assembly, stage inspection, final inspection and testing before dispatch, packing and delivery at destination sub-station by road transport, transit insurance, unloading at site/stores of 8 MVA, 33/11 KV Power Transformer(s), complete with all fittings, accessories, associated equipment/spares, 10% extra Transformer Oil, required for its satisfactory operation in any of the sub-stations of the Purchaser.

1.2 The core shall be constructed either form high grade, non-aging Cols Rolled Grain Oriented (CRGO) silicon steel laminations conforming to HIB grade with lamination thickness not more than 0.23mm to 0.27mm or better (Quoted grade and type shall be used). The maximum flux density in any part of the cores and yoke at normal voltage and frequency shall not be more than 1.5 Tesla. The Bidder shall provide saturation curve of the core material, proposed to be used. Laminations of different grade(s) and different thickness (s) are not allowed to be used in any manner or under any circumstances.

1.3 The scope of supply should also include the provision of type test.. The purchaser reserves the right to waive type tests as indicated in the section on Quality Assurance, Inspection and Testing in this specification.

1.4 1) The Power 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. The Transformer(s) offered, shall be complete with all components, necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of supply, irrespective of whether those are specifically brought out in this specification and / or the commercial order or not.

The purchaser reserves the right to reject the transformers if on testing the losses exceed the declared losses beyond tolerance limit as per IS or the temperature rise in oil and / or winding exceeds the value, specified in technical particular or impedance value differ from the guaranteed value including tolerance as per this specification and if any of the test results do not match with the values, given in the guaranteed technical particulars and as per technical specification. The Purchaser reserves the right to retain the rejected Transformer and take into service until the supplier replaces it, at no extra cost to the purchaser by a new transformer.

Alternately, the supplier shall repair or replace the Transformer within a reasonable period as decided by the purchaser to purchaser’s satisfaction at no extra cost to the purchaser.
<table>
<thead>
<tr>
<th></th>
<th>SPECIFIC TECHNICAL REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rated MVA (ONAN rating)</td>
</tr>
<tr>
<td>2</td>
<td>No. of phases</td>
</tr>
<tr>
<td>3</td>
<td>Type of installation</td>
</tr>
<tr>
<td>4</td>
<td>Frequency</td>
</tr>
<tr>
<td>5</td>
<td>Cooling medium</td>
</tr>
<tr>
<td>6</td>
<td>Type of mounting</td>
</tr>
<tr>
<td>7</td>
<td>Rated voltage</td>
</tr>
<tr>
<td></td>
<td>a) High voltage winding</td>
</tr>
<tr>
<td></td>
<td>b) Low voltage winding</td>
</tr>
<tr>
<td>8</td>
<td>Highest continuous system voltage</td>
</tr>
<tr>
<td></td>
<td>a) Maximum system voltage ratio (HV / LV)</td>
</tr>
<tr>
<td></td>
<td>b) Rated voltage ratio (HV / LV)</td>
</tr>
<tr>
<td>9</td>
<td>No. of windings</td>
</tr>
<tr>
<td>10</td>
<td>Type of cooling</td>
</tr>
<tr>
<td>11</td>
<td>MVA Rating corresponding to ONAN cooling system</td>
</tr>
<tr>
<td>12</td>
<td>Method of connection:</td>
</tr>
<tr>
<td></td>
<td>HV:</td>
</tr>
<tr>
<td></td>
<td>LV:</td>
</tr>
<tr>
<td></td>
<td>Connection symbol</td>
</tr>
<tr>
<td>13</td>
<td>System earthing</td>
</tr>
<tr>
<td></td>
<td>Neutral of LV side to be solidly earthed.</td>
</tr>
<tr>
<td>14</td>
<td>Percentage impedance voltage on normal tap and MVA base at 750 C corresponding to HV/ LV rating and applicable tolerances :</td>
</tr>
<tr>
<td>15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(No negative tolerance will be allowed)</td>
</tr>
<tr>
<td>16</td>
<td>Intended regular cyclic overloading of windings</td>
</tr>
<tr>
<td>17</td>
<td>a) Anticipated unbalanced loading</td>
</tr>
<tr>
<td></td>
<td>b) Anticipated continuous loading of windings (HV / LV)</td>
</tr>
<tr>
<td>18</td>
<td>a) Type of tap changer</td>
</tr>
<tr>
<td></td>
<td>b) Range of taping</td>
</tr>
<tr>
<td></td>
<td>c) Rated Current of OLTC</td>
</tr>
<tr>
<td></td>
<td>d) Rated Short Current of OLTC</td>
</tr>
<tr>
<td>19</td>
<td>Neutral terminal to be brought out</td>
</tr>
<tr>
<td>20</td>
<td>Over Voltage operating capability and duration</td>
</tr>
<tr>
<td>21</td>
<td>Maximum Flux Density in any part of the core and yoke at rated MVA, rated voltage i.e 33 KV / 11 KV and system frequency of 50 HZ</td>
</tr>
</tbody>
</table>
**Insulation levels for windings:**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>33KV</th>
<th>11KV</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 1.2 / 50 microsecond wave shape Impulse withstand (KVₚ)</td>
<td>170</td>
<td>95</td>
</tr>
<tr>
<td>b) Power frequency voltage withstand (KVₚrms)</td>
<td>70</td>
<td>28</td>
</tr>
</tbody>
</table>

**Type of winding insulation**

<table>
<thead>
<tr>
<th>Winding</th>
<th>HV winding</th>
<th>LV winding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Withstand (KV P)</td>
<td>Uniform</td>
<td>Uniform</td>
</tr>
</tbody>
</table>

**Withstand time for three phase short circuit**

2 Seconds

**Noise level at rated voltage and frequency**

As per NEMA Publication No. TR-1.

**Permissible Temperature Rise over ambient temperature of 50°C**

<table>
<thead>
<tr>
<th>Type of temperature measurement</th>
<th>HV</th>
<th>LV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Of top oil measured by thermometer.</td>
<td>35°C</td>
<td>40°C</td>
</tr>
</tbody>
</table>

**Minimum clearances in air (mm):**

<table>
<thead>
<tr>
<th>Phase to Phase</th>
<th>Phase to ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>HV</td>
<td>400</td>
</tr>
<tr>
<td>LV</td>
<td>280</td>
</tr>
</tbody>
</table>

**Terminals**

<table>
<thead>
<tr>
<th>Type</th>
<th>HV winding line end</th>
<th>LV winding</th>
</tr>
</thead>
<tbody>
<tr>
<td>36 KV oil filled communicating type porcelain bushings (Antifog type)</td>
<td>12 KV porcelain type of bushing (Antifog type)</td>
<td></td>
</tr>
</tbody>
</table>

**Insulation level of bushing**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>HV</th>
<th>LV</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Lightning Impulse withstand (KVP)</td>
<td>170</td>
<td>95</td>
</tr>
<tr>
<td>b) 1 Minute Power Frequency withstand voltage (KV -rms )</td>
<td>70</td>
<td>28</td>
</tr>
<tr>
<td>c) Creepage distance (mm) (minimum)</td>
<td>900</td>
<td>300</td>
</tr>
</tbody>
</table>

**Material of HV & LV Conductor**

Electrolytic Copper

**Maximum current density for HV and LV winding for rated current**

2.4 A/ mm²

**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 L.V.**

 Shall be greater than or equal to 1.5, but less than or equal to ‘5’.

**Core Assembly**

Boltless type

**Temperature Indicator**

<table>
<thead>
<tr>
<th>Type</th>
<th>HV</th>
<th>LV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil</td>
<td>One number</td>
<td></td>
</tr>
<tr>
<td>Winding</td>
<td>One number</td>
<td></td>
</tr>
</tbody>
</table>

**Maximum permissible no load loss at rated voltage and rated frequency.**

4.50 KW

**Maximum permissible load loss at rated current and at 75°C**

38 KW

**Accommodation on tank for outdoor neutral CT**

Yes
Neutral side C.T. for owner’s use

i) Type
   Single phase outdoor mounted

ii) Quantity
    One on LV side

iii) Voltage Class
     12 KV

iv) No. of cores
    One

v) Current ratio (A/A)
   As per system requirement.

vi) Turn ratio
    Identical to the turns ratio provided on HV & LV side.

vii) Knee point voltage
    600 volts (Minimum)

viii) Class of Accuracy
     PS

ix) Maximum secondary resistance (Ohms) at 75°C
    5

x) Location for mounting
   In neutral lead before connection to station earth.

xi) Maximum Excitation Current of Knee Point Voltage
    25 mA

xiii) Secondary current of C.T.
     1 (one) Amp.

Type of Oil Preservation
Air Cell Type

2.1 MARSHALLING BOX

A metal enclosed, weather, vermin and dust proof marshalling box fitted with required glands, locks, glass door, terminal Board, heater with switch, illumination lamp with switch etc. shall be provided with each transformer to accommodate temperature indicators, terminal blocks etc. It shall have degree of protection of IP 55 or better as per IS: 2147 (Refer Clause 3.12).

2.2 PERFORMANCE

i) 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.

ii) The maximum flux density in any part of the core and yoke at rated MVA. Voltage and frequency shall be 1.5 Tesla (maximum).

iii) Transformer shall under exceptional circumstances due to sudden disconnection of the load, be capable of operating at the voltage approximately 25% above normal rated voltage for a period of not exceeding one minute and 40% above normal for a period of 5 seconds.

iv) The transformer may be operated continuously without danger on any particular tapping at the rated MVA ± 12.5% of the voltage corresponding to the tapping.

v) The thermal ability to withstand short circuit shall be demonstrated by calculation.

vi) Transformer shall be capable of withstanding thermal and mechanical stress caused by any symmetrical and asymmetrical faults on any winding.

2.4 AUXILIARY POWER SUPPLIES

The following power supplies shall be available at site:
   AC. 3phase, 400 volts, 50Hz. Earthed
   AC 1 phase, 230 volts, 50Hz. Earthed
   24 V DC.
2.5 **DRAWINGS/DOCUMENTS INCORPORATING THE FOLLOWING PARTICULARS SHALL BE SUBMITTED WITH THE BID**

a) General outline drawing showing shipping dimensions and overall dimensions, net weights and shipping weights, quality of insulating oil, spacing of wheels in either direction of motion, location of coolers, marshalling box and tap changers etc.

b) Assembly drawings of core, windings etc. and weights of main components / parts.

c) Height of center line on HV and LV connectors of transformers from the rail top level.

d) Dimensions of the largest part to be transported.

e) GA drawings / details of various types of bushing

f) Tap changing and Name Plate diagram

g) Type test certificates of similar transformers.

h) Illustrative & descriptive literature of the Transformer.

i) Maintenance and Operating Instructions.

2.6 **MISCELLANEOUS**

i) Padlocks along with duplicate keys as asked for various valves, marshalling box etc. shall be supplied by the contractor, wherever locking arrangement is provided.

ii) Foundation bolts for wheel locking devices of Transformer shall be supplied by the Contractor.

2.7 **DELIVERY**

The full quantity of the equipments shall be delivered as per the delivery schedule appended to this specification.

2.8 **SCHEDULES**

All Schedules annexed to the specification shall be duly filled by the bidder separately.

2.9 **ALTITUDE FACTOR**

If the equipment is to be installed in the hilly area, necessary correction factors as given in the Indian Standard for oil temperature rise, insulation level etc. shall be applied to the Standard Technical Parameters given above.

2.10 **NAME PLATE**

Transformer rating plate shall contain the information as given in clause 15 of IS-2026 (part-I). The details on rating plate shall be finalized during the detailed engineering. Further, each transformer shall have inscription of purchaser’s name. The name plate shall also include (i) The short circuit rating, (ii) Measured no load current and no load losses at rated voltage and rated frequency, (iii) measured load losses at 75° C (normal tap only), (iv) D.C resistance of each winding at 75° C.

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: 35°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/m²

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:
  - 33 KV System: 33 KV
  - 11 KV System: 11 KV
- Maximum system voltages:
  - 33 KV System: 36.3 KV
  - 11 KV System: 12 KV
- Nominal short circuit level (Basing on apparent power):
  - 33 KV System: 1.7 KA
  - 11 KV System: 5.1 KA
- Insulation levels:
  - 33 KV System: 170 KV (peak)
  - 11 KV System: 95 KV (peak)
- Power frequency one minute withstand (wet and dry) voltage:
  - 33 KV System: 70 KV (rms)
  - 11 KV System: 28 KV (rms)
- Neutral earthing arrangements:
  - 11 KV System: Solidly earthed

5 CODES & STANDARDS

5.1 (i) The design, material, fabrication, manufacture, inspection, testing before dispatch and performance of power transformers at site shall comply with all currently applicable statutory regulations and safety codes in the locality where the equipment will be installed. The equipment shall also conform to the latest applicable standards and codes of practice. Nothing in this specification shall be construed to relieve the contractor of this responsibility.

5.2 The equipment and materials covered by this specification shall conform to the latest applicable provision of the following standards.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS:5</td>
<td>Colour for ready mixed paints</td>
</tr>
<tr>
<td>IS:325</td>
<td>Three Phase Induction Motors</td>
</tr>
<tr>
<td>IS:335</td>
<td>New insulating oil for transformers, switch gears</td>
</tr>
<tr>
<td>IS:1271</td>
<td>Classification of insulating materials for electrical machinery and apparatus in relation to their stability in services</td>
</tr>
</tbody>
</table>
IS:2026(Part I to IV) : Power Transformer
IS:2071 : Method of high voltage testing
IS:2099 : High voltage porcelain bushings
IS:2147 : Degree of protection
IS:2705 : Current Transformers
IS:3202 : Code of practice for climate proofing of electrical equipment
IS:3347 : Dimensions for porcelain Transformer Bushings
IS:3637 : Gas operated relays
IS:3639 : Fittings and accessories for power Transformers
IS:5561 : Electric Power Connectors
IS:6600/BS:CP’10:0 : Guide for loading of oil immersed Transformers
IS:10028 : Code of practice for selection, installation and maintenance of transformers, Part I. II and III
C.B.I.P. Publication : Manual on Transformers

If the standard is not quoted for any item, it shall be presumed that the latest version of Indian Standard shall be applicable to that item.

The equipment complying other internationally accepted standards, may also be considered if they ensure performance superior to the Indian Standards.

