

Volume – I

Tender Notification for

**SUPPLY OF 31.5 MVA, 66/11 kV POWER
TRANSFORMER ALONG WITH NIFPS**

CMC/BR/20-21/SV/RS/RJ/890

Due Date for Submission of Bids: 29.01.2021

**BSES RAJDHANI POWER LTD (BRPL)
BSES Bhawan, Nehru Place, New Delhi-110019
Corporate Identification Number: U74899DL2001PLC111527
Telephone Number: +91 11 3009 9999
Fax Number: +91 11 2641 9833
Website: www.bsedelhi.com**

Section – I

REQUEST FOR QUOTATION

Tender Notification: CMC/BR/20-21/SV/RS/RJ/890

**Procurement of 31.5 MVA, 66/11 kV Power Transformer
along with NIFPS**

INDEX

	Page No.
SECTION – I: REQUEST FOR QUOTATION	04
SECTION – II: INSTRUCTIONS TO BIDDER	09
SECTION – III: GENERAL CONDITIONS OF CONTRACT	17-25
1.0 GENERAL INSTRUCTIONS	17
2.0 DEFINITION OF TERMS	18
3.0 CONTRACT DOCUMENTS & PRIORITY	18
4.0 SCOPE OF SUPPLY – GENERAL	19
5.0 QUALITY ASSURANCE AND INSPECTION	19
6.0 PACKING, PACKING LIST & MARKING	20
7.0 PRICE BASIS FOR SUPPLY OF MATERIALS	20
8.0 VARIATION IN TAXES, DUTIES & LEVIES	20
9.0 TAXES & DUTIES ON RAW MATERIALS & BOUGHT OUT COMPONENTS	21
10.0 TERMS OF PAYMENT AND BILLING	21
11.0 PRICE VALIDITY	20
12.0 PERFORMANCE GUARANTEE	21
13.0 FORFEITURE	21
14.0 RELEASE	22
15.0 DEFECTS LIABILITY PERIOD	22
16.0 RETURN, REPLACEMENT OR SUBSTITUTION	22
17.0 EFFECTIVE DATE OF COMMENCEMENT OF CONTRACT	22
18.0 TIME – THE ESSENCE OF CONTRACT	22
19.0 THE LAWS AND JURISDICTION OF CONTRACT	22
20.0 EVENTS OF DEFAULT	22
21.0 CONSEQUENCES OF DEFAULT	23
22.0 PENALTY FOR DELAY	23
23.0 FORCE MAJEURE	23
24.0 TRANSFER AND SUB-LETTING	24
25.0 RECOVERIES	25
26.0 WAIVER	25
27.0 INDEMNIFICATION	25
SECTION – IV: QUANTITY AND DELIVERY REQUIREMENT	26
SECTION – V: TECHNICAL SPECIFICATION OF POWER TRANSFORMER	27

SECTION – I: REQUEST FOR QUOTATION

1.0 Event Information

1.01 BRPL invites sealed tenders for supply of Lithium Ion Battery from the manufacturers. The bidder must qualify the technical requirements as specified in clause 2.0 stated below. The sealed envelopes shall be duly super scribed as — **“BID FOR SUPPLY OF 31.5 MVA, 66/11 KV POWER TRANSFORMER ALONGWITH NIFPS FOR VARIOUS SITES OF BRPL ,TENDER NOTICE CMC/BR/20-21/SV/RS/RJ/890 DUE FOR SUBMISSION ON DT. 29.01.2021”**.

Sl. No.	Item Description	Specification	Requirement	Estimated Cost
			Total Qty.	
BRPL, DELHI				
1	31.5 MVA, 66/11 kV , Power Transformer along with NIFPS	SECTION V	05 Nos.	11.00 Crs

Note: Quantity may vary to any extent of +/- 30% of above mentioned total quantity.

1.02 The schedule of specifications with detail terms & conditions can be obtained from address given below against demand draft/Pay Order of **Rs.1180/- with GST-**, drawn in favour of **BSES RAJDHANI POWER LTD**, payable at New Delhi. The sale of tender documents will be issued from **06.01.2021** onwards on all working days upto **20.01.2021**. The tender documents can also be downloaded from the website **“www.bsesdelhi.com”**.

In case tender papers are downloaded from the above website, then the bidder has to enclose a demand draft covering the cost of bid documents as stated above in a separate envelope with suitable superscription —**“Cost of Bid Documents: Tender Notice Ref: CMC/BR/20-21/SV/RS/RJ/890”**.This envelope should accompany the Bid Documents.

1.03 Offers will be received upto **1530 Hrs. on dt. 29.01.2021** as indicated earlier and will be opened at the address given below dt. **29.01.2021 at 1600 Hrs.** in the presence of authorized representatives of the bidders. The schedule of specifications with detail terms & conditions are enclosed. It is the sole responsibility of the bidder to ensure that the bid documents reach this office on or before the due date.

**HEAD OF THE DEPARTMENT, 1st FLOOR, ‘C’ BLOCK,
CONTRACTS & MATERIALS DEPARTMENT, BSES RAJDHANI POWER LTD,
BSES BHAWAN,
NEHRU PLACE, NEW DELHI-110019.**

1.04 BRPL reserves the right to accept/ reject any or all Tenders without assigning any reason thereof and alter the quantity of materials mentioned in the Tender documents at the time of placing purchase orders. Tender will be summarily rejected if:

- i) Earnest Money Deposit (EMD) @ 1% (One percent) of the Tender value i.e. **Rs. 11,00,000/-** is not deposited in shape of Bank Draft in favour of BSES RAJDHANI POWER LTD, payable at New Delhi or Bank Guarantee executed on favour of BSES RAJDHANI POWER LTD.
- ii) The offer does not contain “FOR, NEW DELHI price indicating break-up towards all taxes & duties”.
- iii) Complete Technical details are not enclosed.
- iv) Tender is received after due time due to any reason.

1.05 BRPL reserves the right to reject any or all bids or cancel/ withdraw the invitation for bids without assigning any reason whatsoever and in such case no bidder/ intending bidder shall have any claim arising out of such action time of placing purchase orders.

2.0 Qualification Criteria:-

The prospective bidder must qualify all of the following requirements to be eligible to participate in the bidding. Bidders who meet following requirements will be considered as successful bidder and management has a right to disqualify those bidders who do not meet these requirements.

- 1) The bidders must have the manufacturing/Assembly base in India for Power transformer of similar rating or higher ratings .The Bidder must Posses their own type tested design on similar or higher rating – (Short Circuit, Impulse Test & Temperature Rise) carried out at CPRI/ERDA with in last 5 Years for offered ratings or above. In case type test reports are older than five (5) years from the date of bid opening, bidder shall submit the undertaking that there is “since the last type test, the product has not undergone any change in design and the materiel used and the dimensions of the product are the same as the one on which the type test was conducted”.

Non submission of type test reports will lead to rejection of the offer. Type test older than Ten (10) years shall not be acceptable and bid is liable for rejection.

- 2) The bidder shall have servicing , repairing, testing & refurbishment facility in INDIA with necessary spares and testing equipment for providing prompt after sales service for Power Transformer. Details of the set-up available shall be brought out in the offer, failing which the offer will be rejected. The bidder shall submit undertaking along with the bid confirming compliance to qualifying criteria for bidder.
- 3) The Bidder should have supplied 20 Nos or more of 31.5 MVA or above (66 KV or higher voltage class) in last 5 years from the date of bid opening.

- 4) The bidder should have performance certificates for 2 years satisfactory performance from at least 2 reputed companies for transformers of similar rating and higher rating.
- 5) The bidder should have qualified technical and QA personnel at various stages of Manufacture & testing. The bidder shall submit undertaking with organization chart along with the bid confirming compliance to qualifying criteria for bidder.
- 6) Bidder should have Average Annual Sales Turnover of Rs 150 Crores or more in last 3 financial Years from the date of Bid opening
- 7) BRPL reserves the right to assess the capabilities/Installed capacity.
- 8) The bidder must possess valid ISO 9001:2015 certification
- 9) The Bidder shall submit an undertaking “No Litigation” is pending for the company and in case of any running litigation details and value to be provided.
- 10) An undertaking (self-certificate) that the bidder has not been blacklisted/debarred by any central/state government institution including electricity utilities
- 11) The bidder must have valid PAN No., GST Registration Number, in addition to other statutory compliances. The bidder must submit the copy of registrations and submit an undertaking that the bidder shall comply all the statutory compliances as per the laws/rules etc. before the start of the work.

