TP CENTRAL ODISHA DISTRIBUTION LIMITED
(A Tata Power & Odisha Govt. joint venture)
2nd Floor, IDCO Tower, Janpath, Bhubaneshwar, Odisha 751022

OPEN TENDER NOTIFICATION

FOR

Supply of 2.5MVA and 3.15MVA Power Transformer

Tender Enquiry No.: TPCODL/P&S/1000000164/2021-22

Due Date for Bid Submission: 01st February-2022 [17:00 Hrs.]

TP Central Odisha Distribution Limited
(A TATA Power and Odisha Government Joint Venture)
Procurement & Stores Department,
2nd Floor, IDCO Towers, Janpath, Bhubaneswar – 751022

TP CENTRAL ODISHA DISTRIBUTION LIMITED
(A Tata Power & Odisha Govt. joint venture)
2nd Floor, IDCO Tower, Janpath, Bhubaneshwar, Odisha 751022

Procedure to Participate in E-Tender

Tender Enquiry No- TPCODL/P&S/1000000164/2021-22

Tender Enquiry No	Work Description	EMD (Rs.)	Tender Participation Fee (Rs.)	Last Date and Time for payment of Tender Participation Fee
TPCODL/ P&S/1000 000164/20 21-22	OPEN TENDER NOTIFICATION FOR Supply of 2.5MVA and 3.15MVA Power Transformer	1.50 Lakh	5,000/-	21.01.2022, 17:00 Hours

*** EMD is exempted for MSMEs registered in the State of Odisha.**

**** MSMEs registered in the State of Odisha shall pay tender fee of Rs. 1,000/- including GST. For details of MSME norms, pls refer "Annexure A" below.**

Step 1: The bidder can get primary information about the tender from the NEWSPAPER advertisement / TPCODL website (in case of open tender) / invitation through e-mail (in case of limited tenders).

Step 2: First the prospective Bidder who intends to participate in an open tender should deposit the requisite tender fee as mentioned in the tender document trough NEFT/ RTGS in the a/c of TPCODL as mentioned in the tender document. Deposit of the Tender fee should be made within the scheduled time for such deposit as indicated in the Tender document.

Step 3: After deposit of the tender fee, the bidder should furnish the following information through e-mail to the contact person indicated in the tender document.

Please note that corresponding details mentioned in this document will supersede any other details mentioned anywhere else in the Tender Document.

Procedure to Participate in Tender.

Following steps to be done before “Last date and time for Payment of Tender Participation Fee” as mentioned above

1. Eligible and Interested Bidders to submit duly signed and stamped letter on Bidder's letter head indicating
    a. Tender Enquiry number
    b. Name of authorized person, Address, Postal code (pin code)
    c. Contact number
    d. e-mail id
    e. Details of submission of Tender Participation Fee (bank name/amount/NEFT-RTGS UTR No.
    f. GST Registration No
2. Non-Refundable Tender Participation Fee, as indicated in table above, to be submitted in the form of Direct deposit in the following bank account and submit the receipt along with a covering letter clearly indicating the Tender Reference/ Enquiry Number –

    Beneficiary Name – TP Central Odisha Distribution Ltd.

    Bank Name – STATE BANK OF INDIA

TP CENTRAL ODISHA DISTRIBUTION LIMITED
(A Tata Power & Odisha Govt. joint venture)
2nd Floor, IDCO Tower, Janpath, Bhubaneshwar, Odisha 751022

Branch Name – IDCO Towers, Bhubaneshwar

Address – PO- Sahidnagar, Janapath, Bhubaneswar.

Branch Code – 7891

Account No – 10835304915

IFSC Code – SBIN0007891

Step 4: After receipt of the above information through e-mail, Vendor will get an **invitation email** from ARIBA System which is the e-tendering platform of TPCODL. In this mail there will be an online link as **Click Here** to participate in the tender.

Step 5: Click "**Click Here**" to access this event.

Step 6: If you are bidding first time for TPCODL through ARIBA site then please "Sign UP by creating User Name and password as mentioned in Sign Up page. Please follow the process, as mentioned in the Sign Up page, during creation of User Name and password.

Those who are already having User Name and password for accessing TPCODL events, they can LOGIN using same User Name and password.

Step 7: Click Continue. The simple one-page registration screen will open for first time user. All * mark mandatory field to be filled in.

Step 8: You will be able to see the RFQ (i.e Detail Tender document).

Step 9: After review and downloading of all documents click on "**Accept Review Prerequisites**" i.e acceptance of terms and conditions.

Step 10: Review and accept "**Bidder Agreement**".

Step 11: You can see attached tender document in PDF format against clause no 1.1.1 (Introduction).

Step 12: Vendor has to attach PDF version of technical bid in clause no. 2.1 and 2.2. (**In this field do not attach any price document.)**

Step 13: **Uploading of Price Bid**

(a) Price schedule is attached in envelope.3.1 of ARIBA. Same has to be downloaded and price and tax details to be filled in as per the format given, print to be taken in vendor's letter head and signature and seal to be made by authorized person. PDF version of this price bid to be attached. For Price Bid put all the unit price and taxes and duties in provided field. Put "0" (ZERO) in not applicable field.

(b) In addition, the bidder has to upload the editable form of the price bid in EXCEL format in envelope 3.2 of ARIBA system.

Step 14: After uploading successfully Techno commercial offer and price part then click on "**Submit Entire Response".**

Note: Once user ID and password created, bidder can also login to ARIBA site through the following URL:

https://service.ariba.com/Sourcing.aw/124997008/aw?awh=r&awssk=oxt0s1BN&dard=1

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Annexure-A

Preferential norms for procurement from MSMEs registered in the State of Odisha

1) Tender Fees

To participate in the tender, MSMEs registered in the State of Odisha shall pay Rs.1,000/- including GST towards cost of tender paper.

2) Earnest Money Deposit (EMD)

EMD shall be exempted for MSME registered in the State of Odisha. However, Bidder shall be barred to participate in the tendering process for a period of 2 years in case it backs out post award of the contract.

3) Qualification Requirement for Open Tenders

Qualification Requirement of Financial Turnover for MSME registered in the State of Odisha shall be reduced to 20% of the existing criteria.

For past experience, instead of relying on the volumes / value of earlier Supplies / Projects, assessment of the Bidder shall be done on the basis of feedback from Customers. Past performance experience at Tata Power and its Group Companies shall supersede feedback from other Customers.

4) Reservation for MSME

It shall be mandatory to procure at least 20% of the total volume of the procurement from MSME registered in the State of Odisha (however, it shall not apply where goods/services are not available with the MSME), subject to matching L1 discovered prices and meeting technical specifications including quality requirements.

5) Performance Bank Guarantees

Performance Bank Guarantee for MSME registered in the State of Odisha shall be 25% of the value normally prescribed.

TP CENTRAL ODISHA DISTRIBUTION LIMITED
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TP CENTRAL ODISHA DISTRIBUTION LIMITED
(A Tata Power & Odisha Govt. joint venture)
2nd Floor, IDCO Tower, Janpath, Bhubaneshwar, Odisha 751022

1.0 Event Information

1.1. Scope of work

Open Tenders are invited from interested Bidders entering into a Rate Contract/Purchase Order valid for 1 years for the following:

S. No.	Description	EMD Amount (Rs.)	Tender Fee* (Rs.)
1.	Open Tender Notification for Supply of 2.5MVA and 3.15MVA Power Transformer	1.50 Lakh	5,000/-

* *Inclusive of GST*

* *EMD is exempted for MSMEs registered in the State of Odisha.*

*** MSMEs registered in the State of Odisha shall pay tender fee of Rs. 1,000/- including GST. For details of MSME norms, pls refer "Annexure A" below.*

1.2. Availability of Tender Documents

Non-transferable tender documents may be purchased by interested eligible bidders from address given below, on submission of written application to the under mentioned and upon payment of non-refundable Tender Fee.

Chief (Procurement & Stores)
TP Central Odisha Distribution Limited
2nd Floor, IDCO Towers, Janpath, Bhubaneswar – 751022

Tender documents may be downloaded by interested eligible bidders from TPCODL website www.tpcentralodisha.com with effect from 13th January' 2022. In the event of detailed tender documents are downloaded from TPCODL website, the Tender Fee shall be compulsorily submitted either online through NEFT/ RTGS or demand draft/ Banker's Cheque drawn in favor of "TP Central Odisha Distribution Limited", payable at Bhubaneswar only. Any such bid submitted without this Fee shall be rejected.

Bidders are requested to visit TPCODL website www.tpcentralodisha.com regularly for any modification/ clarification to the bid documents.

1.3. Calendar of Events

(a)	Date of sale/ availability of tender documents from TPCODL Website	13.01.2022, 1000 Hours
(b)	Last date and time of Payment of Tender Fee	21.01.2022, 1700 Hours
(c)	Last Date of receipt of pre-bid queries, if any	25.01.2022, 1000 Hours
(d)	Last Date of Posting Consolidated replies to all the pre-bid queries as received	29.01.2022, 1800 Hours
(e)	Last date and time of receipt of Bids	01.02.2022, 1700 Hours
(f)	Date & Time of opening technical bids and EMD (Envelope-1 & 2)	01.02.2022, 1700 Hours

Note: In the event of last date specified for submission of bids and date of opening of bids is declared as a closed holiday for TPCODL's office, the last date of submission of bids and date of opening of bids will be the day following working day at appointed times.

1.4 Mandatory documents required along with the Bid

1.4.1 EMD of requisite value and validity
1.4.2 Tender Fee in case the tender is downloaded from website
1.4.3 Requisite Documents for compliance to Qualification Criteria mentioned in Clause 1.7.
1.4.4 Drawing, Type Test details along with a sample of each item as specified at Annexure I (as applicable)
1.4.5 Duly signed and stamped 'Schedule of Deviations' as per Annexure III on bidder's letter head.
1.4.6 Duly signed and stamped 'Schedule of Commercial Specifications' as per Annexure IV on bidder's letter head.
1.4.7 Proper authorization letter/ Power of Attorney to sign the tender on the behalf of bidder.
1.4.8 Copy of PAN, GST, PF and ESI Registration (In case any of these documents is not available with the bidder, same to be explicitly mentioned in the 'Schedule of Deviations')

Please note that in absence of any of the above documents, the bid submitted by a bidder shall be liable for rejection.

1.5. Deviation from Tender

Normally, the deviations to tender terms are not admissible and the bids with deviation are liable for rejection. Hence, the bidders are advised to refrain from taking any deviations on this Tender. Still in case of any deviations, all such deviations shall be set out by the Bidders, clause by clause in the 'Annexure III - Schedule of Deviations' and same shall be submitted as a part of the Technical Bid.

1.6. Right of Acceptance/Rejection

Bids are liable for rejection in absence of following documents:

i. EMD of requisite value and validity
ii. Tender fee of requisite value
iii. Price Bid as per the Price Schedule mentioned in Annexure I (BOQ)
iv. Necessary documents against compliance to Qualification Requirements mentioned at Clause 1.7 of this Tender Document
v. Filled in Schedule of Deviations as per Annexure III
vi. Filled in Schedule of Commercial Specifications as per Annexure IV
vii. Receipt of Bid within the due date and time

TPCODL reserves the right to accept/reject any or all the bids without assigning any reason thereof.

1.7. Qualification Criteria

a) The bidder should have an average annual turnover of Rs. 4 crores in last three financial years (FY 18-19, FY 19-20 and FY 20-21). Copy of audited Balance Sheet and P&L Account to be submitted in this regard.

b) Bidder must be a BEE Certified OEM of Power Transformer of same or, Higher Ratings with manufacturing facility / assembly in India. TPCODL reserves the right to inspect the said manufacturing facility as a proof of compliance to this parameter.

c) The bidder should have valid BEE certification with successful Type Test Report (TTR) conducted from CPRI / ERDA/ International Accredited Laboratory and shall furnish the same as a part of the Technical Bid. The type tests should have been conducted on the equipment / material of the same design. The type tests should have been conducted within 5 years prior to the date of bid opening. Time period for type test can be extended by another 5 years as a special case, if there is no change

in design / material of construction (MOC). In case the type test reports furnished are not for the quoted equipment / material but for the equipment / material with higher voltage class and/or different capacity, then type test shall be carried out for the offered equipment / material from CPRI/ERDA without any cost implication to the owner and the Type Test reports and relevant drawings duly approved by the Type Testing agency shall be furnished within 3 months from the date issue of RC.

d) The bidder should have supplied Power Transformers of same or, higher rating with specifications as mentioned above, minimum 02 nos., during any one of the financial year out of the immediate past three financial years.

e) The bidder should have In-house routine and acceptance testing facilities for acceptance as per relevant IS/IEC. Self-undertaking to be submitted in this regard. TPCODL reserves the right to inspect the said manufacturing facility as a proof of compliance to this parameter.

f) The bid shall be accompanied by user's certificate (preferably issued within immediate last 5 years) from any Distribution Utility/ Reputed Private Organization/ State Govt. / Central Govt. or their undertaking(s) in support of satisfactory performance of the Transformer supplied earlier to them. In case the bidder has a previous association with Tata Power for similar products and services, the performance feedback for that bidder by TPC User Group shall only be considered irrespective of performance certificates issued by any third organization. Copy of performance certificates to be submitted in this regard.

g) The bidder must have all statutory compliance like valid PAN no, GSTN etc. The bidder must submit the copy of all these registrations

1.8. Marketing Integrity

We have a fair and competitive marketplace. The rules for bidders are outlined in the General Condition of Contracts. Bidders must agree to these rules prior to participating. In addition to other remedies available, TPCODL reserves the right to exclude a bidder from participating in future markets due to the bidder's violation of any of the rules or obligations contained in the General Condition of Contracts. A bidder who violates the market place rules or engages in behavior that disrupts the fair execution of the marketplace, may result in restriction of a bidder from further participation in the marketplace for a length of time, depending upon the seriousness of the violation. Examples of violations include, but are not limited to:

- Failure to honor prices submitted to the marketplace
- Breach of terms as published in TENDER/NIT

1.9. Supplier Confidentiality

All information contained in this tender is confidential and shall not be disclosed, published or advertised in any manner without written authorization from TPCODL. This includes all bidding information submitted to TPCODL. All tender documents remain the property of TPCODL and all suppliers are required to return these documents to TPCODL upon request. Suppliers who do not honor these confidentiality provisions will be excluded from participating in future bidding events.

2.0 Evaluation Criteria

- The bids will be evaluated technically on the compliance to tender terms and conditions.
- The bids will be evaluated commercially on over BOQ basis (all-inclusive lowest cost) for the complete tender as calculated in Schedule of Items [Annexure I].

- The bids will be evaluated on Safety Parameters as mentioned in Annexure-VIII. Bidders have to submit all the documents related to safety bid.
- Bidder has to mandatorily quote against each item of Schedule of Items *[Annexure I].* Failing to do so, TPCODL may reject the bids.

NOTE: *In case a new bidder is not registered with TPCODL, factory inspection and evaluation shall be carried out to ascertain bidder's manufacturing capability and quality procedures. However, TPCODL reserves the right to carry out factory inspection and evaluation for any bidder prior to technical qualification.*

In case a bidder is found as Disqualified in the factory evaluation, their bid shall not be evaluated any further and shall be summarily rejected. The decision of TPCODL shall be final and binding on the bidder in this regard.

2.1 Price Variation Clause: The prices shall remain firm during the entire contract period.

3.0 Submission of Bid Documents

3.1 Bid Submission

Bidders are requested to submit their offer in line with this Tender document through e-tendering process.

Please note all future correspondence regarding the tender, bid submission, bid submission date extension, Pre-bid query etc. will happen only through TPCODL E-Tender system (Ariba).

No e-mail or, verbal correspondence will be responded. All communication will be done strictly with the bidder who have done the above step to participate in the Tender.

Bids shall be submitted in 4 (four) parts:

FIRST PART: "EMD" as applicable shall be submitted. The EMD shall be valid for 210 days from the due date of bid submission in the form of Bank Guarantee / Bank Draft / Bankers Pay Order (issued from a Scheduled Bank) online NEFT/ RTGS transfer favoring 'TP Central Odisha Distribution Limited' payable at Bhubaneswar. The EMD has to be strictly in the format as mentioned in General Condition of Contract, failing which it shall not be accepted by TPCODL and the bid as submitted shall be liable for rejection. A separate non-refundable tender fee of stipulated amount also needs to be transferred online through NEFT/ RTGS in case the tender document is downloaded from our website.

TPCODL Bank Details for transferring Tender Fee and EMD is as below:

Account Name: TP CENTRAL ODISHA DISTRIBUTION LIMITED
Bank Name: SBI, IDCO Towers, Bhubaneswar
Bank Account No.: 10835304915
IFSC Code: SBIN0007891

Note- EMD is preferred in form of Bank Guarantee and to be delivered at the following address. However, in view of present situation if Bidder is finding it difficult to make and submit BG for EMD amount, they can do online transfer of EMD amount in the above mentioned Account and submit proof of the same as part of Bid Submission.

Please note that in such case, Tender Fee and EMD should be strictly 2 separate transactions.

Please note as return of EMD from Bank Account is non-standard practice the same may take more time than return of EMD BG.

EMD Original Hard Copy shall be delivered at the following address in Envelope clearly indicating Tender Reference/ Enquiry Number, Name of Tender and Bidder Name

Chief (Procurement & Stores)
TP Central Odisha Distribution Limited
2nd Floor, IDCO Towers, Janapath, Bhubaneswar- 751022

SECOND PART: "TECHNICAL BID" shall contain the following documents:

a) Documentary evidence in support of qualifying criteria
b) Technical literature/GTP/Type test report etc. (if applicable)
c) Qualified manpower (if available)
d) Testing facilities (if applicable)
e) No Deviation Certificate as per the Annexure III – Schedule of Deviations
f) Acceptance to Commercial Terms and Conditions viz. Delivery schedule/period, payment terms etc. as per the Annexure IV – Schedule of Commercial Specifications.
g) Quality Assurance Plan/Inspection Test Plan for supply items (if applicable)

The technical bid shall be properly indexed and is to be submitted through TPCODL E-tender System (Ariba) only. Hard Copy of Technical Bids need not be submitted.

THIRD PART (Safety Bid): Bidder shall mention the details as required in the safety bid form (As mentioned in annexure- IX). Bidder also has to submit the relevant documents for the same as required by TPCODL

FOURTH PART: "PRICE BID" shall contain only the price details and strictly in format as mentioned in Annexure I along with explicit break up of basic prices, Taxes & duties, Freight etc. In case any discrepancy is observed between the item description stated in Schedule of Items mentioned in the tender and the price bid submitted by the bidder, the item description as mentioned in the tender document (to the extent modified through Corrigendum issued if any) shall prevail.

Price Bid is to be submitted in soft copy through TPCODL E-Tendering system (Ariba) only. Hard copy of Price Bid not be submitted.

The EMD in the form of Bank Draft / BG / Bankers Pay Order shall be submitted in original hard copy and then placed in sealed envelope which shall be clearly marked as below:

EMD

"OPEN TENDER NOTIFICATION FOR SUPPLY OF 2.5MVA and 3.15MVA POWER TRANSFORMER."

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

SIGNING OF BID DOCUMENTS:

The bid must contain the name, residence and place of business of the person or persons making the bid and must be signed and sealed by the Bidder with his usual signature. The names of all persons signing should also be typed or printed below the signature.

The Bid being submitted must be signed by a person holding a Power of Attorney authorizing him to do so, certified copies of which shall be enclosed.

The Bid submitted on behalf of companies registered with the Indian Companies Act, for the time being in force, shall be signed by persons duly authorized to submit the Bid on behalf of the Company and shall be accompanied by certified true copies of the resolutions, extracts of Articles of Association, special or general Power of Attorney etc. to show clearly the title, authority and designation of persons signing the Bid on behalf of the Company. Satisfactory evidence of authority of the person signing on behalf of the Bidder shall be furnished with bid.

A bid by a person who affixes to his signature the word 'President', 'Managing Director', 'Secretary', 'Agent' or other designation without disclosing his principal will be rejected.

The Bidder's name stated on the Proposal shall be the exact legal name of the firm.

3.2 Contact Information

All the bidders are requested to send their pre-bid queries (if any) against this tender through e-mail within the stipulated timelines. The consolidated reply to all the queries received shall be posted on TPCODL website by the stipulated timelines as detailed in calendar of events.

Communication Details:

Handling Team Lead for this Tender:
Name: Manas Ranjan Patra
Contact No.: 9777454502
E-Mail ID: manas.patra@tpcentralodisha.com

Handling Team Lead for this Tender:
Name: Prashant Gupta
Contact No.: 9634077589
E-Mail ID: prashant.gupta@tpcentralodisha.com

Sr. General Manager (Operation Services):

Name: Mr. Sudhakar Behera
Contact No.: 9437282663
E-Mail ID: sudhakar.behera@tpcentralodisha.com

Advisor (Material Procurement):

Name: Mr. Deba Prasad Das
Contact No.: 9438297571
E-Mail ID: debaprasad.das@tpcentralodisha.com

3.3 Bid Prices

Bidders shall quote for the entire Scope of Supply/ work with a break up of prices for individual items and Taxes & duties. The bidder shall complete the appropriate Price Schedules included herein, stating the Unit Price for each item & total price with taxes, duties & freight up to destination at various sites of TPCODL. The all-inclusive prices offered shall be inclusive of all costs as well as Duties, Taxes and Levies paid or payable during the execution of the supply work, breakup of price constituents.

Applicable GST to be specified clearly.

The quantity break up shown else-where other than Price Schedule is tentative. The bidder shall ascertain himself regarding material required for completeness of the entire work. Any items not indicated in the price schedule but which are required to complete the job as per the Technical Specifications/ Scope of Work/ SLA mentioned in the tender, shall be deemed to be included in prices quoted.

3.4 Bid Currencies

Prices shall be quoted in Indian Rupees Only.

3.5 Period of Validity of Bids

Bids shall remain valid for 180 days from the due date of submission of the bid.

Notwithstanding clause above, the TPCODL may solicit the Bidder's consent to an extension of the Period of Bid Validity. The request and responses thereto shall be made in writing.

RC Validity: - The validity of this rate contract shall be one year from the date of issuance.

3.6 Alternative Bids

Bidders shall submit Bids, which comply with the Bidding documents. Alternative bids will not be considered. The attention of Bidders is drawn to the provisions regarding the rejection of Bids in the terms and conditions, which are not substantially responsive to the requirements of the bidding documents.

3.7 Modifications and Withdrawal of Bids

The bidder is not allowed to modify or withdraw its bid after the Bid's submission. The EMD as submitted along with the bid shall be liable for forfeiture in such event.

3.8 Earnest Money Deposit (EMD)

The bidder shall furnish, as part of its bid, an EMD amounting as specified in the tender. The EMD is required to protect TPCODL against the risk of bidder's conduct which would warrant forfeiture.

The EMD shall be denominated in any of the following form:

- Banker's Cheque/ Demand Draft/ Pay order drawn in favor of TP Central Odisha Distribution Limited payable at Bhubaneswar.
- Online transfer of requisite amount through NEFT/ RTGS.
- Bank Guarantee valid for 210 days after due date of submission.

The EMD shall be forfeited in case:

a) The bidder withdraws its bid during the period of specified bid validity.

Or,

b) The successful Bidder does not
   a) accept the Purchase Order, or
   b) furnish the required Performance Security Bank Guarantee

3.9 Type Tests (if applicable)

The type tests specified in TPCODL specifications should have been carried out within five years prior to the date of opening of technical bids and test reports are to be submitted along with the bids. If type tests carried out are not within the five years prior to the date of bidding, the bidder will arrange to carry out type tests specified, at his cost. The decision to accept/ reject such bids rests with TPCODL.

4 Bid Opening & Evaluation process

4.1. 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 TPCODL's processing of Bids or award decisions may result in rejection of the Bidder's Bid.

4.2. Technical Bid Opening

Bids will be opened at TPCODL Office, Bhubaneswar. All tender bids shall be opened internally by TPCODL. Presence of any bidder will not be allowed during bid opening process. Technical bid must not contain any cost information whatsoever.

First the envelope marked "EMD" will be opened. Bids without EMD/cost of tender (if applicable) of required amount/ validity in prescribed format, shall be rejected.

Next, the technical bid of the bidders who have furnished the requisite EMD will be opened, one by one.

4.3. Preliminary Examination of Bids/Responsiveness

TPCODL will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have

been properly signed, and whether the Bids are generally in order. TPCODL may ask for submission of original documents in order to verify the documents submitted in support of qualification criteria.

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.

Prior to the detailed evaluation, TPCODL will determine the substantial responsiveness of each Bid to the Bidding Documents including production capability and acceptable quality of the Goods offered. A substantially responsive Bid is one, which conforms to all the terms and conditions of the Bidding Documents without material deviation.

Bid determined as not substantially responsive will be rejected by the TPCODL and may not subsequently be made responsive by the Bidder by correction of the non-conformity.

4.4. Techno Commercial Clarifications

Bidders need to ensure that the bids submitted by them are complete in all respects. To assist in the examination, evaluation and comparison of Bids, TPCODL may, at its discretion, ask the Bidder for a clarification on its Bid for any deviations with respect to the TPCODL specifications and attempt will be made to bring all bids on a common footing. 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 owing to any clarifications sought by TPCODL.

4.5. Price Bid Opening

Price bids will be opened internally without the presence of any bidder representative. The EMD of the bidder withdrawing or substantially altering his offer at any stage after the technical bid opening will be forfeited at the sole discretion of TPCODL without any further correspondence in this regard.

4.6. Reverse Auctions

TPCODL reserves the right to conduct the reverse auction (instead of public opening of price bids) for the products/ services being asked for in the tender. The terms and conditions for such reverse auction events shall be as per the Acceptance Form attached as Annexure VI of this document. The bidders along with the tender document shall mandatorily submit a duly signed copy of the Acceptance Form attached as Annexure VI as a token of acceptance for the same.

5 Award Decision

TPCODL will award the contract to the successful bidder whose bid has been determined to be the lowest-evaluated responsive bid as per the Evaluation Criterion mentioned at Clause 2.0. The Cost for the said calculation shall be taken as the all-inclusive cost quoted by bidder in Annexure I (Schedule of Items) subject to any corrections required in line with Clause 3.2 above. The decision to place purchase order/LOI solely depends on TPCODL on the cost competitiveness across multiple lots, quality, delivery and bidder's capacity, in addition to other factors that TPCODL may deem relevant.

TPCODL reserves the rights to award contract to one or more bidders so as to meet the delivery requirement or nullify award decision without assigning any reason thereof.

In case any supplier is found unsatisfactory during delivery process, the award will be cancelled and TPCODL reserves right to award contract to other suppliers who are found fit.

6 Order of Preference/Contradiction

In case of contradiction in any part of various documents in tender, following shall prevail in order of preference:

1. Schedule of Items (Annexure I)
2. Post Award Contract Administration (Clause 7.0)

3. Submission of Bid Documents (Clause 3.0)
4. Scope of Work and SLA (Annexure VII)
5. Technical Specifications (Annexure II)
6. Acceptance Form for Participation in Reverse Auction (Annexure VI)
7. General Conditions of Contract (Annexure VIII)

7 Post Award Contract Administration

7.1. Special Conditions of Contract

- The Rate shall remain FIRM till the execution period of the Order.
- Business Associate (BA) shall submit applicable Performance Bank Guarantee as per GCC within 30 days of issuance of order. PBG applicable shall be 5% of Order Value. PBG submitted, shall be released after completion of applicable guarantee period plus one month.
- Any change in statutory taxes, duties and levies during the contract period shall be borne by TPCODL. However, in case of delay in work execution owing to reasons not attributable to TPCODL, any increase in total liability shall be passed on the Bidder, whereas any benefits arising owing to such statutory variation in taxes and duties shall be passed on TPCODL.
- Statutory Variations: Any changes in existing taxes/ Duties and levies, Introduction of new taxes and duties etc. during the period of the contract shall be paid at actuals to BA subject to BA shall submit the tax break up in details, however, where BA has quoted the all-inclusive prices and not shown the tax break-up, this clause will not be applicable. The date of issue of MDCC shall be used for this purpose.
- Quotation in all BOM items is mandatory, and bid shall be rejected if any line of found blank in un price bid.
- There will be no price escalation given to bidder after issuance of the order.
- **Warranty period**: 24 months from date of supply or, 18 months from date of commissioning, whichever is earlier. All other terms and conditions of TPCODL General Conditions of Contract shall be applicable.
- **Terms of Payment:** On delivery of the materials in good condition and certification of acceptance by certified official, Associate shall submit the Bills/ Invoices in original in the name of TPCODL to Invoice Desk. The payment shall be released within 30 days from the date of submission of certified bills/ invoices.

7.2 Drawing Submission and Approval

The relevant drawings and GTPs need to be submitted within two weeks of receipt of firm purchase order by the successful bidder to TPCODL for approval. In case, re-submission of drawings is required on request of TPCODL, same needs to be submitted back to TPCODL within 5 days of such request.

7.3 Delivery Timelines

Delivery within 90 Days from the placement of Purchase Order (PO)/ Release Order (RO).

7.4 Payment Terms

On delivery of the materials in good condition and certification of acceptance by certified official, Associate shall submit the Bills/ Invoices in original in the name of TP Central Odisha Distribution Limited to Invoice Desk. The payment shall be released within 30 days from the date of submission of certified bills/ invoices.

7.5 Climate Change

Significant quantities of waste are generated during the execution of project and an integrated approach for effective handling, storage, transportation and disposal of the same shall be adopted. This would ensure the minimization of environmental and social impact in order to combat the climate change. Please refer attached Environment Policy and Sustainability Policy, Annexure-XI for more details.

7.6 Ethics

TPCODL is an ethical organization and as a policy TPCODL lays emphasis on ethical practices across its entire domain. Bidder should ensure that they should abide by all the ethical norms and in no form either directly or indirectly be involved in unethical practice.

TPCODL work practices are governed by the Tata Code of Conduct which emphasizes on the following:

- We shall select our suppliers and service providers fairly and transparently.
- We seek to work with suppliers and service providers who can demonstrate that they share similar values. We expect them to adopt ethical standards comparable to our own.
- Our suppliers and service providers shall represent our company only with duly authorized written permission from our company. They are expected to abide by the Code in their interactions with, and on behalf of us, including respecting the confidentiality of information shared with them.
- We shall ensure that any gifts or hospitality received from, or given to, our suppliers or service providers comply with our company's gifts and hospitality policy.
- We respect our obligations on the use of third party intellectual property and data.

Bidder is advised to refer Tata Code of Conduct (TCOC) attached at Annexure X for more information.

Any ethical concerns with respect to this tender can be reported to the following e-mail ID:

ravindra.singh@tpcentralodisha.com and Pravin.jain@tpcentralodisha.com

8 Specification and standards

As per Annexure II

9 General Condition of Contract

Any condition not mentioned above shall be applicable as per GCC Annexure-VIII attached along with this tender.

10 Safety

All jobs are this tender have to be executed strictly in compliance to the Safety terms and Conditions of TP Central Odisha Distribution Limited. Please refer attached Safety terms and conditions, Annexure-IX, for details. Violation of Safety norms will result in Penalty as mentioned in the above document.

TP CENTRAL ODISHA DISTRIBUTION LIMITED
(A Tata Power & Odisha Govt. joint venture)
2nd Floor, IDCO Tower, Janpath, Bhubaneshwar, Odisha 751022

ANNEXURE I

Schedule of Items

Sl No.	Item Description	HSN Code	Unit	Quantity (Q)	Unit Price (in Rs.) A	GST (in Rs.) B	Unit Price (All Inclusive) (in Rs.) A+B	Total Amount (in Rs.) Q x (A+B)
1.	POWER TRANSFRMER 3PH 2.5MVA 33/0.4 KV-CU		EACH	2				
2.	POWER TRANSFORMER 3 PH 3.15MVA 33/11KV		EACH	2				
	Total							

NOTE:

- The bids will be evaluated commercially on the overall lowest cost in line item basis.
- The unit price with GST in column no. 7, is landed price for TPCODL at their store Bhubaneswar / Cuttack. Refer CLAUSE 3.3 Bid Price.
- The bidders are advised to quote prices strictly in the above format. Failing to do so, bids are liable for rejection.
- Bidder needs to quote mandatorily for each line item of the BOQ.
- The bidder must fill each and every column of the above format. Mentioning “extra/inclusive” in any of the column may lead for rejection of the price bid.
- No cutting/ overwriting in the prices is permissible.

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ANNEXURE II

Technical Specification (Refer Page- 86 and Onwards rating wise)

Attached as Annexure-II (Technical Specification)

ANNEXURE III
Schedule of Deviations

Bidders are advised to refrain from taking any deviations on this TENDER. Still in case of any deviations, all such deviations from this tender document shall be set out by the Bidders, Clause by Clause in this schedule and submit the same as a part of the ***Technical Bid.***

Unless specifically mentioned in this schedule, the tender shall be deemed to confirm the* TPCODL*'s specifications:

S. No.	Clause No.	Tender Clause Details	Details of deviation with justifications

By signing this document we hereby withdraw all the deviations whatsoever taken anywhere in this bid document and comply to all the terms and conditions, technical specifications, scope of work etc. as mentioned in the standard document except those as mentioned above.

Seal of the Bidder:

Signature:

Name:

TP CENTRAL ODISHA DISTRIBUTION LIMITED
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ANNEXURE IV

Schedule of Commercial Specifications

(The bidders shall mandatorily fill in this schedule and enclose it with the offer Part I: Technical Bid. In the absence of all these details, the offer may not be acceptable.)

S. No.	Particulars	Remarks
1.	Prices firm or subject to variation (If variable indicate the price variation clause with the ceiling if applicable)	Firm / Variable
1a.	If variable price variation on clause given	Yes / No
1b.	Ceiling	--------- %
1c.	Inclusive of GST	Yes / No (If Yes, indicate % rate)
1d.	Inclusive of transit insurance	Yes / No
2.	Delivery	Weeks / months
3.	Guarantee clause acceptable	Yes / No
4.	Terms of payment acceptable	Yes / No
5.	Performance Bank Guarantee acceptable	Yes / No
6.	Liquidated damages clause acceptable	Yes / No
7.	Validity (180 days) (From the date of opening of bid)	Yes / No
8.	Inspection during stage of manufacture	Yes / No
9.	Rebate for increased quantity	Yes / No (If Yes, indicate value)
10.	Change in price for reduced quantity	Yes / No (If Yes, indicate value)
11.	Covered under Small Scale and Ancillary Industrial Undertaking Act 1992	Yes / No (If Yes, indicate, SSI Reg'n No.)