5.3 DRAWINGS

a) The contractor shall furnish, within fifteen days after issuing of Letter of Award. Six copies each of the following drawings/documents incorporating the transformer rating for approval.

i) Detailed overall general arrangement drawing showing front and side elevations and plan of the transformer and all accessories including radiators and external features with details of dimensions, spacing of wheels in either direction of motion, net weights and shipping weights, crane lift for un-tanking, size of lugs and eyes, bushing lifting dimensions, clearances between HV and L.V terminals and ground, quantity of insulating oil etc.

ii) Assembly drawings of core and winging and weights of main components / parts

iii) Foundation plan showing loading on each wheel land jacking points with respect to centre line of transformer.

iv) GA drawings details of bushing and terminal connectors.

v) Name plate drawing with terminal marking and connection diagrams.

vi) Wheel locking arrangement drawing.

vii) Transportation dimensions drawings.

Viii) Magnetization characteristic curves of PS class neutral and phase side current transformers, if applicable.

ix) Interconnection diagrams.

x) Over fluxing withstand time characteristic of transformer.

xi) GA drawing of marshalling box.

xii) Control scheme/wiring diagram of marshalling box.
xi) Technical leaflets of major components and fittings.

xiv) As built drawings of schematics, wiring diagram etc.

xv) Setting of oil temperature indicator, winding temperature indicator.

xvi) Completed technical data sheets.

xvii) Details including write-up of tap changing gear.

xviii) HV conductor bushing.

xix) Bushing Assembly.

xx) Bi-metallic connector suitable for connection to 100 mm² up to 232 mm² AAAC Conductor.

xxi) GA of LV cable Box.

xxii) Radiator type assembly.

b) All drawings, documents, technical data sheets and test certificates, results calculations shall be furnished.

5.4 Any approval given to the detailed drawings by the purchaser shall not relieve the contractor of the responsibility for correctness of the drawing and in the manufacture of the equipment. The approval given by the purchaser shall be general with over all responsibility with contractor.

6. GENERAL CONSTRUCTIONAL FEATURES

6.1 All material used shall be of best quality and of the class most suitable for working under the conditions specified and shall withstand the variations of temperature and atmospheric conditions without distortion or deterioration or the setting up of undue stresses which may impair suitability of the various parts for the work which they have to perform.

6.2 Similar parts particularly removable ones shall be interchangeable.

6.3 Pipes and pipe fittings, screws, studs, nuts and bolts used for external connections shall be as per the relevant standards. Steel bolts and nuts exposed to atmosphere shall be galvanized.

6.4 Nuts, bolts and pins used inside the transformers and tap changer compartments shall be provided with lock washer or locknuts.

6.5 Exposed parts shall not have pockets where water can collect.

6.6 Internal design of transformer shall ensure that air is not trapped in any location.

6.7 Material in contact with oil shall be such as not to contribute to the formation of acid in oil. Surface in contact with oil shall not be galvanized or cadmium plated.

6.8 Labels, indelibly marked, shall be provided for all identifiable accessories like Relays, switches current transformers etc. All label plates shall be of in corrodible material.

6.9 All internal connections and fastenings shall be capable of operating under overloads and over-excitation, allowed as per specified stands without injury.

6.10 Transformer and accessories shall be designed to facilitate proper operation, inspection, maintenance and repairs.

6.11 No patching, plugging, shimming or other such means of overcoming defects, discrepancies or errors will be accepted.

6.12 Schematic Drawing of the wiring, including external cables shall be put under the prospane sheet on the inside door of the transformer marshalling box.
6.13 Painting

6.13.1 All paints shall be applied in accordance with the paint manufacturer’s recommendations. Particular attention shall be paid to the following:

   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.

6.13.1.1 All paints, when applied in normal full coat, shall be free from runs, sags, wrinkles, patchiness, brush marks or other defects.

6.13.1.2 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.

6.13.1.3 The supplier shall, prior to painting protect nameplates, lettering gauges, sight glasses, light fittings and similar such items.

6.13.2 Cleaning and Surface Preparation

6.13.2.1 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.

6.13.2.2 Steel surfaces shall be prepared by Sand/Shot blast cleaning or Chemical cleaning by Seven tank process including Phosphating to the appropriate quality.

6.13.2.3 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.

6.13.2.4 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.

6.13.3 Protective Coating

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

6.13.4 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 Polyurethane paint. The color of the finishing coats shall be dark admiral grey conforming to No.632 or IS 5:1961.

6.13.5 Painting Procedure

6.13.5.1 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.

6.13.5.2 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.

6.13.5.3 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.

6.13.5.4 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.

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

6.13.6 Damages to Paints Work

6.13.6.1 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.

6.13.6.2 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.

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

6.13.7 Dry Film Thickness

6.13.7.1 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.

6.13.7.2 Each coat of paint shall allowed to hardened before the next is applied as per manufacture’s recommendations.

6.13.7.3 Particular attention must be paid to full film thickness at edges.

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

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Paint Type</th>
<th>Area to be painted</th>
<th>No of Coats</th>
<th>Total Dry film thickness(Min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Liquid paint</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Zinc Chromate(Primer)</td>
<td>Out side</td>
<td>02</td>
<td>45 micron</td>
</tr>
<tr>
<td></td>
<td>b) Poly Urethene (P.U) Paint ( Finish Coat)</td>
<td>Out side</td>
<td>02</td>
<td>35 micron</td>
</tr>
<tr>
<td></td>
<td>c) Hot Oil paint</td>
<td>inside</td>
<td>01</td>
<td>35 micron</td>
</tr>
</tbody>
</table>

7.0 DETAILED DESCRIPTION
7.1 **Tank**

7.1.1 The Transformer tank and cover shall be fabricated from high grade low carbon plate steel of tested quality. The tank and the cover shall be of welded construction.

7.1.2 Tank shall be designed to permit lifting by crane or jacks of the complete transformer assembly filled with oil. Suitable lugs and bossed shall be provided for this purpose.

7.1.3 All breams, flanges, lifting lugs, braces and permanent parts attached to the tank shall be welded and where practicable, they shall be double welded.

7.1.4 The main tank body of the transformer, excluding tap changing compartments and radiators, shall be capable of withstanding pressure of 760mm of Hg.

7.1.5 Inspection hole(s) with welded flange(s) and bolted cover(s) shall be provided on the tank cover. The inspection hole(s) shall be of sufficient size to afford easy access to the lower ends of the bushings, terminals etc.

7.1.6 **Gaskets of Nitrile Rubber or equivalent shall be used to ensure perfect oil tightness. All gaskets shall be closed design (without open ends) and shall be of one Piece only. Rubber gaskets used for flange type connection of the various oil compartments shall be laid in grooves or in groove equivalent section on bolt sides of the gaskets, throughout their total length. Care shall be taken to ensure uniformly distributed mechanical strength. Over the gasket and retains throughout the total length. Gasket of Neopropene and / or any kind of impregnated / bonded core or cork only which can easily be damaged by over passing are not acceptable. Use of hemp as gasket material is also not acceptable.**

7.1.7 Suitable guides shall be provided for positioning the various parts during assemble or dismantling. Adequate space shall be provided between the cores and windings and the bottom of the tank for collection of any sediment.

7.2 **Tank Cover**

The transformer top shall be provided with a detachable tank cover with bolted flanged gasket joint. Lifting lugs shall be provided for removing the cover. The surface of the cover shall be suitable sloped, so that it does not retain rain water.

7.3 **UNDER CARRIAGE**

7.3.1 The transformer tank shall be supported on steel structure with detachable plain rollers completely filled with oil. Suitable channels for movement of roller with transformer shall be space accordingly, rollers wheels shall be provided with suitable rollers bearings, which will resist rust and corrosion and shall be equipped with fittings for lubrication. It shall be possible to swivel the wheels in two directions, at right angle to or parallel to the main axis of the transformers.

7.4 **CORE**

7.4.1 Stage level inspection for core construction shall be carried out by the owner.

7.4.2 Each lamination shall be insulated such that it will not deteriorate due to mechanical pressure and the action of hot transformer oil.

7.4.3 **The core shall be constructed either form high grade, non-aging Cold Rolled Grain Oriented (CRGO)silicon steel laminations conforming to HIB grade with lamination thickness not more than 0.23mm to 0.27mm or better(quoted grade and type shall be used).The maximum flux density in any part of the cores and**
yoke at normal voltage and frequency shall not be more than 1.5 Tesla. The bidder shall provide saturation curve of the core material, proposed to be used. Laminations of different grade(s) and different thickness(s) are not allowed to be used in any manner or under any circumstances.

7.4.4(A) The bidder should offer the core for inspection starting from the destination port to enable WESCO for deputing inspecting officers for detail verification as given below and approval by the purchaser during the manufacturing stage. Bidder’s call notice for the purpose should be accompanied with the following documents as applicable as a proof towards use of prime core material:

The core coils, if found suitable, are to be sealed with proper seals which shall be opened in presence of the inspecting officers during core-cutting at the manufacturer’s or it’s sub-vendor’s premises as per approved design drawing.

a) Purchase Order No. & Date
b) Invoice of the supplier with corresponding Purchase Order
c) Mills test certificate
d) Packing list
e) Bill of lading
f) Bill of entry certificate to customs

Core material shall be directly procured either from the manufacturer or through their accredited marketing organization of repute, but not through any agent.

7.4.4(B) For Transformer Manufacturer™, who has in-house core cutting facility, the packed core coils shall be verified at their works as per followings along with witnessing of core-cutting.

   a. Purchase Order No. & Date;
   b. No. of packed coils with Package nos.
   c. Gross weight:
   d. Net weight:
   e. Port of loading
   f. Port of Discharge
   g. Name of the ocean vessel:
   h. Grade & Thickness of Core Material:
   i. Any other information as mentioned on the body of packed coils.

7.4.4(C) For those bidders, who have no in-house core cutting facility, they should mention the names of at least three sub-vendors to whom they intend to assign their core cutting. Such sub-vendors should have been approved by other Electricity Board/ Electrical Utilities and accredited by some internationally recognized certification body like ISO-9000 etc. to ensure that a minimum quality parameters & tolerance are maintained. The experience, the details of core cutting facilities finishing & testing facilities etc. as available which such sub-vendors should be clearly out-lined in the bid

7.4.4(D) On award of Contract the TM is to assign the core-cutting to such sub-vendors for which approval is to be given by the Purchaser.

7.4.5 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.

7.4.6 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.

7.4.7 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.

7.4.8 All steel sections used for supporting the core shall be thoroughly shot or sand blasted, after cutting, drilling and welding.

7.4.9 The finally assembled core with all the clamping structures shall be free from deformation and shall not vibrate during operation.

7.4.10 The core clamping structure shall be designed to minimize eddy current loss.

7.4.11 The framework and clamping arrangements shall be securely earthed.

7.4.12 The core shall be carefully assembled and rigidly clamped to ensure adequate mechanical strength.

7.4.13 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.

7.4.14 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.

7.4.15 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 assemble shall be so fixed in the tank that shifting will not occur during transport or short circuits.

7.4.16 The temperature gradient between core & surrounding shall be maintained less than 20deg C. The manufacturer shall demonstrate this either through test (Procurement to be mutually agreed) or by calculation.

7.5 INTERNAL EARTHING

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

7.5.2 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.

7.5.3 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.

7.5.4 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.

7.6  **WINDING**

7.6.1  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.

7.6.2  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.

7.6.3  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.

7.6.4  Materials used in the insulation and assembly of the windings shall be insoluble, non catalytic and chemically inactive in the hot transformer oil and shall not soften or the otherwise affected under the operating conditions.

7.6.5  Varnish application on coil windings may be given only for mechanical protection and not for improvement in dielectric properties. In no case varnish or other adhesive be used which will seal the coil and prevent evacuation of air and moisture and impregnation by oil.

7.6.6  Winding and connections shall be braced to withstand shocks during transport or short circuit.

7.6.7  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.

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

7.6.8.1  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.

7.6.8.2  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.

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

7.6.8.4  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.

7.6.8.5  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.

7.6.8.6  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.

7.6.8.7  Magnitude of impulse surges transferred from HV to LV windings by electro magnetic induction and capacitance coupling shall be limited to BILL of LV winding.
7.6.8.8 The current density adopt for all winding shall not exceed 2.4 amp/sq. mm. The total net cross section area of the strip conductor for calculating carrying density for each winding shall be obtained after deducting the copper area lost due to rounding up of the sharp edges at the rectangular conductor.

7.7 INSULATING OIL

7.7.1 The insulating oil for the transformer shall be of EHV grade, generally conforming to IS: 335. No inhibitors shall be used in the oil.

7.7.2 The quantity of oil required for the first filling of the transformer and its full specification shall be stated in the bid. **The bidder shall quote the price of transformer complete with all fittings, accessories and new transformer oil required for first filling plus 10% extra oil.** The extra quantity of oil shall be supplied in non-returnable drums along with the oil required for the radiator banks.

7.7.3 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.