3.0 Bidding and Award Process

Bidders are requested to submit their questions regarding the RFQ or the bidding process after review of this RFQ. BRPL response to the questions raised by various bidders will be distributed to all participating bidders through website.

a. Time schedule of the bidding process

The bidders on this RFQ package should complete the following within the dates specified as under:

S.No.	Steps	Activity description	Due date
1	Technical Queries	All Queries related to RFQ	On or before 25.01.2021 1500 Hrs.

2	Technical Offer	Documentary evidence in support of qualifying criteria. Technical Literature/ GTP/ Drawings/ Type test report, if any, etc., Testing facilities, any other relevant document, acceptance to commercial terms & conditions viz. delivery Schedule/ Period, Payment terms, PBG etc. Quality assurance plan, Deviation from the specification, list of plant & machinery and testing equipments Unpriced items.	29.01.2021, 1530 Hrs
3	Commercial Offer	Prices for Power Transformer and Break up regarding basic price and taxes. Delivery commitment	29.01.2021, 1530 Hrs
4	Opening of technical bid	As per RFQ	29.01.2021, 1600 Hrs

This is a two part bid process. Bidders are to submit the bids (a) Technical Bid (b) Price Bid. Both these parts should be furnished in separate sealed covers superscribing with specification no., validity etc, with particulars as **Part-I “Technical Particulars & Commercial Terms & Conditions”** and **Part-II “Financial bid“** and these sealed envelopes should again be placed in another sealed cover which shall be submitted before the due date & time specified.

Bidders are requested to submit the bid in one original plus one copy in duplicate.

- **The Part-I (Technical Bid)** - Technical Bid should not contain any cost information whatsoever. In case of Bids where the qualification requirements, technical suitability and other requirements are found to be inadequate, Part-II “Financial Bid” will be returned unopened.
- **The Part-II (Financial Bid)** - Qualified bidders will be intimated after technical evaluation of all the bids is completed. The date and time of same shall be intimated in due course to the qualified bidders. Notwithstanding anything stated above, the Purchaser reserves the right to assess bidder’s capability to perform the contract, should the circumstances warrant such assessment in the overall interest of the purchaser. In this regard the decision of the purchaser is final.

4.0 Award Decision

Purchaser intends to award the business on a lowest bid basis, so suppliers are encouraged to bid competitively. The decision to place purchase order / letter of acceptance solely depends on purchaser on the cost competitiveness across multiple lots, quality, delivery and bidder’s capacity, in addition to other factors that Purchaser may deem relevant.

The purchaser reserves all the rights to award the contract to one or more bidders so as to meet the delivery requirement or nullify the award decision without any reason.

BSES reserves the right to split the tender quantity amongst techno commercially qualified bidders on account of delivery requirement in tender, quantity under procurement etc.

Splitting of tender quantity amongst more than one bidder shall be governed by below mentioned guidelines:

- If the quantity is to be split among 2 bidders, it will be done in the ratio of 70:30 on L1 price.
- If the quantity is to be split among 3 bidders, it will be done in the ratio of 60:25:15 on L1 price.
- In case quantity needs to be distributed and order splitting is required, distribution of quantity shall be maximum among three (3) bidders.

In the event of your bid being selected by purchaser (and / or its affiliates) and your subsequent DEFAULT on your bid; you will be required to pay purchaser (and / or its affiliates) an amount equal to the difference in your bid and the next lowest bid on the quantity declared in RFQ.

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

Quantity Variation: The purchaser reserves the rights to vary the quantity by +/- **30%** of the tender quantity.

Repeat Order: BRPL reserves the right to place repeat order at the same rates & terms and conditions as per this tender against additional requirement subject to mutual agreement between BRPL & supplier.

5.0 Market Integrity:

We have a fair and competitive marketplace. The rules for bidders are outlined in the Terms & Conditions. Bidders must agree to these rules prior to participating. In addition to other remedies available, we 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 Terms & Condition. Bidders who violate the marketplace rules or engage in behavior that disrupts the fair execution of the marketplace restricts a bidder to 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 the terms of the published in Request For Quotation.

6.0 Supplier Confidentiality

All information contained in this RFQ is confidential and may not be disclosed, published or advertised in any manner without written authorization from BRPL. This includes all bidding information submitted.

All RFQ documents remain the property of BRPL and all suppliers are required to return these documents to BRPL upon request.

Suppliers who do not honor these confidentiality provisions will be excluded from participating in future bidding events.

7.0 Contact Information

All communication as regards this RFQ shall be made (i) in English, (ii) in writing and (iii) sent by mail, facsimile to:

	Technical	Commercial
Contact Name	Mr. Sheshadri Krishnapura Copy to Mr. Robin Sebastian	Mr. Robin Sebastian
Address	BSES RAJDHANI POWER LTD, 2nd Floor, B Block, Nehru Place, New Delhi – 110019	C&M Deptt. 1st floor, D- Block, BSES Rajdhani Power Limited, BSES Bhawan, Nehru Place, New Delhi -110019
Email-ID	sheshadri.krishnapura@relianceada.com	robin.sebastian@relianceada.com

SECTION – II

INSTRUCTION TO BIDDERS (ITB)

**31.5 MVA, 66/11 kV Power Transformers Along with
NIFPS**

CMC/BR/20-21/SV/RS/RJ/890

A. GENERAL

1.00 BSES Rajdhani power Ltd, hereinafter referred to as the Purchaser are desirous of implementing the various Systems Improvement/Repair & Maintenance works at their respective licensed area in Delhi. The Purchaser has now floated this tender for procurement of 31.5 MVA, 66/11 kV Power Transformer as notified earlier in this bid document.

2.00 SCOPE OF WORK

The scope shall include Design, Manufacture, Testing at works conforming to the Technical Specifications enclosed along with Packing, Forwarding, Freight and Unloading and proper stacking at Purchaser's stores.

3.00 DISCLAIMER

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

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

3.03 Though adequate care has been taken while issuing the Bid document, the Bidder should satisfy itself that Documents are complete in all respects. Intimation of any discrepancy shall be given to this office immediately.

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

4.00 COST OF BIDDING

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

B BIDDING DOCUMENT

5.00 BIDDING DOCUMENTS

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

Volume –I

- a) Request for Quotation (RFQ) - Section – I
- b) Instructions to Bidders (ITB) - Section – II
- c) General Conditions of Contract - Section - III
- d) Quantity and delivery requirement - Section –IV
- e) Technical Specifications (TS) - Section –V

Volume – II

- a) Bid Form - Annexure – I
- b) Bid Format - Annexure – II
- c) Price Schedule - Annexure – III
- d) Commercial Terms & Conditions - Annexure - IV
- e) No Deviation Sheet - Annexure - V
- f) Qualification Criterion - Annexure - VI

5.02 The Bidder is expected to examine the Bidding Documents, including all Instructions, Forms, Terms and specifications. Failure to furnish all information required by the Bidding documents or submission of a Bid not substantially responsive to the Bidding Documents in every respect will may result in the rejection of the Bid.

6.00 AMENDMENT OF BIDDING DOCUMENTS

6.01 At any time prior to the deadline for submission of Bids, the Purchaser may for any reasons, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by Amendment.

6.02 The Amendment shall be part of the Bidding Documents, pursuant to Clause 5.01, and it will be notified in writing by Fax/e-mail to all the Bidders who have received the Bidding Documents and confirmed their participation to Bid, and will be binding on them.

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

C PREPARATION OF BIDS

7.00 LANGUAGE OF BID

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

8.00 DOCUMENTS COMPRISING THE BID

The Bid prepared and submitted by the Bidder shall comprise the following components:

- a) Bid Form ,Price & other Schedules (STRICTLY AS PER FORMAT)and Technical Data Sheets completed in accordance with Clause 9.0, 10.0, 11.0 and Technical Specification;
- b) All the Bids must be accompanied with the required EMD as mentioned in the Section-I against each tender.
- c) Power of Attorney or Authorization letter indicating that the person(s) signing the Bid have the authority to sign the Bid and thus that the Bid is binding upon the Bidder during the full period of its validity, in accordance with clause 12.0.

9.00 BID FORM

9.01 The Bidder shall complete an “Original” and another one “Copy” of the Bid Form and the appropriate Price & Other Schedules and Technical Data Sheets.

9.02 EMD

Pursuant to Clause 8.0(b) above, the bidder shall furnish, as part of its bid, a EMD amounting to 1% of the total bid value (FOR Destination) i.e. Rs. **11,00,000/-**. The EMD is required to protect the Purchaser against the risk of Bidder’s conduct which would warrant the security’s forfeiture.