Seal of the Bidder:

Signature:

Name:

ANNEXURE V

Checklist of all the documents to be submitted with the Bid

Bidder has to mandatorily fill in the checklist mentioned below:

S. No.	Documents attached	Yes / No / Not Applicable
1	EMD of required value	
2	Tender Fee as mentioned in this tender	
3	Signed copy of this tender as an unconditional acceptance	
5	Duly filled schedule of commercial specifications (Annexure IV)	
6	Sheet of commercial/technical deviation if any (Annexure III)	
7	Balance sheet for the last completed three financial years; mandatorily enclosing Profit & loss account statement	
8	Acknowledgement for Testing facilities if available (duly mentioned on bidder letter head)	
9	List of Machine/tools with updated calibration certificates if applicable	
10	Details of order copy (duly mentioned on bidder letter head)	
11	Order copies as a proof of quantity executed	
12	Details of Type Tests if applicable (duly mentioned on bidder letter head)	
13	All the relevant Type test certificates as per relevant IS/IEC (CPRI/ERDA/other certified agency) if applicable	
14	Project/supply Completion certificates	
15	Performance certificates	
16	Client Testimonial/Performance Certificates	
17	Credit rating/solvency certificate	
18	Undertaking regarding non blacklisting (On company letter head)	
19	List of trained/untrained Manpower	

Seal of the Bidder:

Signature:

Name:

ANNEXURE VI

ACCEPTANCE FORM FOR PARTICIPATION IN REVERSE AUCTION EVENT

(To be signed and stamped by the bidder)

In a bid to make our entire procurement process more fair and transparent, TPCODL intends to use the reverse auctions as an integral part of the entire tendering process. All the bidders who are found as technically qualified based on the tender requirements shall be eligible to participate in the reverse auction event.

The following terms and conditions are deemed as accepted by the bidder on participation in the bid event:

1. TPCODL shall provide the user id and password to the authorized representative of the bidder. *(Authorization Letter in lieu of the same shall be submitted along with the signed and stamped Acceptance Form).*
2. TPCODL will make every effort to make the bid process transparent. However, the award decision by TPCODL would be final and binding on the supplier.
3. The bidder agrees to non-disclosure of trade information regarding the purchase, identity of TPCODL, bid process, bid technology, bid documentation and bid details.
4. The bidder is advised to understand the auto bid process to safeguard themselves against any possibility of non-participation in the auction event.
5. In case of bidding through Internet medium, bidders are further advised to ensure availability of the entire infrastructure as required at their end to participate in the auction event. Inability to bid due to telephone line glitch, internet response issues, software or hardware hangs, power failure or any other reason shall not be the responsibility of TPCODL.
6. In case of intranet medium, TPCODL shall provide the infrastructure to bidders. Further, TPCODL has sole discretion to extend or restart the auction event in case of any glitches in infrastructure observed which has restricted the bidders to submit the bids to ensure fair & transparent competitive bidding. In case of an auction event is restarted, the best bid as already available in the system shall become the start price for the new auction.
7. In case the bidder fails to participate in the auction event due any reason whatsoever, it shall be presumed that the bidder has no further discounts to offer and the initial bid as submitted by the bidder as a part of the tender shall be considered as the bidder's final no regret offer. Any offline price bids received from a bidder in lieu of non-participation in the auction event shall be out-rightly rejected by TPCODL.
8. The bidder shall be prepared with competitive price quotes on the day of the bidding event.
9. The prices as quoted by the bidder during the auction event shall be inclusive of all the applicable taxes, duties and levies and shall be FOR at TPCODL site.
10. The prices submitted by a bidder during the auction event shall be binding on the bidder.
11. No requests for time extension of auction event shall be considered by TPCODL.
12. The original price bids of the bidders shall be reduced on pro-rata basis against each line item based on the final all-inclusive prices offered during conclusion of the auction event for arriving at Contract amount.

Signature & Seal of the Bidder

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ANNEXURE VII

Scope of Work & Service level agreement

NA

ANNEXURE- VIII

GENERAL CONDITIONS OF CONTRACT FOR SUPPLY ORDERS

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1.0 ORGANIZATIONAL VALUES

The TPCODL Group has always been a value driven organization. These values continue to direct the Group's growth and businesses. The six core Tata Values underpinning the way we do business are:

Integrity - We must conduct our business fairly, with honesty and transparency. Everything we do must stand the test of public scrutiny.

Understanding - We must be caring, respectful, compassionate and humanitarian towards our colleagues and customers around the world and always work for the benefit of India.

Excellence - We must constantly strive to achieve the highest possible standards in our day to day work and in the quality of goods and services we provide.

Unity - We must work cohesively with our colleagues across the group and with our customers and partners around the world to build strong relationships based on tolerance, understanding and mutual co-operation.

Responsibility - We must continue to be responsible and sensitive to the countries, communities and environments in which we work, always ensuring that what comes from the people goes back to the people many times over.

Agility - We must work in a speedy and responsive manner and be proactive and innovative in our approach.

2.0 ETHICS

In our effort towards Excellence and in Management of Business Ethics at TPCODL, an Ethics Management Team is constituted.

The main objective of the Ethics Management Team is to:

1. Record, address and allay the issues and concerns on ethics raised by different stakeholders like employees, consumers, vendors, Associates etc. by initiating immediate corrective actions.
2. Ensure proper communication of the ethics policies and guidelines through prominent displays at all offices of TPCODL and through printed declarations in all concerned documents where external stakeholders are involved.
3. Ensure proper framework of policies as preventive measures against any ethics violation recorded by them.
4. Prepare and submit MIS of all issues and concerns, corrective and preventive actions on monthly basis to the top management for their information.

All Associates and Stakeholders are requested to register any grievance on ethics violation on our website www.tpcentralodisha.com

3.0 CONTRACT PARAMETERS

3.1 Issue/Award of Contract

TPCODL awards the contract to the Associate in writing in the form of Purchase Order (PO) or Rate Contract (RC), hereafter referred as Contract, through in any or all of following modes physical handover / post / e-mail / web document / fax with all the attachments/enclosures which shall be part of the contract document.

On receipt of the contract, the associate shall return to TPCODL copy of the contract document duly signed by legally authorized representative of associate, within two days of Effective Date of Contract for contracts having contract execution time less than 30 days and within five days for all other contracts.

3.2 Contract Commencement Date

The date of issue/award of contract shall be the Effective Date of Contract or Contract Commencement date.

3.3 Contract Completion Date

The date of expiry of Guarantee Period shall be deemed as the Contract Completion Date.

3.4 Contract Period/Time

The period from Contract Commencement Date to Contract Completion Date shall be deemed as the Contract Period/Time.

3.5 Contract Execution Completion Date

The stipulated date for completing the supply as per schedule of quantities shall be deemed as the Contract Execution Completion Date.

3.6 Contract Price /Value

The total all-inclusive price/value mentioned in the PO/RC is the Contract Price/Value and is based on the quantity, unit rates and prices quoted and awarded and shall be subject to adjustment based on actual quantities supplied and accepted and certified by the authorized representative of the company unless otherwise specified in schedule of quantities or in contract documents.

3.7 Contract Document

The Contract Document shall mean and include but not limited to the following:

- NIT/Tender Enquiry, QR, Instruction to Bidders, Special Condition of Contract (SCC) of tender, GCC, Technical & Commercial Specifications including relevant annexure and attachments).
- Bids & Proposals Received from Associate including relevant annexure/attachments.
- RC/PO with agreed deviations from the tender/bid documents.

- All the Inspection and Test reports, Detailed Engineering Drawings.
- Material Dispatch Clearance Certificate (MDCC).
- Minutes of Meeting (MoM)

3.8 Contract Language

All documents, instructions, catalogues, brochures, pamphlets, design data, norms and calculations, drawings, operation, maintenance and safety manuals, reports, labels, on deliveries and any other data shall be in English Language.

The Contract documents and all correspondence between the TPCODL, Third Parties associated with the contract, and the Associate shall be in English language.
However, all signboards required indicating "Danger" and/or security at site and otherwise statutory required shall be in English, Hindi, and local languages.

3.9 Reverse Auction

TPCODL reserves the right to conduct the reverse auction (instead of public opening of price bids) for the products / services being asked for in the tender. The terms and conditions for such reverse auction events shall be as per the Acceptance Form attached in Annexure F. The bidders along with the tender document shall mandatorily submit a duly signed copy of the Acceptance Form as mentioned in the Annexure J as a token of acceptance for the same.

4.0 SCOPE OF WORK

All the activities that are to be undertaken by the Associate to realize the contractual deliverables in completeness form Scope of Work. Following clauses list, but not limited to, major requirements of the scope of work.

The associate shall satisfy himself and undertake fully the technical/commercial requirements of items to be supplied as listed in the Schedule of Quantities together with the tests to be performed /test reports to be furnished before dispatch, arrangement of stage and final inspections during manufacturing as per terms and conditions of contract, technical parameters & delivery terms and conditions including transit insurance to be met in order to fully meet TPCODL's requirements.

Completeness: Any supplies and services which might have not been specifically mentioned in the Contract but are necessary for the scope mentioned in Special Terms & Conditions and/or completeness of the works at the highest possible level, including any royalties, license fees & compensation to be paid, whether incurred by the associates or by a third party for the work covered in the scope, regardless of when incurred, shall be supplied/provided by the associate without any extra cost and within the time schedule for efficient , smooth and satisfactory operation and maintenance of the works at the highest possible level under Indian conditions (but according to international standards for facility of this type), unless expressly excluded from the scope of supplies and services in this Contract.

TPCODL have the right, during the performance of the Contract, to change the scope and/or technical character of the Project and/or of the supplies and services stipulated in the Contract by submitting a

request in writing to the Associate. The Associate shall, within fifteen days of receipt of such request from the TPCODL, provide Purchaser with a reasonably detailed estimate of the cost of the change outlined in the request.

In the event, TPCODL requests a change, the Contract price and time shall be adjusted upwards or downwards, as the case may be and shall be mutually agreed to. The associate shall not be entitled to any extension of time unless such changes adversely affect the time schedule.

The Associate shall not proceed with the changes as requested till adjustment of contract price and time schedule where so applicable in terms of or otherwise directed by the TPCODL.

5.0 PRICES/RATES/TAXES

Unless specified elsewhere in the contract document, the prices/rates are inclusive of cost of finished product for which MDCC will be issued by TPCODL, packaging and forwarding charges, freight and transit insurance charges covering loading at Associate's works, transportation to TPCODL store/site & unloading & delivery at TPCODL stores/TPCODL site, cost of documentation including all the relevant test certificates and other supportive documents to be furnished.

The Prices/Rates are inclusive of all taxes, levies, cess and duties, particularly Goods and Services Tax as applicable. All government levy / taxes shall be paid only when the invoice is submitted according to the relevant act.

The prices/rates shall remain firm till actual completion of entire supply of goods/material/equipment as per contract is achieved and shall remain valid till the completion of the contract.

The prices shall remain unchanged irrespective of TPCODL making changes in quantum in all or any of the schedules of items of contract.

5.1 Changes in Statutory Tax Structure

If rate of any or all of the statutory taxes and duties applicable to the contract changes, such changes shall be incorporated by default if the changes occur within the contract execution time and shall be applicable if the contract is executed by the Associate within the Contract Execution Time.

For execution of contracts beyond contract execution time, where the delay is not attributable to TPCODL no upward revision in tax /duties shall be considered irrespective of changes in the statutory tax structure either within the contract execution time or beyond. However, in such cases, benefits due to any downward revisions in statutory tax rates shall be passed on to TPCODL.

6.0 TERMS OF PAYMENT

On delivery of the materials in good condition and certification of acceptance by TPCODL official, Associate shall submit the Bills/Invoices in original in the name of "The TP Central Odisha Distribution Limited" to invoice desk, complete with all required documents as under:

- Test Reports (4 sets).

- MDCC issued by TPCODL.
- Packing List.
- Drawing and Catalog.
- Guarantee/Warranty Card.
- Delivery Challan.
- O&M Manual.
- Copy of Order.
- Minutes of Meeting.

Bills/ invoices shall mention Supplier's GST Number. TPCODL will make 100% payment within 30 days of submission of the Bill/Invoice complete in all respects and along with all the requisite documents mentioned above, subject to condition that Associate has furnished the requisite Security-cum-Performance Guarantee as stipulated in the contract.

6.1 Quantity Variation

Payment will be made on the basis of actual quantity of supplies/actual measurement of works accepted by TPCODL and not on the basis of contract quantity.

6.2 Full and Final Payment

Full & Final Payment in all contracts shall be made subject to the associate submitting "No Demand Certificate" in the format as per Annexure-C.

7.0 MODE OF PAYMENT

Payment shall be made through crossed Cheque or RTGS whichever of the two modes chosen by the Associate, in favour of Associate's Bank Account on TPCODL records, on whose name Contract has been issued. Those Associates opting for the RTGS mode shall submit the details of Bank Account and other details as per annexure G. Further, for any payments made, TPCODL is not responsible for any consequences/disputes Associate have among the owners channel partners, sub-Associates and all such dispute/concerns shall be settled solely by the Associate.

8.0 SECURITY CUM PERFORMANCE DEPOSIT

Associates shall submit within 15 days from the effective date of issue of PO/RC, Security Performance Bank Guarantee (SPBG) in the format as per Annexure B of this document from banks acceptable to TPCODL for:

(a) 5% of the PO value if purchase order value is more than Rs 5 Crores.
(b) 10% of the PO value if purchase order value is less than Rs 5 Crores.

This shall remain valid till the end of the Guarantee Period of contract, plus one month.

(c) 5% of the RC value in case of Rate Contract. This shall remain valid till the Guarantee period plus one month.

- For PO/RC values less than Rs. 5 lacs, Associate may request for deduction of amount equivalent to SPBG value from their first invoice. Such amount shall be withheld by TPCODL while processing the invoice and shall be released after completion of Guarantee Period plus one month.
- For PO/RC values less than Rs. 3 lacs, the clause (8.0) for Security cum Performance Bank Guarantee (SPBG) shall not be applicable.
- In case of RC (Rate Contract) after the expiry of RC validity, Associate shall have to submit SPBG. However, the Associate has the option to re-submit the SPBG as per actual RO (Release Order) value issued against the RC, valid for Guarantee Period plus one month.
  The Guarantee Period shall be considered as per the last RO issued against the said RC. The original SPBG as submitted against the RC shall be released on submission of the new SPBG to TPCODL. Alternatively, Associate may extend the validity of original SPBG only till the requisite period, i.e. Guarantee Period plus one month.

9.0 STATUTORY COMPLIANCE

9.1 Compliance to Various Acts

Associate should ensure adherence to all applicable laws, rules and regulation applicable under this contract from time to time. In case of violation any risk, costs etc shall be in associates account and keep TDPPL indemnified always till completion of contracts.

9.2 SA 8000

As TPCODL is SA 8000 compliant, it expects its Associates to follow guidelines of SA 8000:2014 on the following aspects

1. Child Labour
2. Forced or Compulsory Labour
3. Health & Safety
4. Freedom of Association & Right to Collective Bargaining
5. Discrimination
6. Disciplinary Practices
7. Working Hours
8. Remuneration
9. Management System

9.3 Affirmative Action

TPCODL appreciate and welcome the engagement/employment of persons from SC/ST community or any other deprived section of society by their business associates.

Relaxation in Contract Clauses under Affirmative Action for SC/ ST Business Associates**

TPCODL believes that inclusive growth is the key to sustainable development, and to promote the same Policy on Affirmative Action for Scheduled Caste & Scheduled Tribe Communities has been adopted across the company.

Under the same pre-text, and to promote entrepreneurship among SC/ST community TPCODL has taken initiative by proposing relaxations in contract clauses as per below:

S. No	Initiative	for SC/ ST BA's	Guideline Document
1	Tender Fees	100% waiver for SC/ST community	All Open Tenders
2	Earnest Money Deposit	50 % relaxation of estimated EMD value	All limited and Open Tenders
3	Performance Bank Guarantee	50% relaxation in PBG for order value above 50 lacs else 25% relaxation	All limited and Open tenders

4	Turnover	25% relaxation in company turnover under qualifying requirement criteria	All Open Tenders

**Classification of BAs under SC/ST shall be governed under following guidelines:

- Proprietorship/ Single Ownership Firm: Proprietor of the firm should be from SC/ST community. Governing document shall be duly audited balance Sheet for the last FY bearing the name of proprietor.
- Partnership Firm: Only such firms shall qualify which have SC/ST partners holding equal to or more than 50% of the total ownership pattern of the firm. Governing document shall be Partnership Deed and audited balance sheet/ ITR for last FY.
- Private limited company: Only such firms shall qualify which have SC/ST directors holding equal to or more than 50% of the total ownership pattern of the firm. Governing document shall be Memorandum of Understanding (MoU) and/or Article of Association (AoA).

Governing document shall be Memorandum of Understanding (MoU) and/or Article of Association (AoA).

Note: Certification from SC/ST commission shall be required for deciding upon SC/ST status of a person.

10.0 QUALITY

10.1 Knowledge of Requirements

The Associate shall be deemed to have carefully examined and to have knowledge of the equipment, the general and other conditions, specifications, schedules, drawings, etc. forming part of the Contract and also to have satisfied himself as to the nature and character of the work to be executed and the type of the equipment and duties required including wherever necessary of the site conditions and relevant matters and details. Any information thus procured or otherwise obtained from TPCODL/Consultants shall not in any way relieve the Associate from his responsibility and executing the works in accordance with the terms of contract.

10.2 Material/Equipment/Works Quality

The items / works under the scope of the Associate shall be of the best quality and workmanship according to the latest engineering practice and shall be manufactured from materials of best quality considering strength and durability for their best performance and, in any case, in accordance with the specifications set forth in this Contract. All material shall be new. Substitution of specified material or variation from the process of fabrication/ construction/ manufacture may be permitted but only with the prior written approval of the TPCODL.

10.3 Adherence to Rules & Regulations

The Associate shall procure and/or fabricate/erect all materials and equipment in accordance with all requirements of Central and State enactment, rules and regulations governing such work in India and at site. This shall not be construed as relieving the Associate from complying with any requirement of TPCODL as enumerated in the Contract which may be more rigid than and not contrary to the above mentioned rules, nor providing such construction as may be required by the above mentioned rules and regulations. In case of variance of the Technical Specification from the laws, ordinance, rules and regulations governing the work, the Associate shall immediately notify the same to the TPCODL. It is the sole responsibility of the Associate, however, to determine that such variance exists. Wherever required by rules and regulations, the Associate shall also obtain the statutory authorities' approval for the plant, machinery and equipment to be supplied by the Associate.

10.4 Specifications and Standards

The Associate shall follow all codes and standards referred in the Contract Document. Codes and standards of other may be followed by the Associate with the prior written approval of TPCODL, provided materials, supplies and equipment according to the standard are equal to or better than the corresponding standards specified in the Contract.

Brand names mentioned in the Contract documents are for the purpose of establishing the type and quality of products to be used. The Associate shall not change the brand name and qualities of the bought out items without the prior written approval of the TPCODL. All such products and equipment shall be used or installed in strict accordance with original manufacturer's recommendations, unless otherwise directed by the TPCODL. In any circumstances the codes, specimen and standards prescribed by any government agency should not be violated.

11.0 INSPECTION/PARTICIPATION

11.1 Right to Carry Out Inspection

TPCODL reserves the right to send its representatives for inspection or participation at various stages of contract execution listed below, applicable as per contract construction.

- During basic design and detail engineering of material/ Equipment carried out by Associate /Outsourced Agencies.
- During manufacturing stages of the product at Associate's/Associate's Outsourced Agency's Plant/Facility.
- During Pre-dispatch Inspection and Testing of finished/manufactured product at Associate's/Associate's outsourced Agency's Plant/Facility.
- During Installation & Commissioning Activities/Stages.
- Prior to Clearing of the completed installation for commissioning.
- Any other stage as find appropriate by TPCODL during contract execution time.

All inspections and participation shall be carried out by TPCODL giving written intimation to the Associate or receiving appropriate advance written inspection call from the Associate, unless otherwise specified elsewhere in the contract document.

11.2 Facilitating Inspection

The Associate shall provide all opportunities and information to TPCODL's engineers to get acquainted with the technical know-how and the methods and practices adopted by the Associate in basic and detail engineering. The Associate shall provide documents, drawings, calculations etc. as may be required by TPCODL's Engineers.

The Associate shall provide free of charge office accommodation, office facilities, secretarial services, communication facilities, general and drawing office stationary, etc. as may be reasonably required by the TPCODL's engineers. Similarly, facilities shall also be provided by Associate's outsource agencies/partners/authorized dealers (collectively termed as sub associates) if such basic and detail engineering activities are carried out in the design offices of sub-Associates.

The Associate shall be responsible for the safety of employees of TPCODL/Third Party Agency when they are at the Associate's /Associate's outsource agency's plant or facility for carrying out/witnessing inspection/testing. All statutory safety precautions as applicable shall be followed by the Associate during Inspection Testing. If TPCODL inspectors are not satisfied with the safety arrangements at the plant, TPCODL have the right to call off inspection till such time corrective action is taken by the Associate.
Before raising the call for pre-dispatch final inspection and testing, the Associate shall conduct all the tests—type tests, routine tests etc-as specified in the contract document and submit copies of the test certificates to TPCODL along with the inspection call, for scrutiny of TPCODL.

The Associate and TPCODL shall jointly document all the observations, comments and action points after completion of inspection and it shall be binding on the Associate to provide compliance on all the points requiring compliance and furnish the compliance report to the designated authority of TPCODL for receiving clearance for dispatch of materials

11.3 Third Party Nomination

TPCODL also may nominate a third party for the purpose of carrying out the inspection and such an agency shall be entitled to all the rights and privileges of TPCODL as far as conducting the inspection.

11.4 Waiver of Inspections

TPCODL on its own discretion shall chose to waive off any inspection and ask the Associate to submit all the test reports as applicable as per contract specifications, related to inspection and testing of the goods ordered for scrutiny and clearance for dispatch.

11.5 Incorrect Inspection Call

In case it is observed that the material offered for inspection is not ready at the time of TPCODL inspection visit rendering it as futile, all costs towards such inspection shall be recovered from the BA. Taxes as applicable on such recoveries shall be borne by the BA.

12.0 MDCC & DELIVERY OF MATERIALS

12.1 Material Dispatch Clearance Certificate

Associate shall deliver material/goods/equipment against Supply Contracts or Supply Part of Composite/Service Contracts only after receiving Material Dispatch Clearance Certificate (hereafter termed as MDCC) issued by designated authority of TPCODL. Material delivered at TPCODL stores or at project site without a valid MDCC issued by the designated official of TPCODL shall be rejected. MDCC shall be issued to associate furnishing compliance report on the action points documented during pre-dispatch inspection and testing at Associate's/ Sub Associate's plant/ facility. In case Pre-dispatch inspection is waived at the discretion of TPCODL, then, MDCC shall be issued on receiving all the test reports-routine& type-from the Associate and finding them in order.

The associate shall include and provide for securely protecting and packing the materials so as to avoid loss or damage during handling and transport by air, sea, rail and road or any other means.

All such packing shall allow to the extent possible for easy removal and checking at Site. The associate shall take special precautions to prevent rusting of steel and iron parts during transit by sea. Gas seals or other materials shall be utilized by the associate for protection against moisture during transit of all Plant and Equipment.

Each Equipment or parts of Equipment shall be tagged with reference to the assembly drawings and corresponding part numbers. Each bale or package shall contain a packing note quoting specifically the name of the associate, item description, quantity, item / package identification.

All packing cases, containers, packing and other similar materials shall be new and supplied free by the associate and it shall not be required to be returned to the associate.
Notwithstanding anything stated in this clause, the associate shall be entirely responsible for loss, damage or depreciation or deterioration to the materials and supplies due to faulty and/or insecure packing or otherwise during transportation to the Site until otherwise provided herein.

In case of the consignments dispatched by road, the associate shall ensure that it or its subcontractors:

i) Identify and obtain the correct type of trucks/trailers, keeping in view the nature of consignments to be dispatched.

ii) Take such actions as may be necessary to avoid all possible chances of damages during transit and to ensure that all packages are firmly secured.

Timelines for inspection and MDCC is as below:

S. No.	Inspection	MDCC issuance time including Inspection time (max.)

1	Outside Bhubaneswar	12 days
2	Within Bhubaneswar	5 days
3	Waiver*	3 working days

* Associate is expected to raise the inspection call assuming that Inspection shall be carried out by TPCODL. The decision for waiver of inspection shall be on sole discretion of TPCODL.

12.2 Right to Rejection on Receipt

Goods/Material/Equipment delivered in condition physically damaged & incomplete as a product ordered, or not packed and transported as per the terms and conditions of the contract is liable to be rejected. Such item shall be lifted back by Associates within 15 days from receipt of rejection note from TPCODL and have to supply back the material within next 30 days or within the timeframe mutually decided by Associate and TPCODL.

If delivery of the material is beyond the agreed time, Liquidated damage clause, mentioned in this GCC separately shall be applicable; but the period for levy of LD shall be considered as per the original delivery schedule and not from the agreed timelines for material rectification.

12.3 Consignee

Unless otherwise specified in the Contract Document, Materials/Goods/Equipment shall be consigned to “Stores-In-Charge”, TPCODL, Bhubaneswar.

12.4 Submission of mandatory documents on Delivery

Following documents shall be mandatorily submitted by BA along with supply of material to TPCODL stores/site:

S. No.	Documents	Requisite
1	Invoice copy in original	With all consignments
2	LR copy	Wherever required
3	Packing list	With all consignments
4	MDCC	With all consignments
5	Purchase order / Release order	Signed copy
6	Test certificates	With all consignments
7	Inspection/JVR report	In case pre-dispatch inspection is conducted
8	Device data in CD as per template for metering items	Wherever applicable

12.5 Dispatch and Delivery Instructions

S. No.	Instructions
1	Purchase order/ Release order no. shall be mentioned on invoice and on material

2	TPCODL material code and material description shall be mentioned in invoice and on material.
3	"Property of TPCODL" shall be embossed on material.
4	The material shall be properly sealed and packed in standard packing as per purchase order terms & conditions.
5	The weight and quantity of material shall be mentioned wherever applicable
6	The material supplied shall be co-related with the packing list.
7	The name plate detail on equipment shall include Material code, Material description, specification detail of material [as applicable], Serial No. Year of manufacturing, PO/RO no. and date, "PROPERTY OF TPCODL, Bhubaneswar", Guarantee period and Associate's name.
8	In case of manual unloading, supplier / transporter shall deploy sufficient Labour for unloading the material at TPCODL central store. For heavy item(s), crane will be provided by TPCODL [unloading cost will be recovered from the associate].
9	The driver should have valid License and one helper in truck. All the documents of truck like registration papers, PUC etc. should be available in Truck.
10	BA representative should accompany the material and get it unloaded / stacked in his presence wherever possible.

13.0 GUARANTEE

13.1 Guarantee of Performance

Associates shall stand guarantee that the equipment and material supplied under the contract is free from design, manufacturing, material, construction, erection & installation and workmanship & quality defects and is capable of its due, rated and intended quality performance, as an integrated product delivered under the contract, for a specific period termed as Guarantee Period (as elaborated elsewhere in this clause). The Associate should also guarantee that the equipment/material is new and unused except for the usage required for the tests and checks required as part of quality assurance.

13.2 Guarantee Period

The Guarantee Period will be equipment/service/work specific and shall be as specified in the Standard Specifications of TPCODL for the equipment/material/service/work and where standard specifications are not part of contract documents or guarantee period is not specified in the standard specifications, the guarantee period shall be as per the Special Terms and Conditions of the Contract. In case of no mention of the guarantee period in standard specifications or SCC Guarantee Period will be 60 Months from the Date of Commissioning or 72 months from the date of delivery of final lot of supplies made, whichever is earlier.

13.3 Failure in Guarantee Period (GP)

If the equipment and material supplied under the contract fails to perform its due, rated & intended quality performance, during the Guarantee period, the associate is liable to undertake

repair/rectify/replace the equipment and material supplied within time frame specified in the SCC or elsewhere in the contract documents at associate's cost to make the equipment and material supplied/service or work rendered under the contract of performing its due, rated and intended quality performance. If Associate fails to repair/rectify/replace the equipment or material supplied rendered under the contract, failed in Guarantee Period, TPCODL will be at liberty to get the same done at Associate's risks and costs and recover all such expenses plus the TPCODL's own charges (@ 20% of expenses incurred), from the Associate or from the "Security cum Performance Deposit" as the case may be.

If during the Warranty/ Guarantee period some parts of the supplies are replaced owing to the defects/ damages under the Warranty, the Warranty period for such replaced parts shall be until the expiry of twelve months from the date of such replacement or renewal or until the end of original Guarantee period, whichever is later.

Any repairs during the Guarantee Period shall be carried out by the Associate within 30 days of reporting the issue to Associate by TPCODL. However, if replacement of the Equipment is required, Associate shall notify the same to TPCODL within 7 days of reporting the issue by TPCODL. Thereafter, the total time for supply of new equipment/ material shall be equal to the original delivery period of that equipment/ material as specified in the Contract. In case the Associate is not able to rectify/ replace the faulty equipment/ material within the stipulated timelines as mentioned above, penalty shall be levied as per the Liquidated Damages clause mentioned in this document. The penalty amount shall be recovered from the payment due to the vendor or by encashment of the SPBG as the case may be.

13.4 Cost of repairs on failure in GP

The cost of repairs/rectification/replacement, required transportation, site inspection /mobilization/dismantling and re-installation costs as applicable, to be borne by Associate. The Associate has to ensure that the interruption in the usage of intended purpose of the equipment is minimized to the maximum extent In lieu of the time taken for repairs/rectification/replacement.

13.5 Guarantee period for Goods Outsourced

If the Associate outsources partly equipment/materials/services from third party as mutually agreed upon at the pre award stage of contract, TPCODL shall have the benefit of any additional guarantee period if provided by the third party for the part supplied/executed by them.

13.6 Latent Defect

Hidden defects in manufacturing or design of the product supplied and which could not be identified by the tests conducted but later manifested during operation of the equipment are termed as latent defects. Associates shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Company.

13.7 Support beyond the Guarantee Period

The Associate shall ensure availability of spares and necessary support for a period of atleast 10 years post completion of guarantee period of equipment supplied against the contract.

14.0 LIQUIDATED DAMAGES

a) For supplies which are of standalone use, multiple in quantities and having a single final delivery schedule, Liquidated damages shall be levied without prejudice to any of the other contractual rights of TPCODL, as described below:

   For delay of each week and part thereof from the delivery schedule specified in the contract, 1% of contract value corresponding to undelivered quantity, provided full quantity is supplied within 130% of the original contract time. If full contractual quantity is not delivered within 130% of contract time for delivery, TPCODL has the right to levy LD on the entire contract value, subject to a maximum of 10% of the total contract value.

b) For Supplies having phased delivery schedule as per contract terms, standalone use and multiple in quantities, Liquidated damages shall be levied without prejudice to any of the other contractual rights of TPCODL, as described below:

For the purpose of calculating and applying LD, each delivery lot shall be considered separately. For delay of each week and part thereof, from the delivery schedule specified for the lot, 1% of the contract value corresponding to the undelivered quantity of the lot subject to a maximum of 10% of the total contract value of the subject lot. However, if full contractual quantity is not delivered within 130% of contract time for delivery, TPCODL has the right to levy LD on the entire contract value, subject to a maximum of 10% of the total contract value. Deduction of LD shall be on landed cost i.e contract value inclusive of taxes and in pursuant statutory compliance GST would be applicable at the stipulated rate and the same shall be borne by Business Associate. In case of LD deduction, a GST invoice shall be issued by TPCODL as a proof of deduction/ recovery.

14.1 LD Waiver Request

Any request of LD waiver shall be submitted within thirty (30) days of deducting LD. Request submitted beyond the timeline shall not be entertained.

15.0 UNLAWFUL ACTIVITIES

The Associate shall have to ensure that none of its employees are engaged in any unlawful activities (whether covered under the scope of the present GCC or not) subversive of the TPCODL's interest failing which appropriate action (legal or otherwise) may be taken against the Associate by the TPCODL, in accordance with the terms of the present GCC.

16.0 CONFIDENTIALITY

Associate and its employees or representatives thereof shall strictly maintain the confidentiality of various information they come across while executing the contract as detailed below.

16.1 Documents

All maps, plans, drawings, specifications, schemes and other documents or information related to the Contract/Project and the subject matter contained therein and all other information given to the Associate by the TPCODL in connection with the performance of the contract shall be held confidential by the Associate and shall remain the property of the TPCODL and shall not be used or disclosed to third parties by the Associate for any purpose other than for which they have been supplied or prepared. The Associate may disclose to third parties, upon execution of confidentiality agreements, such part of the drawings, specifications or information if such disclosure is necessary for the performance of the Work provided such third parties agree in writing to keep such information confidential to the same extent and degree as provided herein, for the benefit of the TPCODL.

16.2 Geographical Data

Maps, layouts and photographs of the unit/plant including its surrounding regions showing vital installation for national security of country or those of TPCODL shall not be published or disclosed to the third parties or taken out of the country without prior written approval of the TPCODL and upon execution of confidentiality agreements satisfactory to the TPCODL with such third parties prior to disclosure.

16.3 Associate's Processes

Title to secret processes if any developed by the Associate on an exclusive basis and employed in the design of the equipment shall remain with the Associate. TPCODL shall hold in confidence such processes and shall not disclose such processes to the third parties without prior approval of the Associate and execution by such third parties of secrecy agreements satisfactory to the Associate prior to disclosure. Upon completion of contract, such processes shall become the property of the TPCODL. Title to technical specifications, drawings, flow sheets, norms, calculations, diagrams, interpretations of test results, schematics, layouts and such other information, which the Associate has supplied to the TPCODL under the Contract shall be passed on to the TPCODL. The TPCODL shall have the right to use these for construction, erection, start-up, Trial Run, operation, maintenance, modifications and/or expansion of the works including for the manufacture of spare parts.