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

<table>
<thead>
<tr>
<th>S.No</th>
<th>Characteristic</th>
<th>Requirement</th>
<th>Method of Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Appearance</td>
<td>The oil shall be clear &amp; transparent &amp; free from suspended matter or sediment</td>
<td>A representative sample of oil shall be examined in a 100 mm thick layer at ambient temp.</td>
</tr>
<tr>
<td>02</td>
<td>Density at 20°C</td>
<td>0.89 g/cm³ Max.</td>
<td>IS:1448</td>
</tr>
<tr>
<td>03</td>
<td>Kinematic Viscosity at 27 deg. C Max</td>
<td>27 CST</td>
<td>IS:1448</td>
</tr>
<tr>
<td>04</td>
<td>Interfacial tension at 27 °C Min.</td>
<td>0.03 N/m</td>
<td>IS:6104</td>
</tr>
<tr>
<td>05</td>
<td>Flash Point</td>
<td>136 °C</td>
<td>IS:1448</td>
</tr>
<tr>
<td>06</td>
<td>Pour Point Max.</td>
<td>-6 °C</td>
<td>IS:1448</td>
</tr>
<tr>
<td>07</td>
<td>Neutralisation Value (Total Acidity) Max.</td>
<td>0.03 mg KOH/gm</td>
<td>IS:335</td>
</tr>
<tr>
<td>08</td>
<td>Electric strength Breakdown (voltage) Min.</td>
<td>72.5 KV</td>
<td>IS:6792</td>
</tr>
<tr>
<td>09</td>
<td>Dielectric dissipation factor tan delta at 90° C</td>
<td>0.03 Max</td>
<td>IS:6262</td>
</tr>
<tr>
<td>10</td>
<td>Min specific resistance(resistively) at 90° C</td>
<td>35X10¹² ohm cm (min.)</td>
<td>IS:6103</td>
</tr>
<tr>
<td>11</td>
<td>Oxidation stability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Neutralization value after oxidation</td>
<td>0.40mg KOH/g</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Total sludge after oxidation</td>
<td>0.10% by weight max.</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Presence of oxidation Inhibitor</td>
<td>The oil shall not contain anti-oxidant Additives.</td>
<td>IS:335</td>
</tr>
<tr>
<td>15</td>
<td>Water content Max:</td>
<td>Less than 25ppm</td>
<td>IS:2362</td>
</tr>
</tbody>
</table>

7.8 VALVES

i) Valves shall be of forged carbon steel upto 50mm size and of gun mental or of cast iron
bodies with gun metal fittings for sizes above 50mm. They shall be of full way type with screwed ends and shall be opened by turning counter clockwise when facing the hand wheel. There shall be no oil leakage when the valves are in closed position.

ii) Each valve shall be provided with an indicator to show the open and closed positions and shall be provided with facility for padlocking in either open or closed position. All screwed valves shall be furnished with pipe plugs for protection. Padlocks with duplicate keys shall be supplied along with the valves.

iii) All valves except screwed valves shall be provided with flanges having machined faced drilled to suit the applicable requirements. Oil tight blanking plates shall be provided for each connection for use when any radiator is detached and for all valves opening to atmosphere. If any special radiator valve tools are required the contractor shall supply the same.

Each transformer shall be provided with following valves on the tank:

- Drain valve so located as to completely drain the tank.
- Two filter valves on diagonally opposite corners of 50mm size.
- Oil sampling valves not less than 8mm at top and bottom of main tank.
- One 15mm air release plug.
- Valves between radiators and tank.

Drain and filter valves shall be suitable for applying vacuum as specified in the specifications.

7.9 ACCESSORIES

7.9.1 Bushing

i) All porcelain used in bushings shall be homogeneous, non-porous, uniformly glazed to brown colour and free from blisters, burns and other defects.

ii) Stress due to expansion and contraction in any part of the bushing shall not lead to deterioration.

iii) Bushing shall be designed and tested to comply with the applicable standards.

iv) Liquid oil-filled bushings shall be equipped with liquid level indicators and means for sampling and draining the liquid. The angle of inclination to vertical shall not exceed 30 degree.

v) Oil in oil-filled bushings shall meet the requirements of the transformer oil standards.

vi) Bushing rated for 400A and above shall have non-ferrous flanges and hardware.

vii) Fittings made of steel or malleable iron shall be galvanized.

viii) Bushing shall be so located on the transformers that full flashover strength will be utilized. Minimum clearances as required for the BIL shall be realized between live parts and live parts to earthed structures.

ix) All applicable routine and type tests certificates of the bushings shall be furnished for approval.

x) Bushing shall be supplied with bi-metallic terminal connector/ clamp/ washers suitable for fixing to bushing terminal and the PURCHASER’S specified conductors. The connector/clamp shall be rated to carry the bushing rated current without exceeding a temperature rise of 55° C over an ambient of 50° C. The connector/clamp shall be designed to be corona free at the maximum rated line to ground voltage.
xi) Bushing of identical voltage rating shall be interchangeable.

xii) The insulation class of high voltage neutral bushing shall be properly coordinated with the insulation class of the neutral of the low voltage winding.

xiii) Each bushing shall be so coordinated with the transformer insulation that all flashover will occur outside the tank.

7.9.2 Protection & Measuring Devices

i) Oil Conservator Tank

a) The Conservator tank shall have adequate capacity between highest and lowest visible levels to meet the requirement of expansion of the total cold oil volume in the transformer and cooling equipment.

b) The conservator tank shall be bolted into position so that it can be remove for cleaning purposes.

c) The conservator shall be fitted with magnetic oil level gauge with low level electrically insulated alarm contact.

d) Plain conservator fitted with silica gel breather.

ii) Pressure Relief Device.

The pressure relief device provided shall be of sufficient size for rapid release of any pressure that may be generated in the tank and which may result in damage of the equipment. The device shall operate at a static pressure of less than the hydraulic test pressure of transformer tank. It shall be mounted direct on the tank. A pair of electrically insulated contract shall be provided for alarm and tripping.

iii) Buchholz Relay

A double float type Buchholz relay shall be provided., Any gas evolved in the transformer shall collect in this relay. The relay shall be provided with a test cock suitable for a flexible pipe connection for checking its operation. A copper tube shall be connected from the gas collector to a valve located about 1200 mm above ground level to facilitate sampling with the transformer in service. The device shall be provided with two electrically independent potential free contacts, one for alarm on gas accumulation and the other for tripping on sudden rise of pressure.

iv) Temperature Indicator

a) Oil Temperature Indicator (OTI):

The transformers shall be provided with a microswitch contact type thermometer with 150 mm dial for top oil temperature indication. The thermometer shall have adjustable, electrically independent potential free alarm and trip contacts. Maximum reading pointer and resetting device shall be mounted in the local control panel. A temperature sensing element suitably located in a pocket on top oil shall be furnished. This shall be connected to the OTI by means of capillary tubing. Accuracy class of OTI shall be ± 1% or better. Two Nos electrical contact capable of operating at 5 A ac at 230 volt supply.

b) Winding Temperature Indicator(WTI):  

A device for measuring the hot spot temperature of the winding shall be provided. It shall comprise the following.
i) Temperature sensing element.

ii) Image Coil.

iii) Microswitch contacts.

iv) Auxiliary CTS, If required to match the image coil, shall be furnished and mounted in the local control panel.

v) 150mm dial local indicating instrument with maximum reading pointer mounted in local panel and with adjustable electrically independent ungrounded contacts, besides that required for control of cooling equipment, one for high winding temperature alarm and on for trip.

vi) Calibration device.

vii) Two number electrical contact each capable of operating at 5 A ac at 230 Volt supply.

7.9.3 Oil Preservation Equipment

7.9.3.1 Oil Sealing

The oil preservation shall be diaphragm type oil sealing in conservator to prevent oxidation and contamination of oil due to contact with atmospheric moisture.

The conservator shall be fitted with a dehydrating filter breather. It shall be so designed that.

i) Passage of air is through a dust filter & Silica gel.

ii) Silica gel is isolate from atmosphere by an oil seal.

iii) Moisture absorption indicated by a change in colour of the crystals of the silica gel can be easily observed from a distance.

iv) Breather is mounted not more than 1400 mm above rail top level.

7.10 MARSHALLING BOX

i) Sheet steel, weather, vermin and dust proof marshalling box fitted with required glands, locks, glass door, terminal Board, heater with switch, illumination lamp with switch, watertight hinged and padlocked door of a suitable construction shall be provided with each transformer to accommodate temperature indicators, terminal blocks etc. The box shall have slopping roof and the interior and exterior painting shall be in accordance with the specification. Padlock along with duplicate keys shall be supplied for marshalling box. The degree of protection shall be IP-55 or better.

ii) The schematic diagram of the circuitry inside the marshalling box be prepared and fixed inside the door under a prospone sheet.

iii) The marshalling box shall accommodate the following equipment:

a) Temperature indicators.

b) Space for accommodating Control & Protection equipment in future for the cooling fan (for ONAF type cooling, may be provided in future).

c) Terminal blocks and gland plates for incoming and outgoing cables.
All the above equipments except c) shall be mounted on panels and back of panel wiring shall be used for inter-connection. The temperature indicators shall be so mounted that the dials are not more than 1600 mm from the ground level and the door(s) of the compartment(s) shall be provided with glazed window of adequate size. The transformer shall be erected on a plinth which shall be 2.5 feet above ground level.

iii) To prevent internal condensation, a metal clad heater with thermostat shall be provided. The heater shall be controlled by a MCB of suitable rating mounted in the box. The ventilation louvers, suitably padded with felt, shall also be provided. The louvers shall be provided with suitable felt pads to prevent ingress of dust.

iv) All incoming cables shall enter the kiosk from the bottom and the gland plate shall not be less than 450 mm from the base of the box. The gland plate and associated compartment shall be sealed in suitable manner to prevent the ingress of moisture from the cable trench.

v) The control connection, wiring etc. shall be as per Clause 3.15 of this specification.

7.11 TAPCHANGER

7.11.1 ON-LOAD TAP-CHANGERS WITH REMOTE TAP CHANGE CONTROL

Each transformer shall be provided with a on-load tap-changer connected to the high voltage winding. The on-load tap-changer shall be capable of withstanding the voltages described earlier and shall comply with the requirements of IEC-214, latest revision. It’s tapping range, number of steps and tap positions shall be as specified.

Adequate access for personnel shall be provided for inspection and maintenance. The guaranteed interval between maintenance periods for the diverter switch shall be 10 years or 50,000 operations. It shall not be possible for oil in the diverter switch compartment to come in contact with the oil in the main transformer tank.

The tap-changer shall be driven by a motor operated mechanism incorporating a stored energy device which shall ensure that once a change of tap begins it is completed and so shall ensure that the mechanism does not fail in an intermediate position on loss of the supply voltage to the motor. The motor shall be rated for 400/230V, 50 Hz and shall operate satisfactorily at any voltage between 85% and 110% of rated voltage.

A tap-changer mechanism box with hinged door and mounted on the transformer tank at a convenient height shall contain all electrical and mechanical parts associated locally with control of the tap-changer. Remote tap-changer controls shall also be provided at a transformer control panel (one per transformer, to be supplied under this contract) in the control room.

Facilities for electrical raise and lower operation (Control switch or push button) as well as mechanical operation shall be provided as the tap-change mechanism box. An interlock shall be provided which shall interrupt the electric supply to the drive motor when the manual mechanical operating device is engaged. The motor drive control shall be such that on initiation of a tap-change operation by means of a control switch or push-button the tap-changer shall complete its movement from one service position to an adjacent one irrespective of whether or not the control switch or push button has been operated continuously during the running time or motor drive. Another operation shall only be possible when the previous operation has been completed, the control switch or push button has been released and the control system is again in the rest position.

The tap-changer arrangement shall be such that a command to raise tap-numbers shall result in an increase in the secondary voltage with constant voltage applied to the high voltage winding.

An under and over voltage monitoring relay fed with line voltage from the owner’s voltage
Transformers on the low voltage side of the transformer and capable of being set in a continuously variable range from 90% to 115% normal voltage (110V) shall be used to give visual and audible signals at the remote tap change control panel if the LV voltage lies above or below preset values.

Limit switches shall be provided to prevent over-running of the tap-change mechanism. These shall be directly connected in the motor circuit. In addition mechanical end stops shall be fitted to prevent over-running of the mechanism under any conditions. A counter shall be provided to indicate the number of tap-change operations that have been taken place.

A mechanical tap-position indicator shall be provided and it shall be visible from ground level through a window in the door of the mechanism box. Position transmitter e.g. dial switches shall be provided to:

a. Signal tap position to the control cabinet in the control room.
b. Signal “out of step” under parallel operating conditions.

A Remote/Local switch shall be provided at the mechanism box to select either remote or local operation. When this switch is turned to the Remote position control shall be passed to the control cabinet in the control room. It should be possible to use only one control, i.e. Local or Remote.

It shall be possible to operate a transformer tap-changer independently or in parallel with the tap-changers of other similar transformers in the same substation in either a “master” or “follower” mode. In addition, when operating independently or in parallel in the master mode, it shall be possible to have manual operation by means of control switch, push button or, (in future) automatic operation by means of an automatic voltage regulating relay. Contacts shall be provided for future SCADA control of the tap-changer and for reporting of the tap position and mode of control to the SCADA system. The paralleling scheme shall use the in-step principle and shall have provision for operating singly or in parallel in any combination. It shall be possible for any transformer in a group to be selected as either the master or follower for that group when operating in parallel. Each transformer control panel shall therefore have a manual/automatic control switch or push buttons, independent/master/follower control switch or push buttons as well as “raise” and lower” control switches or push buttons. Interlock shall be provided to avoid independent operation when the transformers are running in parallel. There should not be any out-of-step during such operation.

The control scheme shall be capable of extension to cater for the total number of transformers to be installed in any future development of the substation. The control mode selected shall be indicated on the front of the control cabinet.

Each transformer shall have a miniature circuit breaker (MCB) on the AC distribution cabinet through which the 400/230V, 50 Hz supply to its tap-changer and temperature controls is passed. Separate MCB’s shall be provided at the mechanism box for protection of the motor and control circuits. The control circuits shall operate at 110V single phase, to be supplied from a transformer having a ratio of 230/55-0-55 V, with the center point earthed through a removable link mounted in the marshalling box or tap-changer mechanism box.

Each tap-changer mechanism box shall be fitted with an anti-condensation space heater (230V AC) controlled by a humidistat with variable range. A lamp for illumination purposes controlled by a door switch shall be provided. Solar gain can give rise to high temperature within a mechanism box. Adequate ventilation shall be provided to ensure that all equipment contained therein shall operate satisfactorily under these conditions.

A terminal block with terminals rated for 10 A continuous current, 650V grade of moulded insulating materials shall be provided for panel wiring and external connection.

Ten percent spare terminals shall be provided in each mechanism box.
The tap changer mechanism box shall be outdoor, weatherproof type, dust, vermin and damp proof with a degree of protection of IP54 of IEC 529 or IS 13947 equivalent.

7.11.3 Transformer Tap Change Control Panel

The indoor panel suitable for installation in the owner’s control room mentioned above shall contain:

- Raise and Lower push buttons or switch.
- Independent / master / follower selector switch.
- Remote tap position indicator.
- Necessary audible & visual alarms.
- Out of step relay with two spare contacts (2 NO + 2 NC)

In addition to the above the Transformer tap change control panel shall have an audible and visual annunciation system for the following trips and alarms.