The EMD shall be denominated in the currency of the bid, and shall be in the following form:

- a) A bank guarantee issued by any scheduled bank strictly as per the form at enclosed and shall be valid for a period of thirty (30) days beyond the validity of the bid.
- b) Bank Draft in favour of BSES RAJDHANI POWER LTD, payable at New Delhi.

Unsuccessful bidders’ EMD will be discharged or returned as promptly as possible as but not later than thirty (30) days after the expiration of the period of bid validity.

The successful bidder’s EMD will be discharged upon furnishing the performance security. The EMD may be forfeited:

- a) If the Bidder:
 - i) Withdraws its bid during the period of bid validity specified by the Bidder in the Bid Form; or
- b) in the case of a successful Bidder, if the Bidder fails:
 - i) to sign the Contract, or
 - ii) to furnish the required performance security.

10.00 BID PRICES

10.01 Bidders shall quote for the entire Scope of Supply with a break-up of prices for individual items. The total Bid Price shall also cover all the Supplier's obligations mentioned in or reasonably to be inferred from the Bidding Documents in respect of Design, Supply, Transportation to site, all in accordance with the requirement of Bidding Documents. The Bidder shall complete the appropriate Price Schedules included herein, stating the Unit Price for each item & total Price.

10.02 The prices offered shall be inclusive of all costs as well as Duties, Taxes and Levies paid or payable during execution of the supply work, breakup of price constituents, should be there. Prices quoted by the Bidder shall be—Firm “and not subject to any price adjustment during the performance of the Contract. A Bid submitted with an adjustable price quotation will be treated as non-responsive and rejected.

11.00 BID CURRENCIES

Prices shall be quoted in **Indian Rupees (INR) only**.

12.00 PERIOD OF VALIDITY OF BIDS

12.01 Bids shall remain valid for **120 days** post bid date.

12.02 Notwithstanding Clause 12.01 above, the Purchaser may solicit the Bidder's consent to an extension of the Period of Bid Validity. The request and the responses thereto shall be made in writing by Fax/e-mail.

13.00 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 of Clause 22.03 & 22.04 regarding the rejection of Bids, which are not substantially responsive to the requirements of the Bidding Documents.

14.00 FORMAT AND SIGNING OF BID

14.01 The original Bid Form and accompanying documents (as specified in Clause 9.0), clearly marked "Original Bid", plus one copy must be received by the Purchaser at the date, time and place specified pursuant to Clauses 15.0 and 16.0. In the event of any discrepancy between the original and the copies, the original shall govern.

14.02 The original and copy of the Bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to sign on behalf of the Bidder. Such authorization shall be indicated by written Power-of-Attorney accompanying the Bid.

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

D SUBMISSION OF BIDS**15.0 SEALING AND MARKING OF BIDS**

- 15.01 Bid submission: One original & one Copy (hard copies) of all the Bid Documents shall be sealed and submitted to the Purchaser before the closing time for submission of the bid.
- 15.02 The Technical Documents and the EMD shall be enclosed in a sealed envelope and the said envelope shall be superscribed with —**Technical & EMD**. The Financial bid shall be inside another sealed envelope with superscription — **Financial Bid**. Both these envelopes shall be sealed inside another big envelope. All the envelopes should bear the Name and Address of the Bidder and marking for the Original and Copy. The envelopes should be superscribed with —**“Tender Notice No, Due date of submission, Tender opening date”**.
- 15.03 The Bidder has the option of sending the Bids in person. Bids submitted by Telex/ Telegram/ Fax will not be accepted. No request from any Bidder to the Purchaser to collect the proposals from Airlines/Cargo Agents etc shall be entertained by the Purchaser.

16.0 DEADLINE FOR SUBMISSION OF BIDS

- 16.01 The original Bid, together with the required copies, must be received by the Purchaser at the address specified not later than **1530 HRS on 29.01.2021**.
- 16.02 The Purchaser may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Documents in accordance with Clause 9.0, in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended.

17.0 ONE BID PER BIDDER

Each Bidder shall submit only one Bid. A Bidder who submits or participates in more than one Bid will cause all those Bids to be rejected.

18.00 LATE BIDS

Any Bid received by the Purchaser after the deadline for submission of Bids prescribed by the Purchaser, pursuant to Clause 16.0, will be declared "Late" and rejected and returned unopened to the Bidder.

19.00 MODIFICATIONS AND WITHDRAWAL OF BIDS

- 19.01 The Bidder is not allowed to modify or withdraw its Bid after the Bid's submission.

E. EVALUATION OF BID**20.00 PROCESS TO BE CONFIDENTIAL**

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

21.00 CLARIFICATION OF BIDS

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

22.00 PRELIMINARY EXAMINATION OF BIDS / RESPONSIVENESS

- 22.01 Purchaser 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.
- 22.02 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.
- 22.03 Prior to the detailed evaluation, Purchaser 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.
- 22.04 Bid determined as not substantially responsive will be rejected by the Purchaser and/or the Purchaser and may not subsequently be made responsive by the Bidder by correction of the non-conformity.

23.0 EVALUATION AND COMPARISON OF BIDS

- 23.01 The evaluation of Bids shall be done based on the delivered cost competitiveness basis.
- 23.02 The evaluation of the Bids shall be a stage-wise procedure. The following stages are identified for evaluation purposes: In the first stage, the Bids would be subjected to a responsiveness check. The Technical Proposals and the Conditional ties of the Bidders would be evaluated. Subsequently, the Financial Proposals along with supplementary Financial Proposals, if any, of Bidders with Techno-commercially Acceptable Bids shall be considered for final evaluation.
- 23.03 The Purchaser's evaluation of a Bid will take into account, in addition to the Bid price, the following factors, in the manner and to the extent indicated in this Clause:

- (a) Supply Schedule
- (b) Deviations from Bidding Documents

Bidders shall base their Bid price on the terms and conditions specified in the Bidding Documents. The cost of all quantifiable deviations and omissions from the specification, terms and conditions specified in Bidding Documents shall be evaluated. The Purchaser will make its own assessment of the cost of any deviation for the purpose of ensuring fair comparison of Bids.

- 23.04 Any adjustment in price, which results from the above procedure, shall be added for the purposes of comparative evaluation only to arrive at an "Evaluated Bid Price". Bid Prices quoted by Bidders shall remain unaltered.

F. AWARD OF CONTRACT

24.0 CONTACTING THE PURCHASER

- 24.01 From the time of Bid submission to the time of contract award, if any Bidder wishes to contact the Purchaser on any matter related to the Bid, it should do so in writing.
- 24.02 Any effort by a Bidder to influence the Purchaser and/or in the Purchaser's decisions in respect of Bid evaluation, Bid comparison or Contract Award, will result in the rejection of the Bidder's Bid.

25.0 THE PURCHASER 'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS

The Purchaser reserves the right to accept or reject any Bid and to annul the Bidding process and reject all Bids at anytime prior toward of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Purchaser's action.

26.0 AWARD OF CONTRACT

The Purchaser will award the Contract to the successful Bidder whose Bid has been Determined to be the lowest-evaluated responsive Bid, provided further that the Bidder has been determined to be qualified to satisfactorily perform the Contract. Purchaser reserves the right to award order other bidders in the tender, provided it is required for progress of project & provided he agrees to come to the lowest rate.

27.0 THE PURCHASER'S RIGHT TO VARY QUANTITIES

The Purchaser reserves the right to vary the quantity i.e. increase or decrease the numbers/quantities without any change in terms and conditions during the execution of the Order.

28.0 LETTER OF INTENT/ NOTIFICATION OF AWARD

The letter of intent/ Notification of Award shall be issued to the successful Bidder whose bids have been considered responsive, techno-commercially acceptable and evaluated to be the lowest (L1). The successful Bidder shall be required to furnish a letter of acceptance within 7 days of issue of the letter of intent /Notification of Award by Purchaser.

29.0 PERFORMANCE BANK GUARANTEE

The successful Bidder shall furnish the Performance Bank Guarantee for an amount of 10% (Ten percent) of the Contract Price in accordance with the format provided. The Performance Bond shall be valid for a period of twenty four months (24) from the date of the commissioning or thirty months (30) from the date of receipt of material (last consignment) at site/stores whichever is earlier plus 3 months towards claim period. Upon submission of the performance security, the EMD shall be released.

30.00 CORRUPT OR FRADULENT PRACTICES

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

- (a) Defines, for the purposes of this provision, the terms set forth below as follows:
 - i) "Corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them ,or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving, or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and
 - ii) "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Purchaser, and includes collusive practice among Bidders (prior to or after Bid submission) designed to establish Bid prices at artificial non-competitive levels and to deprive the Purchaser of the benefits of free and open competition.
- (b) Will reject a proposal forward if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question ;
- (c) Will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a contract.