16.4 Exclusions

The provision of Clauses 16.1 to 16.3 shall not apply to information:

- Which at the time of disclosure are in the public domain which later on become part of public domain through no fault of the party concerned, or
- Which were in the possession of the party concerned prior to disclosure to him by the other party, or
- Which were received by the party concerned after the time of disclosure without restriction on disclosure or use, from a third party who did not acquire such information directly or indirectly from the other party or has no obligation of confidentiality for such information.

16.5 Violation

In case of violation of this clause, the Associate is liable to pay compensation and damages as may be determined by the competent authority of TPCODL.

17.0 INTELLECTUAL PROPERTY RIGHTS

If, in the course of performance of its functions and duties as envisaged by the scope of the present GCC, the Associate acquires or develops, any unique knowledge or information which would be covered, or, is likely to be covered within the definition of a trademark, copyright, patent, business secret, geographical indication or any other form of intellectual property right, it shall be obliged, under the terms of this present GCC, to share such knowledge or information with the TPCODL. All rights, with respect to, or arising from such intellectual property, as afore mentioned, shall solely vest in TPCODL.

Moreover, the Associate undertakes not to breach any intellectual property right vesting in a third party/parties, whether by breach of statutory provision, passing off, or otherwise. In the event of any such breach, the Associate shall be wholly liable to compensate, indemnify or make good any loss suffered by such third party/parties, or any compensation/damages arising from any legal proceeding/s, or otherwise. No liability of TPCODL shall arise in this respect, and any costs, damages, expenses, compensation payable by TPCODL in this regard to a third party/parties, arising from a legal proceeding/s or otherwise, shall be recoverable from the Associate.

18.0 INDEMNITY

The Associate shall at all times indemnify, keep indemnified and hold harmless the TPCODL and its officers, directors, employees, affiliates, agents, successors and assigns against all actions, claims, demands, costs, charges and expenses arising from or incurred by reason of any infringement of patent, trade mark, registered design, copy rights and/or industrial property rights by manufacture, sale or use of the equipment supplied by the Associate whether or not the TPCODL is held liable for by any court judgement. In this connection, the TPCODL shall pass on all claims made against him to the Associate for settlement.

The Associate assumes responsibility for and shall indemnify and save harmless the TPCODL from all liability, claims, costs, expenses, taxes and assessments including penalties, punitive damages, attorney's fees and court costs which are or may be required to be paid by the TPCODL and its officers, directors, employees, affiliates, agents, successors and assigns arising from any breach of the Associate's obligations under the Contract or for which the Associate has assumed responsibilities under the Contract including those imposed under any local or national law or laws, or in respect to all salaries, wages or other compensation for all persons employed by the Associate or his Sub-Associates or suppliers in connection with the performance of any work covered by the Contract. The Associate shall execute, deliver and shall cause his Sub-Associate and suppliers to execute and deliver, such other further instruments and to comply with all the requirements of such laws and regulation as may be necessary there under to conform and effectuate the Contract and to protect the TPCODL.

The TPCODL shall not be held responsible for any accident or damages incurred or claims arising, due to the Associate's error there from prior to completion of work. The Associate shall be liable for such accidents and after completion of work for such accidents as the case may be due to negligence on his part to carry out Work in accordance with Indian laws and regulations and the specifications set forth herein.

19.0 LIABILITY & LIMITATIONS

19.1 Liability

Except for any specific liability which may be identified in the Contract and which may be payable hereunder, Associate shall not be liable for any special, incidental, indirect, or consequential Damages or any loss of business Contracts, revenues or other financial loss (or equivalents thereof no matter how claimed, computed or characterized) arising out of or in connection with the Performance of the Work or supply of Goods ***unless caused by Associate's negligence, willful misconduct or breach of contract.***

If the Associate is a joint venture or consortium, all concerned parties shall be jointly and severally bound to the TPCODL for the fulfillment of the provisions of the Contract. The consortium or the joint venture shall designate one party as their leader, who will be the coordinator between the parties and TPCODL. The constituents & leader of the consortium or joint venture shall not be changed without the prior consent of TPCODL.

TPCODL shall have no liability or any special, incidental, indirect or consequential Damages for any loss of Business Contracts, revenues or other financial loss arising out of this Contract.

19.2 Limitation of Liability

The total liability of Associate against any contract shall be limited to the Total All Inclusive Contract Value.

20.0 FORCE MAJEURE

Force Majeure applies if the performance by either Party ("the Affected Party") of its obligations under Contract is materially and adversely affected.

"Force Majeure" shall mean any event or circumstance or combination of events or circumstances referred below and their consequences that wholly or partly prevents or unavoidably delays any Party in the performance of its obligations under this Agreement, but only and to the extent that such events and circumstances are not within the reasonable control, directly or indirectly, of the Affected Party and could not have been avoided even if the Affected Party had taken reasonable care:

- Act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, embargo, blockade, revolution, riot, bombs, religious strife or civil commotion, etc. Politically motivated sabotage, or terrorism, etc.

- Action or Act of Government or Governmental agency for which remedy is beyond the control of the affected parties. Any act of God.

Note: Causes like power breakdown/ shortages/fire/strikes, accidents etc do not fall under Force Majeure.

Time being the essence of the Contract, if either party is prevented from the performance of its obligations in whole or in part due to an event of Force Majeure, then provided Notice of happening of any event by the Affected Party is given to the other party within seven (7) days from the date of occurrence of such event, which DIRECTLY has impact on works and submitted details and quantum of resulting effect, but at the same time had made all possible efforts to mitigate and overcome effects thereof, the Affected Party's performance under this Contract shall be suspended until such event ceases and the Scheduled Completion shall be delayed accordingly.

If Force Majeure event(s) continue for a period of more than three months, the parties shall hold consultation to discuss the further course of action.

Neither party shall be considered to be in default or in breach of its obligation under the Contract to the extent that performance of such obligation by either party is prevented by any circumstances of Force Majeure which arise after effective date of Contract.

Neither party can claim any compensation from the other party on account of Force Majeure.

21.0 SUSPENSION OF CONTRACT

21.1 Suspension for Convenience

TPCODL may, at any time and at its sole option, suspend execution of all or any portions of the schedule of items of contract to be supplied/work to executed by Associate under the contract by providing to the Associate atleast two business days written notice for contracts having contract completion period less than sixty days and atleast seven business days' notice for all other contracts.

Upon receipt of any such notice, the Associate shall respond as follows as applicable as per contract construction.

- Immediately discontinue further supply of material/goods specified in the suspension notice for supply contracts
- Immediately discontinue further service/work and supply of materials of those services/materials/work specified in the suspension notice for service /composite contract
- Promptly make every reasonable effort to obtain suspension, upon terms satisfactory to TPCODL, of all orders, outsourcing arrangements, and rental Contracts to the extent that they relate to performance of the portion of Work suspended by the notice.
- Protect and maintain the portion of the service/Work already completed, including the portion of the Work suspended hereunder, unless otherwise specifically stated in the notice.
- Continue delivering/carrying out the supply/service/work items as per contract conditions, which do not fall under purview of the suspension notice.

On receipt of resumption notice from TPCODL, the Associate shall resume execution of contract as specified in the resumption notice, within the time frame specified in the resumption notice.

21.2 Suspension for Breach of Contract conditions.

TPCODL shall suspend execution of whole/or part thereof the contract till such time Associate complies with the conditions stipulated under section clause 22.1 for breach/default of contract conditions.

21.3 Compensation in lieu of Suspension

If the suspension of the contract in whole or in part is for convenience of TPCODL and not due to any breach of contract conditions by the associate, TPCODL at its discretion shall consider compensating all reasonable additional costs incurred by Associate in lieu of suspension of whole or part of contract, on representation of the Associate providing justified estimates of such additional costs and such estimates are found acceptable and approved by competent authority of TPCODL.

If the suspension of contract in whole or part thereof is due to breach of contract conditions (refer clause 22.1) by the Associate, Associate shall not be entitled for any compensation for any cost incurred in lieu of suspension of whole or part of contract and also shall be liable for compensating all the losses arising to TPCODL in lieu of suspension of contract. Resumption notice shall be subject to the Associate taking corrective action for the breach of contract conditions within the time frame and as per the terms specified in the suspension notice.

22 TERMINATION OF CONTRACT

22.1 Termination for Default/Breach of Contract

The contract / PO /RC shall be subject to termination by TPCODL in case of breach of the contract by the Associate which shall include but not be limited to the following:

a. Withdrawal or intimation by the Associate of its intent to withdraw or surrender the execution / completion of the contracted work /PO or failure in ensuring adherence to any delivery schedules, in deviation of the contract/PO.

b. Refusal or neglect on the part of the Associate to supply material/equipment of quantity or quality as specified by TPCODL and within the timeframe as specified in the contract document or refusal or neglect to execute the services/work in terms of the agreed standards of quantity or quality and/or within the timeframe specified in the contract/PO.

c. Failure in any respect to perform any portion of the Work contracted with promptness, diligence, or in accordance with the terms of the contract.

d. Failure to furnish guarantees as specified and /or failure to comply with the terms thereof.

e. Failure to furnish such relevant documents or information within the time specified which may be necessary for due execution / completion of the works and documentation.

f. Liquidation, bankruptcy either voluntary or involuntary OR entering into any composition or compromise with its creditors, or Insolvency.

g. In case any reasonable information has been received by TPCODL that Associate has adopted/ or attempted to adopt any unethical conduct, action in award of the contract /PO or at any time thereafter.

h. Failure to comply with applicable statutory provisions as contained in the contract or failure to comply with the applicable laws.

i. Failure to comply with safety regulations/clauses stipulated in the contract or as may be generally instructed by TPCODL.

If the default or breach as specified under clause 22 (except sub clause g thereof) be committed by the associate for the first time, TPCODL shall issue, along the with notice of default or breach, a warning notice instructing the associate to take remedial/corrective action within the time frame stipulated in the warning notice and not to repeat the same in future. The timeframe for corrective action by the associate shall be specific to the nature of breach of contract and the same shall not be objected to by the Associate. If the Associate fails to comply with the instructions in the warning notice or in taking corrective action to the satisfaction of TPCODL then TPCODL may terminate the entire or part of contract at its discretion by issuing termination notice without incurring any liability on this ground.

In case the contract is terminated for any breach of the nature specified in clause 22 g stated above, TPCODL shall have the right to terminate all the contracts TPCODL is having with the Associate by issuing termination notice which shall be without prejudice to the other rights of TPCODL available to it under law.
Without prejudice to its right to terminate for breach of contract, TPCODL may, without assigning any reason, terminate the Contract in whole or in part at any time at its discretion while the contract is in force by serving a written notice of two weeks to the Associate.

In the event of TPCODL having proceeded with termination of the contract the associate shall comply and proceed further in the following manner:

a) Associate shall discontinue the supply, on the expiry of the said period of two weeks.

b) Associate shall ensure that no further steps are being taken towards discharge of the obligations, terms and conditions as contained in the contract/PO. This shall include initiation of actions not limited to discontinuation of other allied and associated arrangements which the associate might have entered into with third parties for due discharge of its obligations under the contract with TPCODL.

c) The Associate shall perform thereafter such tasks as may be necessary to preserve and protect the terminated portion of the material/service/work in progress and the materials and equipment at TPCODL sites or in transit thereto. However, the associate shall continue to fulfill its contractual obligations with regard to the part of contract not terminated.

d) It shall be open for TPCODL to conduct a joint assessment with the associate of the material, supplies, equipment, works or in general as to the subject matter of the contract in regard to which the associate claims having completed its obligations before or during such termination.

e) It shall be open to TPCODL to seek invocation of the performance bank guarantee or any other guarantee or other security deposit by whatever name called submitted by the associate, which shall not be objected to or protested against by the associate.

In case of termination of the contract the parties agree to be governed inter alia by the following:

a) In case TPCODL exercises its right of termination as stated above the associate shall not dispute or object to the same.

b) The Associate shall be entitled to receive and claim only such payments OR sums of money from TPCODL as may be found payable to it in regard to works executed by it under the terms of the contract and no other claim of any nature whatsoever shall be made by the Associate.

c) All such provisions which the parties have agreed to survive and prevail even after termination of the contract shall remain effective despite the termination.

In the event of such termination, TPCODL may finish the Work by whatever method it may deem expedient, including the hiring of services and /or purchase of material equipment from such third parties as TPCODL may deem fit or may itself provide any labor or materials and perform any part of the Work. The associate undertakes to bear the incremental costs if any paid by TPCODL in such a case attributable to failure on the part of the associate. The Associate in such a case shall not be entitled to receive any further payments and any sums found payable to it may be adjusted by TPCODL against the amount recoverable from him on this ground. The same shall be without prejudice to other rights available to TPCODL under law against the associate.
Upon the termination of any of the contract due to occurrence of any circumstances provided in clauses stated above and constituting repeated breach or misconduct, TPCODL shall be entitled to bar the associates its agents, affiliates from undertaking any negotiation / tendering, bidding, participation activities concerning TPCODL for a period of two years from date of such termination. The same shall be without prejudice to other rights available to TPCODL.

22.2 Termination for Convenience of Associate

Associate at its convenience may request for termination of contract, clearly assigning the reason for such request. TPCODL has full right to accept, reject or partially accept such request. However, associate shall continue its supply as per contract till final approval is given to associates for such termination.

22.3 Termination for Convenience of TPCODL

TPCODL at its sole discretion may terminate the contract by giving 30 days prior notice in writing or through email to the Associate. TPCODL shall pay the Associate for all the supplies/ services rendered till the actual date of contract termination against submission of invoice by the Associate to that effect.

23.0 DISPUTE RESOLUTION & ARBITRATION

In case of any dispute or difference the parties shall endeavor to resolve the same through conciliatory and amicable measures within 15 Days failing which the matter may be referred by either party for resolution by the sole arbitrator to be appointed mutually by both the parties. The arbitral proceedings shall be conducted in accordance with Arbitration and Conciliation Act 1996 and the place of arbitration shall be Bhubaneswar. The language to be used at proceedings shall be English and the award of the arbitrator shall be final and binding on the parties. The parties shall bear their respective costs of arbitration. The associate shall continue to discharge its obligations towards due performance of the works as per the terms of the contract during the arbitration proceedings unless otherwise directed in writing by TPCODL or suspended by the arbitrator. Further, TPCODL shall continue making such payments as may be found due and payable to the associate for such works.

23.1 Governing Laws and Jurisdiction

The parties shall be subject to the jurisdiction of the courts of law in Bhubaneswar and any matter arising here from shall be subject to applicable law in force in India.

24.0 ATTRIBUTES OF GCC

24.1 Cancellation

The Company reserves the right to cancel, add, delete at its sole discretion, all or any terms of this GCC or any contract, order or terms agreed between the parties in pursuance without assigning any reasons and without any compensation to the Associates.

24.2 Severability

If any portion of this GCC is held to be void, invalid, or otherwise unenforceable, in whole or part, the remaining portions of this GCC shall remain in effect.

24.3 Order of Priority

In case of any discrepancies between the stipulations in General Conditions of the Contract (GCC) and Special Conditions of Contract (SCC), the GCC shall stand superseded by the SCC to the extent stipulated hereinabove while balance portion of respective clauses of GCC shall continue to be applicable.

25.0 ERRORS AND OMISSIONS

The Associate shall be responsible for all discrepancies, errors and omissions in the drawings, documents or other information submitted by him, irrespective of whether these have been approved, reviewed or otherwise accepted by the TPCODL or not. However, any error in design/drawing arising out of any incorrect data/written information from TPCODL will not be considered as error and omissions on part of the Associate.

26.0 TRANSFER OF TITLES

The title of ownership and property to all equipment, materials, drawings & documents shall pass to the TPCODL on acceptance of material by store/site after Inspection.

However, such passing of title of ownership and property to the TPCODL shall not in any way absolve, dilute or diminish the responsibility and obligations of the Associate under this Contract including loss or damages and all risks, which shall vest with the Associate.

27.0 INSURANCE

The Contractor shall take out the Insurance Policies which shall cover all risks including the following, as applicable: -

a) The value of the policy shall cover the total value of all the items till they are handed over to TPCODL.

b) TPCODL shall be the principal holder of the policy. The Associate shall be the loss payee under the policy. Associate / Sub-contractor of the Associate shall not be holders or beneficiaries in the policy nor shall they be named in the policy. TPCODL reserves the exclusive right to assign the policy.

c) While the payment of premium may be phased in agreement with the insurance company, at no time shall goods and services required to be provided by the associate shall remain uninsured in accordance with (a) above.

d) A copy of the Insurance policy shall be made available to TPCODL prior to first dispatch lot of any Equipment and policy shall be kept alive and valid at all times up to the stage of final acceptance.

e) TPCODL reserves the right to take out whatever policy that is deemed necessary by him if the associate fails to keep the said policy alive and valid at all times and/or causes lapses in payment of premium thereby jeopardizing the said policy. The cost of such policy(s) shall be recovered / deducted from the amount payable to the associate.

f) The policy shall ensure that the TPCODL's decision regarding replacement of goods damaged, lost or rendered unusable shall be final.

In all cases, the associate shall lodge the claims with the underwriters and also settle the claims and shall also notify TPCODL of any filed claims. However, the associate shall proceed with the repairs and/or replacement of the equipment/components without waiting for the settlement of the claims. In case of seizure of materials by concerned authorities, the associate shall arrange prompt release against bond, security or cash as required. TPCODL, upon request by the associate, will extend all reasonable assistance to the associate in such a case.

All the insurance claims shall be processed and settled by the associate and the missing/damaged items shall be replaced/repaired by them without any extra cost to TPCODL and without affecting the completion time.

28.0 SUGGESTIONS & FEEDBACK

We welcome all our Business Associates to write to us about their experience with TPCODL; be it our Company, our services or our people. Each and every concern, issue, query and suggestion from you will help us to become a better company to work with and shall help us develop a strong bonding of trust and a long term relationship with you.

You may send your feedback by filling up our Business Associate Feedback Form enclosed herewith as *Annexure-I.* You can also log on to our website www.tpcentralodisha.com to provide your feedback.

• Suggestions for us

• Feedback form

• Knowledge Sharing/ Experience with TPCODL

• Any issues with TPCODL.

Submission of feedback form is mandatory before the release of final payment to the BA.

29.0 CONTACT POINTS

In case Business Associate needs information with respect to payments or has any grievances, same may be lodged by log on to our website www.tpcentralodisha.com

30.0 LIST OF ANNEXURES

S. No.	Subject	Annexure
1.	Performa for Bid Security Bank Guarantee	A
2.	Performa for Performance Bank Guarantee (CP cum EP)	B
3.	Performa for No Demand Certificate by Associate	C
4.	Performa For Application For Issuance of Consolidated TDS Certificate	D
5.	Business Associate Feedback Form	E
6.	Acceptance Form For Participation In Reverse Auction Event	F
7.	Form for RTGS Payment	G
8.	Vendor Appraisal Form	H
9.	Manufacturer Authorization Form	I

ANNEX
URE-A

PROFORMA FOR BID SECURITY BANK GUARANTEE

The TP Central Odisha Distribution Limited

Bhubaneswar

WHEREAS, (Name of the Bidder) _____

(hereinafter called "the BIDDER") has submitted his bid dated_____ for the (Name of Contract) _____ (hereinafter called "the BID").

KNOW ALL men by these presents we (Name of the Bank) _____ of (Name of the Country) _____ having our registered office at_____(hereinafter called "the BANK) are bound unto The TP Central Odisha Distribution Limited (TPCODL) in the sum of _____ for which payment well and truly to be made to the TPCODL the Bank binds himself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this _____ day of _____ 20_____.

The CONDITIONS of this obligation are:

i) If the Bidder withdraws his Bid during the period of bid validity specified in the Proforma of Bid or

ii) If the Bidder having been notified of the acceptance of his Bid by the TPCODL during the period of bid validity fails or refuses to furnish the Contract Performance Bank Guarantee, in accordance with the Instructions to Bidders.

We undertake to pay the TPCODL upto the above amount upon receipt of its first written demand, provided that in its demand the TPCODL will note that amount claimed by it is due to it owing to the occurrence of one or both conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force upto and including the date (No of days as mentioned in tender enquiry) days after the closing date of submission of bids as stated in the Invitation to Bid or as extended by you at any time prior to this date, notice of which extension to the Bank being hereby waived, and any demand in respect thereof should reach the Bank not later than the above date.

DATE	**……**	**SIGNATURE OF THE BANK**	**…….**
WITNESS	**……**	**SEAL**	**…….**

(Signature, Name & Address) (At least 2 witnesses)

ANNEXURE- B

PROFORMA FOR PERFORMANCE BANK GUARANTEE (CP cum EP)

(On Rs.100/- Stamp Paper) Note:

a) Format shall be followed in toto
b) Claim period of one month must be kept up
c) The guarantee to be accompanied by the covering letter from the bank confirming the signature to the guarantee

---

The TP Central Odisha Distribution Limited

Bhubaneswar

CP cum EP BG No…….

Order/Contract No……dated……

1. You have entered into a Contract No _____ with M/s._____ (hereinafter referred to as "the Vendor") for the supply cum erection / civil work of _____ (hereinafter referred to as" the said Equipment") for the price and on the terms and conditions contained in the said contract.
2. In accordance with the terms of the said contract, "the Vendor" agreed to furnish you with an irrevocable, unconditional and acceptable bank guarantee for 10% of the value of contract and to be valid till the end of Guarantee period plus one month towards "Contract cum Equipment performance". For this purpose you have agreed to accept the guarantee.

3. In consideration thereof, we, _____ hereby irrevocably and unconditionally guarantee to pay to you on demand but in any case before the end of five working days from the date of the claim and without demur and without reference to "the Vendor" such amount or amounts not exceeding the sum of

   Rs._____ (Rupees _____ only) being _____% (_____ percent) of the total value of the contract on receipt of your intimating that "the

   Vendor" has not fulfilled his contractual obligations. You shall be the sole judge for such non-fulfillment and "the Vendor" shall have no right to question such judgment.

4. You shall have the right to file / make your claim on us under the guarantee for a **further period of one month** from the date of expiry.

5. This guarantee shall not be revoked without express consent and shall not be affected by your granting time or any other indulgence to "the Vendor", which shall include but not be limited to, postponement from time to time of the exercise the same in you or any right which you may have against "the Vendor" and to exercise the same in any covenant contained or implied in the said contract or any other course or remedy or security available to you, and our Bank shall not be released from its obligations under this guarantee by

your exercising any of your rights with reference to matters aforesaid or any of them or by reasons of any other act or forbearance or other acts of omission or commission on your part or any other indulgence shown by you or by any other matter or thing whatsoever which under the law would, but for this provision have the effect of relieving our bank from its obligation under this guarantee.

6. We also agree that you shall be entitled at your option to enforce this guarantee against our bank as a principal debtor, in the first instance, notwithstanding any other security or guarantee that you may have in relation to "the Vendor's" liabilities in respect of the premises

7. This guarantee shall not be affected by any change in the constitution of our Bank or "the Vendor" or for any other reason whatsoever.

8. Any claim / extension under the guarantee can be lodge-able at outstation banks or at Bhubaneswar branch and claim will also be payable at Bhubaneswar Branch (to be confirmed by Bhubaneswar Branch by a letter to that effect in case BG is from the branch outside Bhubaneswar).

9. Notwithstanding anything herein contained, our liability under this guarantee is limited to Rs._____ (Rupees_____ only and the guarantee will remain in force upto and including _____(Date) and shall be extended from time to time for such period or period as may be desired by "the Vendor".

10. Unless a demand or claim under this guarantee is received by us in writing within one months from_____ (expiry date) i.e. on or before _____ (claim period end date), we shall be discharged from all liabilities under this guarantee thereafter.

Dated at_____ this_____ day of _____ 20__

Bank's rubber stamp

1. Banks full address
   Designation of Signatory
2. Bank official number

ANNEXURE-C

PROFORMA FOR "NO DEMAND CERTIFICATE" BY ASSOCIATE

(On Company's Letter head or with Company Seal)
(To be submitted by the Associate to TPCODL Accounts Department at the time of receipt of full and final payment)

(Certificate No. CCP/002)

Name of the Project Order/

Contract No.

Dated

Name of the Associate Scheme No.

/ Job No.

We, M/s._____ (Associate) do hereby acknowledge and confirm that we have received the full and final payment due and payable to us from TPCODL, in respect of our aforesaid Order No _____ dated_____ including amendments, if any, issued by TPCODL to our entire satisfaction and we further confirm that we have no claim whatsoever pending with TPCODL under the said contract / W.O.

Notwithstanding any protest recorded by us in any correspondence, documents, measurement books and / or final bills etc., we waive all our rights to lodge any claim or protest in future under this contract.

We are issuing this "NO DEMAND CERTIFICATE" in favour of TPCODL, with full knowledge and with our free consent without any undue influence, misrepresentation, coercion etc.

Place **Name**

(Company Seal)

ANNEXURE-D

PROFORMA FOR APPLICATION FOR ISSUANCE OF CONSOLIDATED TDS CERTIFICATE

To be printed on the letterhead

To,

The TP Central Odisha Distribution Limited
Bhubaneswar

Sub: Application for issuance of Consolidated TDS Certificate for the FY _____ Dear Sir,

I / we hereby request / authorize you to issue me / us a consolidate TDS Certificate for the financial year _____ against tax deducted at source by you from my / our payments / bills during the said year from time to time under Chapter XVII – B of the Income Tax Act, 1961. For and on behalf of

Signature

Name

Address

Contact No. (Land Line)

(Mobile)

PAN #

Assessing authority

ATTACH THE COPY OF PAN CARD

NIT No.: TPCODL/P&S/1000000164/2021-22

TP CENTRAL ODISHA DISTRIBUTION LIMITED

(A Tata Power & Odisha Govt. joint venture)

2nd Floor, IDCO Tower, Janpath Bhubaneshwar, Odisha 751022

ANNEXURE-E

BUSINESS ASSOCIATE FEEDBACK FORM

With an objective to improve our internal processes and systems, and serve you better, we solicit your valuable feedback & suggestions. It is estimated that it will take about 10 minutes to complete this survey. We assure you that your feedback shall be kept confidential. Please send the duly filled feedback form in the "TPCODL addressed - attached envelop"

You are associated with us as

☐ OEMs ☐ Service Contractor ☐ Material Suppliers ☐ Material & Manpower Supplier

You are associated with us for

☐ Less than 1 year ☐ More than 1 year but less than 3 years ☐ More than 3 years

Your office is located at

☐ Bhubaneswar ☐ Within 200 kms from Bhubaneswar ☐ More than 200 kms from Bhubaneswar

Your nearly turnover with TPCODL

☐ Less than 25 Lacs ☐ 25 Lacs to 1 Crore ☐ More than 1 Cr.

Additional Information

Your Name	
Your Designation	
Your Organization	
Contact Nos.	
Email	

TP CENTRAL ODISHA DISTRIBUTION LIMITED
(A Tata Power & Odisha Govt. joint venture)
2nd Floor, IDCO Tower, Janpath Bhubaneshwar, Odisha 751022

We once again thank you for your participation in this survey. Please spare 10 minutes to give your feedback on following pages (Section A to E)

SECTION – A

(Please √ mark in the relevant box and give your remarks / suggestions / information for our improvement).

S. No.	Parameters	1 Do Not Agree	2 Slightly in Agreement	3 In Fair Agreement	4 Mostly in Agreement	5 Fully Agree	Remarks/ Suggestion
1	You receive all relevant queries / tenders from us in timely manner.						
2	We provide you enough lead time to respond to our queries / tenders.						
3	We provide you adequate support (drawings, documents, clarifications, briefing etc.) to enable you meet our requirements.						
4	All following elements of our contract / purchase order are rational :						
4.1	Scope of Work						
4.2	Delivery / Execution Schedule						
4.3	Payment Terms						
4.4	Liquidated Damages						
4.5	Performance Guarantee						
5	Our purchase orders / contracts are simple, specific & easy to understand						
6	TPCODL demonstrate willingness to be flexible in administration of Contract / Purchase Order						
7	We provide timely responses / clarifications to your queries						
8	TPCODL representative you interact / coordinate with is adequately empowered to support you in meeting contractual obligations						
9	TPCODL provide you all necessary infrastructure support for timely and quality completion of work (including AMC)						

S. No.	Parameters	1	2	3	4	5	Remarks/ Suggestion
		Do Not Agree	Slightly in Agreement	In Fair Agreement	Mostly in Agreement	Fully Agree	
10	TPCODL Engineer-in-Charge timely certifies the jobs executed/ material supplied						
11	TPCODL Engineer-in-Charge efficiently supervises the job execution for timely completion of job						
12	BIRD (Bill Inward Receipt Desk) initiative has improved payment disbursement process						
13	Our approach for Inspection and Quality Assurance effective to expedite project completion?						
14	TPCODL never defaults on contractual terms						
15	In TPCODL Contracts closure is done within set time limit						
16	Our material receiving procedures are well defined and efficiently deployed to reduce mutual inconvenience						
17	Bank Guarantees are released in time bound manner						
18	Our processes related to payment / account settlement are effective.						
19	You get payments on time						
20	TPCODL Employees follow Ethical behaviour						

SECTION – B

SECTION – B (Please rate the following parameters on a scale of 1 to 5, where 1 - Minimum; 5 - Maximum)

S. No.	Parameters	1	2	3	4	5	Remarks/ Suggestion
1	How do you rate courtesy/ empathy/ attitude level and warmth of TPCODL employees you interact with from following team?						
1.1	Project Engineering						
1.2	District / Zones						
1.3	Projects/HOG (TS &P)						
1.4	Inspection & Quality Assurance						
1.5	Stores						
1.6	Metering & Billing						
1.7	Accounts / Finance						
1.8	Administration						
1.9	IT & Automation						
2	How would you rate TPCODL in comparison to your other clients in terms of **fairness of treatment and transparency** with its Business Associates?						
3	How would you rate TPCODL in comparison to your other clients in terms of **processes and systems to manage partnership** with its Business Associates						
4	How would you rate TPCODL in comparison to your other clients in terms of **building long term & mutually relationship** with its Business Associates						

SECTION – C

Please √ mark in the relevant box and give your remarks / suggestions / information for our improvement.

S. No.	Parameters	Certainly No	Probably No	Certainly Yes	Probably Yes	Remarks/ Suggestion
1	Based on your experience with TPCODL, would you like to continue your relationship with TPCODL?					
2	If someone asks you about TPCODL, would you talk "positively" about TPCODL?					
3	Would you refer TPCODL name to others in your community, fraternity and society as a professional & dynamic organization?					

SECTION - D

If we ask you to rate us on a scale of 1 to 10, how will you rate TPCODL, that truly represents your overall satisfaction with us (please tick appropriate box) -

1	2	3	4	5	6	7	8	9	10

SECTION – E

Please √ mark in the relevant box and give your remarks / suggestions / information for our improvement.

Please spare your thoughts for TPCODL's improvement in particular areas of weaknesses, particularly relating to some great practices, attitudes that you have seen elsewhere in Indian and International Organizations, which you recommend TPCODL to adopt. Please give your valuable salient recommendations.

Please spare your thoughts for TPCODL's improvement in particular areas of major concerns for you. We also welcome your suggestions to adopt any best practices, altitudes that you

Recommendation	*Please tick (√) your top 5 expectations out of the following 10 points listed below -*	
(Please list down improvement you expect from TPCODL)	*Timely payment*	
1	*Flexibility in Contracts/PO*	
	Clarity in PO,s & Contracts	
2	*Timely response to quarries*	
	Timely certification of works executed	
3	*Clarity in Specs, drawings, other docs etc.*	
	Adequate information provided on website for tender notification, parties qualified etc.	
4	*Timely receipt of material at site for execution*	
	Performance Guarantee/EMD released in time	
5	*Inspection & quality assurance support for timely job completion*	

We thank you for your time and courtesy!!

TP CENTRAL ODISHA DISTRIBUTION LIMITED
(A Tata Power & Odisha Govt. joint venture)
2nd Floor, IDCO Tower, Janpath Bhubaneshwar, Odisha 751022

ANNEXURE-F

ACCEPTANCE FORM FOR PARTICIPATION IN REVERSE AUCTION EVENT

(To be signed and stamped by the bidder prior to participation in the auction event)

In a bid to make our entire procurement process more fair and transparent, TPCODL intends to use the reverse auctions through SAP-SRM tool as an integral part of the entire tendering process. All the bidders who are found as technically qualified based on the tender requirements shall be eligible to participate in the reverse auction event.

The following terms and conditions are deemed as accepted by the bidder on participation in the bid event:

1. TPCODL shall provide the user id and password to the authorized representative of the bidder. (Authorization Letter in lieu of the same shall be submitted along with the signed and stamped Acceptance Form).
2. TPCODL will make every effort to make the bid process transparent. However, the award decision by TPCODL would be final and binding on the supplier.
3. The bidder agrees to non-disclosure of trade information regarding the purchase, identity of TPCODL, bid process, bid technology, bid documentation and bid details.
4. The bidder is advised to understand the auto bid process to safeguard themselves against any possibility of non-participation in the auction event.
5. In case of bidding through Internet medium, bidders are further advised to ensure availability of the entire infrastructure as required at their end to participate in the auction event. Inability to bid due to telephone line glitch, internet response issues, software or hardware hangs, power failure or any other reason shall not be the responsibility of TPCODL.
6. In case of intranet medium, TPCODL shall provide the infrastructure to bidders. Further, TPCODL has sole discretion to extend or restart the auction event in case of any glitches in infrastructure observed which has restricted the bidders to submit the bids to ensure fair & transparent competitive bidding. In case an auction event is restarted, the best bid as already available in the system shall become the start price for the new auction.
7. In case the bidder fails to participate in the auction event due any reason whatsoever, it shall be presumed that the bidder has no further discounts to offer and the initial bid as submitted by the bidder as a part of the tender shall be considered as the bidder's final no regret offer. Any offline price bids received from a bidder in lieu of non-participation in the auction event shall be out rightly rejected by TPCODL.
8. The bidder shall be prepared with competitive price quotes on the day of the bidding event.
9. The prices as quoted by the bidder during the auction event shall be inclusive of all the applicable taxes, duties and levies and shall be FOR at TPCODL site.
10. The prices submitted by a bidder during the auction event shall be binding on the bidder.
11. No requests for time extension of the auction event shall be considered by TPCODL.
12. The original price bids of the bidders shall be reduced on pro-rata basis against each line item based on the final all-inclusive prices offered during conclusion of the auction event for arriving at Contract amount.