- Oil temperature alarm
- Oil temperature trip
- Winding temperature alarm
- Winding temperature trip
- Buchholz alarm
- Buchholz trip
- Surge relay trip (OLTC gear)
- Low oil level alarm
- Tap changer out-of-step alarm
- Failure of D.C supply alarm

Two spare windows shall be supplied on each panel

Indicating lamps shall be panel mounted type with rear terminal connections. Lamps shall be provided with series connected resistors preferably built within the lamp assembly. Lamps shall have screwed translucent lamp covers to diffuse light and shall be continuously rated for 120 percent of the 24 volt DC supply from a power pack having desired capacity. The ‘DC supply failure’ lamp shall operate from the AC supply and be rated for 230 Volt AC. The wattage of the lamps shall be not more than five watts. Bulbs and lenses shall be interchangeable and easily replaceable from the font of the panel.

The Annunciation scheme with facia windows and alarm bells shall work as follows.

<table>
<thead>
<tr>
<th>Incident</th>
<th>Alarm Bell</th>
<th>Facia Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fault occurrence</td>
<td>Ringing</td>
<td>Light flashing</td>
</tr>
<tr>
<td>Sound cancel</td>
<td>Off</td>
<td>Light flashing</td>
</tr>
<tr>
<td>Acknowledge</td>
<td>Off</td>
<td>Steady light</td>
</tr>
<tr>
<td>Fault cleared and reset</td>
<td>Off</td>
<td>Clear</td>
</tr>
<tr>
<td>Lamp test</td>
<td>Off</td>
<td>Steady</td>
</tr>
</tbody>
</table>
Any new annunciation operating after the operation of the ‘sound cancel’ shall cause audible and visual alarm even if the process of acknowledging the previous alarm is going on or has yet to be carried out. Resetting facilities for the flasher and audible alarm circuits of the annunciator shall be provided, and provision shall be made for switching off the entire annunciation system. Two spare windows shall be provided.

The control and relay panel shall be metal clad, dust, moisture, rodent and vermin proof with degree of protection not less than IP 41 specified in IEC :529/ IS : 13947. Panels shall have folded construction and be of unit type. Each panel shall be a free standing structure, independent floor mounting type and shall be manufactured from cold rolled sheet steel of thickness not less than 2.5 mm. There shall be sufficient reinforcement to provide level surfaces, resistance to vibration and rigidity during transportation, installation and service. The panel shall be painted as specified in the clause on “painting” in the specification.

Design, material selection and workmanship shall be such as to result in neat appearance inside and outside with no welds, rivets or bolt ends apparent from outside, with all exterior surfaces even and smooth. The equipment on the front of the panel shall be matched to give neat uniform appearance.

All doors and removable covers shall be gasketed all round with neoprene bonded gaskets. Ventilating louvers shall be provided with screens and filters. The screen shall be made of non corroding metal like brass or galvanized iron wire mesh.

The transformer tap change control panel shall be supplied with all necessary internal wiring, terminal blocks, relays and alarms to provide the above listed alarm and trip functions.

Panel wiring shall be suitably bunched and clamped for neat appearance. The conductors used for wiring purpose shall be PVC insulated 650 Volt grade semi-flexible heat resistant, flame retardant and vermin proof electrolytic copper cable conforming to IEC : 227 or IS : 1554. The wiring shall be securely supported and taken through PVC troughs. All panel wiring shall be capable of withstanding a voltage of 2 KV AC 50 Hz for one minute.

Terminal blocks of brass studs rated for 10 amps continuous current, 650 volt DC grade covered by moulded insulating materials with adequate electrical clearance shall be provided for terminating the panel wiring and outgoing connections. The termination shall be made by crimping lugs or bare conductor with insulating sleeves at the ends. The arrangement can be horizontal or vertical as per standard practice adopted by the manufacturer. All terminals must be numbered and wire terminations provided with numbered ferrules for identification. All numbering and marking including those in wiring diagrams shall follow the guidelines provided in IS : 11353. Ten percent spare terminals shall be provided.

A separate removable gland plate shall be provided at the bottom of each panel for entry of PVC insulated control and auxiliary power cables in the cabinet. At least five electroplated brass cable glands of approved sizes with shrouds shall be provided in the gland plate for these cables. Provision shall be made for earthing of the cable armours in the glands.

7.12 FITTINGS AND ACCESSORIES

The following fittings and accessories shall be provided on the transformers:

i) Conservator with isolating valves, oil filling hole with cap and drain valve. The conservator vessel shall be filled with constant oil pressure diaphragm oil sealing system.

ii) Magnetic type oil level gauge (150 mm dia) with low oil level alarm contacts.

iii) Prismatic/ toughened glass oil level gauge.

iv) Silica gel breather with oil seal and connecting pipe complete with first fill of activated silica
v) A double float type Buchholz relay with isolating valve. Bleeding pipe and a testing cock, the test cock shall be suitable for a flexible (pipe connection for checking its operation). A 5mm dia. Copper pipe shall be connected from the relay test cock to a valve located at a suitable height above ground level to facilitate sampling of gas with the transformer in service. Interconnection between gas collection box and relay shall also be provided. The device shall be provided with two electrically independent ungrounded contacts, one for alarm on gas accumulation and the other for tripping on sudden oil surge. These contacts shall be wired up to transformer marshalling box. The relay shall be provided with shut off valve on the conservator side as well as on the tank side.

vi) Pressure relief devices (including pressure relief valve) and necessary air equalizer connection between this and the conservator with necessary alarm and trip contacts.

vii) Air release plugs in the top cover.

viii) Inspection cover, access holes with bolted covers for access to inner ends of bushing etc.

ix) Winding temperature (hot spot) indicating device for local mounting complete in all respects. Winding temperature indicator shall have three set of contacts to operate at different settings:

a) To provide winding temperature high alarm

b) To provide temperature too high trip

x) Dial thermometer with pocket for oil temperature indicator with one set of alarm and one set of trip contacts and maximum reading pointer.

xi) Lifting eyes or lugs for the top cover, core and coils and for the complete transformer.

xii) Jacking pads

xiii) Haulage lugs.

xiv) Protected type mercury / alcohol in glass thermometer and a pocket to house the same.

xv) Top and bottom filter valves on diagonally opposite ends with pad locking arrangement on both valves.

xvi) Top and bottom sampling valves.

xvii) Drain valve with pad locking arrangement

xviii) Rating and connection diagram plate.

xix) Two numbers tank earthing terminals with associated nuts and bolts for connections to purchaser’s grounding strip.

xx) Bi-directional flagged rollers with locking and bolting device.

xxi) Marshalling Box (MB)

xxii) Shut off valve on both sides of flexible pipe connections between radiator bank and transformer tank.

xxiii) Cooling Accessories:

a) Requisite number of radiators provided with:-

- One shut off valve on top
- One shut off valve at bottom
- Air release device on top
- Drain and sampling device at bottom
- Lifting lugs.

b) Air release device and oil drain plug on oil pipe connectors:

xxiv) Terminal marking plates for Current Transformer and Main Transformer
xxv) On-Load Tap Changer
xxvi) Oil Preservation Equipment
xxvii) Oil Temperature indicator

Note: (i) The fittings listed above are indicative and any other fittings which are generally required for satisfactory operation of the transformer are deemed to be included in the quoted price of the transformer.

(ii) The contacts of various devices required for alarm and trip shall be potential free and shall be adequately rated for continuous, making and breaking current duties as specified.

7.13 CONTROL CONNECTIONS AND INSTRUMENT AND WIRING TERMINAL BOARD AND FUSES

i) Normally no fuses shall be used anywhere instead of fuses MCB’s (both in AC & DC circuits) shall be used. Only in cases where a MCB cannot replace a fuse due to system requirements, a HRC fuse can be accepted.

ii) All wiring connections, terminal boards, fuses MCB’s and links shall be suitable for tropical atmosphere. Any wiring liable to be in contact with oil shall have oil resisting insulation and the bare ends of stranded wire shall be sweated together to prevent seepage of oil along the wire.

iii) Panel connections shall be neatly and squarely fixed to the panel. All instruments and panel wiring shall be run in PVC or non-rusting metal cleats of the compression type. All wiring to a panel shall be taken from suitable terminal boards.

iv) Where conduits are used, the runs shall be laid with suitable falls, and the lowest parts of the run shall be external to the boxes. All conduit runs shall be adequately drained and ventilated. Conduits shall not be run at or below ground level.

v) When 400 volt connections are taken through junction boxes or marshalling boxes, they shall be adequately screened and 400 volts Danger Notice must be affixed to the outside of the junction boxes or marshalling box. Proper colour code for Red, Yellow, Blue wires shall be followed.

vi) All box wiring shall be in accordance with relevant ISS. All wiring shall be of stranded copper (48 strands) of 1100 Volt grade and size not less than 2.5 sq.mm

vii) All wires on panels and all multi-core cables shall have ferrules, for easy identifications, which bear the same number at both ends, as indicated in the relevant drawing.

viii) At those points of interconnection between the wiring carried out by separate contractors, where a change of number can not be avoided double ferrules shall be provided on each wire. The change of numbering shall be shown on the appropriate diagram of the equipment.

ix) The same ferrule number shall not be used on wires in different circuits on the same panels.

x) Ferrules shall be of white insulating material and shall be provided with glossy finish to prevent the adhesion of dirt. They shall be clearly and durably marked in black and shall not be affected
by dampness or oil.

xi) Stranded wires shall be terminated with tinned Ross Courtney terminals, claw washers or crimped tubular lugs. Separate washers shall be suited to the size of the wire terminated. Wiring shall, in general, be accommodated on the sides of the box and the wires for each circuit shall be separately grouped. Back of panel wiring shall be arranged so that access to the connecting items of relays and other apparatus is not impeded.

xii) All circuits in which the voltage exceeds 125 volts, shall be kept physically separated from the remaining wiring. The function of each circuit shall be marked on the associated terminal boards.

xiii) Where apparatus is mounted on panels, all metal cases shall be separately earthed by means of stranded (48 No.) copper wire of strip having a cross section of not less than 2 sq. mm where strip is used, the joints shall be sweated. The copper wire shall have green coloured insulation for earth connections.

xiv) All wiring diagram for control and relay panel shall preferably be drawn as viewed from the back and shall show the terminal boards arranged as in services.

xv) Terminal block rows should be spaced adequately not less than 100 mm apart to permit convenient access to external cables and terminations.

xvi) Terminal blocks shall be placed with respect to the cable gland (at a minimum distance of 200 mm) as to permit satisfactory arrangement of multicore cable tails.

xvii) Terminal blocks shall have pairs of terminals for incoming and outgoing wires. Insulating barriers shall be provided between adjacent connections. The height of the barriers and the spacing between terminals shall be such as to give adequate protection while allowing easy access to terminals. The terminals shall be adequately protected with insulating dust proof covers. No live metal shall be exposed at the back of the terminal boards. CT terminals shall have shorting facilities. The terminals for CTs should have provision to insert banana plugs and with isolating links.

xviii) All interconnecting wiring, as per the final approved scheme between accessories of transformer and marshalling box is included in the scope of this specification and shall be done by the Transformer supplier.

xix) The schematic diagram shall be drawn and fixed under a transparent prospane sheet on the inner side of the marshalling box cover.

xx) To avoid condensation in the Marshalling Box, a space heater shall be provided with an MCB and thermostat.

xxi) Suitable MV, CFL light shall be provided in the Marshalling Box for lightning purpose.

7.14 RADIO INTERFERENCE AND NOISE LEVEL

Transformers shall be designed with particular care to suppress at least the third and fifth harmonic voltages so as to minimise interference with communication circuits. Transformer noise level when energised at normal voltage and frequency shall be as per NEMA stipulations.

8 INSPECTION AND TESTING

(i) The Contractor shall carry out a comprehensive inspection and testing Programme during manufacture of the transformer. An indicative in inspection is given under Clause No. 4.1. This is, however, not intended to form a comprehensive Programme as it is contractor’s responsibility to draw up and carry out such a Programme duly approved by the purchaser.

(ii) The contractor shall carry out type tests and routine tests on the transformers.
(iii) Only one no of transformer of each rating will be subjected to type test. The charges for conducting each of type tests shall be included in the bid price and no separate type test charges shall be paid. The Purchaser reserves the right to conduct any or all type tests at CPRI/ National Govt. Approved Laboratory, if the type tests were not conducted earlier on transformers of the same rating and design.

(iv) The pre-shipment checks shall also be carried out by the contractor.

(v) The requirements on site tests are as listed in the specifications.

(vi) Certified test report and oscillograms shall be furnished to the Purchaser Consultants for evaluation as per the schedule of distribution of documents. The Contractor shall also evaluate the test results and rectify the defects in the equipment based on his and the Purchaser’s evaluations of the tests without any extra charges to the Purchaser. Manufacturer’s Test Certificates in respect of all associated auxiliary and ancillary equipment shall be furnished.

(vii) The bidder shall state in his proposal the testing facilities available at his works. In case full testing facilities are not available, the bidder shall state the method proposed to be adopted so as to ascertain the transformer characteristics corresponding to full capacity.

8.1 INSPECTION

i) Tank and Conservator

   Inspection of major weld.
   Crack detection of major strength weld seams by dye penetration test.
   Check correct dimensions between wheels, demonstrate turning of wheels, through $90^\circ$ and further dimensional check.
   Leakage test of the conservator.

ii) Core

   a) Sample testing of core materials for checking specific loss, properties, magnetization characteristics and thickness.
   b) Check on the quality of varnish if used on the stampings.
   c) Check on the amount of burrs.
   d) Visual and dimensional check during assembly stage.
   e) Check on completed core for measurement of iron loss, determination of maximum flux density,
   f) Visual and dimensional checks for straightness and roundness of core, thickness of limbs and suitability of clamps.
   g) High voltage DC test (2 KV for one minute ) between core and clamps.

iii)

   a. Sample check for physical properties of materials.
   b. Check for dielectric strength
   c. Check for the reaction of hot oil on insulating materials.

iv) Winding

   a. Sample check on winding conductor for mechanical and electrical conductivity.
   b. Visual and dimensional checks on conductor for scratches, dent mark etc.
   c. Sample check on insulating paper for PH value, electric strength.
   d. Check and ensure that physical condition of all materials taken for windings is satisfactory and free of dust.
   e. Check for absence of short circuit between parallel strands.

v) Checks Before Drying Process
a) Check condition of insulation on the conductor and between the windings.
b) Check insulation distance between high voltage connections, between high voltage connection cables and earth and other live parts.
c) Check insulating distances between low voltage connections and earth and other parts.
d) Insulating test for core earthing.

vi) Check During Drying Process

b) Check for completeness of drying

vii) Assembled Transformer

Check completed transformer against approved outline drawing, provision for all fittings, finish level etc.
Jacking test on the assembled Transformer.

viii) Oil

All standard tests in accordance with IS: 335 shall be carried out on Transformer oil sample before filling in the transformer.

ix) Test Report for bought out items

The contractor shall submit the test reports for all bought out / sub contracted items for approval.

a) Buchholz relay
b) Sudden pressure rise relay on Main Tank
c) Winding temperature indicators (for TX capacity 8 MVA )
d) Oil temperature indicators
e) Bushings
f) Bushing current transformers in neutral
g) Marshalling box
h) On Load Tap changer
i) Any other item required to complete the works.
j) Porcelain, bushings, bushing current transformers, wherever provided, winding coolers, control devices, insulating oil and other associated equipment shall be tested by the contractor in accordance with relevant IS. If such requirement is purchased by the contractor on a sub-contract, he shall have them tested to comply with these requirements.