30.02 Furthermore, Bidders shall be aware of the provision stated in the General Conditions of Contract.

SECTION – III

GENERAL CONDITIONS OF CONTRACT (GCC)

**31.5 MVA, 66/11 kV Power Transformers Along with
NIFPS**

CMC/BR/20-21/SV/RS/RJ/890

GENERAL TERMS AND CONDITIONS**1.0 General Instructions**

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

2.0 Definition of Terms

- 2.01 "Purchaser" shall mean BRPL Limited, on whose behalf this bid enquiry is issued by its authorized representative / officers.
- 2.02 "Bidder" shall mean the firm who quotes against this bid enquiry issued by the Purchaser. "Supplier" or "Supplier" shall mean the successful Bidder and/or Bidders whose bid has been accepted by the Purchaser and on whom the "Letter of Acceptance" is placed by the Purchaser and shall include his heirs, legal representatives, successors and permitted assigns wherever the context so admits.
- 2.03 "Supply" shall mean the Scope of Contract as described.
- 2.04 "Specification" shall mean collectively all the terms and stipulations contained in those portions of this bid document known as RFQ, Commercial Terms & Condition, Instructions to Bidders, Technical Specifications and the Amendments, Revisions, Deletions or Additions, as may be made by the Purchaser from time to time.
- 2.05 "Letter of Acceptance" shall mean the official notice issued by the Purchaser notifying the Supplier that his proposal has been accepted and it shall include amendments thereto, if any, issued by the Purchaser. The "Letter of Acceptance" issued by the Purchaser shall be binding on the "Supplier" The date of Letter of Acceptance shall be taken as the effective date of the commencement of contract.

- 2.06 “Month” shall mean the calendar month and “Day” shall mean the calendar day.
- 2.07 “Codes and Standards” shall mean all the applicable codes and standards as indicated in the Specification.
- 2.08 “Offer Sheet” shall mean Bidder's firm offer submitted to BRPL in accordance with the specification.
- 2.09 “Contract” shall mean the “Letter of Acceptance” issued by the Purchaser.
- 2.10 “Contract Price” shall mean the price referred to in the “Letter of Acceptance”.
- 2.11 “Contract Period” shall mean the period during which the “Contract” shall be executed as agreed between the Supplier and the Purchaser in the Contract inclusive of extended contract period for reason beyond the control of the Supplier and/or Purchaser due to force majeure.
- 2.12 “Acceptance” shall mean and deemed to include one or more of the following as will be stipulated in the specification:
- a) The written acceptance of material by the inspector at suppliers works to ship the materials.
 - b) Acceptance of material at Purchaser site stores after its receipt and due inspection/ testing and release of material acceptance voucher.
 - c) Where the scope of the contract includes supply, acceptance shall mean issue of necessary equipment / material takeover receipt after installation & commissioning and final acceptance.
- 3.0 Contract Documents & Priority**
- 3.01 Contract Documents: The terms and conditions of the contract shall consist solely of these RFQ conditions and the offer sheet.
- 3.02 Priority: Should there be any discrepancy between any term hereof and any term of the Offer Sheet, the terms of these RFQ shall prevail.
- 4.0 Scope of Supply - General**
- 4.01 The “Scope of Supply” shall be on the basis of Bidder’s responsibility, completely covering the obligations, responsibility and supplies provided in this Bid enquiry whether implicit or explicit.
- 4.02 Bidder shall have to quote for the Bill of quantities as listed in Section – IV of this RFQ.
- 4.03 Quantity variation and additional requirement if any shall be communicated to successful bidder during project execution.
- 4.04 All relevant drawings, data and instruction manuals.

5.0 Quality Assurance and Inspection

- 5.01 Immediately on award of contract, the bidder shall prepare detailed quality assurance plan / test procedure identifying the various stages of manufacture, quality checks performed at each stage, raw material inspection and the Customer hold points. The document shall also furnish details of method of checking, inspection and acceptance standards / values and get the approval of Purchaser before proceeding with manufacturing. However, Purchaser shall have right to review the inspection reports, quality checks and results of suppliers in house inspection department which are not Customer hold points and the supplier shall comply with the remarks made by purchaser or his representative on such reviews with regards to further testing, rectification or rejection, etc.
- 5.02 Witness and Hold points are critical steps in manufacturing, inspection and testing where the supplier is obliged to notify the Purchaser in advance so that it may be witnessed by the Purchaser. Final inspection is a mandatory hold point. The supplier needs to proceed with the work past a hold point only after clearance by purchaser or a witness waiver letter from BRPL.
- 5.03 The performance of waiver of QA activity by Purchaser at any stage of manufacturing does not relieve the supplier of any obligation to perform in accordance with and meet all the requirements of the procurement documents and also all the codes & reference documents mentioned in the procurement document nor shall it preclude subsequent rejection by the purchaser.
- 5.04 On completion of manufacturing the items can be dispatched only after issue of shipping release by the Purchaser.
- 5.05 All testing and inspection shall be done without any extra cost.
- 5.06 Purchaser reserve the right to send any material out of the supply to any recognized laboratory for testing and the cost of testing shall be borne by the Purchaser. In case the material is found not in order with the technical requirement / specification, the charges along with any other penalty which may be levied is to be borne by the bidder. To avoid any complaint the supplier is advised to send his representative to the stores to see that the material sent for testing is being sealed in the presence of bidders representative.
- 5.07 Bidder has to sign quality agreement before supply of the material.

6.0 Packing, Packing List & Marking

- 6.01 Packing: Supplier shall pack or shall cause to be packed all Commodities in boxes and containers and otherwise in such a manner as shall be reasonably suitable for shipment by road or rail to BRPL without undue risk of damage in transit.
- 6.02 Packing List: The contents of each package shall be itemized on a detailed list showing the exact weight and the extreme outside dimensions (length, width and height) of each container or box. One copy of the packing list shall be enclosed in each package delivered. There shall also be enclosed in one package a master packing list identifying each individual package,

which is part of the shipment. On any packaging where it is not feasible to place the packing list inside the container, all pertinent information shall be stenciled on the outside and will thus constitute a packing list.

7.01 Prices basis for supply of materials

Bidders require quoting their prices on Landed Cost Basis and separate price for each item. For Supply to BRPL Delhi the price shall be inclusive of packing, forwarding, GST and freights. The above supply prices shall also include unloading at site stores. Transit and storage insurance will be arranged by BRPL; however bidder to furnish required details in advance for arranging the same by BRPL.

8.0 Variation in taxes, duties & levies:

- 8.01 The total order value shall be adjusted on account of any variations in Statutory Levies imposed by Competent Authorities by way of fresh notification(s) within the stipulated delivery period only. However, incase of reduction in taxes, duties and levies, the benefits of the same shall be passed on to BUYER.
- 8.02 No other Taxes, Duties & Levies other than those specified above will be payable by BUYER except in case of new Levies, Taxes & Duties imposed by the Competent Authorities by way of fresh notification(s) subsequent to the issue of PURCHASE ORDER but within the stipulated delivery period.
- 8.03 Notwithstanding what is stated above, changes in Taxes, Duties & Levies shall apply only to that portion of PURCHASE ORDER not executed on the date of notification by Competent Authority. Further, changes in Taxes, Duties & Levies after due date of Delivery shall not affect PURCHASE ORDER Terms and Value.
- 8.04 PURCHASE ORDER value shall not be subject to any variation on account of variation in Exchange rate(s).

9.0 Taxes & Duties on raw materials & bought out components:

- 9.01 Taxes & Duties on raw materials & bought out components are included in Order Value and are not subject to any escalation or variation for any reason whatsoever.
- 9.02 Taxes & Duties on raw materials & bought out components procured indigenously are included in Order Value and are not subject to any escalation or variation for any reason whatsoever.

10.0 Terms of payment and billing

10.01 For Supply of Equipments:

- 100% payment shall be made within 45 days from the date of receipt of material at store/ site against submission of 10 % performance bank guarantee. (Refer 10.01)

10.02 Bidder to submit the following documents against dispatch of each consignment:

- i) Consignee copy of LR
- ii) Supplier detailed invoice showing commodity description, quantity, unit price, total price and basis of delivery.
- iii) Original certificate issued by BRPL confirming receipt of material at site and acceptance of the same.
- iv) Dispatch clearance / inspection report in original issued by the inspection authority
- v) Packing List.
- vi) Test Reports
- vii) Guarantee Certificate.
- viii) Insurance policy to be obtained by supplier

11.0 Price Validity

11.01 All bids submitted shall remain valid, firm and subject to unconditional acceptance by BRPL Delhi for 120 days post bid-date. For awarded suppliers, the prices shall remain valid and firm till contract completion.