Signature & Seal of the Bidder

TP CENTRAL ODISHA DISTRIBUTION LIMITED
(A Tata Power & Odisha Govt. joint venture)
2nd Floor, IDCO Tower, Janpath Bhubaneshwar, Odisha 751022

ANNEXURE-G

To,

DGM (Finance) (Resource)
The TP Central Odisha Distribution Limited
Bhubaneswar

Sub: **e-Payments through National Electronic Fund Transfer (NEFT) OR Real Time Gross Settlement System (RTGS)**

Dear Sir,

We request and authorize you to affect e-payment through NEFT/RTGS to our Bank Account as per the details given below:-

Vendor Code	:	
Title of Account in the Bank	:	
Account Type	:	(Please mention here whether account is Savings/Current/Cash Credit)
Bank Account Number	:	
Name & Address of Bank	:	
Bank Contact Person's Names	:	
Bank Tele Numbers with STD Code	:	
Bank Branch MICR Code	:	(Please enclose a Xerox a copy of a cheque. This cheque should not be a payable at par cheque)

TP CENTRAL ODISHA DISTRIBUTION LIMITED

(A Tata Power & Odisha Govt. joint venture)

2nd Floor, IDCO Tower, Janpath Bhubaneshwar, Odisha 751022

Bank Branch IFSC Code	:	(You can obtain this from branch where you have your account)
Email Address of accounts person: (to send payment information)	:	
Name of the Authorized Signatory:	:	
Contact Person's Name:	:	
Official Correspondence Address:	:	

We confirm that we will bear the charges, if any, levied by our bank for the credit of NEFT/RTGS amounts in our account. Any change in above furnished information shall be informed to TPCODL well in time at our own. Further, we kept TPCODL indemnified for any loss incurred due to wrong furnishing of above information.

Thanking you,

For _____

(Authorised Signatory)

(Signature with Rubber Stamp)

Certification from Bank:

We confirm that we are enabled for receiving NEFT/RTGS credits and we further confirm that the account number (specify Bank a/c no.) of (Please mention here name of the account holder), the signature of the authorised signatory and the MICR and IFSC Code of our branch mentioned above are correct.

This also is certified that the above information is correct as per Bank record

(Manager's/ Officers Signature under Bank Stamp)

ANNEXURE-H

VENDOR APPRAISAL FORM

TO BE SUBMITTED BY VENDOR (To be filled as applicable)			
VENDOR:			
1.0	**DETAILS OF THE FIRM**		
	1.1	NAME (IN CAPITAL LETTERS)	:
	1.2	TYPE OF CONCERN (PROPRIETARY) Partnership, Pvt. Ltd., Public Ltd. etc.	:
	1.3	YEAR OF ESTABLISHMENT	:
	1.4	LOCATION OF OFFICE POSTAL ADDRESS TELEGRAPHIC ADDRESSES, TELEX NO. FAX NO.	:
	1.5	LOCATION OF MANUFACTURING UNITS	:
		i) UNITS 1	:
		ii) OTHER UNITS	:
2.0	**PRODUCTS MANUFACTURED**		:
3.0	**TURNOVER DURING THE LAST 3 YEARS (TO BE VERIFIED WITH THE LATEST PROFIT & LOSS STATEMENT).**		:
4.0	**VALUE OF FIXED ASSETS**		:
5.0	**NAME & ADDRESS OF THE BANKERS**		:
6.0	**BANK GUARANTEE LIMIT**		:
7.0	**CREDIT LIMIT**		:
8.0	**TECHNICAL**		
	8.1	NO. OF DESIGN ENGINEERS (INDICATE NO. OF YEARS EXPERIENCE IN RELATED FIELDS)	:
	8.2	NO. OF DRAUGHTS MEN	:
	8.3	COLLABORATION DETAILS (IF ANY)	:
		8.3.1 DATE OF COLLABORATION	:

		8.3.2 NAME OF COLLABORATOR	:
		8.3.3 RBI APPROVAL DETAILS	:
		8.3.4 EXPERIENCE LIST OF COLLABORATOR	:
		8.3.5 DURATION OF AGREEMENT	:
	8.4	AVAILABILITY OF STANDARDS / DESIGN PROCEDURES / COLLABORATOR'S / DOCUMENTS (CHECK WHETHER THESE ARE LATEST/CURRENT	:
	8.5	TECHNICAL SUPPORT, BACK-UP GUARANTEE, SUPERVISION, QUALITY CONTROL BY COLLABORATOR (WHEREVER ESSENTIAL). (THIS CLAUSE IS RELEVANT WHEN VENDOR'S EXPERIENCE IS INADEQUATE)	:
	8.6	QUALITY OF DRAWINGS	:
9.0	**MANUFACTURE**		
	9.1	SHOP SPACE, LAYOUT LIGHTING, VENTILATION, ETC.	:
	9.2	POWER (KVA)	:
		MAINS INSTALLED	:
		UTILIZED	:
		STANDBY POWER SOURCE	:
	9.3	MANUFACTURING FACILITIES (ATTACH LIST OF EQUIPMENT AS APPLICABLE)	:
		9.3.1 MATERIAL HANDLING	:
		9.3.2 MACHINING	:
		9.3.3 FABRICATION	:
		9.3.4 HEAT TREATMENT	:
		9.3.5 BALANCING FACILITY	:
		9.3.6 SURFACE TREATMENT PRIOR TO PAINTING/ COATING, POLISHING, PICKLING, PASSIVATION, PAINTING, ETC.	:
	9.4	SUPERVISORY STAFF	:
	9.5	ADEQUACY OF SKILLED LABOURS (MACHINISTS, WELDERS, ETC.)	:
	9.6	NO. OF SHIFTS	:

	9.7	TYPE OF MATERIAL HANDLED (SUCH AS CS, SS, ETC.)	
	9.8	WORKMANSHIP	:
	9.9	MATERIAL IN STOCK AND VALUE	:
	9.10	TRANSPORT FACILITIES	:
	9.11	CARE IN HANDLING	:
10.0	**INSPECTION / QC / QA / TESTING**		
	10.1	NUMBER OF PERSONNEL (INDICATE NO. OF YEARS OF EXPERIENCE)	:
	10.2	INDEPENDENCE FROM PRODUCTION	:
	10.3	AVAILABILITY OF PROCEDURAL WRITE UP/QUALITY PLAN	:
	10.4	INCOMING MATERIAL CONTROL AND DOCUMENTATION	:
	10.5	RELIABILITY/REPUTATION OF SUPPLY SOURCES	:
	10.6	STAGE INSPECTION AND DOCUMENTATION	:
	10.7	SUB-ASSEMBLY & DOCUMENTATION	:
	10.8	FINAL INSPECTION AND DOCUMENTATION	:
	10.9	PREPARATION OF FINAL DOCUMENTATION PACKAGE	:
	10.10	TYPE TEST FACILITIES	:
	10.11	ACCEPTANCE TEST FACILITIES	:
	10.12	CALIBRATION OF INSTRUMENTS AND GAUGES (WITH TRACEABILITY TO NATIONAL STANDARDS) (ATTACH LIST)	:
	10.13	STATUTORY APPROVALS LIKE BIS, IBR, ETC.(AS APPLICABLE)	:
	10.14	SUB-VENDOR APPROVAL SYSTEM AND QUALITY CONTROL	:
	10.15	DETAILS OF TESTS CARRIED OUT AT INDEPENDENT RECOGNIZED LABORATORIES	:
		i) FURNISH LIST OF TESTS CARRIED OUT AND THE NAME OF THE LABORATORY WHERE THE TESTS WERE CONDUCTED	:
		ii) CHECK AVAILABILITY OF CERTIFICATES AND REVIEW THESE WHEREVER POSSIBLE	:
11.0	**EXPERIENCE (INCLUDING CONSTRUCTION / ERECTION / COMMISSIONING) TO BE FURNISHED IN THE FORMAT INDICATED IN APPENDIX)**		:

12.0	**SALES, SERVICE AND SITE ORGANIZATIONAL DETAILS**	:
13.0	**CERTIFICATE FROM CUSTOMERS (ATTACH COPIES OF DOCUMENTS)**	:
14.0	**POWER SITUATION**	:
15.0	**LABOUR SITUATION**	:
16.0 *	**APPLICABILITY OF SC/ST RELAXATION (Y/N)** **IF YES, SUPPORTING DOCUMENTS TO BE ATTACHED**	
17.0	**ORGANIZATIONAL DETAILS** 1. PF NO 2. ESI NO 3. INSURANCE FOR WORK MAN COMPENSATION ACT NO 4. ELECTRICAL CONTRACT LIC NO 5. ITCC / PAN NO 6. SALES TAX NO 7. WC TAX REG. NO	:
18.0	**DOCUMENTS TO BE ENCLOSED:** 1. FACTORY LICENSE 2. ANNUAL REPORT FOR LAST THREE YEARS 3. TYPE TEST REPORT FOR THE ITEM 4. PAST EXPERIENCE REPORTS 5. ISO CERTIFICATE –QMS, EMS, OHAS, SA 6. REGISTRATION OF SALES TAX 7. COPY OF TIN NO. 8. COPY OF SERVICE TAX NO. 9. REGISTRATION OF CENTRAL EXCISE 10. COPY OF INCOME TAX CLEARANCE. 11. COPY OF PF REGISTRATION 12. COPY OF ESI REGISTRATION 13. COPY OF INSURANCE FOR WORK MAN COMPENSATION ACT NO 14. COPY OF ELECTRICAL CONTRACT LIC NO 15. COPY OF PAN NO 16. COPY OF WC TAX REGISTRATION 17. DOCUMENTS IN SUPPORT OF SC/ST RELAXATION AT S.NO.16.0 18. GSTN CERTIFICATE	

*** Classification of BA s under SC/ST shall be governed under following guidelines:**

- **Proprietorship/ Single Ownership Firm:** Proprietor of the firm should be from SC/ST community. Governing document shall be Proprietorship Deed.
- **Partnership Firm:** Only such firms shall qualify which have SC/ST partners holding equal to or more than 50% of the total ownership pattern of the firm. Governing document shall be Partnership Deed.

- **Private Limited Company:** Only such firms shall qualify which have SC/ST directors holding equal to or more than 50% of the total ownership pattern of the firm. Governing document shall be Memorandum of Understanding (MoU) and/or Article of Association (AoA).

NOTE: Certification from SC/ST Commission shall be required for deciding upon SC/ST status of a person.

ANNEXURE-I

MANUFACTURER AUTHORIZATION FORM

(To be submitted on OEM's Letter Head)

Date: ……

Tender Enquiry No.: ……..

To,

Chief (Procurement & Stores)

The TP Central Odisha Distribution Limited

Bhubaneswar

Sir,

WHEREAS M/s. *[name of OEM]*, who are official manufacturers of …… having factories at *[address of OEM]* do hereby authorize M/s *[name of bidder]* to submit a Bid in relation to the Invitation for Bids indicated above, the purpose of which is to provide the following Goods, manufactured by us

……and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with the Special Conditions of Contract or as mentioned elsewhere in the Tender Document, with respect to the Goods offered by the above firm in reply to this Invitation for Bids.

We hereby confirm that in case, the channel partner fails to provide the necessary services as per the Tender Document referred above, M/s *[name of OEM]* shall provide standard warranty on the materials supplied against the contract. The warranty period and inclusion / exclusion of parts in the warranty shall remain same as defined in the contract issued to their channel partner against this tender enquiry.

Yours Sincerely,

For ……..

Authorized Signatory

ANNEXURE IX

SAFETY POLICY AND SAFETY TERMS AND CONDITIONS

Definitions

Order Manager: Order Manager is the TPCODL representative, who has the ownership of the given job under the signed contract.

Service Provider/Contractor/Vendor: An individual or an organization that provides services to TPCODL under a signed contract.

Site Safety Management Plan: It is the safety plan agreed between Contractor / Service provider and TPCODL. It will contain the entire job specific safety requirement and will be signed by the service provider.

High Risk Job: Any job which has significant health and safety risk associated to it. The list of high risk jobs has been identified at TPCODL level.

Emergency: A serious, unexpected, business discontinuity and often dangerous situation resulting into loss of revenue / property and requiring immediate action.

1. Safety Policy

HEALTH AND SAFETY POLICY

Tata Power is committed to provide safe and healthy working environment for the prevention of work related injuries and ill-health. Safety is one of our core values. We strive to be a leader in safety excellence in the global power and energy business. In pursuit of this, we are committed to the following:

- Maintain and continually improve our management systems to eliminate hazards and reduce health & safety risks to all our stakeholders.
- Incorporate appropriate health & safety criteria into business decisions for selection of plant and technology, performance appraisal of individuals and appointments in key positions.
- Comply and endeavour to exceed all applicable health & safety legal and other requirements
- Integrate health & safety procedures and best practices into every operational activity with assigned line-functional responsibilities at all levels.
- Involve our employees and business associates in maintaining a safe and healthy work environment through consultation and participation
- Inculcate safety culture by visible leadership and empowerment.
- Ensure required competency to enable our employees and business associates for working safely.
- Promptly report incidents, investigate, share crucial learnings and prevent recurrences.
- Influence our business associates in enhancing their health and safety standards and align with Tata Power's health & safety codes and practices.
- Set safety & health metrics as indicators of excellence, monitor progress and continually improve health and safety performance.

We shall ensure the availability of appropriate resources at all times to fully implement and communicate this policy to all stakeholders by suitable means and periodically review its relevance in continuously changing business environment.

(Praveer Sinha)
CEO & Managing Director

Date: 11th March, 2019

TATA POWER
Lighting up Lives!

2. Safety Organization & Responsibilities

2.1 Contractor Site Management and Supervision

Each Contractor will be responsible for fulfilling all statutory and safety requirements as per the laws of the land and not limited to Factory Act, Electricity Act, Electricity Rules and Regulations, Shop and Establishment Act etc.

Each Contractor shall provide at least one competent full time safety supervisor for workforce of less than 100 numbers. When workforce ranges from 100 to 1000, the contractor has to provide at least one qualified safety officer and safety supervisors (reporting to the safety officer) in the ratio 1:100. For every 1000 addition in workforce, the contractor has to add 1 safety officer. The TPCODLProject Safety Manager will review and approve the appointment of all safety supervisors. Contractor/Subcontractor safety supervisors/officers will work with Tata Power Safety Managers and align themselves with Tata Power safety requirements.

Each Contractors'/Subcontractors' Site Manager is responsible, and will be held accountable, for the safety of their sub-contractors and workforce and for ensuring that all equipment, materials, tools and procedures remain in safety compliance at job site, including:

- Holding officer/supervisors accountable for safety and actively promote safe work performance.
- Participate in and cooperate with all safety program requirements to be implemented in order to meet Tata Power safety objectives.
- Ensure timely reporting of safety incidents, near misses, unsafe acts and conditions.
- Identify the training needs of its employees and maintain all safety training documents.
- Provide safety performance report at an agreed frequency.
- Stopping of unsafe work (acts and/or conditions) immediately, until corrective action be taken.

2.2 Contractor Supervisors and General Staff

Contractors' site supervisors and general staff members in charge of job site functions such as field engineering, warehousing, purchasing, cost and scheduling, etc. are responsible for the safe performance of the work of those they supervise. They must set an example for their fellow employees by being familiar with applicable sections of the Site Safety program and ensuring that all site activities are performed with SAFETY as the primary objective.

Each site supervisor is responsible and will be held accountable for identifying, analyzing and eliminating or controlling all hazards through implementation of an aggressive, pro-active Health, Safety and Environmental Program from project inception through project completion. Each supervisor will proactively participate in the SHE program by observing, correcting unsafe acts, and recording these observations.

2.3 Contractor Workforce

Contractor workforce must make safety a part of their job by following safety rules and regulations and by using all safeguards and safety equipment. They must take an active part in the Site Safety program to ensure their own safety and injury-free employment as well as being alert to unsafe practices of their fellow employees.

Every member of the workforce is expected to report for work without influence of any Drug/Alcohol. All employees are expected to report any hazardous conditions practices and behaviors in their work areas and correct where ever possible. Workforce is responsible for active participation in safety and health programs, suggestion systems, and trainings and in immediate reporting of all injuries, any unsafe practices, conditions or incidents to their supervisors.

2.4 Vendor/Contractor

Vendors/Contractor shall at all times comply with, and ensure that their workforce comply with all site safety rules and regulations. Specifically, with applicable provisions of the Tata Power Site Safety Management Plan, and all statutory safety rules and regulations.

3. Site Safety Rules and Procedures

The work in the safest possible manner can only happen when it has been carefully planned and all applicable procedures are followed. The Tata Power Safety Procedures are derived from Tata Power best practices and the applicable Government acts regulations. In each case, the most stringent regulation is used.

Following is the list of Tata Power's critical Safety Rules and Procedures. Contractor shall refer to approved Rules and Procedures for detailed requirements and ensure conformance.

3.1 Lock Out and Tag Out Procedure

This procedure is intended to be used for the protection of Personnel while servicing or performing maintenance on equipment / pipeline / vessel / process systems. This is a general procedure that shall be used as the minimum requirements for isolation of equipment, pipelines, machines, system from all possible sources of hazardous energy and / or material such as Steam, Hot Water, Compressed Air, any other process fluid / chemical energy/Mechanical energy or Electrical energy. For complete procedure kindly refer Procedure Document No. TPSMS/CSP/LOTO/001 REV 01 available on official website of Tata Power (www.tatapower.com)

3.2 Excavation Safety (Shoring and Sloping) Procedure

This procedure is developed to cover the safe practices required for shoring and sloping in excavation and trenching jobs. This procedure is developed to establish mandatory requirements for practices to protect personnel, property and equipment from hazards associated with above activities. For complete procedure kindly refer Procedure Document No TPSMS/CSP/EXS/002 REV 01 available on official website of Tata Power (www.tatapower.com)

3.3 Confined Space Entry Procedure

This procedure outlines the steps required to perform the confined space entry and to protect personnel from the hazards of entering and conducting operations in confined spaces. For complete procedure kindly refer Procedure Document No –TPSMS/CSP/CSE/003 REV 01 available on official website of Tata Power (www.tatapower.com)

3.4 Working at Height Procedure

This procedure describes the rules and procedures to protect employees from the hazards of working at heights.

This procedure is developed to cover the safe practices required for Working at Heights. This procedure is developed to establish mandatory requirements for practices to protect personnel from hazards associated in this area. For complete procedure kindly refer Procedure Document No –TPSMS/CSP/WAH/004 REV 01 available on official website of Tata Power (www.tatapower.com)

3.5 Heavy Equipment Movement Safety Procedure

Heavy equipment lifting and movement is an activity involving loading, unloading, storage and movement from one place to another including lifting and erection or repairing of equipment with cranes or hoists. Material, machinery and equipment handling operations are being carried out by large capacity cranes and hoists, which make the job safer and faster. This procedure addresses the hazards and precautions associated with such equipment and their use. For complete procedure kindly refer Procedure Document No –TPSMS/CSP/HEMS/005 REV 01 available on official website of Tata Power (www.tatapower.com)

3.6 Mobile Crane Safety Procedure

Mobile cranes are responsible for many incidents, injuries. Falling loads from mobile cranes pose a severe hazard to operators and nearby workers and property. Many types of cranes, hoists, and rigging devices are used for lifting and moving materials. To maintain safe, appropriate standards has to be adhered to and only qualified and licensed individuals shall operate these devices. For complete procedure kindly refer Procedure Document No –TPSMS/CSP/MCS/006 REV 01.

3.7 Scaffold Safety Procedure

This procedure is developed to provide information on the safe erection, use, dismantling and maintenance of access scaffolding in the workplace. It is developed to establish mandatory requirements for practices to protect personnel from hazards associated with erection, use and dismantling of scaffolds. For complete procedure kindly refer Procedure Document No – TPSMS/CSP/SCAF/007 REV 01 available on official website of Tata Power (www.tatapower.com)

3.8 Electrical Safety Procedure

The objective of these standards is to specify minimum mandatory requirements and advisory guidance for identifying and controlling hazards to ensure 'Zero Harm' with regard to operation maintenance and testing of electrical equipment. For complete procedure kindly refer Procedure Document No- TPSMS/CSP/ELEC/010 REV 01 available on official website of Tata Power (www.tatapower.com)

3.9 Job Safety Analysis (JSA) Procedure

This objective of this procedure is to have a task based risk assessment process in place that identifies, evaluates and controls the risks associated with work activities, and as a result, prevents those involved in the task or those potentially affected by the task, from being harmed. For complete procedure kindly refer Procedure Document No- TPSMS/CSP/JSA/009 REV 01 available on official website of Tata Power (www.tatapower.com)

3.10 Fire Safety Management Procedure

Objective of This standard is to specify the minimum mandatory requirements and advisory guidelines to ensure prevention of fire related incidents and managing / controlling their impacts if they do occur. For complete procedure kindly refer Procedure Document No- TPSMS/CSP/FSM/011 REV 01

3.11 Permit To Work Procedure

Given the inherent hazards of the power generation and distribution industry, a significant number of TATA POWER operations and installations are critical. Work Permit (WP) System is an essential element in controlling the workplace risks in an effective manner. For complete procedure kindly refer Procedure Document No –TPSMS/CSP/PTW/008 REV 01 available on official website of Tata Power (www.tatapower.com)

3.12 Lift (Elevator) Safety Procedure

To provide safe operating procedure for taking control of lift car before entering and existing the pit of OTIS make elevators. For complete procedure kindly refer Procedure Document No – TPSMS/GSP/LIFT/001 REV 01 available on official website of Tata Power (www.tatapower.com)

3.13 Working on conveyor belt Procedure

This procedure is developed to cover the safe practices required for Working on live equipment and to protect personnel from hazards associated with it. For complete procedure kindly refer Procedure Document No – TPSMS/GSP/CONV/002 REV 01 available on official website of Tata Power (www.tatapower.com)

3.14 Handling Hazardous Materials Procedure

This Procedure is developed to provide procedure for recycling and / or safe disposal of used / waste batteries in compliance with all legislation. For complete procedure kindly refer Procedure Document No- TPSMS/GSP/HAZM/003 REV 01 available on official website of Tata Power (www.tatapower.com)

3.15 Material Handling and Storage Procedure

The purpose of this document is to provide procedures to assist the safe handling of materials (manual handling and mechanical handling). For complete procedure kindly refer Procedure Document No – TPSMS/GSP/MATL/004 REV 01 available on official website of Tata Power (www.tatapower.com)

3.16 Contractor Safety Management Procedure

The purpose of this document is to engage with contractors in a way to create safe work environment for everyone working for Tata Power. For complete procedure kindly refer Procedure Document No – TPSMS/GSP/CSM/015 REV 01 available on official website of Tata Power (www.tatapower.com)

The above procedures will be updated periodically and the updated version of the procedures as well as any additional critical procedure will be available on official website of Tata Power (www.tatapower.com) for your reference.

4. Training and Capability Building

Safety Training and capability building of workforce is a major component of safety management program. All training required must be provided and documented as specified by Tata Power and Indian Regulations. Tata Power Safety Manager will audit contractors training and related documentation to assure its adequacy.

4.1 Tata Power Site Safety Orientation

All Tata Power contractor and subcontractor workforce is required to attend Tata Power Site Safety Orientation Training to receive a Safety Training Card, which is required to obtain a Gate Pass to the site, prior to entry.

This Safety Orientation Course will be for duration of minimum half day. The information provided during the orientation will include, but is not limited to following:

- Job rules, personal safety and conduct
- Hazards reporting
- Reporting of injuries

- Emergency procedures
- Safety Activities and Program including disciplinary measure and incentives.
- Critical safety procedure relevant to the job

4.2 Capability Building

Appropriate training such as L1, L2 & L3 is given to ensure that a jobholder, either supervisor or worker, is competent to do his/her job safely. The skill training is provided through TPSDI and other agencies authorized by Tata Power on the list of 15 procedures mentioned under safety procedure.

Contractor shall ensure that concerned workmen are provided with adequate training before he/she is allowed to execute the work.

An evaluation test will be conducted after the completion of the training. Those workmen employee who meet the minimum required competency will be provided with Gold Card which is valid for 3 years, post which the workmen has to reappear for the assessment. If the workman is not able to qualify the assessment, he/she will be given 3 additional attempts to clear in 3 month timeframe failing which he/she will not be allowed to work on high risk jobs.

5. Pre-Employment and Periodic Medical check up

Contractor shall arrange to conduct a pre-employment and periodic medical check-up for its entire workforce by Tata Power medical officer or Tata Power authorized medical officer. The contractor shall be able to produce the certificate prior to the employment. The contractor shall also organize to conduct periodical medical checkup (six monthly) for the following category of employees:

- Drivers (Check for Vision & Hearing)
- Equipment Operators (Check for Vision & Hearing)
- Workforce working at Height (Check for Vision, Hearing, Vertigo & Height Phobia)
- Workforce Handling the hazardous substances (Coal, ash and chemicals)
- Workforce in high decibel area (> 90 Decibel, Check for Hearing)
- Workforce, working in specific areas requiring specific medical attention should conduct the medical test as laid down in the respective Site Safety Management Plan.

6. Safety Performance Evaluation and Penalties

A certain percentage of the bill value will be retained against every running bill as safety performance retention. The amount will be released with the last invoice based on “Safety Performance score” attached in CSM-F-3 of CSM procedure. The amount is based on following table

Contract Value	Retention Amount (%)
Upto 10 Lakhs	2.5
10 – 50 lakhs	2
0.5 to 10 Cr	1.5
>10 Cr	1

- Safety performance Score will be monitored by the Order Manager every month.

- For the contract value of more than Rs 1 Cr or contract duration more than 12 months, the retention amount shall be released half yearly based on safety performance. For all remaining contracts, the retention amount will be released with the final bill.
- In case of job stoppage due to safety violations/ unsafe observations at the site, no time extension shall be given to the contractor, if such delays are attributable to contractor.
- In case of fatality, limb loss or loss of property, vendor has to pay for liability, legal, statutory and additional mutually agreed settlement charges imposed by the appointed committee. This charge is over and above the retention amount.
- The committee will finalize an amount between 5 -50 lakhs based on factors such as advise by statutory authorities, contract value and impact of accident etc.
- Safety performance bonus 1% (limiting to 50 lakhs) of the invoice value will be considered at the end of the job if the contractual safety performance score is 100%.
- During the progress of the work, concerned Supervisor/Engineer will visit and inspect the work site regularly and evaluate the safety performance of the contractor based on matrix attached herewith.
- Order Manager, divisional chief and SBU head have the authority to terminate the contract in case of three consecutive serious violations.

7. Safety Performance Evaluation - CSM-F-3

S. No.	Lead Indicators	Unit Of measurement	Target	Weightage
1	% of Employee certified in TPSDI/Authorized agency	%	50	10
2	CFSA score (Annexure 6.1)	Average Severity of Violations	1.49	20
3	Monthly inspection completed for Critical Equipments, lifting Tools & Tackles and hand tools used at site	%	80	5
4	Condition of tools, tackles and equipments	%	100	15
	Lag Indicators			
1	Number of Fatalities	No.	0	30
2	Number of Lost work day case (LWDC)	No.	0	10
3	Man-days Lost	No.	0	10

In addition to above evaluation criteria, for specific violations penalty shall be imposed on the contractors under following circumstances:

Sr No	Description of violation	Severity	Penalty /
1.	Working without Permit	5	5000/-
2.	Untrained (TPSDI) worker on high-risk jobs.	5	5000/-
3.	Unhygienic/Bad condition of PPE	2	250/-
4.	Not following Tata Power Procedure & Standard	4	2000/-
5.	Unsafe Act/Condition of Severity 4	4	2000/-
6.	Unsafe Act/Condition of Severity 5	5	5000/-
7.	No Earthling of Electrical equipment	5	5000/-
8.	Damaged welding cable	5	5000/
9.	Violation of Positive Isolation Procedure (LOTO Not followed)	5	5000/
10.	ELCB of more than 30 mA/ELCB not working	5	5000/
11.	On/Off switch of welding m/c not working	5	5000/
12.	Electric cable tied with metal wire	5	5000/
13.	Leakage found DA hose / cylinder	5	5000/
14.	Use of LPG	5	5000/
15.	Use of Three-wheeler at the work site.	5	5000/
16.	Starting the job without Tool Box Talk	5	5000/
17.	Spatter falling on DA hose / Gas-line/ pathways / Equipment	5	5000/
18.	No safety latch in crane hook	5	5000/
19.	Load raised or swung over people or occupied areas of buildings	5	5000/
20.	Persons standing in swing area of construction equipments.	5	5000/
21.	Using damaged slings.	5	5000/
22.	Unstable scaffolding/non standard Scaffolding in use	5	5000/
23.	Handrails and mid-rails are missing	5	5000/
24.	Safety Harness not anchored with lifeline/fixed structure	5	5000/
25.	Fall arrestor not provided/ Not being used.	5	5000/
26.	Double life line not used for working at height	5	5000/
27.	No rubber mat in DB room	4	2000/-
28.	Water found accumulated in DB room/near welding machine.	4	2000/
29.	Inserting electric cables into socket, without using plug.	4	2000/
30.	Use of damaged electrical cable/two core cables.	4	2000/
31.	Inflammable material found in D.B Room./ welding areas.	4	2000/
32.	Loose material falling into excavated pit	4	2000/
33.	Water logging into excavated pit	4	2000/
34.	No / inadequate Barricade	4	2000/

Sr No	Description of violation	Severity	Penalty /
35.	Undercut / cave-in found on sides of excavated pits	4	2000/
36.	Grinding wheel/ Coupling/ Piling winch/other rotating parts without guard	4	2000/
37.	The HMV/Mobile Crane operator does not having a valid HMV driving license.	4	2000/
38.	The loading area is not leveled properly.	4	2000/
39.	Ladder not anchored at top	4	2000/
40.	Opening found in working platform of scaffolding/floor	4	2000/
41.	Inadequate illumination at the working area	4	2000/
42.	Loose material lying on Gantry ,platform	4	2000/
43.	Cleaning body with Compressed Air.	3	500/-
44.	Gas Cylinders using without cap.	3	500/
45.	Gas Cylinders stored without securing	3	500/
46.	Bringing inside any other chemicals, apart from approved by Safety dept.	3	500/
47.	Using drum for sitting or accessing height.	3	500/
48.	Misusing emergency facilities like fire hydrant line/ hose box/ spray system/ eye wash etc.	3	500/
49.	No provision of Safety net where falling materials or tools may occurs	3	500/
50.	Taking electrical supply from non designated outlet (other than socket).	3	500/
51.	Restricted gangways due to unwanted materials.	3	500/
52.	Not reporting incident.	3	500/
53.	Entering into restricted area like switch yard/ hazardous storage etc.	3	500/
54.	Work without supervision	3	500/
55.	Parking of vehicle without applying wheel choke at right front-front and left rear-rear wheels other than passengers cars.	3	500/
56.	Vehicle without helper or co-driver.	3	500/
57.	Not wearing florescent safety jacket at site.	3	500/
58.	People travelling in load body of vehicle.	3	500/
59.	Parking of vehicles at non designated area.	3	500/
60.	Shifting heavy materials without guide ropes.	3	500/
61.	Using other than 24V lamp inside the confined space/Use of other than 24V lamps.	3	500/
62.	Angular/ starch loading/ lifting with Crane or hoist.	3	500/
63.	By passing the limit switch/ Safety Interlock.	3	500/
64.	Housekeeping activities on road without proper barricade.	3	500/

Sr No	Description of violation	Severity	Penalty /
65.	Trying to board or alit from running vehicle.	3	500/
66.	Cylinder Valves of Gas cylinders not closed when not in use.	3	500/
67.	Flash-back arrester not used.	3	500/
68.	Trolley wheel found damaged.	3	500/
69.	Guy ropes of required length on both sides of object are not used during movement with load.	3	500/
70.	Scotch block/wedge not provide when the vehicle is parked.	3	500/
71.	Suitable Trolley not provided to hold the cylinders.	3	500/
72.	Locked First Aid box	3	500/
73.	Caution boards, danger signs (luminescent /red) along with emergency contact number are not found displayed.	3	500/
74.	Person found jumping barricading tape	3	500/
75.	Stacking of pipes, pile casing , drums without chock blocks/wedges	3	500/
76.	The terrain on which Heavy Equipment/Machinery moves is not reasonably hard.	3	500/
77.	Without Safety Helmet at working sites	4	250/-
78.	Without Crash Helmet (on bikes)	4	500/-
79.	Without Full body double lanyard Safety Harness (for work at height)	5	5000/-
80.	Without Hand gloves - Material Handling, Welding, Cutting,	4	100/-
81.	Without Safety goggles/ face shield - Welding/Cutting /Grinding	5	5000/-
82.	Handling Chemical without PVC Apron	5	5000/-
83.	Smoking in prohibited area (Closed Go-downs, Storage of flammable material, Storage of Gas cylinders)	5	1000/-
84.	Sleeping at Work Place	3	100/-
85.	Driving beyond speed limit	3	1000/-
86.	Seat Belt While Driving (for front seat passengers and driver)	3	500/-
87.	Driving without license	4	1000/-
88.	Heavy Commercial vehicles without reverse horn	3	500/-
89.	Non functional Head light/ tail light and side indicators	3	100/-
90.	Using Mobile Phone During Driving	5	5000/-
91.	Poor visibility of registration number/ without registration number	3	100/-
92.	Broken/ without Side view mirror	3	100/-
93.	Over speeding above specified limit	3	500/-
94.	Broken/ Without Pressure gauge on Oxygen/ LPG / Acetylene cylinder.	3	500/-

Sr No	Description of violation	Severity	Penalty /
95.	Without Flash back arrestor on Industrial Acetylene & Oxygen cylinders.	5	5000/-
96.	Spillage of hazardous material/chemicals during transportation	4	2000/-
97.	Electrical equipment without Earthing/ ELCB/ Double Insulation Cable.	5	5000/-
98.	Lifting Tools & Tackles used without/ expired Test Certificates.	5	5000/-
99.	Housekeeping repeatedly not maintained		
100.	• First Time	3	Warning
101.	• Second Time	4	1000/-
102.	• Third Time	5	5000/-
103.	Serious Violation Of House Keeping (after 1st or 2nd warning to be decided by Project Manager depending on the severity)		Rs.10000/- and above
104.	Repeat Violation of same nature	5	5X Violation

TP CENTRAL ODISHA DISTRIBUTION LIMITED
(A Tata Power & Odisha Govt. joint venture)
2nd Floor, IDCO Tower, Janpath Bhubaneshwar, Odisha 751022

ANNEXURE X

TATA CODE OF CONDUCT

The Owner abides by the Tata Code of Conduct in all its dealing with stake holders and the same shall be binding on the Owner and the Contractor for dealings under this Order/ Contract. A copy of the Tata Code of Conduct is available a tour website:

https://www.tatapower.com/pdf/aboutus/Tata-Code-of-Conduct.pdf

The Contractor is requested to bring any concerns regarding this to the notice of our Chief Procurement & Stores e-mail ID: pravin.jain@tpcentralodisha.com.