8.2 FACTORY TESTS

i) All standards routine tests in accordance IS: 2026 with dielectric tests corresponding as per latest amendments to IS: 2026 shall be carried out.

ii) All auxiliary equipment shall be tested as per the relevant IS. Test certificates shall be submitted for bought out items.

iii) High voltage withstand test shall be performed on auxiliary equipment and wiring after complete assembly.

iv) Following additional routine tests shall also be carried out on each transformer:
8.2.1 Type Test

The transformer shall be subjected to the following type tests particularly Short circuit and Impulse withstand tests at CPR/ National Govt. approved Laboratory at the discretion of the Purchaser, if these tests were not conducted on the transformers of the offered design and rating at the cost of the manufacturer.

1) Tan delta measurement and capacitance of each winding to earth (with all other windings earthed) & between all windings connected together to earth.

2) Measurement of Zero sequence impedance.

3) Temperature Rise Test

4) Short Circuit Test

5) Tank Vacuum test

6) Tank Pressure Test

7) Lightning impulse withstand test for line and neutral terminal.

8) Measurement of acoustic noise level.

The above type tests will be conducted by the supplier at their own cost, if the design/ test result of the type-tested transformer differs from those of the offered transformer as per their bid.

8.2.2 STAGE INSPECTION

The supplier shall offer the core, windings and tank of each transformer for inspection by the purchaser’s representative(s). During stage Inspection, 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 H.V and L.V windings, length, breadth, height and thickness of plates of Transformer tank, the quality of fittings and accessories will be taken / determined. The supplier can offer for final inspection of the transformers subject to clearance of the stage Inspection report by the purchaser.

8.2.3 Routine Tests

Transformer routine tests shall include tests stated in latest issue of IS: 2026 (Part –1). These tests shall also include but shall not be limited to the following:

(i) Measurement of winding DC resistance.

(ii) Voltage ratio on each tapping and check of voltage vector relationship.

(iii) Impedance voltage at all tappings.

(iv) Magnetic circuit test as per relevant ISS or CBIP manual or latest standard being followed.

(v) Measurement of Load losses at normal tap and extreme taps.

(vi) No load losses and no load current at rated voltage and rated frequency, also at 25% to 125% of rated voltage in steps.

(vii) Absorption index i.e insulation resistance for 15 seconds and 60 seconds (R 60/R 15) and polarization index i.e Insulation Resistance for 10 minutes and one minute (R 10 mt/R 1 mt).
(viii) Induced over voltage withstand test.
(ix) Separate source voltage withstand test.
(x) Ten delta measurement and capacitance of each winding to earth (with all other windings earthed) & between all windings connected together to earth.
(xi) Measurement of zero sequence impedance
(xii) Tests on on-load tap changer (fully assembled on transformer) as per IEC : 214/1976 and BS: 4571/1970.
(xii) Auxiliary circuit tests
(xiv) Oil BDV tests
(xv) Measurement of neutral unbalance current which shall not exceed 2% of the full rated current of the transformer.
(xvi) Magnetic balance test
(xvii) Leakage test.

Six (6) set of certified test reports and oscillographs shall be submitted for evaluation prior to dispatch of the equipment. The contractor shall also evaluate the test results and shall correct any defect indicated by his and Purchaser’s evaluation of the tests without charge to the Purchaser.

8.4 TANK TESTS

a) Oil leakage Test:

The tank and oil filled compartments shall be tested for oil tightness completely filled with air or oil of viscosity not greater than that of insulating oil conforming to IS : 335 at the ambient temperature and applying a pressure equal to the normal pressure plus 35 KN/m² measured at the base of the tank. The pressure shall be maintained for a period of not less than 12 hours of oil and one hour for air and during that time no leak shall occur.

b) Pressure Test

Where required by the Purchaser, one transformer tank of each size together with its radiator, conservator vessel and other fittings shall be subjected to a pressure corresponding to twice the normal head of oil or to the normal pressure plus 35 KN/m² whichever is lower, measured at the base of the tank and maintained for one hour.

c) Vacuum Test

One transformer tank of each size shall be subjected to the vacuum pressure of 60 mm of mercury. The tanks designed for full vacuum shall be tested at an internal pressure of 3.33 KN/m² (25 mm of mercury) for one hour. The permanent deflection of flat plates after the vacuum has been released shall not exceed the value specified in C.B.I.P. Manual on Transformers (Revised 1999) without affecting the performance of the transformer.

8.5 PRE-SHIPMENT CHECK AT MANUFACTURERS WORKS

i) Check for proper packing and preservation of accessories like radiators, bushings, explosions vent, dehydrating breather, rollers, buchholz relay, control cubicle connecting pipes and conservator etc.

ii) Check for proper provision of bracing to arrest the movement of core and winding assembly inside the tank.

iii) Gas tightness test to conform tightness.
8.6 INSPECTION AND TESTING AT SITE

The Engineer authorized from WESCO, along with the contractor’s site engineer shall carry out detailed inspection covering areas right from the receipt of material up to commissioning stage. An indicative program of inspection as envisaged by the Engineer is given below.

8.6.1 Receipt and Storage Checks
i) Check and record conditions of each package visible parts of the transformers etc for any damage.
ii) Visual check of core and coils before filling up with oil and also check condition of core and winding in general.

8.6.2 Installation Checks
i) Inspection and performance testing of accessories like tap changers etc.
ii) Check choking of the tubes of radiators
iii) Test on oil samples taken from main tank top and bottom and cooling system. Samples should be taken only after the oil has been allowed to settle for 24 hours.
iv) Check the whole assembly for tightness, general appearance etc.
v) Oil leakage tests.

8.6.3 Pre-Commissioning Tests
After the transformer is installed, the following pre-commissioning tests and checks shall be done before putting the transformer in service.

i) Dry out test
ii) Megger Test
iii) DC Resistance measurement of windings
iv) Ratio test on all taps
v) Phase relationship test (Vector grouping test)
vi) Buchholz relay alarm & surge operation test
vii) Low oil level (in conservator) alarm
viii) Temperature Indicators
ix) Marshalling kiosk
x) Protective relays
xi) Magnetising current
xii) Tests on OLTC

8.6.4 The following additional checks shall be made:

i) All oil valves are incorrect position closed or opened as required
ii) All air pocket are cleared.
iii) Thermometer pockets are filled with oil.
iv) Oil is at correct level in the bushing, conservator, diverter switch & tank etc.
v) Earthing connections are made.
vi) Colour of Silica gel is blue.

vii) Bushing arcing horn is set correctly and gap distance is recorded.

Viii) C T polarity and ratio is correct.

8.7 PERFORMANCE

The performance of the transformer shall be measured on the following aspects.

i) The transformer shall be capable of being operated without danger on any tapping at the rated KVA with voltage variations and ± 10% corresponding to the voltage of the tapping.

ii) Radio interference and Noise Level.

iii) The transformer shall be designed with particular attention to the suppression of third and fifth harmonics so as to minimize interference with communication circuits.

8.8 FAULT CONDITIONS

a) The transformer shall be capable of withstanding for **five (5) seconds** without damages any external short circuit to earth.

b) Transformer shall be capable of withstanding thermal and mechanical stresses conveyed by symmetrical or asymmetrical faults on any winding. This shall be demonstrated through calculation as per IS : 2026.

c) Transformer shall accept, without injurious heating, combined voltage and frequency fluctuation which produce the 125% over fluxing condition for one minute.

Certified test report and oscillograms shall be furnished to the Purchaser / Consultant for evaluation as per the schedule of distribution of documents. The Contractor shall also evaluate the test results and rectify the defects in the equipment based on his and the Purchaser’s evaluations of the tests without any extra charges to the Purchaser. Manufacturer’s Test Certificates in respect of all associated auxiliary and ancillary equipment shall be furnished.

The bidder shall state in his proposal the testing facilities available at his works. In case full testing facilities are not available, the bidder shall state the method proposed to be adopted so as to ascertain the transformer characteristics corresponding to full capacity testing.

8.9 WITNESSING OF TESTS AND EXCESSIVE LOSSES

i) The purchaser and or his representative reserve the right to witness any or all test or to accord waiver at its sole discretion.

ii) The Purchaser reserves the right to reject the Transformer if losses exceed the maximum specified as per **Clause No 2. SPECIFIC TECHNICAL REQUIREMENTS (STANDARD CONDITIONS), item-35 & 36** of this specification or if temperature rise of oil and winding exceed the values specified at item -26 of the above clause.
LOSSES:

<table>
<thead>
<tr>
<th>SL.No</th>
<th>Tender No.</th>
<th>Transformer Rating</th>
<th>Maximum No Load Loss in Kw</th>
<th>Maximum Copper Loss in Kw</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>WESCO / CAPEX/33</td>
<td>33/11KV, 8 MVA</td>
<td>4.5</td>
<td>38</td>
</tr>
</tbody>
</table>

N.B : There shall be no positive tolerance to above losses. Capitalization of losses shall not be factored in the comparative statement for selection of vendors.

10.1 SPARE PARTS

In case the manufacturer goes out of production of spare parts, then he shall make available the drawings of spare parts and specification of materials at no extra cost to the Purchaser fabricate of procure spare parts from other sources.

Mandatory Spare Parts

The suppliers shall provide the following mandatory spare s for each of Transformer supplied


2. Bimetallic connector for H.V & L.V. Bushings – Each 2 sets

10.2 INSTRUCTION MANUAL

Eight sets of the instruction manuals shall be supplied at least four (4) weeks before the actual dispatch of equipment. The manuals shall be in bound volumes and shall contain all the drawings and information required for erection, operation and maintenance of the transformer. The manuals shall include amongst other, the following particular:

a) Marked erection prints identifying the components, parts of the transformer as dispatched with assembly drawings.

b) Detailed dimensions, assembly and description of all auxiliaries.

c) Detailed views of the core and winding assembly, winding connections and tapings tap changer construction etc. These drawings are required for carrying out overhauling operation at site.

d) Salient technical particulars of the transformer.

e) Copies of all final approved drawings.

f) Detailed O&M instructions with periodical check lists and Performa etc.

10.3 COMPLETENESS OF EQUIPMENT

All fittings and accessories, which may not be specifically mentioned in the specification but which are necessary for the satisfactory operation of the transformer, shall be deemed to be included in the specification and shall be furnished by the supplier without extra charges. The equipment shall be complete in all details whether such details are mentioned in the
specification or not, without any financial liability to the Purchaser under any circumstances.

11.0  **TOOLS AND TACKLES**
All the necessary tools and tackles required for normal operation & maintenance of the transformers shall be supplied by the Contractor

12.0  **COMMISSIONING**
The equipments shall be commissioned as per CBIP manual, IS: 10028 and manufacturer’s recommendations. All the related drawings and manuals shall be pre-requisite for release of final payment.

13.0  **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.

<table>
<thead>
<tr>
<th>Clause No.</th>
<th>Non Compliance</th>
</tr>
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14.0  **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.

<table>
<thead>
<tr>
<th>Clause No.</th>
<th>Type Test Certificate or Routine test Report</th>
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</thead>
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</table>

N.B : There shall be no positive tolerance to above losses. Capitalization of losses shall not be factored in the comparative statement for selection of vendors.
SECTION – V

LIST OF ANNEXURES

(SCHEDULES AND FORMATS)
TENDER NOTICE NO: \textit{wesco} /CAPEX / Power Transformer / 33 Date: 12.02.2013

\textbf{ABSTRACT OF GENERAL TERMS AND CONDITIONS}

(For supply of Power Transformers)

1. Whether the bidder is a Manufacturer & furnished relevant documents: Yes / No
2. Required Cost of Tender Furnished Yes / No
3. Required Earnest Money Furnished in Demand Draft Yes / No
4. Whether Type test certificates enclosed with the bid: Yes / No
5. Manufacturer’s past supply experience including user’s certificate furnished or not: - Yes / No
6. Audited annual reports for the last 3 years furnished or not: Yes / No
7. Deviation to the specification , if any (List enclosed or not):- Yes / No
8. Whether agreed to Purchaser’s Delivery schedule: Yes / No
   If agreed,
   a) Date of commencement :
   b) Rate of delivery per month :
9. Whether agreed to Purchaser’s Guarantee clause:- Yes / No
10. Whether agreed for 180 days’ validity period of Prices Yes / No
11. Whether the Prices are \textbf{FIRM}? Yes / No
12. Whether agreed to furnish security deposit in shape of B.G. encashable at Bhubaneswar in case his tender is successful: - Yes / No
13. Whether agreed to penalty for delayed delivery: - Yes / No
14. Whether agreed to Purchaser’s standard terms of payment or not: Yes / No
15. Valid ITCC & STCC furnished or not: Yes / No

Signature of the bidder
With seal of the Bidder

This form is to be duly filled up & signed by the Bidder along with seal & submitted along with the Part-I of tender.
DECLARATION FORM

To

Sir,

Having examined the above specifications together with the Tender terms and conditions referred to therein.

1- I / we the undersigned do hereby offer to supply the materials covered thereon in complete shape in all respects as per the rules entered in the attached contract schedule of prices in the tender.

2- I / we do hereby undertake to have the materials delivered within the time specified in the tender.

3- I / we do hereby guarantee the technical particulars given in the tender supported with necessary reports from concerned authorities.