12.0 Performance Guarantee

12.01 Supplier shall establish a performance bond in favor of BRPL in an amount not less than Ten percent (10%) of the total price of the Contract (the "Performance Bond"). The Performance Bond shall be valid for a period of twenty four months (24) from the date of the commissioning or thirty months (30) from the date of receipt of material (last consignment) at site/stores whichever is earlier plus 3 months towards claim period. It shall be in accordance with one of the following terms:

- a) Depositing pay order /demand draft of the relevant amount directly with BRPL at the address listed above or as otherwise specified by BRPL, either of which shall constitute the Performance Bond hereunder; or
- b) Bank guarantee from any nationalized bank in favour of BSES RAJDHANI POWER LTD (BRPL). The performance Bank guarantee shall be in the format as specified by BRPL.

13.0 Forfeiture

13.01 Each Performance Bond established under Clause 10.0 shall contain a statement that it shall be automatically and unconditionally forfeited without recourse and payable against the presentation by BRPL of this Performance Bond to the ICICI Bank at Mumbai, or to the relevant company/ correspondent bank referred to above, as the case may be, together with a simple statement that supplier has failed to comply with any term or condition set forth in the Contract.

13.02 Each Performance Bond established under will be automatically and unconditionally forfeited without recourse if BRPL in its sole discretion determines that supplier has failed to comply with any term or condition set forth in the contract.

14.0 Release

All Performance Bonds will be released without interest within seven (7) days from the last date up to which the Performance Bond has to be kept valid (as defined in Clause 10.0) except for the case set forth in Clause 21.0.

15.0 Defects Liability Period

15.01 The bidder to Guarantee the materials / items supplied against any defect of failure, which arise due to faulty materials, workmanship or design for the entire defects liability period. The Defect liability period shall be 60 months from the date of commissioning or 66 months from the date of delivery whichever is earlier. If during the defects liability period any materials / items are found to be defective, these shall be replaced or rectified by the bidder at his own cost within 30 days from the date of receipt of intimation.

16.0 Return, Replacement or Substitution.

BRPL shall give Supplier notice of any defective Commodity promptly after becoming aware thereof. BRPL may in its discretion elect to return defective Commodities to Supplier for replacement, free of charge to BRPL, or may reject such Commodities and purchase the same or similar Commodities from any third party. In the latter case BRPL shall furnish proof to Supplier of the cost of such substitute purchase. In either case, all costs of any replacement, substitution, shipping, labour and other related expenses incurred in connection with the return and replacement or for the substitute purchase of a Commodity hereunder should be for the account of Supplier. BRPL may set off such costs against any amounts payable by BRPL to Supplier. Supplier shall reimburse BRPL for the amount, if any, by which the price of a substitute Commodity exceeds the price for such Commodity as quoted in the Bid.

17.0 Effective Date of Commencement of Contract:

17.01 The date of the issue of the Letter of Acceptance shall be treated as the effective date of the commencement of Contract.

18.0 Time – The Essence of Contract

18.01 The time and the date of completion of the “Supply” as stipulated in the Letter Of Acceptance / Purchase order issued to the Supplier shall be deemed to be the essence of the “Contract”. The Supply has to be completed not later than the aforesaid Schedule and date of completion of supply.

19.0 The Laws and Jurisdiction of Contract:

19.01 The laws applicable to this Contract shall be the Laws in force in India.

19.02 All disputes arising in connection with the present Contract shall be settled amicably by mutual consultation failing which shall be finally settled as per the rules of Arbitration and Conciliation Act, 1996 at the discretion of Purchaser. The venue of arbitration shall be at Mumbai in India

20.0 Events of Default

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

- a) Supplier fails or refuses to pay any amounts due under the Contract;
- b) Supplier fails or refuses to deliver Commodities conforming to this RFQ/ specifications, or fails to deliver Commodities within the period specified in P.O. or any extension thereof
- c) Supplier becomes insolvent or unable to pay its debts when due, or commits any act of bankruptcy, such as filing any petition in any bankruptcy, winding-up or reorganization proceeding, or acknowledges in writing its insolvency or inability to pay its debts; or the Supplier's creditors file any petition relating to bankruptcy of Supplier;
- d) Supplier otherwise fails or refuses to perform or observe any term or condition of the Contract and such failure is not remediable or, if remediable, continues for a period of 30 days after receipt by the Supplier of notice of such failure from BRPL.

21.0 Consequences of Default.

- a) If an Event of Default shall occur and be continuing, BRPL may forthwith terminate the Contract by written notice.
- b) In the event of an Event of Default, BRPL may, without prejudice to any other right granted to it by law, or the Contract, take any or all of the following actions;
 - i) present for payment to the relevant bank the Performance Bond;
 - ii) purchase the same or similar Commodities from any third party; and/or
 - iii) recover any losses and/or additional expenses BRPL may incur as a result of Supplier's default.

22.0 Penalty for Delay

22.01 If supply of items / equipments is delayed beyond the supply schedule as stipulated in purchase order then the Supplier shall be liable to pay to the Purchaser as penalty for delay, a sum of 1% (one percent) of the contract price for every week delay or part thereof for undelivered quantities.

22.02 The total amount of penalty for delay under the contract will be subject to a maximum of ten percent (10%) of the contract price for undelivered quantities.

22.03 The Purchaser may, without prejudice to any method of recovery, deduct the amount for such damages from any amount due or which may become due to the Supplier or from the Performance Bond or file a claim against the supplier.

23.0 Force Majeure

23.01 General

An "Event of Force Majeure" shall mean any event or circumstance not within the reasonable control directly or indirectly, of the Party affected, but only if and to the extent that:

- i) Such event or circumstance materially and adversely affects the ability of the affected Party to perform its obligations under this Contract, and the affected Party has taken all reasonable precautions, due care and reasonable alternative measures in order to prevent or avoid the effect of such event on the affected party's ability to perform its obligations under this Contract and to mitigate the consequences thereof.
- ii) For the avoidance of doubt, if such event or circumstance would not have materially and adversely affected the performance of the affected party had such affected party followed good industry practice, such event or circumstance shall not constitute force majeure.
- iii) Such event is not the direct or indirect result of the failure of such Party to perform any of its obligations under this Contract.
- iv) Such Party has given the other Party prompt notice describing such events, the effect thereof and the actions being taken in order to comply with above clause.

23.02 Specific Events of Force Majeure subject to the provisions of above clause, Events of Force Majeure shall include only the following to the extent that they or their consequences satisfy the above requirements:

23.03 Mitigation of Events of Force Majeure Each Party shall:

- i) Make all reasonable efforts to prevent and reduce to a minimum and mitigate the effect of any delay occasioned by an Event of Force Majeure including recourse to alternate methods of satisfying its obligations under the Contract;
- ii) Use its best efforts to ensure resumption of normal performance after the termination of any Event of Force Majeure and shall perform its obligations to the maximum extent practicable as agreed between the Parties; and
- iii) Keep the other Party informed at regular intervals of the circumstances concerning the event of Force Majeure, with best estimates as to its likely continuation and what measures or contingency planning it is taking to mitigate and or terminate the Event of Force Majeure.

23.04 Burden of Proof In the event that the Parties are unable in good faith to agree that a Force Majeure event has occurred to an affected party, the parties shall resolve their dispute in accordance with the provisions of this Agreement. The burden of proof as to whether or not a force majeure event has occurred shall be upon the party claiming that the force majeure event has occurred and that it is the affected party.