TP CENTRAL ODISHA DISTRIBUTION LIMITED
(A Tata Power & Odisha Govt. joint venture)
2nd Floor, IDCO Tower, Janpath Bhubaneshwar, Odisha 751022

ANNEXURE XI

ENVIRONMENT & SUSTAINABILITY POLICY

CORPORATE ENVIRONMENT POLICY

Tata Power is committed to a clean, safe and healthy environment, and we shall operate our facilities in an environmentally sensitive and responsible manner. Our commitment to environmental protection and stewardship will be achieved by:

- Complying with the requirements and spirit of applicable environmental laws and striving to exceed required levels of compliance wherever feasible
- Ensuring that our employees are trained to acquire the necessary skills to meet environmental standards
- Conserving natural resources by improving efficiency and reducing wastage
- Making business decisions that aim towards sustainable development
- Engaging with stakeholders to create awareness on sustainability

(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018

TATA POWER
Lighting up Lives!

CORPORATE SUSTAINABILITY POLICY

At Tata Power, our Sustainability Policy integrates economic progress, social responsibility and environmental concerns with the objective of improving quality of life. We believe in integrating our business values and operations to meet the expectations of our customers, employees, partners, investors, communities and public at large

- We will uphold the values of honesty, partnership and fairness in our relationship with stakeholders
- We shall provide and maintain a clean, healthy and safe working environment for employees, customers, partners and the community
- We will strive to consistently enhance our value proposition to the customers and adhere to our promised standards of service delivery
- We will respect the universal declaration of human rights, International Labour Organization's fundamental conventions on core labour standards and operate as an equal opportunities employer
- We shall encourage and support our partners to adopt responsible business policies, Business Ethics and our Code of Conduct Standards
- We will continue to serve our communities:
  - By implementing sustainable Community Development Programmes including through public/private partnerships in and around our area of operations
  - By constantly protecting ecology, maintaining and renewing bio-diversity and wherever necessary conserving and protecting wild life, particularly endangered species
  - By encouraging our employees to serve communities by volunteering and by sharing their skills and expertise
  - By striving to deploy sustainable technologies and processes in all our operations and use scarce natural resources efficiently in our facilities
  - We will also help communities that are affected by natural calamities or untoward incidence, or that are physically challenged in line with the Tata Group's efforts

The management will commit all the necessary resources required to meet the goals of Corporate Sustainability.

(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018

TATA POWER
Lighting up Lives!

CONTENTS

1. SCOPE:

This Specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing forwarding, supply and unloading at site/store and performance of Oil immersed, non-sealed, naturally cooled, three Phase 33/0.433 kV,50Hz, outdoor conventional type, copper winding, Distribution Transformer of 2500 KVA rating.

The transformer shall be complete with all components and accessories, which are necessary or usual for their efficient performance and trouble free operation under the various operating and atmospheric conditions specified in clause no. 3

Such of the parts that may have not been specifically included, but otherwise form part of the transformer as per standard trade and/or professional practice and/or are necessary for proper operation of transformer, will be deemed also included in this specification. The bidder shall not be eligible for any extra charges for such accessories etc. notwithstanding the fact that at the time of an initial offer bidder had segregated such items and quoted for them separately.

2. APPLICABLE STANDARDS:

The equipment (and the materials used) covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian standards & other relevant standards for components, BEE & CEA guidelines with latest amendment from time to time, thereof, some of which are listed below:

Indian Standards (IS)	Title
IS 1180 : 2014	Outdoor Type Oil Immersed Distribution Transformers Upto and Including 2500 KVA, 33 kV-Specification
IS 2026 : 2011 (all parts)	Specification for Power Transformers
IS 104 : 1979	Specification for ready mixed paint, brushing, zinc chrome, priming
IS 335 : 2018	Specification for new insulating oil.
IS 649: 1997	Testing for steel sheets and strips and magnetic circuits.
IS 5 : 2007	Specification for Colors for ready mixed paints and enamels
IS 1576: 1992	Solid Pressboard for Electrical Purposes -Specification
IS 2099:1986	Specification for bushings for alternating voltages above 1000 volts

IS 2362:1993	Determination of water content in oil by Karl in oil Fischer Method – Test Method.
IS 3024 : 2006	Grain oriented electrical steel sheets and strips
IS3347 (Part I & Part-3): 1979	Dimensions for Porcelain Transformer Bushings for Use in Normal and Lightly Polluted Atmospheres - Part 1 : Up to and including 1 kV
IS 4253: Part II: 1980	Specification for cork composition sheets- Part II : Cork and Rubber
IS 4257(Part I): 1981	Dimensions for Clamping Arrangements for Porcelain transformer Bushings - Part I: For 12 kV to 36 kV Bushings
IS 5082:1998	Wrought Aluminum and Aluminum Alloy bars, Rods , Tubes, Sections, Plates and Sheets for Electrical Applications
IS 5561 : 1970	Specification for Electric Power Connectors
IS 6103 : 1971	Specification for Testing of specific resistance of electrical insulating liquids
IS 2026 part 7	Guide for loading of Oil-immersed transformer
IS 6792:1992	Method for Determination of Electric Strength of Insulating Oil
IS 7404 (Part-1): 1991	Paper Covered conductors: Round Conductors
IS 7421:1988	Specification for porcelain bushings for alternating voltages up to and including 1000kv
IS 8603 (Part-1) : 1977	Dimensions for Porcelain Transformer Bushings for Use in Heavily Polluted Atmospheres - Part I:12 kV and 17.5 kV Bushings
IS 9335:1979	Specification for Cellulosic Papers for Electrical Purposes
IS 10028: 1981	Code of Practice for Selection, Installation and Maintenance of Transformers
IS 11149:1984	Specification for rubber gaskets
IS 12444: 1988	Specification for Continuously Cast and Rolled Electrolytic Copper Wire Rods for Electrical Conductors.
IS/IEC 60947 (Part 1& Part 2)	Specification for LV Switchgear & Control gear
IS 6160	Rectangular electrical conductors for electrical machines
IS 13964: 1994	Methods of measurement of transformer and reactor sound levels
IS 3401 : 1992	Specification of silica Gel
IS 1897: 2008	Copper strip for electrical purposes
IS 60529	Degree of protection provided by enclosure
IS 816	Welding of Mild Steel
CEA -2008	Guidelines for specifications of energy efficient outdoor type single and three phase distribution transformers

IS 6262 : 1971	Method of test for power factor and dielectric constant of electrical insulating liquids
IS 16659: 2017	Fluids For Electro technical Applications - Unused Natural Esters For Transformers And Similar Electrical Equipment
IS 16081: 2013	Insulating liquids — Specifications for. Unused synthetic organic esters for Electrical purposes
IEC 60156: 1995	Method of determination of electric strength of insulating oils.
IEC 60296: 2003	Specification for unused mineral insulating oils for transformers and switchgear.
IEC 60529: 2001	Degrees of protection provided by enclosures (IP Code)
IS 1852	: Rolling and cutting tolerances for hot rolled steel products

3. CLIMATIC CONDITIONS:

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C
4	Maximum Humidity	95%
5	Average Annual Rainfall	150mm
6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m
8	Wind Pressure	300 Km/hr
9	Earthquakes of an intensity in horizontal direction	equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

TPCODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed upto 300 Kmph. The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months.

4. GENERAL TECHNICAL REQUIREMENTS:

4.1 PRINCIPAL PARAMETERS:

The three phase distribution transformers shall be oil immersed, naturally cooled,double wound, outdoor type conventional type (rating- 2500 kVA).

Primary Voltage : 33 kV

Secondary Voltage: 0.433kV

The Windings of transformers shall be connected (Delta) on the primary side and Y (Star) on the secondary side. The Neutral of the LT winding shall be brought out to a separate terminal. The Vector Group shall be Dyn-11.

The transformer shall conform to the following specific parameters.

SI.NO	TECHNICAL PARTICULARS	DESIRED VALUE
	Reference Standard	IS 1180
1	Continuous rated capacity (KVA)	2500
2	Application	Outdoor
3	System voltage (max.)	36 KV
4	Rated voltage HV	33 KV
5	Rated voltage LV (V)	433
6	Line current HV (A)	43.74
7	Line current LV (A)	3333.43
8	Frequency (Hz)	50
9	No. of Phases	3
10	Connection HV	Delta
11	Connection LV	Star
12	Vector group	DYN11
13	Type of cooling	ONAN
14	Tap changing arrangement (off load)	+5.0% to –10% in steps of 2.5%

15	No. of tap positions	7
16	Noise level at rated voltage and frequency	61
17	Temerature Rise	
17.1	Of top oil	40 °C
17.2	Of winding	45 °C
18	Max. Total Losses at 50% loading at 75°C (watts)	6611.25
19	Max. Total Losses at 100% loading) at 75°C (Watts).	19887.5
20	Short circuit impedance voltage at 75°C (±10% tolerance)	6.25
21	Insulation Class	A
22	Normal Flux Density (at rated voltage and frequency)	1.6 T
23	Maximum current density (A/mm²)	2.5
24	Impulse withstand voltage	170 KVp
25	Power frequency withstand voltage	70 KV
26	Max. flux density (Increase of +12.5 % combined voltage & frequency variation from rated voltage & frequency)	1.9 T
27	Voltage fluctuations permissible	+12.5% to -12.5%
28	Neutral terminal	Two separate brought out neutral from main neutral bus bar, One for taking out the neutral for 4 wire system and other additional neutral for solid earthing.
29	Minimum clearances in air (mm) :	
29.1	HV phase to phase/ phase to earth	350/320
29.2	LV phase to phase/ phase to earth	75 / 40

30	Minimum clearances in Cable Box (mm) :	
30.1	HV phase to phase/ phase to earth	350/220
30.2	LV phase to phase / phase to earth	25/20
31	Wheels	The transformer shall be provided with four uni-directional rollers with locking arrangement suitable for rail gauges in both the axis for movement of transformer in either direction. Distance between wheels shall be as per relevant standard

5. GENERAL CONSTRUCTION:

5.1 GENERAL: efficiency level 2 as per IS 1180:2014

1. The transformer shall be stacked core, copper coil, oil immersed, naturally cooled (ONAN), non-sealed type with plain rectangular tank.
2. The transformer shall be suitable for service with fluctuations in supply voltage up to +12.5% to -12.5%.
3. The transformer shall be designed suitable for service life of 25years.
4. The transformer and accessories shall be designed to facilitate trouble free operation, inspection, maintenance and repairs under the various operating and atmospheric conditions specified in clause no. 3.
5. The design shall incorporate every precaution and provision for the safety of the equipment as well as staff engaged in operation and maintenance of the equipment.
6. All outdoor apparatus of the transformer, including bushing insulators with their mountings, shall be designed so as to avoid any accumulation of water.

5.2 CORE:

1. Transformer core shall be stack type, 2D, constructed from high grade cold rolled, non-ageing, grain oriented, silicon steel lamination which shall be properly annealed (under inert atmosphere, if required) to relieve stresses.
2. The core shall have low loss and good grain properties.
3. Core should be coated with hot oil proof, with insulation coating, an inorganic coating equivalent to C-5 type as ASTM A976 or IS 3024, like Carlite -3.
4. All core should be clamped together with frames to prevent vibration and noise. The core clamping shall be preferably without through bolts and if any bolt used same shall be effectively insulated.

5. The core thickness should be 0.23mm or less and grade should be M3 or better. 23HP85 as per IS 3024 or better with Minimum Polarization in Tesla at a Field Strength of 800 A/m
6. Only single grade and same thickness of core stampings shall be accepted and mixing of different grades shall not be allowed.
7. The complete design of the core must ensure maximum permanency of the core losses without continuous working of the transformers.
8. The value of the maximum flux density allowed in the design and grade of lamination used shall be clearly stated. The vendor shall submit the calculations in support of the same.
9. The handling of core lamination and stacking should be smooth and uniform.
10. The transformer shall be suitable for continuous service without damage under 'over fluxing' where the ratio of voltage over frequency exceeds the corresponding ratio at rated voltage and rated frequency up to 12.5% and the core shall not get saturated. The BH graph to be submitted by bidder for core material.
11. The No Load current shall not exceed 2% of the Full Load current and will be measured by energizing the transformer at rated voltage and frequency. Increase of 12.5% of rated voltage shall not increase the no-load current by 5% maximum of full load current .
12. The bidder shall be required to submit the following documents in regard to procurement of core material during stage inspection:

- Invoice of supplier
- Mill's test certificate
- Packing list
- Bill of landing
- Bill of entry certificate by custom (if required)
- Description of material, electrical analysis, physical inspection certificate for surface defects, thickness and width of material.

13. The bidder shall offer the core for inspection and approval of TPCODL during manufacturing stage. Heavy penalty or black listing shall be imposed on the bidders using defective CRGO sheets i.e in case of nonconformance w.r.t TPCODL Specifications.
14. Transformer core assembly shall have enclosed type lifting lugs for lifting arrangement.
15. Bidder shall provide the below details in below table:

Sl. No.	Description	Unit	As furnished by bidder
1	Magnetizing (No Load) Current		
	90% Voltage	%	
	100% Voltage	%	

	112.5% Voltage	%	
2.	Core grade		
3.	Thickness of core Lamination	Mm	
4.	Core Dimension: Length X height X diameter	mm x mm x mm	
5.	Gross core area	Sq.cm	
6.	Net core area	Sq.cm	
7.	Flux density (calculated)	Tesla	
8.	Over fluxing without saturation (BH curve to be submitted)	Tesla	
9.	Mass of core	Kg	
10.	Loss per Kg of core at the above specified flux density	Watt	
11.	Core window height	Mm	
12.	Center to center distance of the core	Mm	
13	Mass of Core Lamination (min.)	Kg	
14	Make of Core offered		

5.3 WINDINGS:

1. Primary and secondary windings shall be constructed from high- conductivity (copper conductors), Double Paper Covered (DPC) copper conductor with min. 30% overlap per layer of paper & TPC with 25% overlap per layer.
2. The conductor should be drawn uniformly without any deformation and any burr.
3. No metallic or non-metallic dust should be present in-between DPC conductor.
4. The current density for HV and LV winding should not be more than 2.5 Ampere per sq.mm.
5. The insulation between core and bolts, core and clamps shall withstand 2.5 kV for one minute.
6. Proper bonding of inter layer insulation with the conductor shall be ensured.

7. All turns of windings shall be adequately supported (by which material) to prevent movement. The core/coil assembly shall be securely held in position to avoid any movement under short circuit conditions.
8. The joints in the winding shall be avoided but if it is necessary then, they shall be properly brazed and the resistance of the joints shall be less than that of parent conductor. Crimping is not allowed at any joints.
9. LV winding shall be such that neutral formation is at the top.
10. Bidder shall provide the below details in below table:

Sl. No.	Description	Unit	As furnished by bidder
1.	DPC Paper for HV and LV conductors :		
	Type of DPC Paper		
	Make of DPC Paper		
	Thickness DPC Paper	mm	
	Percentage Overlapping (not less than 60%)	%	
2.	Type of Paper for Interlayer Insulation		
	Make of Paper for Interlayer Insulation		
	Thickness of Paper for Interlayer Insulation	mm	
3.	Type of Paper for Insulation Between HV and LV winding		
	Make of Paper for Insulation Between HV and LV winding		
	Thickness of Paper for Insulation Between HV and LV winding (for all sizes)	mm	
4.	Type of Pressboards used for Insulation Between HV and LV winding		
	Make of Pressboards used for Insulation Between HV and LV winding		
	Thickness of Pressboards for Insulation Between HV and LV winding (all size)	mm	
5.	Type of Paper used for insulation between core and LV		
	Make of Paper used for insulation between core and LV		

	Thickness of Paper used for insulation between core and LV (All sizes)		
6.	Type of Pressboard used for insulation between core and LV		
	Make of Pressboard used for insulation between core and LV		
	Thickness of Pressboard used for insulation between core and LV (All sizes)		
7.	Material used for top and bottom yoke insulation		
	Make of material used for top and bottom yoke insulation		
	Thickness of material used for top and bottom yoke insulation	mm	
8.	Type of material used for Spanner, wedge and Axial for insulation		
	Type of material used for Spanner, wedge and Axial for insulation		
	Thickness of material used for Spanner, wedge and Axial for insulation (all sizes)	mm	

Losses: Bidder shall provide the below details in below table:

Sl. No.	Description	Unit	As furnished by bidder
1	No Load losses	Watt	
2	Load losses at 50%loading at 75° C	Watt	
3	Load losses at 100% loading at 75° C	Watt	
4	Total losses at 50%load at 75° C	Watt	
5	Total losses at 100% load at 75° C	Watt	
6	**Efficiency at 75 deg. C**		
7	**Efficiency at Unity P.F.**		

7.1	100% load	%	
7.2	80% load	%	
7.3	60% load	%	
7.4	40% load	%	
7.5	20% load	%	
8	**Efficiency at 0.8 P.F.**		
8.1	100% load	%	
8.2	80% load	%	
8.3	60% load	%	
8.4	40% load	%	
8.5	20% load	%	
9	**Regulation at :**		
9.1	Unity P.F. at 75 deg. C	%	
9.2	0.8 P.F. at 75 deg. C	%	
9.3	% Impedance at 75 deg. C	%	

5.4. INSULATED PAPER & INSULATED PRESS BOARD

1. Inter layer insulation both for HV and LV windings shall be Epoxy diamond dotted Kraft paper and compressed pressboard of make (refer Clause no.5.32) subject to approval of Tata Power-DDL.
2. Primary and secondary windings shall be constructed from high- conductivity (copper conductors), Double Paper Covered (DPC) copper conductor with min. 30% overlap per layer of paper & TPC with 25% overlap per layer.
3. Kraft paper and Pressboard should be made of pure Cellulose from soft wood pulp manufactured from sulphate process. No additive, adhesive or coloring matter shall be present.
4. Kraft paper and Pressboard should be of class A (105°C) insulation material.
5. All spacers, axial wedges / runners used in windings shall be made of pre-compressed solid pressboard.
6. All axial wedges/runners shall be properly milled to dovetail shape so that they pass through the designed spacers freely.
7. Insulation shearing, milling and punching operations shall be carried out in such a way, that there should not be any burr, sharp edges and dimensional variations.
8. Kraft paper self-adhesive tape to be used for bonding of insulating paper layer, spanner and paperboards that are immersed in the oil filled transformer.

9. Below required values could be verified if required at any stage of the inspection and it should fulfill the requirement as per below table:

Characteristics	Kraft Paper	Pressboard (all Sizes)
1. Dimension	As specified by bidder with ±5% tolerance.	As specified by bidder with tolerance as per IS1576.
2. Apparent Density	>0.80 g/cm^3	as per IS 1576 w.r.t Thickness
3. pH of Aqueous extract	6-8%	6-8%
4. Electrical strength i) in air ii) In Oil	 7KV/mm ----------	 12KV/mm 35KV/mm
5. Ash content	Maximum 1%	Maximum 0.7
6. Moisture content	Maximum 8%	Maximum 8%
7. Oil absorption	----------	Minimum 9%
8. Heat stability	As per IS 9335-part 3	As per IS 1576
9. Tear index	As per IS 9335-part 3	As per IS 1576

Bidder has to submit the test certificates as per IS-9335, IS-1576 for all type of insulating materials covering above stated parameters along with below parameters during stage inspection :

1. Substance (Grammage) (g/m3)
2. Compressibility
3. Tensile strength
4. Conductivity of water extract
5. Shrinkage in air
6. Flexibility
7. Cohesion between plies1.
8. Elongation
9. Air permeability

Sl. No.	Description	Unit	As furnished by bidder
1.	DPC Paper for HV and LV conductors :		
	Type of DPC Paper		
	Make of DPC Paper		
	Thickness DPC Paper	mm	
	Percentage Overlapping (not less than 60%)	%	

2.	Type of Paper for Interlayer Insulation		
	Make of Paper for Interlayer Insulation		
	Thickness of Paper for Interlayer Insulation	mm	
3.	Type of Paper for Insulation Between HV and LV winding		
	Make of Paper for Insulation Between HV and LV winding		
	Thickness of Paper for Insulation Between HV and LV winding (for all sizes)	mm	
4.	Type of Pressboards used for Insulation Between HV and LV winding		
	Make of Pressboards used for Insulation Between HV and LV winding		
	Thickness of Pressboards for Insulation Between HV and LV winding (all size)	mm	
5.	Type of Paper used for insulation between core and LV		
	Make of Paper used for insulation between core and LV		
	Thickness of Paper used for insulation between core and LV (All sizes)		
6.	Type of Pressboard used for insulation between core and LV		
	Make of Pressboard used for insulation between core and LV		
	Thickness of Pressboard used for insulation between core and LV (All sizes)		
7.	Material used for top and bottom yoke insulation		
	Make of material used for top and bottom yoke insulation		

	Thickness of material used for top and bottom yoke insulation	mm	
8.	Type of material used for Spanner, wedge and Axial for insulation		
	Type of material used for Spanner, wedge and Axial for insulation		
	Thickness of material used for Spanner, wedge and Axial for insulation (all sizes)	mm	

5.5 TRANSFORMER TANK

1. The transformer tank shall be of robust construction, **rectangular in shape** and shall be built up of electrically tested welded mild steel plates.
2. The tank shall be fabricated by welding at corners. No horizontal or vertical joints in tank side walls and its bottom or top cover shall be allowed.
3. All welding operations should be carried by **qualified welders** (performance qualification certificates to the customer) as per the relevant ASME standards and a copy of the **welding procedure** has to be submitted to TPCODL at the time of drawing approval.
4. The **thickness of tank** should be as below:

For top and bottom : 6 mm (min.)

For Sides : 5 mm (min.)

Tolerance shall be applicable as per IS 1852 as per above thickness band.

5. In addition the cover of the main tank shall be provided with an **air release plug.**
6. The tank plates shall be of such strength that the complete transformer when filled with oil may be lifted bodily by means of the lifting lugs provided. The top cover shall have no cut at point of lifting lug.
7. The transformer tank cover shall be bolted with tank rim so as to make a leak proof joint.
8. The tank plate and lifting lugs shall be of such strength that the complete transformer filled with oil may be lifted by means of lifting shackle.
9. The tank cover shall have slight slope (10 mm $\pm$ 2mm) towards HV side to drain rain water.
10. There must be sufficient space from the core to the top cover to take care of oil expansion. The oil volume inside the tank shall be such that even under the extreme operating conditions, the **pressure generated inside the tank does not exceed 0.4 kg/sq. cm positive or negative** and the tank shall be of adequate mechanical strength to withstand it.
11. The transformer should be capable of **withstanding 0.8kg/sq.cm air pressure and a vacuum of 0.7kg/sq.cm**. The permanent deflection of the flat plate, when the tank without oil is subjected to a vacuum of 525 mm of mercury shall not be more than the values specified:

Length of Plate	Deflection
Up to 750 mm	5.0 mm
751 mm to 1250 mm	6.5 mm
1251 mm to 1750 mm	8.0 mm
Above 1750 mm	9.0 mm

12. **The tank design shall be such that the core and the windings can be lifted freely without dismantling the bushings.**
13. All joints of tank and fittings shall be oil tight and no bulging shall occur during service.
14. Anti –theft stainless steel fasteners with breakaway nut shall be provided at top cover (minimum 4 nos. at corners) placed in between other bolts without affecting pitch of bolts.
15. The tightening torque chart to be provided for all bolts used. This shall be submitted along with each rating drawings.
16. The transformer shall be provided with four pulling lugs of MS plate of 8mm thick to pull the transformer horizontally.
17. The maximum overall size of DTs(including tolerance) shall be min. 2500 mm x 2300 mm

Lifting lugs:

18. The transformer shall be provided with a minimum of four welded heavy duty enclosed lifting lugs of Structural steel E250 or better grade quality A (Minimum quality A) as per IS 2062 plate of minimum 16mm thickness for lower rating and gradually increased for higher rating as per weight suitably reinforced by vertical supporting flat stiffener smooth welded properly on the side walls up to reinforcing angle. They shall be so extended that cutting bend plate is not required. The transformer lifting lug shall be painted with yellow colour.
19. The location of lifting lugs shall be such that the clearance between lifting chain and nearest part of bushing shall be at least 100 mm.
20. There shall be facilities for lifting the core coil assembly separately.
21. The lifting lugs shall be designed in such a way that any two diagonal lugs are capable of lifting two times of the total weight of the transformer. The design of should be such that it should be suitable for 120degree lifting rope angle as per ASME B30.9 and at any point of time the maximum stress allowed on the Lug martial shall be lesser than 82MPa as per ANSI C.57.12.10
22. Calculation sheet for Lifting lug design to be submitted by Bidder. The calculation shall include the Stress on lifting lug material and stress on welding both. The Stress on the welding should be less than 840kg/cm2 as per ANSI C.57.12.10. All calculation to be done for considering lifting on any diagonal opposite two lugs conditions.
23. The lifting lugs shall be located on the side walls only and conservator on LT box side. Separate drawing to be submitted stating welding thickness, welding length and location on tank along with stiffener support for all rating and all lugs.
24. Bidder shall provide the transformer size and clearances in below table:

Sl. No	Description	Unit	As furnished by bidder
1	**Transformer overall Length x Height x width**	mm x mm x mm	

2	Only Tank **overall Length x Height x width**	mm x mm x mm	
3	HV Cable box overall LxWxH	mm x mm x mm	
4	LV Cable box overall LxWxH	mm x mm x mm	
5	**Clearances**		
5.1	Core and LV (minimum 5mm)	Mm	
5.2	LV and HV (minimum 8mm)	Mm	
5.3	HV Phase to phase (minimum 10mm)	Mm	
5.4	Between HV winding and Yoke (minimum 20mm)	Mm	
5.5	Between LV winding and Yoke (minimum 5mm)	Mm	
5.6	Between yoke and inside of tank to cover (minimum 100mm)	Mm	
5.7	Between yoke and bottom (minimum 10mm)	Mm	
5.8	Any point of winding to tank (minimum 20mm)	Mm	
6	**Calculated Impedance**	%	
7.1	HV to Earth Creepage distance in oil (minimum 15mm)	Mm	
7.2	LV to Earth Creepage distance in oil (minimum 5mm)	Mm	
8.	Conservator dimension (dia x Length)	Mmxmm	
9.	Size of Pipe used for conservator to Tank	Mm	
10.	Size of Pipe used for Valves	Mm	
1	Base Channel size	Mmxmmxmm	

1.			
12.	No. of Radiators	Nos	
13.	No. of fins per Radiator	Nos	
14.	Dimension of radiator fins (L x W)	Mmxmm	
15.	Make of Tank material		

5.6 RADIATORS

1. Radiators of pressed steel type conforming to the design requirement suitable for mineral oil and Ester oil (all type) type transformer.
2. The Pressed Steel type should be used in vertical formation without any bending and should be individually tested for leakage and pressure test etc. before welding with the main tank.
3. **Thickness** of sheet for radiators shall be **1.20 mm (min)**.
4. The **mounting** of the radiators shall be **non-detachable** (i.e., they should be welded permanently with the tank).
5. The number / cross section / length / fixing arrangement of radiators shall be indicated in the general assembly drawing.
6. Radiator thickness must be uniform without any dent or damage and also no bulging or concave should occur even after performing pressure/ vacuum test and temperature rise test.Corrugated designs are not accepted.

5.7 TRANSFORMER TOP COVER GASKET AND BOLT:

1. **Cork rubber gaskets** conforming to Type C , grade RC70 as per IS 4253 (Part-2) shall be provided for all oil bearing & water ingress resistant requirements for components like HV & LV bushings bottom gasket, HV & LV terminal box, Top Cover, Conservator, Valves etc.
2. **Nitrile/Neoprene rubber gaskets** conforming to Type IV – 4C (heat and oil resistant) as per IS 11149 shall be provided for bushing O ring (oil gaskets).
3. **Only Joint free Gasket to be used. Only in case of top cover gasket and terminal box gasket up to two dove-tail joints with adhesive shall be allowed. The terminal box gasket joint shall come at bottom part.**
4. Cork sheet, Nitrile/Neoprene rubber gaskets shall be free from cracks, pinholes and shall be capable of being cut or punched without crack or tearing.
5. The Transformer top cover shall be connected with main tank using tinned copper strip (30mm wide, 0.7mm thick) at two places (diagonally opposite with each other).

6. The strip should touch bare surface of tank in order to ensure proper electrical connection of tank body with top cover with the strip.
7. All the covers like inspection cover, LV box cover, HV box cover, Conservator cover must be electrically connected using tinned copper strip (30mm wide, 0.7mm thick).
8. Separate arrangement to be made and cover tightening bolt not to be used for equipotential strips.

5.8 OSR: oil surge relay

Suitable OSR shall be provided in between conservator Tank and OLTC Tank. The installation shall be fixed and weather proof to avoid any water seepage inside the relay.

5.9 BUSHINGS:

For 33 kV, 36kV bushing will be used. All the bushings provided, of the same voltage class, shall be interchangeable bushings with plain shed as per IS 3347 shall be mounted on the Top cover of the tank. Only one sheet metal pocket shall be provided for mounting of HV bushing and the same shall not be fixed on pipes. Sheet metal pocket shall be designed in such a way that all HV Bushings shall remain parallel and at equidistance throughout. Bushing having type tested as per IS 3347 shall only be acceptable. These bushings shall be compatible for termination of overhead conductor. Suitable terminal connectors shall be provided on the bushing.

On LT Side cable box is to be provided,1.1 kV class bushing shall be provided. The current rating of the bushings shall be appropriate as per the rating of the transformer. The LT bushing shall on the sideways.

5.10 CABLE BOXES:

1. Cable boxes made up of Mild Steel 2.2mm thickness with suitable handle and front cover to be provided for both HV and LV side.
2. Water should not accumulate on cable boxes and proper slope shall be provided in order to ensure drainage of water.
3. Cable box protection shall be IP 55. Test reports to be submitted.
4. Cable box should be painted in same way as that of tank painting with treatment.
5. HV and LV cable boxes shall be fixed on opposite sides on the tank with nuts and bolts (gasket placed in between them) in such a way that they can be completely removed whenever required.
6. Canopy shall be provided on all gasket joints, the bend edges of cover overlapping gasket to protect from rain and sunlight shall also accepted.
7. Cable cleating arrangements shall be provided just below terminal box (outside) to keep Cable straight and to support cables to avoid tension on bushings due to cable weight.
8. For Cable clamping, Fire retardant nylon grade material to be used for oval shaped

clamping arrangement with GI nut bolt on both HV & LV Side.

9. For HV Cable box, Non-magnetic Gland plate shall have thickness of 3mm and shall be in two parts in such a way that HV cable can be easily removed.
10. For LV cable box, Non-magnetic Gland plate shall have thickness of 4mm and shall be in two or more parts in such a way that LV cables can be easily removed by removing the gland plates.
11. Gland plates shall be mounted separately with nut & bolt arrangement and gasket in between them.
12. The size of the cable box cover should be moderate so that only one or two people is enough to lift it.
13. The bidder shall submit drawings for the box with internal details along with the transformer for approval.

HV CABLE BOX:

1. The HV box shall be designed and fixed on transformer such way that only opening of cover shall facilitate for working on cable termination with ease of accessibility of terminal.
2. GI Steel earthing Flat of 50X6mm shall be provided and brought out the HV box to earth the armor of HV cable.
3. HV box gland plate shall have Single compression gland designed for 33kV, 3C X 95 sqmm / 3 runs of 1C x 400 sqmm XLPE Cable as per drawing approved from TPCODL.
4. Distance between HV gland plate and HV bushings should be minimum 750 mm.
5. Earthing provision (Body earth) shall be provided in the HV box with M12 bolt.
6. **HV side Busbar and HT bushing shall be connected with suitable flexible copper jumper.**
7. **Additional Canopy sheet Shall be provided over HT Cable BOX.**

LV CABLE BOX:

1. Neutral terminal of LV winding shall be brought out on LV phase terminals to form four wire system.
2. Epoxy Insulators shall be provided from top side in LV box to support LV busbar.
3. LV busbar shall be of Copper material & shall have clearances as mentioned in GTP.
4. Lugs shall be of Bi metallic material with tin coating & shall comply the IS requirements.
5. Design of LV Busbar and supporting insulators shall be designed to facilitate connection 14 runs of 4C x 300sqmm cable while maintaining clearances as per standard practice (keeping sufficient clearance for cable termination and maintenance.)
6. **Four no. of louvers shall be provided in LV cable box for heat dissipation.GI Mess sheet shall be provided in the back side of louvers for restricted entry of the rodents.**

7. Additional Canopy sheet Shall be provided over LT Cable BOX.

8. Arrangement in the LV box shall be BYRN from left to right when viewed from front.

All Nut bolts shall be as per Clause 5.24 and size selection shall with as per the hole size of the lugs to be used (lug size -300 sqmm).