4- I / we do hereby certify to have furnished a copy of the tender specifications by remitting Cash/ Demand draft & this has been duly acknowledged by you in your letter No……………….Dt……………….

5- I / we do hereby agree to furnish the composite Bank Guarantee in the manner specified / acceptable by THE <PURCHASER>& for the sum as applicable to me / us as per clause No.23 in Annexure-III(A) of this specification within fifteen days of issue of Letter of intent / Purchase Order, in the event of Purchase order being decided in my / us favour, failing which I / we clearly understand that the said LOI / P.O. shall be liable to be withdrawn by the Purchaser.

Signed this……………….Day of…………………200….

Yours faithfully,

(Signature of Tenderer with Seal)

(This form should be duly filled up & signed by the bidder & submitted along with the original copy of the bid)
PROFORMA FOR COMPOSITE BANK GUARANTEE FOR SECURITY DEPOSIT, PAYMENT AND PERFORMANCE

This Guarantee Bond is executed this ____ day of ___________________________ by us the ______________________ Bank at ___________________

P.O.__________ P.S. ____________ Dist ________________ State __________

( indicate designation of Purchaser )

Whereas Western Electricity Supply Company of Odisha Ltd. (WESCO) Regd. Office: N 1/22, IRC Village, Nayapalli, Bhubaneswar – 751015 registered under the Company Act 1956 (here in after called “the Purchaser”) has placed Purchase Order No._________ Dt.___________ (hereinafter called “the Agreement”) with M/s_________________ _________________________ (hereinafter called “the Contractor”) for supply of __________________ (name of the material) and whereas WESCO has agreed (1) to exempt the Contractor from making payment of security deposit, (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 Contractor to the WESCO a composite Bank Guarantee of the value of 10% (ten percent) of the Contract price of the said Agreement.

1. Now, therefore, in consideration of WESCO having agreed (1) to exempt the Contractor for making payment of security deposit, (2) to release 100% payment to the Contractor and (3) to exempt from furnishing performance guarantee in terms of the said Agreement as aforesaid, we the ____________________ Bank, Address ____________________________ (code No. ________) (hereinafter referred to as “the Bank”) do hereby undertake to pay to the WESCO an amount not exceeding Rs._____________ (Rupees _________________ ) only against any loss or damage caused to or suffered by WESCO by reason of any breach by the said Contractor(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 the guarantee without any demur, merely on a demand WESCO stating that the amount claimed is due by way of loss or damage caused to or suffered by WESCO by reason of any breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement or by the reason of any breach by the said Contractor’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 _________________ ) only.

3. We, the ________________________ Bank also undertake to pay to WESCO any money so demanded notwithstanding any dispute or dispute raised by the Contractor(s) in any suit or proceeding instituted/ pending before any court or Tribunal relating thereto our liability under this Agreement being absolute and irrevocable. The payment so made by us under this bond shall be valid discharge of our liability for payment there under and the Contractor(s) shall have no claim against us for making such payment.

4. We, the _________________________ Bank further agree that the guarantee herein contain shall remain in full force and affect during the period that would be taken for the performance of the said Agreement and it shall continue to remain in force endurable till all the dues of WESCO under by virtue of the said Agreement have been fully paid and its claim satisfied or discharged or till WESCO certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharge this guarantee and will not be revoked by us during the validity of the guarantee period.

Unless a demand or claim under this guarantee is made on us or with_____________________________ (Local Bank Name, address and code No.) ____________________________ , Bhubaneswar in writing on or before ________________ (date) we shall be discharged from all liability under this guarantee thereafter.

Contd : - P/ 2
5. We, the _________________________ Bank further agree that WESCO 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 Contractor(s) and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractor(s) or for any forbearance act or omission on part of WESCO or any indulgence by WESCO to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provisions have effect of relieving us.

6. The Guarantee will not be discharged due to change in the name, style and constitution of the Bank and or Contractor(s).

7. We, the _________________________ Bank lastly undertake not to revoke this Guarantee during its currency except with the previous consent of WESCO in writing.

Dated ___________ the __________ day of Two thousand _________.

Not withstanding anything contained herein above.

Our liability under this Bank Guarantee shall not exceed Rs.______________ (Rupees _______ ______________________________________________________________________ ) only.

The Bank Guarantee shall be valid up to _____________________ only.

We or our Bank at Bhubaneswar (Name & Address of the Local Bank) are liable to pay the guaranteed amount depending on the filing of claim and any part thereof under this Bank Guarantee only and only if you serve upon us or our local Bank at Bhubaneswar a written claim or demand and received by us or by Local Branch at Bhubaneswar on or before Dt.__________ otherwise bank shall be discharged of all liabilities under this guarantee thereafter.

For _____________________________________

( indicate the name of the Bank )

N.B.:
(1) Name of the Contractor:

(2) No. & date of the Purchase order / agreement:

(3) Amount of P.O. :

(4) Name of Materials :

(5) Name of the Bank:

(6) Amount of the Bank Guarantee:

(7) Name, Address and Code No. of the Local Branch:

(8) Validity period or date up to which the agreement is valid:

(9) Signature of the Constituent Authority of the Bank with seal:

(10) Name & addresses of the Witnesses with signature:

(11) The Bank Guarantee shall be accepted only after getting confirmation from the respective Banks.
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c) Limit for hot spot temperature for which the transformer is designed (°C)
d) Type and details of winding hot spot temperature detector (°C).

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<td>e) Temperature gradient between windings and oil (°C)</td>
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<td>a) Fixed (Iron ) losses of 3 phase Transformer (KW ) at rated voltage &amp;</td>
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<td>b) Load losses at rated current at principal Tap at 75° C (KW )</td>
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<td>percentage of rated voltage at :-</td>
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<td></td>
<td>a) Principal (normal) tap (%)</td>
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<td></td>
<td>b) Highest tap (%)</td>
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<td></td>
<td>c) Lowest tap (%)</td>
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<tr>
<td>18.</td>
<td>Reactance at rated current &amp; frequency as percentage of rated voltage at:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Principal (normal) tap</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) Highest Tap</td>
<td></td>
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<tr>
<td></td>
<td>c) Lowest Tap</td>
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<td>Resistance at 75° C</td>
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<td></td>
<td>a) H.V. winding at normal tap position</td>
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<td></td>
<td>b) L.V. winding</td>
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<tr>
<td></td>
<td>c) Resistance voltage drop at 75° C winding temperature expressed as percent</td>
<td></td>
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<td></td>
<td>of rated voltage (%)</td>
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<tr>
<td></td>
<td>i) Principal/ normal tap</td>
<td></td>
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<td></td>
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<tr>
<td></td>
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<td>a) Separate source power frequency voltage withstand</td>
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<td>b) Induced over voltage withstand</td>
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<td></td>
<td>i) HV winding (KV rms)</td>
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<td></td>
<td>ii) LV winding (KV rms)</td>
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<tr>
<td></td>
<td>c) Full wave lightning impulse withstand voltage</td>
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<td></td>
<td>i) HV winding (KV peak)</td>
<td></td>
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<tr>
<td></td>
<td>ii) LV winding (KV peak)</td>
<td></td>
</tr>
</tbody>
</table>
d) Power frequency high voltage tests
   i) Test voltage for one minute withstand test on high voltage windings (induced)
   ii) Test voltage for one minute withstand test on low voltage windings
   iii) Test voltage for one minute withstand test on neutral end of low voltage windings
e) Lightning impulse withstand tests
   i) Impulse test on high voltage winding 1.2/50 μ sec full wave withstand (KV peak)
   ii) Impulse test on low voltage winding 1.2/50 μ sec full wave withstand (KV peak)
   iii) Wave form for impulse test

22. No load current, no load loss, no load power factor at normal ratio and frequency (Amp/ KW/ P.F.)
   a) 10 percent of rated voltage
   b) 25 percent of rated voltage
   c) 50 percent of rated voltage
   d) 85 percent of rated voltage
   e) 100 percent of rated voltage
   f) 105 percent of rated voltage
   g) 110 percent of rated voltage
   h) 112.5 percent of rated voltage
   i) 115 percent of rated voltage
   j) 120 percent of rated voltage
   k) 125 percent of rated voltage

23. Efficiency at 75° C at unity power factor
   a) Full load
   b) 75% load
   c) 50% load
   d) 25% load

24(a) The minimum percentage of load at which the transformer will run at maximum efficiency (%)
b) Maximum efficiency of the transformer

25. Regulation at full load at 75° C
   a) At unity power factor (%)
   b) At 0.8 power factor (lagging) (%)

26. Core data
   a) Grade of core material used
   b) Thickness of core plate lamination (mm)
   c) Whether core laminations are of cold rolled grain oriented
   d) Details of oil ducts in core
      i) Whether in the plane & at right angle to the plane of winding
      ii) Across the plane of lamination

<table>
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<th>Sl. No.</th>
<th>Description</th>
<th>Bidder's offer</th>
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<tbody>
<tr>
<td>c)</td>
<td>i) Insulation of core lamination</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii) Insulation of core plates</td>
<td></td>
</tr>
</tbody>
</table>
### Flux density

- **a)** Designed maximum flux density at normal tap at rated voltage and rated frequency (Tesla)
- **b)** Operating continuous flux density (Tesla)
    - i) at normal tap
    - ii) at maximum tap
    - iii) at minimum tap
- **c)** Designed maximum operating flux density which the transformer can withstand for one minute at normal tap (Tesla)
- **d)** Designed maximum operating flux density which the transformer can withstand for five seconds at normal tap (Tesla)

### Inter-Tap insulation

- **a)** Extent of extreme end turns reinforcement
- **b)** Extent of end turns reinforcement
- **c)** Extent of turn adjacent to tapping reinforced
- **d)** Test voltage for 10 seconds 50Hz inter-turn insulation test on (a)
- **e)** Test voltage for 10 seconds 50Hz inter-turn insulation test on (b)
- **f)** Test voltage for 10 seconds 50Hz inter-turn insulation test on (c)

### Windings:

- **a)** Material
- **b)** Type of windings:
    - i) HV windings
    - ii) LV windings
- **c)** Insulation of HV windings
- **d)** Insulation of LV windings
- **e)** Insulation between HV & LV windings

### Continuous rating under following conditions:

- **a)** At 40°C ambient air temp. at site
- **b)** At 30°C ambient air temp. at site
- **c)** At 20°C ambient air temp. at site

### Transformer Tank

- **a)** Material
- **b)** Thickness
    - Top
    - Sides
    - Bottom
- **c)** Details of painting
    - Inner surface
    - Outer surface

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<th>Bidder's offer</th>
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<td>b) Over-all length (mm)</td>
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<td>c) Over-all breadth (mm)</td>
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<td>33.</td>
<td>Weight data of transformer components : (Tolerance + 5% ) (approximate values not allowed)</td>
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<td>Sl. No.</td>
<td>Description</td>
<td>Bidder's offer</td>
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<tr>
<td>--------</td>
<td>-------------------------------------------------------------------------------------------------</td>
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<tr>
<td>a)</td>
<td>Core excluding clamping (Kg)</td>
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</tr>
<tr>
<td>b)</td>
<td>Core with clamping (Kg)</td>
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</tr>
<tr>
<td>c)</td>
<td>HV winding insulated conductor (Kg)</td>
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<td>d)</td>
<td>LV winding Insulated conductor (Kg)</td>
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<td>e)</td>
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<td>f)</td>
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<td>g)</td>
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<tr>
<td>h)</td>
<td>Fittings and accessories (Kg)</td>
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<tr>
<td>i)</td>
<td>Oil required for first filling including 10% extra (Ltrs / Kg)</td>
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<td>1. Oil in main tank (Ltrs)</td>
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<td>ii)</td>
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<td>iii)</td>
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<td>g)</td>
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<td></td>
<td>- phase to earth (mm)</td>
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<td>p)</td>
<td>Maximum pressure of immersing medium (oil) Kg/ cm²</td>
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<td>q)</td>
<td>Free space required at top for removal of bushings (mm)</td>
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35. Details of CT to be provided in the neutral for REF protection.
   a) Outdoor bushing type
   b) No. of cores and their function
   c) Location (Line / Neutral)
   d) Current rating for various cores (Primary / Secondary)
   e) VA burden / Knee Point voltage (Core wise)
   f) Magnetising current at half knee point voltage. (mA)
   g) Classification (PS class) core wise
   h) Test voltage
   i) Construction details

36. Conservator (Main Transformer and OLTC)
   a) Total volume of the Conservator (Cub mtr / Ltr.)
   b) Volume of the conservator between the highest and lowest level (Cubic mtr. / Ltrs )

37. Calculated time constants for natural cooling

38. Type of axial coil supports :
   a) HV winding
   b) LV winding

39. Details of On Load tap changer
   a) Make
   b) Type
   c) Rating
      i) Rated Voltage
      ii) Rated current
      iii) Step voltage
      iv) Number of steps
   d) Whether Diverter switch provided with gas vent and buchholz relay (Yes / No)
   e) Whether a separate oil surge relay with trip contacts provided (Yes / No)
   f) Pressure relief valve
   g) Details of motor device unit housed in kiosk / mounted on tap changer

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<thead>
<tr>
<th>Sl. No.</th>
<th>Description</th>
<th>Bidder's offer</th>
</tr>
</thead>
<tbody>
<tr>
<td>h)</td>
<td>Whether Remote control panel provided with Control scheme for simultaneous</td>
<td></td>
</tr>
<tr>
<td></td>
<td>operation of Tap changer when transformers are running in parallel and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>independent control when in independent operation.</td>
<td></td>
</tr>
<tr>
<td>i)</td>
<td>Details of equipment in the OLTC kiosk</td>
<td></td>
</tr>
<tr>
<td>j)</td>
<td>Details of OLTC panels</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) automatic tap changer relay</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii) literature of all the relays</td>
<td></td>
</tr>
<tr>
<td></td>
<td>iii) dimensions of OLTC, Panel L x B x H</td>
<td></td>
</tr>
<tr>
<td></td>
<td>iv) thickness of sheet</td>
<td></td>
</tr>
<tr>
<td></td>
<td>v) degree of protection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>vi) details of equipment supplied</td>
<td></td>
</tr>
</tbody>
</table>