- 23.05 Termination for Certain Events of Force Majeure. If any obligation of any Party under the Contract is or is reasonably expected to be delayed or prevented by a Force Majeure event for a continuous period of more than 3 months, the Parties shall promptly discuss in good faith how to proceed with a view to reaching a solution on mutually agreed basis. If a solution on mutually agreed basis cannot be arrived at within a period of 30 days after the expiry of the period of three months, the Contract shall be terminated after the said period of 30 days and neither Party shall be liable to the other for any consequences arising on account of such termination.
- 23.06 Limitation of Force Majeure event. The Supplier shall not be relieved of any obligation under the Contract solely because cost of performance is increased, whether as a consequence of adverse economic consequences or otherwise.
- 23.07 Extension of Contract Period due to Force Majeure event The Contract period may be extended by mutual agreement of Parties by way of an adjustment on account of any period during which an obligation of either Party is suspended due to a Force Majeure event.
- 23.08 Effect of Events of Force Majeure. Except as otherwise provided herein or may further be agreed between the Parties, either Party shall be excused from performance and neither Party shall be construed to be in default in respect of any obligations hereunder, for so long as failure to perform such obligations shall be due to and event of Force Majeure."
- 24.0 Transfer And Sub-Letting**
- 24.01 The Supplier shall not sublet, transfer, assign or otherwise part with the Contract or any part thereof, either directly or indirectly, without prior written permission of the Purchaser.
- 25.0 Recoveries**
- 25.01 Whenever under this contract any money is recoverable from and payable by the bidder, the purchaser shall be entitled to recover such sum by appropriating in part or in whole by detecting any sum due to which any time thereafter may become due from the supplier in this or any other contract. Should the sum be not sufficient to cover the full amount recoverable the bidder shall pay to the purchaser on demand the remaining balance.
- 26.0 Waiver**
- 26.01 Failure to enforce any condition herein contained shall not operate as a waiver of the condition itself or any subsequent breach thereof.
- 27.0 Indemnification**
- 27.01 Notwithstanding contrary to anything contained in this RFQ, Supplier shall at his costs and risks make good any loss or damage to the property of the Purchaser and/or the other Supplier engaged by the Purchaser and/or the employees of the Purchaser and/or employees of the other Supplier engaged by the Purchaser whatsoever arising out of the negligence of the Supplier while performing the obligations under this contract.

SECTION – IV: QUANTITY AND DELIVERY REQUIREMENT

Sl. No.	Item Description	Specification	Requirement	Delivery Schedule	Location
BRPL,DELHI					
1	31.5 MVA, 66/11 kV Power Transformers along with NIFPS	SECTION V	05 Nos	As per BRPL requirement	Stores BRPL Delhi
TOTAL					

Annexure –I

BID FORM

Supply of 31.5 MVA, 66/11 kV Power Transformer Along With NIFPS

To

Head of the Department Contracts & Materials BSES Rajdhani Power Ltd BSES Bhawan, Nehru Place New Delhi– 110019

Sir,

We understand that BRPL is desirous of procuring “Power Transformer” in its licensed distribution network area in Delhi. Having examined the Bidding Documents for the above named works, we the undersigned, offer to deliver the goods in full conformity with the Drawings, Conditions of Contract and specifications for the sum of AS PER PRICE BID ENCLOSED or such other sums as may be determined in accordance with the terms and conditions of the contract .The above amounts are in accordance with the Price Schedules attached herewith and are made part of this bid.

If our Bid is accepted, we undertake to deliver the entire goods as per delivery schedule given by you from the date of award of purchase order/letter of intent.

If our Bid is accepted, we will furnish a performance bank guarantee for an amount of 10% (Ten) percent of the total contract value for due performance of the Contract in accordance with the General Conditions of Contract.

We agree to abide by this Bid for a period of 120 days from the date fixed for bid opening under clause 9.0 of GCC, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

We declare that we have studied the provision of Indian Income Tax Law and other Indian Laws for supply of equipments/materials and the prices have been quoted accordingly.

Unless and until Letter of Intent is issued, this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.

We understand that you are not bound to accept the lowest, or any bid you may receive.

There is provision for Resolution of Disputes under this Contract, in accordance with the Laws and Jurisdiction of Contract, Clause 19 of GCC .

Dated this.....day of.....20.....

Signature..... In the capacity of.....
.....duly authorized to sign for and on behalf of (IN BLOCK CAPITALS).....

FORMAT FOR EMD BANK GUARANTEE

(To be issued in a Non Judicial Stamp Paper of Rs.50/-purchased in the name of the bank)

Whereas [name of the Bidder] (hereinafter called the “Bidder”) has submitted its bid dated [date of submission of bid] for the supply of [name and/or description of the goods] (hereafter called “the Bid”). KNOW ALL PEOPLE by these presents that WE [name of bank]at[Branch Name and address],having our registered office at[address of the registered office of the bank](herein after called —“the Bank”),are bound unto BSES Rajdhani Power Ltd., with its Corporate Office at BSES Bhawan Nehru Place, New Delhi -110019, (herein after called —the “Purchaser”) in the sum of _____ for which payment well and truly to be made to the said Purchaser, the Bank binds itself, its 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:

If the Bidder withdraws its Bid during the period of bid validity specified by the Bidder on the Bid Form; or

If the Bidder, having been notified of the acceptance of its Bid by the Purchaser during the period of bid validity:

fails or refuses to execute the Contract Form ,if required; or
fails or refuses to furnish the performance security, In accordance with the Instructions to Bidders/GENERAL CONDITIONS.;

We undertake to pay to the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that is its demand the purchaser will note that amount claimed by it is due to it, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to and including thirty (30) days after the period of bid validity, and any demand in respect thereof should reach the Bank not later than the above date.

(Signature of the bank)

Signature of the witness

PRICE FORMAT

ENQUIRY NO & DATE: NIT: CMC/BR/20-21/SV/RS/RJ/890

PRICE SCHEDULE

ITEM DESCRIPTION	QTY AS PER RFQ	UOM	EX-WORKS RATE/UNIT	CGST (%)	CGST AMOUNT	SGST (%)	SGST AMOUNT	IGST (%)	IGST AMOUNT	FREIGHT	LANDED RATE/UNIT	TOTAL LANDED COST (INR)
31.5 MVA , 66/11 kV Power Transformer	05 Nos											
Nitrogen Injection Fire Protection System	05 Nos											

- Note: 1.Prices shall be Firm
 2.The prices received without break up of ex works, Freight, GST are liable for rejection
 3. Pls. Indicate the exact percentage of taxes in figures and words.
 4. If there is a discrepancy between the unit price and the total price THE UNIT PRICE shall prevail.
 5. Bidders are requested to attach the covering letter head alongwith the price bid indicating reference no and date.

Bidders seal & signature

Annexure – IV

Enquiry No. : CMC/BR/20-21/SV/RS/RJ/890

COMMERCIAL TERMS AND CONDITIONS

S/NO	ITEM DESCRIPTION	AS PER BRPL	CONFIRMATION OF BIDDER
1	Validity of prices	120 days from date of offer	
2	Price basis	Firm, FOR Delhi store basis, Prices shall be inclusive of all taxes & duties, freight upto Delhi stores. Unloading at stores be in vendor's scope Transit insurance in BRPL scope	
3	Payment Terms	100% payment within 45 days after receipt of material at stores	
4	Delivery schedule	As per our requirement	
5	Defect Liability Period	60 months after commissioning or 66 months from the last date of supply after commissioning, whichever is earlier.	
6	Penalty for delay	1% per week of delay of undelivered units or part thereof subject to maximum of 10% of total PO value of undelivered units	
7	Performance Bank Guarantee	10% of total PO value for 24 months after commissioning or 30 months from date of supply, whichever is earlier plus 3 months towards claim period	

ANNEXURE - V

ENQUIRY NO: CMC/BR/20-21/SV/RS/RJ/890

NO DEVIATION SHEET

SL NO	SL NO OF TECHNICAL SPECIFICATION	DEVIATION, IF ANY

SIGNATURE & SEAL OF BIDDER

NAME OF BIDDER

Sl No	Item Description	YES/NO
1	INDEX	YES/NO
2	COVERING LETTER	YES/NO
3	BID FORM (UNPRICED) DULY SIGNED	YES/NO
4	BILL OF MATERIAL (UNPRICED)	YES/NO
5	TECHNICAL BID	YES/NO
6	ACCEPTANCE TO COMMERCIAL TERMS & CONDITIONS	YES/NO
7	FINANCIAL BIDS (IN SEALED ENVELOPE)	YES/NO
8	EMD IN PRESCRIBED FORMAT	YES/NO
9	DEMAND DRAFT OF RS 1180/- DRAWN IN FAVOUR OF	BSES RAJDHANI POWER LTD
10	POWER OF ATTORNEY/ AUTHORISATION LETTER FOR SIGNING THE BID	YES/NO

SECTION – V

TECHNICAL SPECIFICATIONS (TS)

**31.5 MVA, 66/11 kV Power Transformer along with
NIFPS**

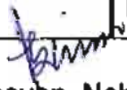
CMC/BR/20-21/SV/RS/RJ/890

The detailed technical specifications of Power Transformer

BSES

Specification for Power Transformer Including NIFPS

Specification no – SP-TRPU-01-R7

Prepared by:		Checked by :		Approved by:		Rev	Date
Name	Sign	Name	Sign	Name	Sign		
DS		SR		DG		01	21-Nov-08
Supriya		Meenakshi		K.K.Alla		02	10 -Aug-09
Javed Ahmed		Abhinav Srivastava		Kiran Alla		03	16-July-14
Javed Ahmed		Abhinav Srivastava		Vijay Panpalia		04	18-July-16
Javed Ahmed		Abhinav Srivastava		K. Sheshadri		05	26-July-17
Javed Ahmed		Abhinav Srivastava		K. Sheshadri		06	22-June-18
JA/SS		Abhinav Srivastava		K. Sheshadri		07	13-Dec-19