The Neutral to be brought out from box through bushing and shall have same dimension as that of phase bushing.

GI earth strip (Size - 50 x 6 mm) shall be provided from neutral bushing to both side of the box and shall be extended up to bottom of the terminal box both sides.

Insulator support to be provided on terminal box both sides for GI earth strip so as to avoid tension on secondary neutral bushing.

There shall be gland provision in side wall bottom or base plate of the LV box with gland of size suitable for 10core cable for taking out voltage terminal to box. 10 core cable up to box shall also be provided wired up from bus bar to TB.

Earthing provision (Body earth) shall be provided in the LV box with M12 bolt.

The clearance above bushing shall be 120mm and below busbar cable mounting bolt shall be 450mm up to gland plate.

The no. and size of cables for installation on LV side shall be as follows:

Transformer Rating	Size of cable for Phase & Neutral	No. of runs
2.5 MVA	4C x 300 sq. mm (1.1 kV Class)	14

5.11 EARTHING CONNECTIONS:

NEUTRAL EARTHING:

1. Separate LV neutral bushing to be provided on top of LV box for neutral earthing.
2. For connecting LV neutral bushing shall be provided with 2 Nos of 50x6 mm GI strip, one on each side of terminal box (The thickness of GI coating of neutral earthing strip shall be **86 microns** (minimum at any point).
3. At the bottom of the GI strips two concentric holes of 12 mm diameter shall be made and M12 size SS nuts, bolts and SS washer shall be provided for them.

BODY EARTHING:

1. Two body earthing terminals pads / boss arrangement (up to 500sq.mm) shall be provided on Transformer tank with M12 SS Bolt with 70 sq. mm lug. with SS plain washer and spring washer.
2. It shall be located on the lower side of the transformer, diagonally opposite to each other.
3. Each Earthing terminal pad on DT shall be provided with two SS M12 bolts on each pad on each side with two 70 sq.mm AL Lugs and washers.

5.12 OIL LEVEL INDICATOR

1. Oil level indicator with **prismatic glass and red colour background** shall be provided.
2. The oil gauge glass shall be removable and so embodied in the end plate so as to prevent oil leakage.
3. The Oil level indicator should indicate oil level at minimum, normal and maximum as -5˚C, 30˚C and 90˚C respectively.

5.13 OIL:

Note: Default Oil shall be Mineral oil only if not specified / asked for other oil.

Mineral Oil: In case of Mineral Oil below are the requirements to be fulfilled:

1. All transformers shall be filled with new, unused, clean; standard mineral oil in compliance with IS 335-2018 / IEC 296 type-II and shall be free from all traces of polychlorinated biphenyl (PCB) compounds.
2. The use of recycled oil is not acceptable.
3. Oil shall be filled under vacuum before filling it shall be filtered and tested (as per IS 6103).
4. The test parameters should be as per the table below:

Test parameters	Values
Break Down Voltage (min)	60 kV
Water content ppm, (max.)	20 ppm
Specific resistance (min.) (at 27˚C)	2.5×10^{12} ohm-cm

Bidder has to provide the oil data in below table:

Sl. No.	Description	Unit	As furnished by bidder
1	**Type of oil**		
2	**Oil Qty. for first filling**	Ltr.	
3	Grade of Oil		
4	Maker's name		
5	BDV at the time of first filling	kV	

5.14 RADIO INTERFERENCE:

When operated at voltages up to 10% in excess of the normal system rating. Transformers shall be substantially free from partial discharges (i.e corona discharges in either internal or external insulation) which are likely to cause Interference with radio or telephone communication.

5.15 CONSERVATOR

1. The conservator shall be supported / fixed on the main body of the transformer tank.
2. The capacity of the conservator tank shall be designed keeping in view of transformer tank & OLTC. Necessary partition arrangement shall be done as per standard practices for keeping separate oil for OLTC & main tank.
3. The design shall also consider the total quantity of oil and its contraction and expansion due to temperature variations. The total volume of conservator shall be such as to contain **10% quantity of the oil used in transformer**. Normally, at least **30% volume of conservator** shall be filled with Oil.
4. Two separate pipe shall be provided one connecting to transformer main tank and oither to OLTC.
5. Jointless pipe shall be used which shall be connected with round flanges.
6. The inside diameter of the pipe connecting the conservator to the main tank shall be within 25 to 50 mm and it should be projected into the conservator so that its end is approximately 20mm above the bottom of the conservator so as to create a sump for collection of impurities. The minimum oil level corresponding to -5°C should be above the sump level.
7. The conservator oil filling cap/hole shall be of 32mm diameter & female type cap to be provided.
8. The conservator to be fitted with float switches such that it shall operate/open contact when the oil level in conservator goes below -5 degree C /Minimum mark. The float switch shall be with normally closed type. This contact shall be wired up in auxiliary terminal box.
9. Buchholz relay: The pipe should not contain any right angle elbows. Its diameter should correspond to the diameter of the hole for the passage of oil of the relay. The pipe must be arranged to slope upwards towards the conservator at an angle of about 2 to 4 degrees to the horizontal (max 5 degrees). The part of the pipe preceding the relay should be straight for a length equal to at least five pipe diameters; the part of the pipe leading to the conservator immediately adjacent to the relay should be straight for a length equal to at least three pipe diameters.
10. The Oil conservator shall be provided with:

- **Oil level indicator** (as per clause no. 5.12).
- **Dehydrating breather** (as per clause no. 5.18).
- **Drain plug**
- **Oil filling hole** (1.25 inch/32mm with thread size of BSP 1.25inch, 11TPI) with cover.
- **Detachable end plate** on one side (the side on which the gauge glass is fitted), to enable the maintenance staff to periodically clean the inside of the conservator tank.

Centre of Gravity: The transformer should be designed in such a way that the centre of gravity of complete transformer with oil and with all accessories shall fall at the vertical centre at lower height such that the transformer should be stable on flat surface ground and while lifting at lifting hooks.

5.16 EXPLOSION VENT/PRESSURE RELEASE VALVE AND AIR RELEASE PLUG

Explosion vent shall be provided on the top cover. Double diaphragm with oil observation gauge (prismatic Type) to be provided on expression vent pipe. If the top diaphragm material is glass then wire mesh to be provided along with the same.

PRV shall be provided to operate before reaching the test pressure. PRV shall not have air release arrangement. The PRV shall seal-off after the excess pressure has been released and it shall have mechanical flag arrangement. The PRV shall have NO, NC contacts wired up in marshalling box.

The cover of the main tank shall be provided with an air release plug .

5.17 DRAIN VALVE & FILTER VALVE

1. The drain valve and filter valve shall be of Brass with gate valve.
2. The drain valve and filter valve shall have double round flanges. One side shall be fixed with tank and other side should be left open for oil filling/filtration purpose.
3. The drain valve and filter valve shall be provided with embossed name plate stating drain valve and filter valve.
4. The drain valve shall be located on the bottom and filter valve shall be provided at side top of tank.
5. Locking arrangement shall be provided to stop movement of hand wheel.
6. The valves shall be covered with a MS box of 2mm thickness by welding on tank. The paint thickness shall be min. 80 micron on the box.

5.18 DEHYDRATING BREATHER

A breather of suitable capacity shall be provided The beather pipe shall enter the conservator from the upper side of the conservator. Top cover of must be metalic and not of plastics, However the body of breather shall be of Polyurethane material (Transparent Type). Drawing shall be submitted with the offer.

1. The silica gel shall be blue colored as per IS: 3401 – 1992. The granules size should be 3-5 mesh (4 to 6.73mm) up to 2kg capacity breather.
2. The body of the breather shall be unbreakable, transparent, UV stabilized seamless, minimum thickness 3mm
3. The top cover shall be of pressure die cast aluminum and powder coated.

4. The oil cup shall be of UV protected polycarbonate.
5. Oil cup shall have marking of oil filling level.
6. The gasket should be of Class 3B, Type III as per IS 11149 Nitrile rubber (Oil resistant gaskets)
7. All tie rods and all hardware should be of stainless steel material (SS 304)
8. Breather mounting arrangement,

a. Up to 2 kg capacity of Silicagel breather shall have top threaded mounting arrangement with 1/2''pipe having BSP threading.
b. 2kg and above capacity shall have flange mounting with 4 holes of 12mm diameter on 83 PCD.

9. While fixing of breather on transformer Teflon tape should be used to make it air tight & water tight. This shall be checked during inspection and after receipt at our stores on each transformer.
10. The breather should have passed air pressured test as per our specification i.e. Breather shall be tested at an air pressure of 0.35kg/cm2 (5 PSI) for period of 30 minutes.

5.19 OTI & WTI

1. Dial Type Oil temperature indicator shall be provided on the top cover of the transformer. It should be suitable for outdoor mounting with maximum indicator pointer. Fixing union shall be of female thread.
2. Range: 0- 120 ˚C, Accuracy: $\pm$ 4 ˚C.
3. The OTI shall have auxiliary contacts for alarm and trip contacts at preset temperatures, both the contacts should be wired up in the auxiliary terminal box.
4. The IP65 gland should be used for dial for taking out auxiliary wires.
5. The OTI shall be IP55 tested.
6. WTI shall be provided in one winding of each phase.
7. WTI shall be **indicating type**, responsive to the combination of top oil temperature and winding current, calibrated to follow the hottest spot temperature of the transformer winding.
8. WTI shall operate a remote alarm and trip in the event of attaining the predefined temperature.

5.20 TERMINAL CONNECTORS:

Suitable Bi-metallic crimping lugs shall be provided as for cable sizes.

5.21 Bucholz Relay:

1. Magnetic Reed type Buchholz relay shall be provided with alarm and tripping contacts to detect accumulation of gas.
2. The installation shall be fixed and weather proof to avoid any water seepage inside the relay.
3. Round flange of nominal pipe bore of **50mm diameter** shall be used.
4. In addition, pocket with heater coil along with Resistance Temperature Indicator (RTD) shall be provided for WTI and OTI. CT for RTD for winding hot spots shall be provided.

5.22 Fittings

The following standard fittings shall be provided.

a) Rating and terminal marking plates non-detachable
b) Earthing terminals with lugs-2 Nos.
c) Lifting lugs for main tank & top cover
d) Terminal connectors on the HV bushings
e) Thermomeler pocket with cap-1 No.
f) Air release device
g) HV bushings-3 Nos
h) LV bushings 4 Nos
i) LV Cable Box with bus bars & cable lugs
j) Pulling lugs-4 Nos
k) Stiffener angle 40x40x5 mm and vertical strip of 50x5 mm flat
l) Radiators-No. & length may be mentioned (as per heat dissipation Calculations)
m) Arcing homs
n) Oil level gauge indicating the positions of oil marked as follows
Min (-5 deg.C)
30 deg C
Max (96 deg C)
o) Drain cum sampling valve with locking arrangement
p) Oil filling hole having p 1-1/4 "thread with plug and drain valve on the Conservator.
q)Silica gel breather
r) Base channel as per Indian Standard.
t) HV cable box with suitable bi-metallic crimping lugs

5.23 Marshalling Box:

1. Marshalling Box of suitable size, made up of Mild Steel and with theft proof locking arrangement shall be provided.
2. Marshalling box shall have IP 55 protection.
3. Marshalling Box shall have provision for wiring the WTI, OTI, MOG, PRV, Buchholz relay. The terminals shall be provided as per table below:

Element	Alarm	Trip
Oil Temperature Indicator	NO,NC,COM	NO,NC,COM
Winding Temperature Indicator HT Side	NO,NC,COM	NO,NC,COM

Winding Temperature Indicator LT Side	NO,NC,COM	NO,NC,COM
Buchholz	NO,NC,COM	NO,NC,COM
Magnetic Oil Level Gauge	NO,NC,COM	
PRV	NO,NC,COM	
LT Voltage terminals	RYBN	
Spare TB	4 No.	

4. WTI meter shall be wired/ installed in the marshalling box.
5. Plastic ferrules engraved with black letters shall be used to mark the wires in the marshalling box.
6. Wiring in Marshalling box shall be done by 2.5 sq.mm Cu FRLS PVC stranded panel wires.
7. For TPCODL, The equipment's connected into marshalling box shall be compatible with power pack relay as per attached specification .
8. All the cables and conduits between the transformer and control cabinet shall be included in the scope of supply by the bidder.

5.24 FASTENERS

1. All the bolts or studs shall be at least 6 mm in diameter except when used for small wiring terminals. All bolts shall be of grade 8.8.
2. All nuts/bolts/washers exposed to atmosphere shall be as follows:

Size 12mm (or below)	Stainless Steel
Above 12mm	Steel with antirust coating (alu zinc coated) ,Hot dip galvanized

3. All ferrous bolts, nuts and washers placed in outdoor positions shall be hot dip galvanized to prevent corrosion (except high tensile steel bolts and spring washers which shall have electrolytic action between dissimilar metals).
4. In case the galvanization is removed due to welding or manufacturing, the parts should be properly cleaned and painted to avoid exposure to atmosphere.
5. The cup type washers to be used as spring washers, cut spring washers are not accepted.
6. Taper washers shall be provided where necessary. Protective washers of suitable material shall be provided on front and back of the securing screws.
7. Each bolt shall project at least one thread but more than three threads through the nut. If bolts and nuts are placed so that they are inaccessible by means of ordinary spanners, special spanners shall be provided. The length of the screwed portion of the bolts shall be such that no screw thread may form part of a shear plane between members.
8. Core bolts shall be black colored high tensile grade-8.8

5.25 ON-LOAD TAP-CHANGERS

i) The transformers shall be provided with On-load Tap Changer

ii) Separate PRV shall be provided for OLTC, which shall be fixed on OLTC tank.

(i) The Transformer shall be with taps ranging from +5% to -15% in equal steps of 1.25% each.

(ii) The tap changing switch shall be located in a convenient position so that it can be operated from ground level. The switch handle shall be provided with locking arrangement along with tap position indication, thus enabling the switch to be locked in position

(iii) The tapping range of On Load Tap Changer shall be +5% to -15% in steps of 1.25% each. The no of taps shall be 17. The On Load Tap Changer shall be supplied with RTCC panel and AVR (Automatic Voltage Regulating Relay)

(iv) The Continuous current rating of the tap changer shall be based on connected winding rating and shall have liberal and ample margin. Lower rated tap changers connected in parallel are not acceptable.

(v) The on-load tap changing equipment shall have the provision for mechanical and electrical control from a local position and electrical control from a remote position. For local mechanical operation, the operating handle shall be brought outside the tank for operation from floor level with provision to lock the handle in each tap position. Remote electrical operation shall have an AUTO-MANUAL selection at the remote location. When selected AUTO, the tap changing gear shall maintain steady voltage within practical limit on the transformers secondary bus from which the reference shall not respond to transient variation of voltage due to grid disturbance and system fault.

(vi) The required voltage relay shall not be sensitive to frequency variation and shall be suitable for sensing voltage from the secondary of transformers mounted on the LT Side

(vii) The tap changer shall be provided with over-current protection in order to prevent the tap-change operation during a short circuit, which would to greatly stress the contacts of the diverter switch. The function of protection shall be arranged as follows;

(viii) Whenever over current occurs, the control circuit for commanding OLTC motor operation shall be blocked by the normally close contracts of the over current relays.

(ix) If during tap change over current occurs, the OLTC motor circuit shall be blocked through the mechanical cam switch, which is close from the very beginning to the very end of every tap change operation and to the normally open contacts of the over current relays. The stop action of the motor shall be made through the motor brake contactor.

(x) The design of the tap changing equipment shall be such that the mechanism will not stop in any intermediate position; however, if the mechanism through faulty operation does stop in an intermediate position, the full load must be carried by the transformer without injury to the equipment. The mechanical position indicator shall be equipped in the motor drive cubicle. The motor shall be designed to be of step control. In any case the operation shall

be of step by step. The voltage regulating relay shall be supplied together with the timer and under voltage relay. The signal order from the voltage regulating relay to execute the tap changer operation, when the regulating voltage is out of the voltage regulating level shall be designed to be delayed by the adjustable timer. If the control voltage abnormally falls, the movement of the tap changer shall be locked by the contact of the under voltage relay, even if the contacts of the voltage regulating relay are working.

(xi) The control circuit of the transformer shall be completely designed and provisions shall be made for parallel operation with another transformer.

(xii) The following accessories, control and selector switches and other necessary accessories shall be furnished.

(xiii) The following accessories, control and selector switches and other necessary accessories shall be furnished.

Remote tap changer control board (Placed in the control room)

- Voltmeter
- “AUTO-MANUAL” control switch
- “RAISE-LOWER” control switch
- Tap position indicator
- Tap changer operation program indicator.

Transformer Tap Changer driving mechanism control cubicle

- “REMOTE-LOCAL-TEST” selector switch
- “AUTOMATIC-MANUAL” control switch
- “RAISE-LOWER” control switch
- Tap position indicator
- Tap changer operation program indicator
- Voltmeter
- Tap change operation counter
- Means for manual operation when power supply is lost

OLTC shall have the entire feature to meet the requirement. The equipment shall conform to the latest applicable Indian standard / IEC standard. Equipment complying with any other authoritative standards such as British, VDE etc. shall also be considered if offered.

- The OLTC gear shall be designed to complete successfully tap changes for the maximum current to which transformer can be loaded i.e. 120% of the rated current. Devices shall be incorporated to prevent tap change when the through current is in excess of the safe current that the tap changer can handle. The OLTC gear shall withstand through fault currents without injury.

- When a tap change has been commenced it shall be completed independently of the operation of the control relays and switches. Necessary safeguards shall be provided to allow for failure of auxiliary power supply or any other contingency which may result in the tap changer movement not being completed once it iscommenced.
- OLTC shall be a separate compartment & should be external to transformer tank. Oil in compartments which contain the making and breaking contacts of the OLTC shall not mix with oil in other compartments of the OLTC or with transformer oil. Gases released from these compartments shall be conveyed by a pipe to a separate oil conservator or to a segregated compartment within the main transformer conservator. A OSR with shut off valves and MOG shall be installed between OLTC and conservator tank. The OLTC conservator shall be provided with prismatic oil level gauges with red color float. The length and alignment of the MOG and OSR pipe shall be such that, the transformer does not trip by the vibration of the pipe.
- Oil in compartments of OLTC which do not contain the make and break contacts, shall be maintained under conservator head through valve pipe connections. Any gas leaving these compartments shall pass through the OSR relay before entering the conservator. The cable entry of OSR should be from bottom end instead from side
- Oil filled compartments shall be provided with filling plug, drain valve with plug, air release vent, oil sampling device, inspection opening with gasket and bolted cover with lifting handles.
- The OLTC motor shall be provided with 415 V auto changeover facilities. For the control of OLTC, purchaser shall provide Tap change control relay. Tap position indication along with the various alarms of tap changer shall be indicated in the marshaling box.
- OLTC tank shall be connected main conservator tank however there shall be physical partition between Main Tank & OLTC Tank so that the same is easily accessible for maintenance.
- OLTC driving mechanism and its associated control equipment shall be mounted in an outdoor, weather proofcabinet, which shall include:
  - Driving motor (415 V - 3 phase, 50 Hz, AC squirrel cage)
  - Motor starting contactor with thermal overload relays, isolating switch and HRC fuses.
  - Duplicate sources of power supply with automatic changeover from the running source to the standbysource and vice versa.
  - End Limit Switch shall be provided to prevent operation beyond extreme taps & Contacts shall be providedfor operation through SCADA.
  - Limit switch to cut off electrical operation on insertion of manual handle (Contacts shall be provided foroperation through SCADA).
  - Local/Remote selector switches shall be provided with status indication.

- Control switch: Raise/off/lower (spring return to normal type). (Contacts shall be provided for operationthrough SCADA).
- Remote/local selector switch (maintained contact type). (Contacts shall be provided for operation throughSCADA).
- Mechanical tap position indicator showing rated tap voltage against each position and resettable maximumand minimum indicators.
- Limit switches to prevent motor over travel in either direction & final mechanical stops.
- Brake or clutches to permit only one tap change at a time on manual operation.
- Emergency manual operating device (hand crank or hand wheel).
- Electrically interlocked reversing contactors (preferably also mechanically interlocked).
- 240V, 50 HZ, AC space heaters with switch and MCB.
- Interior lighting fixture with lamp door switch and MCB.
- Gasketted and hinged door with locking arrangement.
- Terminal blocks, internal wiring, earthing terminals and cable glands for power and control cables.
- Necessary relays, contactors, current transformers etc.
- A five digit counter shall be fitted to the tap changing equipment to indicate the number of operation completed.
- The equipment shall be suitable for supervisory control and indication with make before break multi-way switch, having one potential free contact for each tap position. This switch shall be provided in addition to anyother switch/switches which may be required for remote tap position indication.'
- Operation from the local or remote control switch shall cause one tap movement only until the control switch is returned to the off position between successive operations.
- PRV Shall be provided with OLTC Tank
- Suitable manholes covers should be provided on the sidewalls to give access to the selector switches of the OLTC. There should be ample access for opening /Reconnecting tap-leads to the OLTC from all sides.
- Suitable valves shall be provided to take sample of oil from the OLTC chamber during operation of the transformer.

4. Control Requirements for OLTC-

The following electrical control features shall be provided:

- Positive completion of load current transfer, once a tap change has been initiated, without stopping on any intermediate position, even in case of failure of external power supply.
- Only one tap change from each tap change impulse even if the control switches or push button is maintained in the operated position.
- Cut-off of electrical control when manual control is resorted to. It shall not be possible to operate the electric drive when the manual operating gear is in the use.
- Cut-off of a counter impulse for a reverse tap change until the mechanism comes to rest and resets the circuits for a fresh operation.
- Cut-off of electrical control when it tends to operate the tap beyond its extreme position. Mechanical limit switches shall be provided for this purpose to achieve suitable interlocking.

5. Automatic / Parallel Operation with OLTC

OLTC shall be able to do automatic / parallel operations through RTCC.

6. Alarms-

The following alarms shall be provided with the additional contact arrangement for connection to SCADA.

- End Limit Switch
- Manual Operation Insertion
- A.C. supply failure
- Drive motor auto tripped
- Tap Stuck up change delayed
- OSR trip
- MOG Alarms
- PRV Trip
- TC in Progress.
- Any other protective feature, if considered essential by the Bidder.

7. Auxiliary Power Supply of OLTC, Cooler Control and Power Circuit :

i. Two auxiliary power supplies, 415 volt, three phase four wire shall be provided by the Purchaser for OLTC and power circuit.

ii. All loads shall be fed by one of the two feeders through an electrically interlocked automatic transfer switch housed in the marshalling box for on load tap changer control and cooler circuits.

iii. Design features of the transfer switch shall include the following:

a) Provision for the selection of one of the feeder as normal source and other as standby.

b) Upon failure of the normal source, the load shall be automatically transferred after an adjustable time delay to standby sources.

c) Indication to be provided at marshalling box for failure of normal source and for transfer to standby source and also for failure to transfer.

d) Automatic re-transfer to normal source without any intentional time delay following re-energization of the normal source.

e) Both the transfer and the re-transfers shall be dead transfers and AC feeders shall not be paralleled at any time.

8. Manual Control

The cranking device for manual operation of the OLTC gear shall be removable and suitable for operation by a man standing at ground level.

The mechanism shall be complete with the following :

a) Mechanical tap position indicator which shall be clearly visible from near the

transformer.

b) A mechanical operation counter.

c) Mechanical stops to prevent over-cranking of the mechanism beyond the extreme tap positions.

d) The manual control considered as back up to the motor operated load tap changer control shall be interlocked with the motor to block motor start-up during manual operation. The manual operating mechanism shall be able to show the direction of operation for raising the HV terminal voltage and vice-versa.

Note – RTCC panel is not part of the Tender

MAKE OF MAJOR COMPONENTS & RAW MATERIALS

The BA shall procure the following constituent items from the designated vendors as follows:

S.no	RAW MATERIAL/EQUIPMENT	MAKE
a)	Copper	M/S Sterlite, M/S Hindustan Copper, M/S Hindalco.
b)	Core	M/S AK Steels, POSCO, Kawasaki/ JFE, Nippon Steel.
c)	Insulation paper and Pressboards	ITC paper, ABB, Raman Boards-Mysore, Senapathy Whiteley – Bangalore
d)	Transformer Oil (Mineral oil)	Savita, Apar, Gandhar
e)	Gaskets & Corks	Nu Cork, Anchor Corks
f)	Steel For Tank	M/s, TATA Steel, M/s SAIL, M/s. JSW Steel, M/s. IISCO, M/s. RINL/Vizag Steel, M/s. Jindal Steel,
g)	Dehydrating Breather	Yogya, Anushree, Electrical engineers

Also, Bidder has to provide all test certificates from original manufacturers & relevant sourcing documents. BA shall also have shot blasting facility.

6. NAME PLATE AND MARKING RATING PLATE

1. **MARKING PLATES: Name Plate (Rating) Plate :** SS material
   A rating plate shall be fitted to each transformer in a visible position and shall carry all the information as **specified in clause no. 6.2**

2. **Terminal Marking Plate : on same name plate also accepted**

- The terminal marking plate shall be provided which shall be strictly in accordance with **figure 4 of IS 1180-Part 1: 2014**. This plate may be combined with the rating plate or can be provided separately.

- Value of short circuit impedance on extreme tapping and on principal tapping and indication of winding to which impedance is related has to be displayed additionally.

3.Details Plate : MS sheet of 2.5mm with punched details and welded on tank.

A separate plate of **size 125 mm x 125 mm** shall be provided having following details:

- Property of TPCODL
- Name of the firm.
- Serial No.
- Rating of transformer.
- Purchase Order no. and date.
- Date of dispatch.
- Manufacturing Year

2) **Guarantee Plate**

A separate warranty plate made of **Stainless Steel** with following clause written on it.

"THE EQUIPMENT GUARANTEED UPTO A PERIOD OF 48 MONTHS FROM THE DATE OF COMMISSIONING OR 60 MONTHS FROM THE DATE OF LAST SUPPLY" whichever earlier. In case any manufacturing defects are found, the vendor shall replace the product free of cost.

All the plates described above (clause 1 to 4) should be as followings:

Material	Stainless Steel
Thickness	1 mm
Engraving	The letters on the rating plate shall be engraved black on the white/silver back ground.
Fixing	Fixing screws shall be of stainless steel.

3) Danger Plate: On all cable boxes

Danger notice shall have red lettering on a white background on a plate as specified in **IS: 2551 – 1982.**

4) **BIS Certification Mark: On main name plate**

The Bidder is required to get approval from BIS and display BIS mark on the name plate.

5) Control Circuit drawing Plates:

- Engraved drawing for control circuit unit shall be available on Marshalling box.

6.2 NAME PLATE DETAILS : The name plate shall be strictly as per **IS 1180: 2014** . Additionally, following points shall be displayed :

1. **Actual no load losses of transformer.**
2. **Actual total losses of transformer at 50% load and 100% load.**
3. Standard mark (BIS certification).
4. "**PROPERTY OF TP CENTRAL ODISHA**" shall be written in bold letters.
5. PO number with date has to be mentioned.
6. Overall dimensions of the transformer.

6.3 Marking

1. All transformers shall have HV phase windings marked in both, the terminal boards inside the tank and outside with capital letter 1U, 1V, 1W.
2. The LV winding for the same phase shall be marked by corresponding small letter 2u, 2v, 2w. The neutral point terminal shall be indicated by the letter 2n.
3. The markings shall be done by steel strips in which marks had been engraved in black colour.
4. Colour marking of the bushings shall be done.

7. TESTS:

All routine, acceptance & type tests shall be carried out in accordance with the IS 2026 and IS 1180: Part-1 (2014). All routine & type tests shall be witnessed by the TPCODL/his authorized representative. All the components shall also be type tested as per the relevant standards.

Following tests shall be necessarily conducted on the Distribution Transformers in addition to others specified in IS/IEC standards.

7.1ACCEPTANCE TESTS

1. Temperature Rise test on one unit of first lot against every release order / PO for each rating. For further lots, TPCODL reserves the right to perform Temperature rise if required. [As per IS 2026 (Part 2) Clause no.4]
2. Oil leakage test for acceptance shall be conducted at pressure of 0.35kg/sq.cm for one hour. (IS 1180 (Part 1) clause 21.5.1.3)
3. The painted surface shall pass the Cross Adhesion Test (IS1180 part 1 clause no. 21.4.d).
4. Calibration of WTI and OTI.
5. Magnetic Balance Test.
6. OEM test reports for CT if used.
7. OEM test reports for breather for air pressure test.
8. At stage inspection -Checking of weight, dimensions, fitting and accessories, tank sheet thickness, oil quantity, material finish and workmanship, physical verification of core coil assembly and measurement of flux density on one unit of each rating of the offered lot with reference to the GTP and contract drawings. Oil BDV of all offered lot.
9. At least 10% transformer of the offered lot (minimum of one) shall be subjected to all the tests mentioned under the section 'ROUTINE Test" in presence of TPCODL's representative at the place of manufacture before dispatch without any extra charges. The testing shall be carried out in accordance with IS: 1180 and IS: 2026.
10. Device trails & test for 2500 KVA (Buchholz trip, Buchholz alarm, PRV trip, WTI alarm, WTI trip and OTI alarm.
11. The format of final inspection as per annexure-II.
12. At Stage and Final inspection, the incoming raw material and its movement/consumption record in the related jobs of TPCODL will be verified by inspecting officer. In case of any deviation or non-availability of such records, the offered lot may get rejected.

7.2ROUTINE TESTS

1. Measurement of Winding Resistance on each tap.
2. Measurement of voltage ratio, check of voltage displacement, polarity, phase sequence and vector group
3. Measurement of short circuit impedance (principal tapping, when applicable) and load loss at 50% and 100% load
4. Measurement of no load losses and magnetizing current at rated frequency and 90%, 100% and 112.5% of rated voltage
5. Measurement of insulation resistance
6. Induced over voltage withstand test
7. Separate Source voltage withstand test
8. Oil leakage test
9. Neutral current measurement
10. BDV and moisture content of oil in transformer

7.3TYPE TESTS

1. Lightning Impulse Test [As per IS 2026 (Part 3) Clause no. 12].
2. Temperature Rise Test [As per IS 2026 (Part 2) Clause no.4].

NOTE: Maximum measured total loss (No load at Rated excitation load loss at maximum current tap converted to 75°C reference temperature) at 100 percent loading shall be supplied during temperature rise test.

3. Short Circuit Withstand test [As per IS 2026 (Part 5)].

NOTE: Routine tests before and after short circuit test shall be conducted as per IS 2026 (Part 1).

4. Pressure Test [As per IS 1180: Part 1 (2014)].
5. Determination of sound levels [IS 2026 (part 10)].
6. No load current at 112.5% voltage
7. BDV and moisture content of oil in transformer (IS 335).
8. Magnetic balance test.
9. Measurement of Zero-phase sequence impedance.
10. Measurement of Harmonics of no-load current.
11. Test to verify IP 55 for CT terminal Box and cable boxes.

Note: - The tests shall be conducted at CPRI/ERDA labs only.

8. TYPE TEST CERTIFICATES:

The Bidder shall furnish the type test certificates of the offered rating and design of transformer for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI / ERDA or as defined in 7.3 as per the relevant standards. In the event of any discrepancy in the test reports, i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to TPCODL. Type tests should have been conducted in certified Test laboratories during the period not exceeding 5 years from the date of opening the bid.

9. PRE-DISPATCH INSPECTION:

1. Bidder to raise the inspection calls for stage inspection and only after getting clearance from TPCODL shall proceed for further manufacturing. The bidder shall raise the inspection call for Final Inspection or prototype Inspection in TPCODL format.
2. If the prototype inspections asked for during drawing approval then bidder has to make one unit of transformer and raise for inspection call for stage and final for prototype inspection.
3. Equipment shall be subject to inspection by a duly authorized representative of the TPCODL.

4. Inspection may be made at any stage of manufacture at the option of the purchaser and the equipment if found unsatisfactory as to workmanship or material, the same is liable to rejection.

5. Bidder shall grant free access to the places of manufacture to TPCODL's representatives at all times when the work is in progress.

6. Inspection by the TPCODL or its authorized representatives shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specifications.

7. The BA shall ensure that 100% of the lot must be ready for inspection and atleast 10% must be ready with all mounting and accessories during inspection.

8. Material shall be dispatched only after getting MDCC (Material Dispatch Clearance Certificate) from TPCODL.

9. Following documents shall be sent along with material:

i) Test reports

ii) MDCC issued by TPCODL

iii) Invoice in duplicate

iv) Packing list

v) Drawings & catalogue

vi) Guarantee / Warrantee card

vii) Delivery Challan.

viii) Other Documents (as applicable)

10.To ascertain the quality of the transformer oil, the original manufacturer's tests report shall be submitted at the time of inspection.

11.Arrangements shall also be made for testing of transformer oil, after taking out the sample from the manufactured transformers and tested in the presence of TPCODL's representative.

12.In respect of raw material such as core stampings, winding conductors, insulating paper and oil, bidder shall use materials manufactured/supplied by standard manufacturers and furnish the manufacturers' test certificate as well as the proof of purchase from these manufacturers (excise gate pass) for information of the TPCODL.

13.The bidder shall furnish following documents along with their offer in respect of the raw materials:

i) Invoice of supplier.

ii) Mill's certificate

iii) Packing List.

iv) Bill of Landing

v) Bill of entry certificate by custom.

14.To ensure about the quality of transformers, the inspection shall be carried out by the TPCODL's representative at following two stages:

i) Online anytime during receipt of raw material and during manufacturing/assembly Stage.

ii) At finished stage i.e. transformers are fully assembled and ready for dispatch.

15.Advance intimation of 7Days (Within Bhubaneswar)/12 Day (Outside Bhubaneswar) is required for both Stage and final inspections.

16.All tests and inspection shall be carried out at the place of manufacture unless otherwise specifically agreed upon by the manufacturer and TPCODL at the time of purchase.