40. Dispatch details :
   a) Approx. mass of heaviest Package (Kg)
   b) Approx. dimensions of largest Package
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Description</th>
<th>Bidder's offer</th>
</tr>
</thead>
<tbody>
<tr>
<td>i)</td>
<td>Length (mm)</td>
<td></td>
</tr>
<tr>
<td>ii)</td>
<td>Breadth (mm)</td>
<td></td>
</tr>
<tr>
<td>iii)</td>
<td>Height (mm)</td>
<td></td>
</tr>
<tr>
<td>41.</td>
<td>Un-tanking height (mm)</td>
<td></td>
</tr>
<tr>
<td>42.</td>
<td>Bimetallic connectors HV / LV</td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>Normal current rating (A)</td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>Short time current rating (A)</td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>Tensile strength (Kg)</td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>Maximum temperature limit</td>
<td></td>
</tr>
<tr>
<td>e)</td>
<td>Dimensional sketch enclosed indicating tolerances (Yes/No)</td>
<td></td>
</tr>
<tr>
<td>f)</td>
<td>Minimum clearance (mm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Phase to phase</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Phase to Earth</td>
<td></td>
</tr>
<tr>
<td>43.</td>
<td>CORE ASSEMBLY :-</td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>Core diameter (mm)</td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>Core window height (mm)</td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>Core leg centre (mm)</td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>Gross core cross – sectional area (m²)</td>
<td></td>
</tr>
<tr>
<td>e)</td>
<td>Total height of core (mm)</td>
<td></td>
</tr>
<tr>
<td>f)</td>
<td>Details of top end frame</td>
<td></td>
</tr>
<tr>
<td>g)</td>
<td>Details of Bottom end frame</td>
<td></td>
</tr>
<tr>
<td>h)</td>
<td>Details of clamp plate (material, thickness, insulation)</td>
<td></td>
</tr>
<tr>
<td>i)</td>
<td>Total core weight (Kg)</td>
<td></td>
</tr>
<tr>
<td>j)</td>
<td>Core loss, basing on core loss graph at operating flux density (rated voltage and rated frequency) (KW)</td>
<td></td>
</tr>
<tr>
<td>k)</td>
<td>Core stacking factor</td>
<td></td>
</tr>
<tr>
<td>l)</td>
<td>Net core area (Sq.m)</td>
<td></td>
</tr>
<tr>
<td>m)</td>
<td>Margin towards corner joints, cross-fluxing, dielectric loss (KW)</td>
<td></td>
</tr>
<tr>
<td>n)</td>
<td>Total core loss at rated voltage and rated frequency (KW)</td>
<td></td>
</tr>
<tr>
<td>o)</td>
<td>Describe location / method of core grounding</td>
<td></td>
</tr>
<tr>
<td>p)</td>
<td>Details of core- belting</td>
<td></td>
</tr>
<tr>
<td>i)</td>
<td>Material, grade and type</td>
<td></td>
</tr>
<tr>
<td>ii)</td>
<td>Width</td>
<td></td>
</tr>
<tr>
<td>iii)</td>
<td>Thickness</td>
<td></td>
</tr>
<tr>
<td>iv)</td>
<td>Fixing method</td>
<td></td>
</tr>
<tr>
<td>44.</td>
<td>DETAILS OF WINDING</td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>Type of winding</td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>Material of the winding conductor</td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>Maximum current density of windings at rated current and conductor area</td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>Whether windings are pre-shrunk ?</td>
<td></td>
</tr>
<tr>
<td>e)</td>
<td>Whether adjustable coil clamps are provided for HV and LV windings ?</td>
<td></td>
</tr>
<tr>
<td>f)</td>
<td>Whether steel rings are used for the windings ? If so, whether these are split ?</td>
<td></td>
</tr>
</tbody>
</table>
g) Whether electrostatic shields are provided to obtain uniform voltage distribution in the windings?

h) Winding Insulation (Type & Class)
   i) Insulating material, used for
      i) H.V winding
      ii) L.V winding
      iii) Tapping connection
   j) Insulating material used between
      i) L.V and H.V winding
      ii) Core & L.V winding

k) H.V to H.V winding between phases

l) Type of axial supports
   i) H.V winding
   ii) L.V winding

m) Type of radial supports
   i) H.V winding
   ii) L.V winding

n) Maximum allowable torque on coil clamping bolts

o) Clamping ring details
   i) Thickness of ring mm
   ii) Diameter of ring mm
   iii) No. & size of pressure screw

p) Bare conductor size (mm²)
   i) HV
   ii) LV

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Description</th>
<th>Bidder's offer</th>
</tr>
</thead>
<tbody>
<tr>
<td>q)</td>
<td>Insulated conductor size (mm²)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) HV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii) LV</td>
<td></td>
</tr>
<tr>
<td>r)</td>
<td>No. of conductor in parallel (Nos.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) HV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii) LV</td>
<td></td>
</tr>
<tr>
<td>s)</td>
<td>No. of turns / phase</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) HV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii) LV</td>
<td></td>
</tr>
<tr>
<td>t)</td>
<td>No. of discs / phase</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) HV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii) LV</td>
<td></td>
</tr>
<tr>
<td>u)</td>
<td>No. of turns / Disc</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) HV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii) LV</td>
<td></td>
</tr>
<tr>
<td>v)</td>
<td>Gap between discs (mm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) HV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii) LV</td>
<td></td>
</tr>
<tr>
<td>w)</td>
<td>Inside diameter (mm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) HV</td>
<td></td>
</tr>
<tr>
<td>Sl. No.</td>
<td>Description</td>
<td>Bidder's offer</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td></td>
<td>d) Any special measures, taken to reduce eddy current losses and stray losses. Mention in details</td>
<td></td>
</tr>
<tr>
<td>i)</td>
<td>Outside diameter (mm)</td>
<td></td>
</tr>
<tr>
<td>ii)</td>
<td>LV</td>
<td></td>
</tr>
<tr>
<td>x)</td>
<td>Axial height after shrinkage (mm)</td>
<td></td>
</tr>
<tr>
<td>i)</td>
<td>HV</td>
<td></td>
</tr>
<tr>
<td>ii)</td>
<td>LV</td>
<td></td>
</tr>
<tr>
<td>y)</td>
<td>D.C Resistance</td>
<td></td>
</tr>
<tr>
<td>i)</td>
<td>L.V winding at 75° C (Ohms)</td>
<td></td>
</tr>
<tr>
<td>ii)</td>
<td>H.V winding at normal tap at 75° C (Ohms)</td>
<td></td>
</tr>
<tr>
<td>iii)</td>
<td>H.V winding at highest tap at 75° C (Ohms)</td>
<td></td>
</tr>
<tr>
<td>iv)</td>
<td>H.V winding at lowest tap at 75° C (Ohms)</td>
<td></td>
</tr>
<tr>
<td>v)</td>
<td>Total I²R losses at 75° C for normal tap (KW)</td>
<td></td>
</tr>
<tr>
<td>vi)</td>
<td>Total I²R losses at 75° C for highest tap (KW)</td>
<td></td>
</tr>
<tr>
<td>vii)</td>
<td>Total I²R losses at 75° C for lowest tap (KW)</td>
<td></td>
</tr>
<tr>
<td>viii)</td>
<td>Stray losses including eddy current losses in winding at 75° C (KW)</td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>Normal tap position</td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>Highest tap position</td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>Lowest tap position</td>
<td></td>
</tr>
<tr>
<td>ix)</td>
<td>Load losses at 75° C (I²R + Stray)</td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>Normal tap position (KW)</td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>Highest tap position (KW)</td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>Lowest tap position (KW)</td>
<td></td>
</tr>
<tr>
<td>x)</td>
<td>Details of special arrangement, provided to improve surge voltage distribution in the windings.</td>
<td></td>
</tr>
</tbody>
</table>

**45. DETAILS OF TANK:**

<p>| a)     | Material of Transformer tank                                                                                                                  |                |
| b)     | Type of tank                                                                                                                                |                |
| c)     | Thickness of sheet (No approximate value to be mentioned)                                                                                     |                |
| i)     | Sides (mm)                                                                                                                                  |                |
| ii)    | Bottom (mm)                                                                                                                                  |                |
| iii)   | Cover (mm)                                                                                                                                   |                |
| iv)    | Radiators (mm)                                                                                                                               |                |
| d)     | Inside dimensions of main tank (No approximation in dimensions to be used)                                                                  |                |
| i)     | Length (mm)                                                                                                                                  |                |
| ii)    | Breadth (mm)                                                                                                                                  |                |
| iii)   | Height (mm)                                                                                                                                  |                |
| e)     | Outside dimensions of main tank (No approximation in dimensions to be used)                                                                  |                |
| i)     | Length (mm)                                                                                                                                  |                |
| ii)    | Breadth (mm)                                                                                                                                  |                |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>iii) Height (mm)</td>
<td></td>
</tr>
<tr>
<td>f) Vacuum recommended for hot oil circulation (torr / mm of Hg)</td>
<td></td>
</tr>
<tr>
<td>g) Vacuum to be maintained during oil filling in transformer tank (torr / mm of Hg)</td>
<td></td>
</tr>
<tr>
<td>h) Vacuum to which the tank can be subjected without distortion (torr / mm of Hg)</td>
<td></td>
</tr>
<tr>
<td>i) No. of bi-directional wheels provided</td>
<td></td>
</tr>
<tr>
<td>j) Track gauge required for the wheels</td>
<td></td>
</tr>
<tr>
<td>i) Transverse axis</td>
<td></td>
</tr>
<tr>
<td>ii) Longitudinal axis</td>
<td></td>
</tr>
<tr>
<td>k) Type and make of pressure relief device and minimum pressure at which it operates (Kpa)</td>
<td></td>
</tr>
<tr>
<td>46. CONSERVATOR :-</td>
<td></td>
</tr>
<tr>
<td>a) Thickness of sheet (mm)</td>
<td></td>
</tr>
<tr>
<td>b) Size (Dia x length) (mm)</td>
<td></td>
</tr>
<tr>
<td>c) Total volume (Litres)</td>
<td></td>
</tr>
<tr>
<td>d) Volume between the highest and lowest visible oil levels (Litres)</td>
<td></td>
</tr>
</tbody>
</table>
### Annexure- V

**Price Schedule for Materials/ Equipments Offered as per Tender Notice No WESCO /CAPEX / Power Transformer / 33 Date: 12.02.2013**

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Item Description</th>
<th>Quantity</th>
<th>Ex-Works Price (Rs.)</th>
<th>Packing &amp; Forwarding Charges (Rs.)</th>
<th>Excise Duty with education cess (Rs.)</th>
<th>Sales Tax/ VAT (Rs.)</th>
<th>Freight &amp; insurance and other local costs incidental to delivery (Rs.)</th>
<th>Entry Tax, if any (Rs.)</th>
<th>Total Unit Price inclusive of taxes &amp; duties (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>33/11 KV, 8 MVA Power Transformer</td>
<td>Nos 19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11 = (5+6+7+8+9)</td>
</tr>
</tbody>
</table>

**Note:**
1. Any column left blank shall be treated as NIL / Inclusive of.
2. Unit price under Column-11 is inclusive of all.
3. In case of discrepancy between unit price and total price, the unit price shall prevail over the total price.

The above is to be duly filled up, signed and submitted in sealed condition in a separate envelop superscribed as “Part-II Bid – Price Bid”
### ANNEXURE VI (A)

(TECHNICAL DEVIATION FORMAT)

<table>
<thead>
<tr>
<th>Clause No</th>
<th>Prescribed as per Tender Specification</th>
<th>Deviation in the bidder's Offer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bidder's Signature with Seal.

**N.B:**

The bidder has to mention all technical deviations in his offer which differs from the Technical Requirement of this Tender in above format. Deviations not mentioned in above format but mentioned in any other format or in any other part of the offer document shall not be considered as deviation and the bidder shall be deemed to have accepted our technical requirement without deviation.
## COMMERCIAL DEVIATION FORMAT

<table>
<thead>
<tr>
<th>Clause No</th>
<th>Prescribed as per Tender Specification</th>
<th>Provided in the bidder's Offer</th>
</tr>
</thead>
</table>

Bidder’s Signature with Seal.

**N.B:**
The bidder has to mention all commercial deviations in his offer which differs from the Commercial Requirement of this Tender in above format. Deviations not mentioned in this format but mentioned in any other format or in any other part of the offer document shall not be considered as deviation and the bidder shall be deemed to have accepted our commercial requirement without deviation.
ANNEXURE – VII

Format for Consortium Agreement

(On non-judicial stamp paper of appropriate value to be purchased in the name of executants companies or as required by the jurisdiction in which executed)

This Consortium Agreement executed on this, ............... day of ...............Two Thousand......................By:

M/s ........................................a Company (SSI Unit) incorporated under the companies Act – 1956 ........................................and having its registered office at .........................(hereinafter called the “Lead Member/First member” which expression shall include its successors); and

M/s ........................................a company (SSI Unit) incorporated under the Companies Act – 1956 ........................................and having its registered office at .........................(hereinafter called the “Second Member” which expression shall include its successors);

M/s ........................................a company (SSI Unit) incorporated under the Companies Act-1956........................................and having its registered office at ......................... (hereinafter called the “Fourth Member” which expression shall include its successors)

The Lead Member/First Member, the Second Member, the Third Member and the Forth Member shall collectively hereinafter be called as the “Consortium Members” for the purpose of submitting a bid proposal to Western Electricity Supply Company of Odisha Ltd. (WESCO) (Hereinafter referred to as DISCOMs) , being a Company incorporated/Constituted under the Companies Act,1956 having its registered office at N 1/22, IRC Village, Nayapalli, Bhubaneswar - 751015,India (hereinafter called the “Purchaser”)in response to the invitation of bids (hereinafter called as “Tender Notice No………” Document) Dated ............. for supply of Materials/Equipments (hereinafter called as “the Transaction”).