Registered Office: BSES Bhavan, Nehru Place, Delhi - 110019

Record of Revision

Sl No.	Revision No	Item/Clause No.	Nature of change	Approved by
1	R3	CI 30 of Annexure C	Capitalization figure revised	MDB/KKA
2	R3	4.2.7.1	Transformer oil indicated as per Annexure O Test result shall be confirming to Annexure O of this specification added.	MDB/KKA
3	R3	4.2.6.2	At any tap added in the clause	MDB/KKA
4	R3	4.2.9.13	Description modified	MDB/KKA
5	R3	4.2.10.1	HV and LV added.	MDB/KKA
6	R3	6.35	Provision for Valves and NRV for mounting of Nitrogen Injection Fire Protection System (NIFPS) added	MDB/KKA
7	R3	4.2.11.2	Clause v added.	MDB/KKA
8	R3	8.0	Approved make of components modified	MDB/KKA
9	R3	12.2-Note 2	Temperature rise test added in Routine Test	MDB/KKA
10	R3	12.4 (V)	Clause Modified	MDB/KKA
11	R3	Annexure-1.16	Provision for mounting of NIFPS system added	MDB/KKA
12	R4	15.0 and 16.0	Addition of Training and Commissioning support	AS/KA
13	R4	Annexure C	Addition of 33/11kV and 66/11kV 25/31.5MVA	AS/KA
14	R5	Annexure- N	Addition of Technical specification of NIFPS	AS/VP
15	R5	Annexure- O	Addition of Technical specification of Oil	AS/VP
16	R5	Annexure- G	Addition of Technical specification of GPS Tracking	AS/VP

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17	R5	Annexure-I	Addition of clause on Cancellation of Inspection Call	AS/VP
18	R5	Annexure CR	Addition of CRGO Handling and testing	AS/VP
19	R5	Acceptance test	Addition of CRGO testing for all units	AS/VP
20	R5	Site Acceptance test	Addition Received material acceptance test	AS/VP
21	R6	Clause no 12.5, Site Acceptance test	Clause revised	AS/KS
22	R6	Clause no 14, Commissioning Support	Commissioning support for each Transformer added	AS/ KS
23	R6	Type test clause no 12.3	Type test for one Transformer of each rating and type per lot offered	AS/ KS
24	R6	6.36	Mounting of cooling Fans on separate structure	AS/ KS
25	R6	6.37	Earth, Core and Yoke Terminal Box	AS/ KS
26	R6	4.2.11.17	All Control Cable length shall be minimum 15 Meters	AS/ KS
27	R6	5.9	Removal of mercury switching for all protective devices	AS/ KS
28	R7	Annexure-O	Transformer Oil as per latest IS 335 2018	AS/ KS
29	R7	Clause no 12.5	IR value from 1000 MOhm to 2000M Ohm	AS/ KS
30	R7	GTP 28.4B	NCT Rating 2000/1A to 1600-2000/1A	AS/ KS



1.0 Scope of supply

For scope of supply, refer Annexure A, Annexure-N, Annexure-G, Annexure-I and Annexure O

2.0 Codes & standards

Materials, equipment and methods used in the manufacture of Power Transformer shall conform to the latest edition of following –

IEC Standards

IEC 60034	Rotating Electrical Machines. (e.g. For Cooler Fan Motors.)
IEC 60071	Co-ordination of Insulation.
IEC 60076	Power transformers.
IEC 60156	Method for Determination of the Electric Strength for Insulating Oils.
IEC 60044	Current Transformers.
IEC 60214	On-Load Tap-Changers.
IEC 60296	Specification for Unused Mineral Insulating Oils for Transformers and Switchgear.
IEC 60354	Loading Guide for Oil-Immersed Power Transformers.
IEC 60445	Basic & safety principles for man-machine interface, marking and identification- Identification of Equipment Terminals and Conductor termination.
IEC 60529	Degrees of Protection Provided by Enclosures (IP Code).
IEC 60551	Determination of Transformer and Reactor Sound Levels.
IEC 60606	Application Guide for Power Transformers.
IEC 60616	Terminal and Tapping Markings for Power Transformers.
IEC 60947	Low-Voltage Switchgear and Control gear.
IEC 60137	Bushing for alternating voltages above 1000V

British Standards

BS 148	Unused Mineral Insulation Oils for Transformers and Switchgear
BS 223	Bushings for Alternating Voltages above 1000 V.
BS 2562	Cable Boxes for Transformers and Reactors.

Indian Standards

IS:335	Insulating oil
IS:1271	Thermal evaluation and classification of electrical insulation
IS:2099	Bushing for Alternating voltage above 1000V
IS:2705	Current Transformers
IS:3347	Dimensions for Porcelain Transformer bushing
IS:3637	Gas operated relays

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IS:3639	Fitting & Accessories for power transformers
IS:4201	Application guide for CTs
IS:6600	Guide for loading of oil immersed transformers
IS:8478	Application guide for On-load tap changer
IS:8468	On-load tap changer
IS:10028	Code of practice for selection, installation & maintenance of transformers
IS:13947	LV switchgear and Controlgear-Part1
IS 2026	Power Transformers
IS 5561	Electrical Power Connectors
IS 5	Colours for ready mix paints
IS 6272	Industrial cooling fans
IS 325	Three phase induction motors
IS 12676	OIP Paper insulated condenser bushing dimension and requirements
	Indian Electricity Rules
	Indian electricity act
	CBIP manual

In the event of direct conflict between various order documents, the precedence of authority of documents shall be as follows:

- i. Guaranteed Technical Particulars (GTP)
- ii. This Specification
- iii. Referenced Standards
- iv. Approved Vendor Drawings
- v. Other documents

3.0 Major Design Criteria & Parameters of the Transformer

3.1	Major Design criteria	
3.1.1	Voltage variation on supply side	+ / - 10 %
3.1.2	Frequency variation on supply side	+ / - 5 %
3.1.3	Transient condition	- 20 % or + 10 % combined variation of voltage and frequency
3.1.4	Service Condition	Refer Annexure B
3.1.5	Insulation level	Refer Annexure C
3.1.6	Short Circuit withstand level	Refer Annexure C
3.1.7	Overload capability	Refer Annexure C
3.1.8	Noise level	Refer Annexure C

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3.1.9	Radio Influence Voltage	Refer Annexure C
3.1.10	Harmonic currents	Refer Annexure C
3.1.11	Partial Discharges	Refer Annexure C
3.1.12	Parallel operation	Shall be designed to operate in parallel with existing transformer. Details of existing transformers shall be forwarded to the bidder on request
3.2	Major Parameters	
3.2.1	Rating	Refer Annexure C
3.2.2	Voltage Ratio	Refer Annexure C
3.2.3	Vector Group	Refer Annexure C
3.2.4	Impedance	Refer Annexure C
3.2.5	Losses	Refer Annexure C
3.2.5.1	No load Loss	Refer Annexure C
3.2.5.2	Load losses at principal tap	Refer Annexure C
3.2.6	Temperature Rise top oil	Refer Annexure C
3.2.7	Temperature winding	Refer Annexure C
3.2.8	Flux density	Refer Annexure C
3.2.9	Current density	Refer Annexure C
3.2.10	Tapping on HV winding	Refer Annexure C
3.2.11	Design Clearances	Refer Annexure C

4.0 Construction & Design

4.1	Type	ONAN/ONAF, Copper wound, three phase, oil immersed with on load tap changer
4.1.1	Essential provision for ONAF cooling	See note 1 of Annexure C
4.1.2	Provision of mounting cooling fan at site in future at service condition	Required.
4.1.3	Provision of replacement of cooling fan at site in future at service condition	Required
4.1.4	Fan guard	Required
4.2	Major Parts	
4.2.1	Tank	
4.2.1.1	Material of Construction	As per Annexure D GTP Cl. 17.1
4.2.1.2	Plate Thickness	Adequate for meeting the requirements of pressure and vacuum type tests as per CBIP
4.2.1.3	Welding features	<ul style="list-style-type: none"> i) All seams and joints shall be double welded ii) All welding shall be stress relieved for sheet thickness greater than 35 mm iii) All pipes, radiators, stiffeners, welded to the tank shall be welded externally