17.The manufacturer shall offer the inspector representing the TPCODL all reasonable facilitis, without charges, to satisfy him that the material is being supplied in accordance with this specification. This will include Stage Inspection during manufacturing stage as well as Active Inspection during Acceptance Tests.

18.The stage inspection shall be done as per the format given in Annexure – I.

19.During the stage inspection a few assembled core coil and assembled Tanked transformer shall be dismantled (only in case of CRGO material) to ensure that the CRGO laminations, Windings and workmanship are of good quality. TPCODL also reserves the right to review any document or certificates related to material, manufacturing process, quality checks at any point of stage inspection.

20.TPCODL also reserves the right to inspect the tank of transformer before surface preparation and painting. The same shall be informed to TPCODL accordingly.

21.Final inspection Call for carrying out acceptance tests as per relevant IS/IECs shall be sent by the Bidder along with routine test certificates.

22.The bidder shall provide all services to establish and maintain quality of workmanship in his works and that of his sub-contractors to ensure the mechanical / electrical performance of components, compliance with drawings, identification and acceptability of all materials, parts and equipment as per latest quality standards of ISO 9000.

23.The TPCODL has the right to have the test carried out at his own by an independent agency wherever there is a dispute regarding the quality supplied. Also TPCODL has right to test 1% of the supply selected either from the stores or field to check the quality of the product. In case of any deviation TPCODL have every right to reject the entire lot or penalize the bidder, which may lead to blacklisting, among other things.

24.At the time of inspection the material should be ready as specified, In case of material non-readiness or material failure in acceptance, Cost of re-inspection shall be borne by bidder.

10.INSPECTION AFTER RECEIPT AT STORE:

1. The material received at the TPCODL store shall be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection.
2. In case the transformers proposed for supply against the order are not exactly as per the tested design, the Bidder shall be required to carry out the short circuit test and impulse voltage withstand test at its own cost in the presence of the representative of TPCODL.
3. The supply shall be accepted only after such test is done successfully, as it confirms on successful withstand of short circuit and healthiness of the active parts thereafter on un-tanking after a short circuit test.
4. Apart from dynamic ability test, the transformers shall also be required to withstand thermal ability test or thermal withstand ability will have to be established by way of calculations
5. TPCODL reserves the right to conduct all tests on Transformer after arrival at site / stores and the manufacturer shall guarantee test certificate figures under actual service conditions.
6. TPCODL reserves the right to conduct short circuit test and impulse voltage withstand test in accordance to IS, afresh on each ordered rating at purchaser cost, even if the transformer of the same rating and similar design are already tested. This test shall be carried out on a transformer to be selected by TPCODLeither at the manufacturer's works when they are offered in a lot for supply or randomly from the supplies already made to TPCODLstores. The findings and conclusions of these tests shall be binding on the bidder.

11.GUARANTEE:

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under the contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of 48 months from the date of commissioning or 60 months from the date of last supplies made under the contract, whichever is earlier.

Bidder shall be liable to undertake to replace/rectify such defects at his own costs within mutually agreed timeframe and to the entire satisfaction of the TPCODL, failing which the TPCODL will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the TPCODL's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be.

In case of Distribution transformer fails within the guarantee period TPCODL will immediately inform the Bidder who shall take back the failed Distribution Transformer within 15 days from the date of intimation at his own cost and replace / repair the transformer within forty five days of date of intimation with a roll over guarantee. The outage period i.e. period from the date of failure till unit is repaired / replaced shall not be counted for arriving at the guarantee period.

Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser

12. PACKING AND TRANSPORT:

Supplier shall ensure that all material covered by this specification shall be prepared for rail/road

transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

Transformers shall be delivered filled with oil and supplied with all accessories mounted. Screws and bolts shall be thoroughly tightened to ensure no leakage of oil.

13.TENDER SAMPLE:

All offered transformer detailed documents to be submitted as per clause no.18. The sample shall be not applicable

14. QUALITY CONTROL:

The bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. TPCODL's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

The following information shall necessarily be submitted with the bid:

1. List of important raw materials, names of sub-suppliers for raw materials, standards to which raw material is tested and the copies of test reports of the tests carried out on raw materials in presence of Bidder's representatives.
2. List of manufacturing facilities available, level of automation achieved and the areas where manual process exists.
3. List of areas in manufacturing process where stage inspections are normally carried out for quality control and details of these tests and inspections
4. List of testing equipment for final testing with valid calibration reports. Manufacturer shall possess 0.1 class instruments for measurement of losses.
5. QAP withhold points for TPCODL inspection.

15.TESTING FACILITIES:

Supplier/ Manufacturer shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests and predispatch inspectionsas per relevant Indian standards.

16. MANUFACTURING FACILITIES:

The successful bidder will have to submit (after placement of RC) technical compliance document and drawing of each part along with CCA, breather, bushings, terminal box etc. as per RC line items to be submitted for getting approval before mass manufacturing.

The first time supplier will have to make one prototype sample of each line tem of RC as per CAT-B approved drawing within 30 days of drawing approval. Inspection call to be raised by bidder

before 7 days of date of proposed inspection. TPCODL shall arrange inspectors and intimate or confirm the date. Any observation during inspection shall have to be addressed within 7 days and revised improved drawing & technical details to be shared to TPCODL for final approval.

Manufacturing mass quantity to start only after getting CAT-A approved drawings or as per intimation from TPCODL.

17. SPARES, ACCESSORIES AND TOOLS

Bidder shall give an assurance that the reparability of transformer is ensured by using standard spare parts and accessories available in market in India.

18. DRAWINGS AND DOCUMENTS:

Following drawings and documents shall be prepared based on TPCODL specifications and statutory requirements and shall be submitted with the bid:

1. Completely filled in compliance to each clause of Technical Specification and any Additional Details and Fittings.
2. Description of the transformer and all components drawings.
3. General arrangement for Transformer.
4. LV terminal box drawing along with CT if applicable and cleat arrangement and gland plate drawing.
5. Bill of material.
6. Design calculation details of transformer losses, cooling, efficiency and current density, weight of coils and components.
7. Experience Certificate and list
8. Type test certificates.
9. List of makes of major components as listed above.

Drawings / documents to be submitted for approval after the award of the order within 7 days before mass manufacturing are as under:

List of Drawings/Parameters to be submitted:

1. Technical Parameters as asked in Specification (General Technical Particulars, General Technical Requirements, Additional Details, Fittings, Type test Reports and Routine test certificates of bought out accessories).
2. General Arrangement Drawing of the Transformer (Front view, Top view and both sides view. Complete list of fittings to be displayed and quantities to be mentioned with the drawing).
3. Internal Core arrangement drawing.
4. Internal Core-coil assembly drawing.
5. Foundation Plan drawing.
6. Marking plates and Markings (as mentioned in clause 6)
7. HV and LV bushings drawing (with internal view and metal parts)
8. HT connector, LT connector (palm connector), Aluminum Busbar
9. HV and LV Box drawing.

10. Gland Plate for HV/LV box.
11. Conservator drawing.
12. Prismatic oil level gauge drawing.
13. Silica Gel Breather drawing.
14. Auxiliary Terminal Box drawing with internal wiring arrangement.
15. Gland plate of drawing
16. BH curve & Loss/Kg graph of core material offered.
17. The tightening torque chart to be provided for all bolts used in specific rating.
18. Type Test Certificates.
19. Installation/ Mounting Instructions/Drawing.
20. Efficiency vs Load curve of the offered design.
21. Quality Assurance plan.

List of Calculations to be submitted:

1. All the calculations shall be step by step showing the use of formulas and other practical considerations. **Concise calculations in table or excel sheet shall not be accepted.** Also, the reference (only standard sources as IS, IEC or any such standard is acceptable) of the formulas shall be mentioned.
2. Resistance Calculation (75 deg. C)
3. Load Losses Calculation (at 75 deg. C)
4. No load Losses.
5. Stray Losses.
6. Weight of Copper (Bare and with Insulation also).
7. Weight of Core.
8. Flux Density calculations.
9. Current Density Calculations.
10. Short Circuit withstand.
11. Temperature Rise Calculations.
12. Conservator Volume calculations
13. Cooling Calculations showing cooling with tank and radiators separately with no. of radiators and fins mentioned specifically (For both Mineral oil and Ester oil)
14. Calculation sheet for Lifting lug design and mounting lug design to be submitted by Bidder.

Additional Documents to be submitted :

a. List of raw materials as well as bought out accessories and name of sub-suppliers selected from those furnished along with offer.
b. Type test certificates of the raw materials and bought out accessories.
c. The successful Bidder shall submit the **routine test certificates of bought out accessories** and central excise passes for raw material at the time of routine testing.

All the documents & drawings shall be in English language. After the receipt of the order, the successful bidder will be required to furnish all relevant drawings/parameters/calculation to TPCODL for approval.

Instruction Manuals:

Bidder shall furnish softcopies of nicely bound manuals (In English language) covering erection and maintenance instructions and all relevant information and drawings pertaining to the main equipment as well as auxiliary devices.

19. SCHEDULE- "A" GUARANTEED TECHNICAL PARTICULARS:

SI.NO	TECHNICAL PARTICULARS	DESIRED VALUE
	Reference Standard	IS 1180
1	Continuous rated capacity (KVA)	2500
2	Application	Outdoor
3	System voltage (max.)	36 KV
4	Rated voltage HV	33 KV
5	Rated voltage LV (V)	433
6	Line current HV (A)	43.74
7	Line current LV (A)	3333.43
8	Frequency (Hz)	50
9	No. of Phases	3
10	Connection HV	Delta
11	Connection LV	Star
12	Vector group	DYN11
13	Type of cooling	ONAN
14	Tap changing arrangement (off load)	+5.0% to –10% in steps of 2.5%
15	No. of tap positions	7
16	Noise level at rated voltage and frequency	61
17	Temerature Rise	
17.1	Of top oil	40 °C
17.2	Of winding	45 °C
18	Max. Total Losses at 50% loading at 75°C (watts)	6611.25
19	Max. Total Losses at 100% loading) at 75°C (Watts).	19887.5
20	Short circuit impedance voltage at 75°C (±10% tolerance)	6.25
21	Insulation Class	A
22	Normal Flux Density (at rated voltage and frequency)	1.6 T
23	Maximum current density (A/mm^2)	2.5
24	Impulse withstand voltage	170 KVp
25	Power frequency withstand voltage	70 KV
26	Max. flux density (Increase of +12.5 % combined voltage & frequency variation from rated voltage & frequency)	1.9 T

27	Voltage fluctuations permissible	+12.5% to -12.5%
28	Neutral terminal	Two separate brought out neutral from main neutral bus bar, One for taking out the neutral for 4 wire system and other additional neutral for solid earthing.
29	Minimum clearances in air (mm) :	
29.1	HV phase to phase/ phase to earth	350/320
29.2	LV phase to phase/ phase to earth	75 / 40
30	Minimum clearances in Cable Box (mm) :	
30.1	HV phase to phase/ phase to earth	350/220
30.2	LV phase to phase / phase to earth	25/20
31	Wheels	The transformer shall be provided with four uni-directional rollers with locking arrangement suitable for rail gauges in both the axis for movement of transformer in either direction. Distance between wheels shall be as per relevant standard

20.SCHEDULE "B" DEVIATIONS:

(TO BE ENCLOSED WITH TECHNICAL BID)

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications:

SL. No	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those detailed above.

Seal of the Company:

Signature

Designation

ANNEXURE – I

INSPECTION TEST PLAN FOR STAGE INSPECTION OF DISTRIBUTION TRANSFORMER

S No.	Particulars	Details
(A)	**GENERAL INFORMATION:**	
	Name of firm	
	Order No. and Date	
	Details of offer :	
	Rating	
	Quantity	
	Lot Serial Numbers	
	Position of Manufacturing for the offered quantity:	
	Complete tanked assembly	

	Core and coil assembly ready	
	Core assembled	
	Coils ready for assembly	
	i) HV coils ii) LV coils	

Note: i) The stage inspection shall be carried out in case:-

a) 50% quantity is ready with core coil assembly (CCA).

b) 30% quantity of stacked core i.e core assembly shall be ready for inspection.

c) 30% quantity of HV & LV coils shall be ready for inspection.

d) 20% Quantity shall be available in Raw form i.e core stacking in process and coil winding in process for taking measurements.

e) Minimum 50% tanks must be ready for testing and inspection & balance quantity shall be in process.

f) One Tank must be ready for deflection test.

ii) Quantity offered for stage inspection should be offered for final Inspection within 15 days from the date of issuance of clearance for stage inspection, otherwise stage inspection already cleared shall be liable for cancellation.

S No.	Particulars	As offered	As observed	Deviation and Remarks
(C)	**Inspection of Core :**			
	(I) Core Material			
	1) Manufacturer's characteristic certificate in respect of grade of lamination used. (Please furnish test certificate			
	2) Thickness of core lamination			
	3) Remarks regarding Rusting and smoothness of core.			

	4) Whether laminations used for top and bottom yoke are in one piece.												
	5) Core Losses												
	(II) Core Construction :												
	(1) No. of steps												
	(2) Dimension of steps												
	As offered :												
	Step No.	1	2	3	4	5	6	7	8	9	10	11	12
	W mm												
	T mm												
	As found :												
	Step No.	1	2	3	4	5	6	7	8	9	10	11	12
	W mm												
	T mm												
	(3) Core Diameter (mm)												
	(4) Total cross sectional area of core												
	(5) Effective cross sectional area of core												
	(6) Whether top yoke is cut for LV connection.												
	(7) If yes, at 6 above, whether Reinforcement is done.												
	(8) Core length (leg center to leg center)												
	(9) Window height.												
	(10) Core height												
	(11) Core weight only												
(D)	**INSPECTION OF WINDING**												
	(I) Winding material												
	(1) Material used for												

	a) HV winding			
	b) LV winding			
	(2) Grade of material for			
	a) HV winding			
	b) LV winding			
	(3) Test certificate of manufacturer (enclosed copy) for winding material of:			
	a) HV			
	b) LV			
	(II) Construction Details 1) Size of Cross sectional area of conductor for :			
	a) HV winding			
	b) LV winding			
	2) Type of insulation for conductor of :			
	a) HV winding			
	b) LV winding			
	3) Diameter of wire used for delta formation (mm)			
	4) Diameter of coils in:			
	a) LV winding			
	i) Internal Diameter (mm)			
	ii) Outer diameter (mm)			
	b) HV winding			
	j) Internal Diameter (mm)			
	ii) Outer diameter (mm)			
	5) Current density of winding material used for:			
	a) HV			
	b) LV			
	6) Whether neutral formation on top.			

	7) HV coils / Phase			
	a) Number			
	b) Turns/coil			
	c) Total turns			
	8) LV coils /Phase			
	a) Number			
	b) Turns / coil			
	c) Total turns			
	9) Total weight of coils of			
	a) LV winding (Kg)			
	b) HV winding (Kg)			
	10) Winding is free from metallic/non-metallic dust, burr and deformations under DPC paper.			
	a) HV Winding			
	b) LV Winding			
(E)	**INSULATION MATERIALS**			
	(I) DPC Paper Insulation			
	a) Type of Paper (Dotted Kraft or Diamond Dotted Kraft)			
	b) Make			
	c) Thickness (mm)			
	d) DPC laying direction			
	e) Percentage Overlapping			
	II) Interlayer Insulation			
	c) Type of Paper			
	d) Make			
	e) Thickness (mm)			
	III) Between HV and LV winding			

	a) Type of Paper			
	i. Make			
	ii. Thickness (mm) (all size)			
	b) Type of Pressboards			
	i. Make			
	ii. Thickness (mm) (all size)			
	IV) Between core and LV			
	Type of Paper			
	i. Make			
	ii. Thickness (mm) (all size)			
	Type of Pressboards			
	i. Make			
	ii. Thickness (mm) (all size)			
	V) Material used for top and bottom yoke and insulation			
	a) Type of Material			
	i. Make			
	ii.Thickness (mm) (all size)			
	VI) Material used for Spanner, wedge and Axial for insulation			
	a) Type of Material			
	i. Make			
	ii. Thickness (mm) (all size)			
	iii. Visual condition(i.e free from dust, burr, damage and sharp edges)			
	VII) Test certificate of manufacturer (enclose copy for all type of papers and pressboard used)			
(F)	**CLEARANCES: (mm)**			
	(I) Related to core and winding			
	1) LV to core (radial)			

	2) Between Hv and LV (Radial)			
	3) (i) Phase to phase between HV conductor			
	(ii) Whether two nos. press board each of minimum 1mm thick provided to cover the tie rods.			
	4) Thickness of duct between HV and LV coil mm			
	(II) Between core – coil assembly and tank:			
	1) Between winding and body			
	a) Tank length wise			
	b) Tank breadth wise			
(G)	**TANK :**			
	(I) Construction Details:			
	1) Rectangular shape			
	2) Thickness of side wall (mm)			
	3) Thickness of top and bottom plate (mm)			
	4) Provision of sloping top cover towards HV bushing.			
	5) Lifting lug dimension check 6) Lifting lug DP test on welding. 7) The welding thickness measurement with fillet gauge at both side of lifting lug.			
	8) Tank internal dimensions (mm)			
	a) Length			
	b) Breadth			
	c) Height			
	d) On HV side			
	e) On LV side			
	(II) General Details :			
	1) Inside painted by oil corrosion resistant paint (please specify which type of coating done)			
	2) Gasket between top cover and tank			

	a) Material			
	i) Thickness (mm)			
	ii) Jointing over laps (mm)			
	3) Provision of lifting lugs:			
	a) Numbers			
	b) Either reinforced by welded plates edge wise below the lug up to re-enforcing angle of the tank done.			
	4) Pulling lug of MS plate			
	a) Nos.			
	b) Thickness (mm)			
	c) Whether provided on breadth side or length side			
	5) Provision of air release plug			
	6) Provision of hot dip galvanized GI Nuts Bolts with 1no. plain and 1no. spring washer.			
	7) Deformation length wise side wall of tank when subject to			
	a) Vacuum of (-) 0.7 Kg/sq.cm for 30 minutes.			
	b) Pressure of 0.8 Kg/sq.cm. for 30 minutes.			
(H)	**RADIATORS:**			
	1) Fin radiators of 1.2 mm thick sheet			
	a) Dimension of each fin (L × B × T)			
	b) Fins per radiator			
	c) Total No. of radiators bank			
	2) Verification of manufacturer's test certificate regarding Heat dissipation (excluding Top and Bottom) in w/sq.m			
	3) Verification of position of radiator with respect to bushing.			
(I)	**CONSERVATOR**			
	1) Dimensions (L ×D) (in mm.)			
	2) Volume (m3)			
	3) Inside dia. of conservator tank pipe (mm)			
	4) Whether conservator outlet pipe is projected approx. 20 mm inside the conservator tank.			

	5) Whether arrangement made so that oil does not fall on active parts.			
	6) Whether die cast metal oil level gauge indicator having three positions at (-5^{0}C , 30^{0}C and 98^{0}C)			
	7) Whether drain plug & filling hole with cover provided			
	8) Inner side of the conservator Tank painted with -			
(J)	**BREATHER:**			
	1) Whether UV protected seamless acrylic body breather for silica gel provided.			
	2) Make			
	3) Capacity			
(K)	**TERMINALS:**			
	1) Material whether of Brass Rods/Tinned Copper.			
	a) HV			
	b) LV			
	2) Size (dia. In mm)			
	a) HV			
	b) LV			
	3) Whether SRBP tube / insulated paper used for formation of Delta on HV.			
(L)	**BUSHINGS**			
	1) Whether HV bushings mounted on top cover/ side walls.			
	a) HV			
	b) LV			
	2) Whether arrangement for studs for fitting of HV Bushing are in diamond shape (so that arcing horns are placed vertically).)			
	3) Position of mounting of LV bushings			
	4) Bushing Clearance: (mm)			
	a) LV to Earth			
	b) HV to Earth			
	c) Between LV bushings			
	d) Between HV bushings			

(M)	**TANK BASE CHANNEL/ ROLLERS:**			
	1) Size of channel (mm)			
	2) Whether channels welded across the length of the tank			
(N)	**OIL:**			
	1) Type of oil and Name of supplier			
	2) Breakdown voltage of oil: (kV)			
	a) Filled in tanked transformer			
	b) In storage tank (to be tested by Inspecting officer).			
	3) Supplier's test certificate (enclose copy)			
(O)	**ENGRAVING:**			
	1) Engraving of Sl. No. and name of firm.			
	a) On bottom of clamping channel of core-coil assembly.			
	b) On Top cover of tank			
(P)	**i) MS Plate of size 125× 125 mm welded on width side of stiffener.**			
	ii) Following details engraved (as per approved GTP):			
	a) Serial Number			
	b) Name of firm			
	c) Order No. and date			
	d) Rating			
	e) Date of dispatch			
(Q)	**NAME PLATE DETAILS:** Whether Name Plate is as per approved drawing			
(R)	**COLOUR OF TRANSFORMER**			
	1) Tank body with			
	2) Conservator with			

PURCHASER'S OFFICER BIDDER'S REPRESENTATIVE

DATE OF INSPECTION

ANNEXURE-II

FINAL INSPECTION TEST PLAN OF DISTRIBUTION TRANSFORMERS

	Name of the firm / BA	
	Date of inspection	
	Details of offer made	
	(i) Order No. and date	
	(ii) Rating	
	(iii) Quantity	
	(iv) Sl. No. of transformers	
	Date of stage inspection of the lot	
	Reference of stage inspection clearance	
	Sample Quantity (10% of the offered lot, min. one)	Sr. No.---------- ---

ACCEPTANCE TESTS TO BE CARRIED OUT

		Specified Value	Reference documents	Test Results	Pass/Fail
S No.	**PARTICULARS**				

1.	Visual and Physical verification	GTP/Drawing	GTP/Drawing		
2.	Ratio Test		IS 2026 (Part 1) cl. 16.3		
3	Vector Group & Polarity check		IS 2026 (Part 1) cl.16.3		
4.	No load loss measurement	GTP value	IS 2026 (Part 1) cl.16.5		
5.	Max. Load loss measurement (watt) at 50% loading at 75ºC	GTP value	IS 2026 (Part 1) cl.16.4		
	Max. Load loss measurement (watt) at 100% loading at 75ºC Note – Calculation sheet to be attached along with	GTP value			
6.	Winding Resistance :	GTP Value	IS 2026 (Part 1) 16.2.1 & 16.2.3		
	H.V. (in Ohms) Resistance at 75 deg.C (Calculated)				
	L.V. (in Ohms) Resistance at 75 deg.C (Calculated)				
7.	Insulation resistance (M ohm) HV-LV HV-E LV-E		IS 2026 (Part 1) cl.16.6		
8.	a) Separate source Voltage withstand test voltage:		IS 2026 (Part 3) cl.10		
	HV	28 kV for 60 secs.			
	LV	3 kV for 60 secs.			
9.	Induced over-voltage withstand test at double voltage and double frequency	100 Hz, 866 volts for 60 seconds.	IS 2026 (Part 3) cl.11		
10.	No load current at	GTP values	IS 2026 (Part 1) cl.16.5		
	90% volts				

	100% volts				
	112.5% volts				
11.	Neutral current measurement (A)	within 2% of the Full load current			
12.	Percentage Impedance at 75 deg.C (Please furnish calculation sheet)	GTP/TPCODL Specification	IS 2026 (Part 1) cl.16.4		
13.	Transformer oil test (Break down voltage)	>60KV per 2.5mm for one minute			
14.	Oil leakage test (0.35Kg/sq.cm)	Should Withstand for one hour	IS 1180 (Part 1) clause 21.5.1.3		
15.	Pressure test		IS 1180 (Part 1) cl. 21.5.1.2		
16.	Temperature Rise test (Over ambient temperature)	top oil – 35^0 top oil – 40^0	IS 2026 (Part 2) Clause no.4		
17.	Verification of Bushing clearance HV/LV (mm) a) Phase to Phase b) Phase to Earth	GTP			
18.	Paint Thickness test /Cross Adhesion Test	GTP/TPCODL Specification	IS1180 part 1 clause no. 21.4.d		
19.	Galvanization thickness test for 1. Arching horn , 2. Fasteners, 3. Earth strip	86 micron at any point	As per specs		
20.	Check if any joints in top cover gasket and terminal box gasket	Max two dove tail joints			
21.	Check drain valve and filter valve with flange arrangement on both sides.				
22.	Engraving on Name plate, Guarantee plate and Tank body	GTP	GTP		
23	Copy of calibration certificates of testing equipment be enclosed.	100% testing equipment			
24	Verification of tightening torque w.r.t torque chart.	GTP	Approved torque chart		
25	Raw Material sourcing and consumption documents verification in offered lot		As per acceptance clause in the specification		

26	CT- OEM Test reports if applicable	RTC			
27	Breather test reports for air pressure (Type test of OEM from NABL lab)				
28	Breather mounting fixing on conservator with Teflon tape				
29	CT mounting without touching bus bar				
30	Operation of Auxiliary contacts NONC operation test of various accessories like PRV, OTI, float switch etc. as applicable.				
31	Checking of CT terminal Ferruling S1 & S2 for all phases, in Auxiliary box.	As per Approved Drawing	As per Approved Drawing		

PURCHASER'S OFFICER BIDDER'S REPRESENTATIVE

DATE OF INSPECTION

POINTS TO BE SEEN / DIMENSIONS TO BE NOTED AT THE TIME OF DISMANTLING OF TRANSFORMERS:

S No.	PARTICULARS	As required in approved documents / Drawings	As observed	Remark/Deviations
1.	Details of the transformer dismantled for physical verification			
	a) Rating (kVA)			

	b) Sl. No.			
2.	Whether Hot dip galvanized Nuts and Bolts with one spring one plain washer provided for tightening the tank cover. Check galvanization thickness of 86 micron.			
3.	Details of Gasket used between top cover and tank Material			
	a) Thickness (mm)			
	b) Type of joints			
	c) Number of joints			
4.	Whether core is earthed properly with Cu strip (one end should be tightened in between the core laminations and other end bolted on core clamping channel).			
5.	Connections from winding to bushings (describe the manner in which it has been done)			
	a) HV			
	b) LV			
6.	Winding wire dia. and cross sectional area			
	a) HV			
	I) Dia. (mm)			
	II) Area (sq.mm)			
	b) LV			
	I) L × W × Nos. of layer			
	II) Area (sq.mm)			
7.	Thickness of pressboard (s) provided between HV coils to cover the tie rods			
8.	Whether painted with oil and corrosion resistant paint			
	a) Inside the tank and conservator tank			
	b) Core clamping and core base channels			
	c) Tie rods			
	d) Core bolts			

9.	Whether engraving of Sl. No. and name of firm done on the bottom channel of core coil assembly.			
10.	Whether empire sleeves provided up to the end portion of HV winding jointing to bushing			
11	Whether flap on inner side of top cover provided to prevent direct falling of oil on core – coil assembly.			
12	Method of joints			
	a) Between HV coils			
	b) Between tap coils			
	c) For tap changer			
13	Diameter of copper wire, used for formation of delta (should not be less than 1.5 times the dia. Of conductor). (mm)			
14.	HV coils :			
	a) Inner dia. (mm)			
	b) Outer dia. (mm)			
15.	LV coils :			
	c) Inner dia. (mm)			
	d) Outer dia. (mm)			
16.	Core dia.			
17.	Core height including base channel and insulation in between (mm)			
18.	Clearances between			
	a) Core and LV (mm)			
	b) HV and LV (mm)			
	c) Phase to Phase of HV coils (mm)			
	d) Core coil assembly and tank body (mm)			
	I) Length wise			
	II) Width wise			

	e) Top of yoke and top cover (mm)			
	f) Top most live part of tap changer and top cover			
19.	Weight of core only (Kg.)			
20.	Weight of windings (Kg.)			
	a) LV			
	b) HV			
21.	Whether core laminations are in one piece, used for			
	a) Bottom yoke			
	b) Top yoke			
22.	Specific remarks regarding smoothness and rusting of core used.			
23.	Volume of oil filled (to be done once against the order)			
	In tank of the transformer			
	In conservator tank			
24.	Weight of transformer (inclusive of all fittings, accessories, oil etc. complete)			
25.	Inner dimensions of the tank			
	a) Length			
	b) Width			
	c) Height			
	I) LV side			
	II) HV side			
26.	Remarks, if any :			

DATE OF INSPECTION: _____

ANNEXURE – III

SOURCE OF MATERIAL/PLACES OF MANUFACTURE, TESTING AND INSPECTION

S No.	Item	Source of Material	Place of Manufacture	Place of testing and Inspection
1.	Laminations			
2.	Copper Conductor			
3.	Insulating winding wires			
4.	Oil			
5.	Press Boards			
6.	Kraft paper			
7.	MS Plates/Angles/Channels			
8.	Gaskets			
9.	Bushing HV/LV			
10.	Paints			
11.	Breather			

CONTENTS

1. SCOPE:

This Specification provides for design, engineering, manufacture, 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 3.15 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.

The core shall be constructed either from 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.

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

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 employer 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 Engineer 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.

2. APPLICABLE STANDARDS:

The equipment (and the materials used) covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the

following Indian standards & other relevant standards for components, BEE & CEA guidelines with latest amendment from time to time, thereof, some of which are listed below:

Sr.No.	IS number	IS name
1	IS:5	Colour for ready mixed paints
2	IS:325	Three Phase Induction Motors
3	S:335	New insulating oil for transformers, switch gears
4	IS:2026	Power Transformer
5	IS:2071	Method of high voltage testing
6	IS:2099	High voltage porcelain bushings
7	IS:2147	Degree of protection
8	IS:2705	Current Transformers
9	IS:3202	Code of practice for climate proofing of electrical equipment
10	IS:3347	Dimensions for porcelain Transformer Bushings
11	IS:3637	Gas operated relays
12	IS:3639	Fittings and accessories for power Transformers
13	IS:5561	Electric Power Connectors
14	IS:6600/BS:CP10:0	Guide for loading of oil immersed Transformers
15	IS:10028	Code of practice for selection, installation and maintenance of transformers, Part I. II and III
16	C.B.I.P. Publication	Manual on Transformers

3. CLIMATIC CONDITIONS:

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C
4	Maximum Humidity	95%
5	Average Annual Rainfall	150mm
6	Average No. of rainy days per annum	120

7	Altitude above MSL not exceeding	1000m
8	Wind Pressure	300 Km/hr
9	Earthquakes of an intensity in horizontal direction	equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

TPCODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed upto 300 Kmph. The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months.

4. GENERAL TECHNICAL REQUIREMENTS:

4.1 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 shall be1.5 Tesla (maximum) at rated MVA,Voltage and frequency.

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.

The transformer shall conform to the following specific parameters.

Sl.no.	Parameters	Desired Values
1	Rated MVA (ONAN rating)(MVA)	3.15
2	No. of phases	3
3	Ty pe of installation	Outdoor
4	Frequency	50 Hz (± 5%)
5	Cooling medium	Insulating Oil (ONAN)

6	Ty pe of mounting	On Wheels, Mounted on rails.		
7	Rated voltage			
	a) High voltage winding	33 KV		
	b) Low voltage winding	11 KV		
8	Highest continuous system v oltage			
	a) Maximum system voltage ratio (HV / LV)	36 KV/12 KV		
	b) Rated voltage ratio (HV / LV)	33 KV/11 KV		
9	No.of Windings	Two Winding Transformer		
10	Type of Cooling	ONAN		
11	MVA rating corresponding to cooling system	100%		
12	Method of connection			
	HV	Delta		
	LV	Star		
13	Connection Symbol	Dyn11		
14	System Earthing	Neutral LV side to be solidly earthed		
15	Percentage impedance voltage on normal tap and MVA base at 750 C corresponding to HV /LV rating and applicable tolerances :			
	a)% impedance	6.25		
	b) Tolerance%(No negative tolerance will be allowed))	10		
16	Intended regular cyclic overloading of windings	As per IEC –76-1, Clause 4.2		
17.1	a) Anticipated unbalanced loading	Around 10 %		
17.2	b) Anticipated continuous loading of windings (HV / LV)	110 % of rated Current		
18.1	Type of tap changer	off load tap changer		
18.2	b) Range of taping	+ 5% to – 15% in 9 equal steps of 2.5% each on HV winding		
19	Neutral terminal to be brought out	On LV side only		
20	Over Voltage operating capability and duration	112.5 % of rated voltage (continuous)		
21	Maximum Flux Density in any part of the core and yoke at rated MVA, rated voltage i.e 33 KV / 11 KV and system frequency of 50 HZ	1.5 Tesla		
22	Insulation levels for windings :-			
	a) 1.2 / 50 microsecond wave shape Impulse withstand (KVP)	33KV : 170 11KV: 95		
	b) Power frequency voltage withstand (KV rms)	33KV : 70 11KV: 28		
23	Type of winding insulation	Uniform		
24	Withstand time for three phase short circuit	2 Seconds		

25	Noise level at rated v oltage and frequency	A s per NEMA Publication No. TR-1.
26	Permissible Temperature Rise over ambient temperature of 50 deg C	
	a) O f top oil measured by thermometer.	40 deg C
	b) Of winding measured by resistance.	45 Deg C
27	Minimum clearances in air (mm) :-	
	HV	Phase to Phase: 400 Phase to ground: 320
	LV	Phase to Phase: 280 Phase to ground: 140
28	Terminals	
	a) HV winding line end	36 KV oil filled communicating type porcelain bushings (Anti-fog type)
	b) LV winding	17.5 KV porcelain type of bushing (Antifog type) – for outdoor
29	Insulation levels for bushings :-	
	a) 1.2 / 50 microsecond wave shape Impulse withstand (KVP)	33KV : 170 11KV: 70
	b) Power frequency voltage withstand (KV rms)	33KV : 95 11KV: 28
	C) creepage distance (min)	33KV : 900 mm 11KV: 300 mm
30	Material of HV & LV Conductor	Electrolytic copper
31	Maximum current density for HV and LV winding for rated current	2.4 A / mm^2
32	Polarisation index i.e ratio of megger values at 600 sec. to 60 sec for HV to earth, L.V to earth and HV to LV .	Shall be greater than or equal to 1.5, but less than or equal to 5
33	Core Assembly	Boltless Type
34	WTI & OTI	1 no.s each
35	Losses	The losses shall not exceed the value given below
	a)No load loss(fixed losses) KW	3.15 MVA=3.0KW
	b) Load losses at 75°C KW	3.15 MVA=17kW

4.2 CONTROL CONNECTIONS, 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.

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 OEMs, where a change of number cannot 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 colour 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) 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.