WHEREAS Clause-6.1.2 of the Invitation for Bids (IFB),stipulates that Two or more Local SSI Units having been manufacturers of tender item(s) as per this tender specification, provided they fulfill the following eligible criteria;

a) They should have legally valid consortium agreement as per the prescribed format for the purpose of participation in the bidding process. The total no of a consortium shall be limited to four members.
b) All members of the Consortium should be the eligible manufacturer(s) of the materials / equipments tendered.
c) Each member should have valid statutory license to use BEE three star or more level Certification/Type tested report for the tendered materials/equipments conducted within last five years as applicable for the tender.
d) Consortium as a whole shall meet the qualifying norms specified in the tender, they participate.
e) The lead member of the Consortium should meet at least 50% of the qualifying norms in respect of the supply experience.
f) Besides the lead member, other member(s) of the Consortium should meet at least 15% of the qualifying norms in respect of the supply experience.

g) All the Consortium member(s) shall authorize the lead partner by submitting a power of Attorney as per the prescribed format duly signed by the authorized signatories. The lead partner shall be authorized to receive instructions for and on behalf of all partners of the Consortium and entire execution of the contract including receipt of payment exclusively done through the lead partner.

h) The Consortium and its members shall be jointly and severally responsible and be held liable for the purpose of guaranteed obligation and any other matter as required under the contract.

i) Any member of the Consortium member(s) shall not be eligible either in an individual capacity or part of any other consortium to participate in the tender, where the said consortium participates.

j) The prescribed formats for Consortium Agreement (Annexure – VII) and Power of Attorney (Annexure – VIII) are provided in the tender specification as enclosures.

AND WHEREAS the members of the Consortium strictly comply the eligible criteria of the CLAUSE -6.1.2 of the Invitation for Bids (IFB) as stipulated above,

AND WHEREAS bid has been proposed to be submitted to the purchaser vide bid by Lead Member based on this CONSORTIUM agreement between all the members, signed by all the members.

NOW THIS INDENTURE WITNESSETH AS UNDER:

In consideration of the above premises, in the event of the selection of Consortium as successful bidder, all the Parties to this Consortium Agreement do hereby agree abide themselves as follows:

1. M/s ……………………….shall act as Lead Member for and on behalf of Consortium Members. The said Consortium members further declare and confirm that they shall jointly and severally be bound and shall be fully responsible to the Purchaser for the design, manufacture, supply, and successful performance of the materials /equipment, obligations under the supply contract under Agreement(s) submitted/executed by the Lead Member.

2. Despite any breach by the Lead Member or other member(s) of the CONSORTIUM agreement, the Member(s) do hereby agree and undertake to ensure full and effectual an successful performance of the contract with Purchaser and to carry out all the obligations and responsibilities under the said Contract in accordance with the requirements of the Contract.

3. If the Purchaser suffers any loss or damage on account of any breach of the Contract or any shortfall in the performance in meeting the performance guaranteed as per the specification in terms of the Contract, the Member(s)of these presents undertake to promptly make such loss or damage caused to the purchaser, on its demand without any demur. It shall not be necessary or obligatory for the purchaser to proceed against Lead member to these presents before proceeding against or dealing with the other members. The obligation of each of the member is absolute and not independent of the consortium or any member.

4. The financial liability of the members of this CONSORTIUM agreement to the Purchaser, with respect to any of the claims arising out of the performance or non- performance of the obligations set forth in the said CONSORTIUM agreement, read in conjunction with relevant conditions of the contract shall, however, not be limited in anyway so as to restrict or limit the liabilities of any of the members of the CONSORTIUM agreement. The liability of each member is absolute and not severable.

5. It is expressly understood and agreed between the members to this CONSORTIUM agreement that the responsibilities inter se amongst the members shall not in any way be a
limitation of joint and several responsibilities and liabilities of the Members to the Purchaser. It is clearly understood that the lead member shall ensure performance under the agreement(s) and if one or more Consortium members fail to perform its/their respective obligations under the agreements, the same shall be deemed to be a default by all the Consortium Members. It will be open for the purchaser to take any steps, punitive and corrective action including the termination of contract in case of such default also.

6. This CONSORTIUM agreement shall be construed and interpreted in accordance with the laws of India and shall be subjected to exclusive jurisdiction within Bhubaneswar in all matters arising there under.

7. In case of an award of a Contract, all the members to the CONSORTIUM agreement do hereby agree that they shall be jointly and severally responsible for furnishing a contract performance security from a bank in favour of the purchaser in the forms acceptable to purchaser for value of 10% of the Contract price. It is also hereby agreed that the lead member shall, on behalf of the CONSORTIUM submit the contract performance security in the form of an unconditional irrecoverable Bank guarantee in the prescribed format and as per terms of the contract.

8. It is further agreed that the CONSORTIUM agreement shall be irrevocable and shall form an integral part of the Contract, and shall continue to be enforceable till the Purchaser discharges the same. It shall be effective from the date first mentioned above for all purposes and intents.

9. Capitalized terms used but not defined herein shall have the meaning as assigned to them to the Tender Documents and/or the agreements.

10. In case of any dispute amongst the members of the Consortium, purchaser shall not be in any way liable and also the consortium members shall not be absolved from the contractual obligation in any manner.

**IN WITNESS WHEREOF** the Members to the CONSORTIUM agreement have through their authorized representatives executed these presents and affixed Common Seals of their companies, on the day, month and year first mentioned above.

1. Common Seal of <………..> For Lead/First Member
   Has been affixed in my/our presence
   Pursuant to the Board of Director’s resolution dated………………

   Signature………………………….
   ……………………………
   Name………………………….
   Designation……………………

2. Common Seal of <………..> For Second Member
   Has been affixed in my/our presence
   Pursuant to the Board of Director’s resolution dated………………

   Signature………………………….
   ……………………………
   Name………………………….
   Designation……………………
Representative)
Name .......................... Designation

Common Seal of the company
........................................

3. Common Seal of <…………………..>  
For Third Member
Has been affixed in my/our presence 
Pursuant to the Board of Director’s 
resolution dated……………… 
(Signature of authorized 
representative)
Name .......................... Designation

Common Seal of the company
........................................

4. Common Seal of <…………………..>  
For Fourth Member
Has been affixed in my/our presence 
Pursuant to the Board of Director’s 
resolution dated……………… 
(Signature of authorized 
representative)
Name .......................... Designation

Common Seal of the company
........................................

WITNESSES

1. .......................... 2. ..........................
(Signature) (Signature)
Name .......................... Name ..........................
(Official address) (Official address)

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ANNEXURE – VIII

FORM OF POWER OF ATTORNEY FOR CONSORTIUM

(On Non-Judicial Stamp Paper of Appropriate value to be purchased in the Name of CONSORTIUM)

KNOW ALL MEN BY THESE PRESENTS THAT WE, the Members whose details are given hereunder……………………have formed a CONSORTIUM and having our Registered Office (s)/Head Office (s) at …………………………………… (hereinafter called the ‘Consortium’ which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators and assigns) do hereby constitute, nominate and appoint M/s …………………………………. A company incorporated under the laws of ……………… and having its Registered/Head office at ……………….as our duly constituted lawful Attorney (hereinafter called “Lead Member”) to exercise all or any of the powers for supply ……………………………………….for which bids have been invited by the Purchaser namely Western Electricity Supply Company of Odisha Ltd. (WESCO) to undertake the following acts:

(i) To submit proposal, participate and negotiate in respect of the aforesaid Bid – Specification of the Purchaser on behalf of the “Consortium”
(ii) To negotiate with Purchaser the terms and conditions for award of the contract pursuant to the aforesaid Bid and to sign the contract with the Purchaser for and on behalf of the “Consortium”
(iii) To do any other act or submit any document related to the above.
(iv) To receive, accept and execute the contract for and on behalf of the “Consortium”.
(v) To submit the contract performance security in the form of an unconditional irrecoverable Bank guarantee in the prescribed format and as per terms of the contract.

It is clearly understood that the Lead Member shall ensure performance of the contracts(s) and if one or more Member fail to perform their respective portion of the contracts (s), the same shall be deemed to be a default by all the members.

It is expressly understood that this power of Attorney shall remain valid binding and irrevocable till completion of the defect or liability period in terms of the contract.

The CONSORTIUM hereby agrees and undertakes to ratify and confirm all the whatsoever the said Lead Member quotes in the bid, negotiates and signs the contract with the Purchaser and / or proposes to act on behalf of the CONSORTIUM by virtue of this Power of Attorney and the same shall bind the CONSORTIUM as if done by itself.

IN WITNESS THEREOF the members Constituting the CONSORTIUM as aforesaid have executed these presents on this ……………..day of ……………under the Common Seal (s) of their Companies.

For and on behalf of
the Members of CONSORTIUM
The Common Seal of the above Members of the CONSORTIUM:

The Common Seal has been affixed there unto in the presence of:

WITNESS

1. Signature…………………………..
   Name……………………………..
   Designation…………………………
   Occupation…………………………

2. Signature…………………………..
   Name……………………………..
   Designation…………………………
   Occupation…………………………
ANNEXURE-IX

SELF DECLARATION FORM

Name of the Purchaser: -------------------------

Tender Notice No: -----------------------------

Sir,

1. I / we, the undersigned do hereby declare that, I / we have never ever been blacklisted and / or there were no debarring actions against us for any default in supply of material / equipments or in the performance of the contract entrusted to us in any of the Electricity Utilities of India.

2. In the event of any such information pertaining to the aforesaid matter found at any given point of time either during the course of the contract or at the bidding stage, my bid/contract shall be liable for truncation / cancellation / termination without any notice at the sole discretion of the purchaser.

Place-

Date-

Yours faithfully,

Signature of the bidder
With seal

(This form shall be duly filled-up and signed by the bidder & submitted along with the original copy of the Bid.)
ANNEXURE – X (A)

PROFORMA FOR BANK GUARANTEE FOR EARNEST MONEY DEPOSIT
(ON NON-JUDICIAL STAMP PAPER OF Rs.100/-)

Ref Date Bank Guarantee No:

In accordance with invitation to Tender Notice No.-------- Dated ---------- of Western Electricity Supply Company of Orissa Ltd. [herein after referred to as the WESCO] for the purchase of __________________________________________________________ (name of Material)
M/s_________________________________Address______________________________________________
wish/wished to participate in the said tender and as the Bank Guarantee for the sum of Rs.__________________ [Rupees ___________________________]
Valid for a period of .......... days (in words) is required to be submitted by the Bidder.

1. We the __________________________ [Indicate the Name of the Bank] [Hereinafter referred to as ‘the Bank’] at the request of M/S ___________________________________________________________ [Herein after referred to as supplier (s)] do hereby unequivocally and unconditionally guarantee and undertake to pay during the above said period, on written request by WESCO an amount not exceeding Rs.________________________ to the WESCO, without any reservation. The guarantee would remain valid up to 4.00 PM of _______________ [date] and if any further extension to this is required, the same will be extended on receiving instructions from M/s ________________________________________ on whose behalf this guarantee has been issued.

2. We the __________________________ [Indicate the name of the bank] do hereby further undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the WESCO stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the WESCO 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.________________________ (in wards)

3. We, the _____________ Bank undertake to pay the WESCO any money so demanded not withstanding any dispute or disputes so raised by the supplier [s] in any suit or proceeding instituted/pending before any Court or Tribunal relating thereto, our liability under this agreement 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 __________ Bank [Indicate the name of the bank] or our local branch at Bhubaneswar further agree that the guarantee herein contain shall remain in full force and effect during the aforesaid period of ____________ days and it shall continue to be so enforceable till all the dues of the WESCO under by virtue of the said Bid have been fully paid and its claims satisfied or discharged or till WESCO 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 ________________ (date) we shall be discharged from all liability under this guarantee thereafter.

5. We, the __________ Bank [Indicate the name of the bank] or our local branch at Bhubaneswar further agree that the WESCO shall have the fullest liberty without our consent and without affecting in any manner our obligations here under 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 WESCO 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 WESCO or any indulgence by the WESCO 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, the __________ Bank or our local branch at Bhubaneswar lastly undertake not revoke this Guarantee during its currency except with the previous consent of the WESCO in writing.

8. We, the __________________________ Bank further agree that this guarantee shall also be invokable at our place of business at Bhubaneswar [Indicate name, address & branch code of the local branch at BBSR] in the State of Orissa.

Dated ______________________ Day of 2013.

Witness ((Signature, names & address) For ________ [Indicate the name of Bank]
1. Power of Attorney No.______
2. Date: __________
ANNEXURE- X (B)

FORM OF EXTENSION OF BANK GUARANTEE
(ON NON-JUDICIAL STAMP PAPER OF Rs.100/-)

Ref. No. _______________
Dated: __________

WESCO Ltd.,
Regd. Office: N1/22, IRC Village, Nayapalli
Bhubaneswar - 751015

Dear Sirs,

Sub: Extension of Bank Guarantee No. ___________ for Rs. ___________ favouring yourselves
expiring ___________ on account of M/s. ___________ in respect of contract
No. ___________ dated ___________ (hereinafter called original bank guarantee).

At the request of M/s. ___________ we ___________ bank Branch office at ______ having
its head office at ___________ do hereby extend our liability under the above mentioned
guarantee No. ___________ Dated ___________ for a further period of ______ Years/months from
_________ to expire on ___________ except as provided above, all other terms and conditions of the
original bank guarantee No. ___________ dated ___________ shall remain unaltered and binding.

Please treat this as an integral part of the original guarantee to which it would be attached.

Yours faithfully,
For ___________
Manager/Agent/Accountant
Power of Attorney No. ___________
Date: ___________

SEAL OF BANK
Note: The non-judicial stamp paper of worth Rs.100/- shall be purchased in the name of the bank, which has issued the bank guarantee.

ANNEXURE- XI

FORMAT FOR PAST SUPPLY EXPERIENCE

NAME OF THE BIDDER: -

TENDER NOTICE NO: WESCO/CAPEX/Power Transformer / 33 Dated: 12.02.2013

DETAILS OF PURCHASE ORDER(S) EXECUTED DURING FY 2009-10 to 2011-12

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>P.O. No.</th>
<th>Date</th>
<th>Order Qty</th>
<th>Name of the Purchaser</th>
<th>Quantity Supplied during</th>
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<td>TOTAL</td>
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</table>

I/We certify as under:

(i) The above information is true to the best of my / our knowledge and I / we undertake to produce the invoice details on demand.

(ii) In the event of any deviation found later on pertaining to any of the above information either during the course of contract or bidding stage, the bid/contract shall be liable for truncation/cancellation/termination without any notice at the sole discretion of the purchaser.

Signature of the bidder with seal

NOTE: - Self attested photo copies of all Purchase Orders mentioned (all pages) need to be enclosed along with the above format.