5. GENERAL CONSTRUCTION:

5.1 GENERAL:

a)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.

b) Similar parts particularly removable ones shall be interchangeable.

c) 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.

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

e) Exposed parts shall not have pockets where water can collect.

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

g) 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

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

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

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

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

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

5.2 CORE:

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

b)The core shall be constructed either from 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 prov ide 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.

c) The bidder should offer the core for inspection starting from the destination port to enable Employer for deputing inspecting officers for detail verification as given below and approv al by the Employer during the manufacturing stage. Bidders 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-v endor's premises as per approved design drawing.

i) Purchase Order No. & Date.
ii) Invoice of the supplier
iii) Mills test certificate
iv) Packing list
v) Bill of lading
vi) 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.

d) The laminations shall be free of all burrs and sharp projections. Each sheet shall have an insulting coating resistant to the action of hot oil.

e) 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.

f) 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.

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

h) The finally assembled core with all the clamping structures shall be free from deformation and shall not v ibrate during operation.

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

j) The framework and clamping arrangements shall be securely earthed.

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

l) 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.

m) 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 empty ing of the tank through the drain v alve or cause trapping of air during filling.

n) 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.

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

5.3 WINDINGS:

a) 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.
b) 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.
c) 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.
d) Materials used in the insulation and assembly of the windings shall be insoluble, non-catalytic and chemically inactiv e in the hot transformer oil and shall not soften or the otherwise affected under the operating conditions.
e) 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.
f) Winding and connections shall be braced to withstand shocks during transport or short circuit.
g) 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.
h) Terminals of all windings shall be brought out of the tank through bushings for external connections.

i)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 dry ing 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.

ii) 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.

Iii) 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.

iv) 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.

v) 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.

vi) 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.

vii) Magnitude of impulse surges transferred from HV to LV windings by electromagnetic induction and capacitance coupling shall be limited to BIL of LV winding.

viii) The current density adopted in all winding shall not exceed 2.4 A /mm2. The total net cross sectional area of the strip conductors for calculating current density for each winding shall be obtained after deducting the copper area lost due to rounding up of the sharp edges at the rectangular conductors.

5.4 TRANSFORMER TANK

a) The Transformer tank and cover shall be fabricated from high-grade low carbon plate steel of tested quality. The tank shall be of welded construction.
b) Tank shall be designed to permit lifting by crane or jacks of the complete transformer assembly filed with oil. Suitable lugs and bossed shall be provided for this purpose.
c) All beams, flanges, lifting lugs, braces and permanent parts attached to the tank shall be welded and where practicable, they shall be double welded.
d) The main tank body of the transformer, excluding tap changing compartments and radiators, shall be capable of withstanding pressure of 760mm of Hg. The side Tank wall shall be of 6mm thickness (minimum) for 3.15MVA and 8mm(minimum) for 5MVA & 8MVA . The bottom and Top Plate of the Tank shall be of of 8mm thickness (minimum) for 3.15MVA,10mm(minimum) for 5MVA &12mm.(minimum) for 8MVA.
e) 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.
f) 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 connections of the various oil compartments, shall be laid in grooves or in groove-equivalent sections on bolt sides of the gasket, throughout their total length. Care shall be taken to secure uniformly distributed mechanical strength over the gaskets and retains throughout the total length. Gaskets of neoprene and / or any kind of impregnated / bonded core or cork only which can easily be damaged by over-pressing are not acceptable. Use of hemp as gasket material is also not

acceptable.

g) 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.

5.5 TRANSFORMER TOP 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.

5.6 Painting

a) All paints shall be applied in accordance with the paint manufacturers recommendations. Particular attention shall be paid to the following:

i) Proper storage to avoid exposure as well as extremes of temperature.
ii) Surface preparation prior to painting.
iii) Mixing and thinning
iv) Application of paints and the recommended limit on time intervals between coats.
v) Shelf life for storage.

All paints, when applied in normal full coat, shall be free from runs, sags, wrinkles, patchiness, brush marks or other defects. 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 Employer. The supplier shall, prior to painting protect nameplates, lettering gauges, sight glasses, light fittings and similar such items.

b) Cleaning and Surface Preparation

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

C) 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.

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

e) **Painting Procedure**: 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.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 interv als between coats shall be closely followed. All prepared steel surfaces should be primed before v isible 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.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 specifies, such coatings may or may not be of contrasting colors. Paint applied to items that are not be painted, shall be removed at suppliers expense, leaving the surface clean, un-stained and undamaged.

f) **Damages to Paints Work** : Any damage occurring to any part of the painting scheme shall be made good to the same standard of corrosion protection and appearance as that originally employed. A ny damaged paint work shall be made as follows: a) The damaged area, together with an area extending 25mm around its boundary, shall be cleaned down to bare metal. b) A priming coat shall immediately applied, followed by a full paint finish equal to that originally applied and extending 50mm around the perimeter of the originally damaged. The repainted surface shall present a smooth surface. This shall be obtained by carefully chamfering the paint edges before & after priming.

g) **Dry Film Thickness** To the maximum extent practicable, the coats shall be applied as a continuous film of uniform thickness and free of pores. Over-spray , skips, runs, sags and drips should be avoided. The different coats may or may not be same color. Each coat of paint shall allowed to hardened before the next is applied as per manufactures recommendations. Particular attention must be paid to full film thickness at edges. The requirement for the dry film thickness (DFT) of paint and the material to be used shall be as given below:

Sl.No	Paint Type	Area to be painted	No of Coats	Total Dry film thickness(Min)
1	Liquid paint a) Zinc C hromate(Primer) b) POLYURETHANE Paint (Finish Coat) c) Hot Oil paint	 Out side Out side inside	 02 02 01	 45 micron 35 micron 35 micron

5.7 BUSHINGS:

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) Bushing rated for 400A and above shall have non-ferrous flanges and hardware.
v) Fittings made of steel or malleable iron shall be galvanized
vi) 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.
vii) All applicable routine and type tests certificates of the bushings shall be furnished for approval.
viii)Bushing shall be supplied with bi-metallic terminal connector/ clamp/ washers suitable for fixing to bushing terminal and the Client specified conductors. The connector/clamp shall be rated to carry the bushing rated current without exceeding a temperature rise of 55 deg C over an ambient of 50 Deg C. The connector/clamp shall be designed to be corona free at the maximum rated line to ground voltage.
ix) Bushing of identical voltage rating shall be interchangeable.
x) The insulation class of high voltage neutral bushing shall be properly coordinated with the insulation class of the neutral of the low voltage winding.
xi) Each bushing shall be so coordinated with the transformer insulation that all flashover will occur outside the tank.

5.8 INTERNAL EARTHING

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

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

c) 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.
d) 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.

5.9 OIL:

All transformers shall be filled to the required level with new, unused, clean,standard mineral oil in compliance with IS 335/IEC 296 and shall be free from all traces of polychlonnated biphenyl (PCB) compounds. Test results shall be submitted

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

b)The quantity of oil required for the first filling of the transformer and its full specification shall be stated in the bid. transformer shall supplied 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.

c) 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.

d) Transformer Oil-The supplier/OEM shall ensure that the Transformer oil furnished conforms to IS:335 including amendment,if any.

5.10 RADIO INTERFERENCE:

When operated at voltages up to 10% in excess of the normal system rating,Transformers shall be substantially free from partial discharges (i.e corona discharges in either internal or external insulation) which are likely to cause Interference with radio or telephone communication.

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

5.11 CONSERVATOR

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.

5.12 OFF LOAD TAP CHANGER

a) The 3.15 MVA, 5 MVA & 8 MVA transformers shall be provided with Off-load tap changing facility .
b) The Transformer with off-load tap changing gear shall have taps ranging from +5% to -15% in 9 equal steps of 2.5% each on HV winding for voltage variation
c)The tap changing switch shall be located in a convenient position so that it can be operated from ground level. The switch handle shall be provided with locking arrangement along with tap position indication, thus enabling the switch to be locked in position

5.13 Oil Preservation Equipment

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. (Refer 5.16 for details) 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

5.14 PRESSURE RELEASE VALVE

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.

5.15: BUCHOLZ 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 abov e ground level to facilitate sampling with the transformer in serv ice. The dev ice shall be prov ided with two electrically independent potential free contracts, one for alarm on gas accumulation and the other for tripping on sudden rise of pressure.

5.16 OTI

The transformers shall be provided with a mercury 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 dev ice 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. One No electrical contact capable of operating at 5 A ac at 230 volt supply.defined temperature.

5.17 WTI

A device for measuring the hot spot temperature of the winding shall be prov ided. It shall comprise the following.

i)Temperature sensing element.
ii) Image Coil.
iii) Mercury 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.

5.18 VALVE:

a) Valves shall be of forged carbon steel upto 50mm size and of gun mental or of cast iron bodies with gunmetal 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.

b) 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 key s shall be supplied along with the valves.

c)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 OEM shall supply the same.

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

i) Drain valve so located as to completely drain the tank & to be provided with locking arrangement.
ii) Two filter valves on diagonally opposite corners of 50mm size & to be provided with locking arrangement.
iii) Oil sampling valves not less than 8mm at top and bottom of main tank & to be prov ided with locking arrangement.
iv) One 15mm air release plug.
v) Valves between radiators and tank. Drain and filter valves shall be suitable for applying vacuum as specified in the specifications.

5.19 DEHYDRATING BREATHER

A breather of suitable capacity shall be provided The beather pipe shall enter the conservator from the upper side of the conservator. Top cover of must be metalic and not of plastics, However the body of breather shall be of Polyurethane material (Transparent Type). Drawing shall be submitted with the offer.

5.20 TERMINAL CONNECTORS:

Suitable Bi metallic connectors as per IS 5561 shall be supplied with Transformer.

5.21 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, water- tight hinged and padlocked door of a suitable construction shall be prov ided 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 ty pe cooling, may be prov ided 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 prov ided with glazed window of adequate size. The transformer shall be erected on a plinth which shall be 2.5 feet above ground level.

iv) 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.

v) 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.

5.22 Fittings

The following standard fittings shall be provided.

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 gel . Breather is mounted not more than 1400 mm above rail top level.
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 abov e 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 prov ided 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 upto transformer marshalling box. The relay shall be prov ided 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 dev ice for local mounting complete in all respects. Winding temperature indicator shall have two set of contacts to operate at different settings : a) To prov ide winding temperature high alarm b) To prov ide 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 ey es 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 valv e with pad locking arrangement

xviii) Rating and connection diagram plate.

xix) Two numbers tank earthing terminals with associated nuts and bolts for connections to Employer's grounding strip. Bi-directional flagged rollers with locking and bolting dev ice.

xx) Marshalling Box (MB)

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

xxii) Cooling Accessories :

a) Requisite number of radiators provided with :- - One shut off valve on top - One shut off valve at bottom - Air release dev ice on top – Drain and sampling dev ice at bottom - Lifting lugs.

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

xxiii) Terminal marking plates for Current Transformer and Main Transformer

xxiv) Off- Load Tap Changer

xxv) Oil Preservation Equipment

xxi) Oil Temperature indicator

xxv ii) Transformer shall be supplied with all control cable,WTI & OTI, sensing cable, glands, lugs etc (complete control).

Note : 1. 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.

2. The contacts of various dev ices required for alarm and trip shall be potential free and shall be adequately

rated for continuous, making and breaking current duties as specified.

6. NAME PLATE AND MARKING RATING PLATE

A stainless steel rating plate, of at least 1 mm thickness, shall be fitted to each transformer in a visible position and shall carry all the information as specified in the standards. The letters on the rating plate shall be engraved black on the white/silver back ground.Fixing screws for outdoor use shall be of stainless steel or any other corrosion resistant metals.

Danger notice shall have red lettering on a white background or they may be pictorial as approved by TPCODL.

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 Employer's name. The name plate shall also include

(i) The short circuit rating , (ii) Measured no load current and no load losses at rated v oltage and rated frequency , (iii) measured load losses at 75° C (normal tap only), (iv) D.C resistance of each winding at 75° C.

6.2 Terminal Marking

All Transformers shall have the primary and secondary winding terminals markings plainly and indelibly marked on the transformers adjacent to the relevant terminal. Grounding terminals shall also be clearly marked.

7. TESTS:

All routine, acceptance & type tests shall be carried out in accordance with the IS 2026 relevant standrds, & TPCODL approved QAP.All routine & type tests shall be witnessed by the TPCODL/his authorized representative. All the components shall also be type tested as per the relevant standards.

Following tests shall be necessarily conducted on the Power Transformers in addition to others specified in IS/IEC standards.

7.1 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 :

1. Measurement of winding DC resistance.
2. Voltage ratio on each tapping and check of voltage vector relationship.
3. Impedance voltage at all tapings.

4. Magnetic circuit test as per relevant ISS or CBIP manual or latest standard being followed.
5. Measurement of Load losses at normal tap and extreme taps.
6. No load losses and no load current at rated voltage and rated frequency, also at 25% to 121 % of rated voltage in steps.
7. 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).
8. Induced over voltage withstand test.
9. Separate source voltage withstand test
10. Tan delta measurement and capacitance of each winding to earth (with all other windings earthed) & between all windings connected together to earth.
11. Measurement of zero sequence impedance
12. Tests on On- Load tap changer (fully assembled on transformer) as per IEC : 214/ 1976 and BS: 4571/ 1970.
13. Auxiliary circuit tests
14. Oil BDV tests
15. Measurement of neutral unbalance current which shall not exceed 2% of the full rated current of the transformer.
16. Magnetic balance test
17. Leakage test

7.2 TYPE TESTS

The transformer shall be subjected to the following type tests particularly Short circuit and Impulse withstand tests at CPRI. Before conducting the short circuit test and Impulse test, the firm will offer for both stage inspection and final inspection of the transformer by through a 3rd party agency as well as TPCODL / DISCOM at the manufacturer‟s works. If the transformer complies to the specification and offered technical parameters, the transformer will be sealed by authorized engineer(s) of TPCODL and therafter the transformer can be transported to CPRI for required type tests in presence of TPCODL‟s authorized representative(s) who will verify the seal & allow for conducting the type tests. The Type Tests shall include:-

(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.

1. Temperature Rise Test
2. Noise Level Measurement
3. Impulse Voltage Withstand Test, including Full

Waves and Chopped Waves as listed below

a) One full wave at 50% BIL;
b) One full wave at 100% BIL;
c) One chopped wave at 50% BIL
d) Two chopped waves at 100% BIL and
e) Two full waves at 100% BIL.

4. Measurement of winding resistance.
5. Measurement of voltage ratio and check of voltage vector relationship.
6. Measurement of impedance voltage / short-circuit impedance (Principal tapping) and load loss.
7. Measurement of no load loss and current.
8. Measurement of insulation resistance.
9. Dielectric Test.
10. Temperature rise for determining the maximum temperature rise after continuous full load run. The ambient temperature and time should be stated in the test certificate.
11. Short Circuit withstand test
12. Test to verify IP55 of Marshalling and cable boxes.

Note: - The tests shall be conducted at CPRI/ERDA only.

7.3 Inspection:

(i) The OEM shall carry out a comprehensive inspection and testing programme during manufacture of the transformer. This is, however, not intended to form a comprehensive programme as it is OEM"s responsibility to draw up and carry out such a programme duly approved by the TPCODL.

(ii) The OEM shall carry out type tests and routine tests on the transformers.Only one no of transformer of each rating will be subjected to type tests as per relevant IEC/IS in CPRI presence of authorized Engineer(s) of TPCODL. The charges for conducting each of type tests shall be included in the bid price and no separate type test charges shall be paid. Front page of the Type test report of same voltage class, same ratio (33/11kV) & rating (3.15MVA or higher) duly signed by the bidder is required to be scanned & upload along with the bid. However, designed transformer as per tender specification parameters to be made by the OEM at his cost. Type test

to be done designwise not packagewise.

(iii) The pre-shipment checks shall also be carried out by the OEM.

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

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

(vi) 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.

(vii) TPCODL at its discretion may use its power analyser or the power analyser of authorized testing agency for determination of no load loss, no load current, load loss and % Impedance at the works of the manufacturer and the concerned stores/Testing Laboratory of TPCODL/Any other Government approved laboratory.

i) Tank and Conservator

a) Inspection of major weld.
b) Crack detection of major strength weld seams by dye penetration test.
c) Check correct dimensions between wheels, demonstrate turning of wheels, through 900 and further dimensional check.
d) 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. (Determination of gross and net cross sectional area of the core & no. of turns/Phase.)
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) Insulating Material

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 for the bonding of the insulating paper with conductor.
e) Check and ensure that physical condition of all materials taken for windings is satisfactory and free of dust.
f) 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

a) Measurement and recording of temperature and drying time during vacuum treatment.
b) Check for completeness of drying

vii) Assembled Transformer

a) Check completed transformer against approved outline drawing, provision for all fittings, finish level etc.
b) 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 OEM 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 5 MVA)
d) Oil temperature indicators
e) Bushings
f) Bushing current transformers in neutral (If Provided)
g) Marshalling box
h) 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 OEM in accordance with relevant IS . If such requirement is purchased by the OEM on a sub-contract, he shall

have them tested to comply with these requirements

7.4 **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: a) Magnetic Circuit Test Each core shall be tested for 1 minute at 2000 Volt DC b) Oil leakage test on transformer

7.5 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 TPCODL, 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. TYPE TEST CERTIFICATES:

The Bidder shall furnish the type test certificates of the offered rating and design of transformer for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI / ERDA or as defined in 7.3 as per the relevant standards. In the event of any discrepancy in the test reports, i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to TPCODL. Type tests should have been conducted in certified Test laboratories during the period not exceeding 5 years from the date of opening the bid.

9. PRE-DISPATCH INSPECTION:

1. Bidder to raise the inspection calls for stage inspection and only after getting clearance from TPCODL shall proceed for further manufacturing. The bidder shall raise the inspection call for Final Inspection or prototype Inspection in TPCODL format.
2. If the prototype inspections asked for during drawing approval then bidder has to make one unit of transformer and raise for inspection call for stage and final for prototype inspection.
3. Equipment shall be subject to inspection by a duly authorized representative of the TPCODL.
4. Inspection may be made at any stage of manufacture at the option of the purchaser and the equipment if found unsatisfactory as to workmanship or material, the same is liable to rejection.
5. Bidder shall grant free access to the places of manufacture to TPCODL's representatives at all times when the work is in progress.
6. Inspection by the TPCODL or its authorized representatives shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specifications.
7. The BA shall ensure that 100% of the lot must be ready for inspection and atleast 10% must be ready with all mounting and accessories during inspection.
8. Material shall be dispatched only after getting MDCC (Material Dispatch Clearance Certificate) from TPCODL.
9. Following documents shall be sent along with material:
   - i) Test reports
   - ii) MDCC issued by TPCODL
   - iii) Invoice in duplicate
   - iv) Packing list
   - v) Drawings & catalogue
   - vi) Guarantee / Warrantee card
   - vii) Delivery Challan.
   - viii) Other Documents (as applicable)

10. To ascertain the quality of the transformer oil, the original manufacturer's tests report shall be submitted at the time of inspection.
11. Arrangements shall also be made for testing of transformer oil, after taking out the sample from the manufactured transformers and tested in the presence of TPCODL's representative.

12. In respect of raw material such as core stampings, winding conductors, insulating paper and oil, bidder shall use materials manufactured/supplied by standard manufacturers and furnish the manufacturers' test certificate as well as the proof of purchase from these manufacturers (excise gate pass) for information of the TPCODL.
13. The bidder shall furnish following documents along with their offer in respect of the raw materials:
    i) Invoice of supplier.
    ii) Mill's certificate
    iii) Packing List.
    iv) Bill of Landing
    v) Bill of entry certificate by custom.
14. To ensure about the quality of transformers, the inspection shall be carried out by the TPCODL's representative at following two stages:
    i) Online anytime during receipt of raw material and during manufacturing/assembly Stage.
    ii) At finished stage i.e. transformers are fully assembled and ready for dispatch.
15. Advance intimation of 7Days (Within Bhubaneswar)/12 Day (Outside Bhubaneswar) is required for both Stage and final inspections.
16. All tests and inspection shall be carried out at the place of manufacture unless otherwise specifically agreed upon by the manufacturer and TPCODL at the time of purchase.
17. The manufacturer shall offer the inspector representing the TPCODL all reasonable facilitis, without charges, to satisfy him that the material is being supplied in accordance with this specification. This will include Stage Inspection during manufacturing stage as well as Active Inspection during Acceptance Tests.
18. The stage inspection shall be done as per the approved QAP
19. During the stage inspection a few assembled core coil and assembled Tanked transformer shall be dismantled (only in case of CRGO material) to ensure that the CRGO laminations, Windings and workmanship are of good quality. TPCODL also reserves the right to review any document or certificates related to material, manufacturing process, quality checks at any point of stage inspection.
20. TPCODL also reserves the right to inspect the tank of transformer before surface preparation and painting. The same shall be informed to TPCODL accordingly.
21. Final inspection Call for carrying out acceptance tests as per relevant IS/IECs shall be sent by the Bidder along with routine test certificates.

22. The bidder shall provide all services to establish and maintain quality of workmanship in his works and that of his sub-OEMs to ensure the mechanical / electrical performance of components, compliance with drawings, identification and acceptability of all materials, parts and equipment as per latest quality standards of ISO 9000.
23. The TPCODL has the right to have the test carried out at his own by an independent agency wherever there is a dispute regarding the quality supplied. Also TPCODL has right to test 1% of the supply selected either from the stores or field to check the quality of the product. In case of any deviation TPCODL have every right to reject the entire lot or penalize the bidder, which may lead to blacklisting, among other things.
24. At the time of inspection the material should be ready as specified, In case of material non-readiness or material failure in acceptance, Cost of re-inspection shall be borne by bidder.

10. INSPECTION AFTER RECEIPT AT STORE/SITE:

The Engineer authorized from TPCODL along with the BA/client'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.

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.

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.

11. GUARANTEE:

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under the contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of 48 months from the date of commissioning or 60 months from the date of last supplies made under the contract, whichever is earlier.

Bidder shall be liable to undertake to replace/rectify such defects at his own costs within mutually agreed timeframe and to the entire satisfaction of the TPCODL, failing which the TPCODL will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the TPCODL's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be.

In case of Distribution transformer fails within the guarantee period TPCODL will immediately inform the Bidder who shall take back the failed Distribution Transformer within 15 days from the date of intimation at his own cost and replace / repair the transformer within forty five days of date of intimation with a roll over guarantee. The outage period i.e. period from the date of failure till unit is repaired / replaced shall not be counted for arriving at the guarantee period.

Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser

12. PACKING AND TRANSPORT:

Supplier shall ensure that all material covered by this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

Transformers shall be delivered filled with oil and supplied with all accessories mounted. Screws and bolts shall be thoroughly tightened to ensure no leakage of oil.

13. TENDER SAMPLE:

All offered transformer detailed documents to be submitted as per clause no.18. The sample shall be not applicable

14. QUALITY CONTROL:

The bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. TPCODL's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

The following information shall necessarily be submitted with the bid:

1. List of important raw materials, names of sub-suppliers for raw materials, standards to which raw material is tested and the copies of test reports of the tests carried out on raw materials in presence of Bidder's representatives.

2. List of manufacturing facilities available, level of automation achieved and the areas where manual process exists.
3. List of areas in manufacturing process where stage inspections are normally carried out for quality control and details of these tests and inspections
4. List of testing equipment for final testing with valid calibration reports. Manufacturer shall possess 0.1 class instruments for measurement of losses.
5. QAP withhold points for TPCODL inspection.

15. TESTING FACILITIES:

Supplier/ Manufacturer shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests and predispatch inspectionsas per relevant Indian standards.

16. MANUFACTURING FACILITIES:

The successful bidder will have to submit (after placement of RC) technical compliance document and drawing of each part along with CCA, breather, bushings, terminal box etc. as per RC line items to be submitted for getting approval before mass manufacturing.

The first time supplier will have to make one prototype sample of each line tem of RC as per CAT-B approved drawing within 30 days of drawing approval. Inspection call to be raised by bidder before 7 days of date of proposed inspection. TPCODL shall arrange inspectors and intimate or confirm the date. Any observation during inspection shall have to be addressed within 7 days and revised improved drawing & technical details to be shared to TPCODL for final approval.

Manufacturing mass quantity to start only after getting CAT-A approved drawings or as per intimation from TPCODL.

17. SPARES, ACCESSORIES AND TOOLS

Bidder shall give an assurance that the reparability of transformer is ensured by using standard spare parts and accessories available in market in India.

18. DRAWINGS AND DOCUMENTS:

Following drawings and documents shall be prepared based on TPCODL specifications and statutory requirements and shall be submitted with the bid:

1. Completely filled in compliance to each clause of Technical Specification and any Additional Details and Fittings.
2. Description of the transformer and all components drawings.
3. General arrangement for Transformer.

4. LV terminal box drawing along with CT if applicable and cleat arrangement and gland plate drawing.
5. Bill of material.
6. Design calculation details of transformer losses, cooling, efficiency and current density, weight of coils and components.
7. Experience Certificate and list
8. Type test certificates.
9. List of makes of major components as listed above.

Drawings / documents to be submitted for approval after the award of the order within 7 days before mass manufacturing are as under:

List of Drawings/Parameters to be submitted:

1. Technical Parameters as asked in Specification (General Technical Particulars, General Technical Requirements, Additional Details, Fittings, Type test Reports and Routine test certificates of bought out accessories).
2. General Arrangement Drawing of the Transformer (Front view, Top view and both sides view. Complete list of fittings to be displayed and quantities to be mentioned with the drawing).
3. Internal Core arrangement drawing.
4. Internal Core-coil assembly drawing.
5. Foundation Plan drawing.
6. Marking plates and Markings (as mentioned in clause 6)
7. HV and LV bushings drawing (with internal view and metal parts)
8. HT connector, LT connector (palm connector), Aluminum Busbar
9. HV and LV Box drawing.
10. Gland Plate for HV/LV box.
11. Conservator drawing.
12. Prismatic oil level gauge drawing.
13. Silica Gel Breather drawing.
14. Auxiliary Terminal Box drawing with internal wiring arrangement.
15. Gland plate of drawing
16. BH curve & Loss/Kg graph of core material offered.
17. The tightening torque chart to be provided for all bolts used in specific rating.
18. Type Test Certificates.
19. Installation/ Mounting Instructions/Drawing.
20. Efficiency vs Load curve of the offered design.
21. Quality Assurance plan.

List of Calculations to be submitted:

1. All the calculations shall be step by step showing the use of formulas and other practical considerations. **Concise calculations in table or excel sheet shall not be accepted.** Also, the reference (only standard sources as IS, IEC or any such standard is acceptable) of the formulas shall be mentioned.
2. Resistance Calculation (75 deg. C)
3. Load Losses Calculation (at 75 deg. C)
4. No load Losses.
5. Stray Losses.
6. Weight of Copper (Bare and with Insulation also).
7. Weight of Core.
8. Flux Density calculations.
9. Current Density Calculations.
10. Short Circuit withstand.

11. Temperature Rise Calculations.
12. Conservator Volume calculations
13. Cooling Calculations showing cooling with tank and radiators separately with no. of radiators and fins mentioned specifically (For both Mineral oil and Ester oil)
14. Calculation sheet for Lifting lug design and mounting lug design to be submitted by Bidder.

Additional Documents to be submitted :

a. List of raw materials as well as bought out accessories and name of sub-suppliers selected from those furnished along with offer.
b. Type test certificates of the raw materials and bought out accessories.
c. The successful Bidder shall submit the **routine test certificates of bought out accessories** and central excise passes for raw material at the time of routine testing.

All the documents & drawings shall be in English language. After the receipt of the order, the successful bidder will be required to furnish all relevant drawings/parameters/calculation to TPCODL for approval.

Instruction Manuals:

Bidder shall furnish softcopies of nicely bound manuals (In English language) covering erection and maintenance instructions and all relevant information and drawings pertaining to the main equipment as well as auxiliary devices.

19. SCHEDULE- "A" GUARANTEED TECHNICAL PARTICULARS:

TECHNICAL REQUIREMENTS OF POWER TRANSFORMER		
1	Rated MVA of Transformer (ONAN rating)	**3.15MVA**
2	No. of Phases	3
3	Type of Installation	Outdoor
4	Frequency	50 Hz (- 5% to +3%)
5	Cooling medium	Insulating Oil (ONAN)
6	Type of mounting	On Wheels, Mounted on rails.
7	Rated voltage	
	a) High Voltage Winding	33 kV
	b) Low Voltage Winding	11 kV
8	Highest continuous system Voltage	
	a) Maximum system Voltage ratio (HV / LV)	36 kV/ 12 kV
	b) Rated Voltage ratio (HV / LV)	33 kV/ 11 kV
9	No. of windings	Two winding Transformers
10	Type of cooling	ONAN (Oil natural & Air natural)
11	MVA Rating corresponding to ONAN cooling system	100%
12	Method of connection:	
	HV:	Delta

	LV:	Star
13	Connection symbol	Dyn 11
14	System earthing	Neutral of LV side to be solidly earthed.
15	Percentage impedance voltage on Normal tap and MVA base at 75^0C corresponding to HV/ LV rating and applicable tolerances :	**% Impedance for 3.15 MVA - 6.25%,** (Tolerance +10%) (No negative tolerance will be allowed)
16	Intended regular cyclic overloading of windings	As per IEC –76-1, Clause 4.2
17	a) Anticipated unbalanced loading	Around 10%
	b) Anticipated continuous loading of windings (HV / LV)	110 % of rated current
18	Type of tap changer	OFF load in 3.15, 5,8 MVA transformer
	Range of taping	+ 5% to – 15% in 8 equal steps of 2.5% each on HV winding, 9 tap positions. Tap No 3 wil be the Principal tap position.
19	Neutral terminal to be brought out	On LV side only
20	Over Voltage operating capability and duration	112.5 % of rated voltage (continuous)
21	Maximum Flux Density in any part of the core and yoke at rated MVA, rated voltage	**1.5 Tesla**
	i.e 33kV / 11kV and system frequency of 50 Hz	
22	Insulation levels for windings :-	**33 kV** **11 kV**
	a) 1.2 / 50 microsecond wave shape Impulse withstand (KVP)	170 95
	b) Power frequency voltage withstand (KVrms)	70 28
23	Type of winding insulation	
	a) HV winding	Uniform
	b) LV winding	Uniform
24	Withstand time for three phase short circuit	As per IS
25	Noise level at rated voltage and frequency	As per NEMA Publication No. TR-1.

26	Permissible Maximum Temperature Rise over ambient temperature of 50^0 C	
	a) Of top oil measured by thermometer.	35^0 C
	b) Of winding measured by resistance.	40^0 C
	c)Hot Spot Temperature rise	54^0 C
27	Minimum clearances in air (mm) :-	Phase to Phase Phase to ground
	a) HV	400 320
	b) LV	280 140
28	Terminals :-	
	a) HV winding line end	36kV oil filled communicating type porcelain bushings (Antifog type)
	b) LV winding	17.5 kV porcelain type of bushings (Antifog type)
29	Insulation level of Bushing :-	HV LV
	a) Lightning Impulse withstand (KVP)	170 95
	b) 1 Minute Power Frequency withstand voltage (KV-rms)	70 28
	c) Creepage distance (mm) (minimum)	900 300
30	Material of HV & LV Conductor	Electrolytic Copper
31	Maximum current density for HV and LV winding for rated current at normal tap	2.4 A/ mm2
32	Polarisation Index i.e ratio of Megger values at 600 sec. to 60 sec for HV to earth, L.V to earth and HV to LV	Shall be greater than or equal to 1.5, but less than or equal to „5".
33	Core Assembly	Boltless type
34	Temperature Indicator	
	a) Oil	One number
	b) Winding	One number
35	Maximum permissible no load loss at rated voltage and rated frequency.	3.15MVA-3.0 KW (Maximum)
36	Maximum permissible load loss at rated current,at normal tap and at 75^0 C	3.15MVA-17.0 KW (Maximum)
37	Paper Covering thickness of HV Winding Conductor	0.6 mm(minimum)
38	Paper Covering thickness of LV Winding conductor	0.5 mm(minimum)
39	Clearances:-	

	a) Gap between HV Coil to the inside of the tank on the longer side	65 mm(minimum)
	b) Gap between HV Coil to the inside of the tank on the width side (LV Side)	65 mm(minimum)
	c) Gap between HV Coil to the inside of the tank on the width side (HV Side to accommodate delta and tapping leads)	115 mm(minimum)
	d) Gap between Core yoke to tank bottom	55 mm(minimum)
	e) Yoke insulation at top and bottom	130 mm(minimum)
	f) Phase to Phase clearance between HV Limbs	20 mm(minimum)
	g) Radial Clearance between LV and HV Coil	20 mm(minimum)
	h) Radial Clearance between Core to LV Coil	12.5 mm(minimum)
40	The difference of Ampere Turns at each location shall not be more than 5 % at all percentages of tappings	
41	Winding to winding clearance should have minimum 20% of sum of pressboard Cylinder/Barrier.	
42	Tap changing gear:-	
(i)	Type-	In Tank,High Speed Resistor Type
(ii)	Provided on	HV Side
(iii)	Tap range	-15% to +5%
(iv)	Tap Step	2.5% of 33kV (8 equal steps)
(v)	Minimum Rated current	For 3.15 MVA-100A
(vi)	Minimum Rated short circuit current	3KA
(vii)	Automatic control required	YES
(viii)	Remote Control Panel required	YES
(ix)	Marshalling kiosk required	YES
43.	Minimum Air core reactance of HV winding	20%
44.	Type of oil preservation	Air-cell type

20. SCHEDULE "B" DEVIATIONS:

(TO BE ENCLOSED WITH TECHNICAL BID)

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications:

SL. No	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those detailed above.

Seal of the Company:

Signature

Designation