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4.2.1.4	Tank features	<ul style="list-style-type: none"> i) Adequate space at bottom for collection of sediments ii) Stiffeners provided for rigidity shall be adequately sloped to prevent accumulation of water iii) No internal pockets in which gas/air can accumulate iv) No external pocket in which water can lodge v) Tank bottom with welded skid base vi) Tank cover sloped to prevent retention of rain water vii) Minimum disconnection of pipe work and accessories for cover lifting viii) Tanks shall be of strength to prevent permanent deformation during lifting, jacking, transportation with oil filled. ix) Tank to be designed for oil filling under vacuum x) Fitted with lifting lug to lift the tank cover only xi) Manhole of sufficient size required for inspection of core and winding xii) Oil level indicator for transportation
4.2.1.5	Flanged type adequately sized inspection cover rectangular in shape required for	<ul style="list-style-type: none"> i) HV line bushing ii) LV line bushing iii) LV neutral bushing and NCT connection iv) OLTC to winding connection from both sides v) Core assembly earthing <p>Inspection covers should be provided with jacking screws & handle and shall not weigh more than 25KG</p> <p>Overall design shall be in such a way that there shall not be any hindrance / overlapping of some other component, in front of any of the inspection covers.</p>
4.2.1.6	Fittings and accessories on main tank	See under fittings and accessories.
4.2.2	Conservator for the main tank	
4.2.2.1	Capacity	Adequate between highest and lowest visible levels to meet the requirement of expansion of oil volume in the transformer and cooling equipment from minimum ambient temperature to 100° cent.
4.2.2.2	Conservator oil preservation system	By flexible rubber bag (air cell) placed inside conservator

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4.2.2.3	Air cell material	Special type of fabric coated with special grade nitrile rubber, outer surface oil resistant and inner surface ozone resistant
4.2.2.4	Conservator features	<ul style="list-style-type: none"> i) Conservator shall be bolted into position so that it can be removed for cleaning / other maintenance purposes ii) Main pipe from tank shall project about 20 mm above conservator bottom for creating a sump for collection of impurities iii) Conservator minimum oil level corresponding to minimum temperature shall be well above the sump level. iv) It shall be possible to remove and replace the air cell if required v) Conservator to main tank piping shall be supported at minimum two points.
4.2.2.5	Fittings and accessories on main tank conservator	<ul style="list-style-type: none"> i) Prismatic oil gauge with NORMAL, Minimum and Maximum marking ii) End Cover iii) Oil Filling Hole with cap iv) Magnetic Oil gauge with LOW LEVEL alarm contact v) Silica Gel Dehydrating Breather with oil seal and dust filter with clear acrylic single piece clearly transparent cover resistant to UV rays vi) Drain cum filling valve (gate valve) with locking rod and position indicator made of Brass, 25 mm with cover plate vii) Shut off valve (gate valve) with position indicator made of Brass located before and after Bucholz relay, 80 mm viii) Flange for Breather connection ix) Air release valve on conservator (gate valve) made of brass, 25 mm with cover plate x) Air release plug as required
4.2.2.6	Essential provision for mounting of conservator	Conservator to be mounted in such a way that the top cover of the transformer can be lifted without disturbing the conservator
4.2.2.7	Essential provision for breather	<ul style="list-style-type: none"> i) Breather piping shall not have any valve placed in between. ii) Breather piping from conservator shall be supported in such a manner that the maximum unsupported length of the of the breather piping shall not be more than 3 metres iii) Breather shall be removable type mounted at a height of 1400mm from the ground level.

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4.2.3	Conservator for OLTC	
4.2.3.1	Capacity	Adequate between highest and lowest visible levels to meet the requirement of expansion of oil volume in the OLTC from minimum ambient temperature to 100 deg cent.
4.2.3.2	Conservator oil preservation system	Conventional
4.2.3.3	OLTC Conservator features	Same as 4.2.2.4 except air cell features
4.2.3.4	Fittings and accessories on OLTC conservator	<ul style="list-style-type: none"> i) Prismatic oil gauge with NORMAL and MINIMUM marking ii) End Cover iii) Oil Filling hole with cap iv) Magnetic Oil gauge with LOW LEVEL alarm contact v) Silica Gel Dehydrating Breather with oil seal and dust filter with clear acrylic single piece clearly transparent cover resistant to UV rays vi) Drain valve (gate valve) with locking rod and position indicator made of Brass, 25 mm with cover plate vii) Shut off valve (gate valve) with position indicator made of Brass located before oil surge relay, 25 mm viii) Flange for Breather connection ix) Air release plug as required
4.2.3.5	Essential provision for mounting of OLTC conservator	OLTC Conservator to be mounted in such a way that the OLTC can be inspected / maintained without disturbing the OLTC Conservator.
4.2.3.6	Essential provision for OLTC breather	<ul style="list-style-type: none"> i) Breather piping shall not have any valve placed in between ii) Breather piping from conservator shall be supported in such a manner that the maximum unsupported length of the of the breather piping shall not be more than 3 meters iii) Breather shall be removable type mounted at suitable height from ground so that it can be attended to easily for inspection / maintenance.
4.2.4	Radiators	
4.2.4.1	Thickness	1.2 Min
4.2.4.2	Features	Detachable type with lifting lugs, air release plug, drain plug, isolating valve top and bottom in each radiator, Radiator support from ground if required
4.2.4.3	Essential provision if radiators mounted separately	Expansion bellows to be provided in the pipes between main tank and radiator headers.

4.2.4.4	Essential provision for all type of radiators provided	Radiator header pipes shall not originate from tank top cover to make the tank top cover removable at site with minimum labour.
4.2.5	Core	
4.2.5.1	Material	High grade , non ageing, low loss, high permeability, grain oriented, cold rolled silicon steel lamination
4.2.5.2	Grade	As per Annexure D GTP Cl. 18.2
4.2.5.3	Lamination thickness	As per Annexure D GTP Cl. 18.3
4.2.5.4	Design Flux Density at rated conditions at principal tap	As per manufacturer's design.
4.2.5.5	Maximum Flux Density at 10 % over excitation / overfluxing	As per Annexure C , Cl. 35.0
4.2.5.6	Core Design Features	<ul style="list-style-type: none"> i) Magnetic circuit designed to avoid short circuit paths within core or to the earthed clamping structures ii) Magnetic circuit shall not produce flux components at right angles to the plane of lamination to avoid local heating iii) Least possible air gap and rigid clamping for minimum core loss and noise generation iv) Adequately braced to withstand bolted faults on secondary terminals without mechanical damage and damage/ displacement during transportation and positioning. v) Percentage harmonic potential with the maximum flux density under any condition limited to avoid capacitor overloading in the system vi) All steel sections used for supporting the core shall be thoroughly sand blasted after cutting , drilling, welding vii) Provision of lifting lugs for core coil assembly viii) Supporting framework designed not to obstruct complete drainage of oil from transformer ix) The insulation of core to bolts and core to clamps plates shall be able to withstand a voltage of 2Kv rms for one minute. However boltless construction shall be preferred to avoid generation of hot spots and decomposition of oil as well as to reduce noise level.
4.2.6	Winding	
4.2.6.1	Material	Electrolytic Copper
4.2.6.2	Maximum Current Density allowed at any tap.	3 A/mm ²
4.2.6.3	Winding Insulating material	Class A, non catalytic, inert to transformer oil, free from compounds liable to ooze out, shrink or collapse.
4.2.6.4	Winding Insulation	Uniform

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4.2.6.5	Design features	<ul style="list-style-type: none"> i) Stacks of winding to receive adequate shrinkage treatment before final assembly. ii) Connections braced to withstand shock during transport, switching, short circuit, or other transients. iii) Minimum out of balance force in the transformer winding at all voltage ratios. iv) Transposed at sufficient intervals. v) Threaded connection with locking facility vi) Winding leads rigidly supported , using guide tubes if practicable vii) Winding structure and major insulation not to obstruct free flow of oil through ducts viii) Provision of taps as indicated in the technical particulars
4.2.6.6	Essential provision for core coil assembly	<p>Core coil assembly shall be mounted on bottom of the tank.</p> <p>Earthing of core clamping structure and earthing of magnetic circuit shall be in line with CBIP reference guidelines / manual.</p>
4.2.7	Transformer Oil	<p>Should be in accordance with specification as per Annex O of this specification.</p> <p>One sample of oil drawn from every lot of transformer offered for inspection should be tested at NABL accredited lab for tests as listed under Table-1 of IS:1866 (2000). The cost of this testing should be included within the cost of transformer. Test result shall be confirming to Annexure C1 of this specification</p>
4.2.8	Bushings and Terminations	
4.2.8.1	Type below 52 kV	Oil communicating , outdoor, removable
4.2.8.2	Type 52 kV and above	Oil filled porcelain condenser & non-oil communicating type with oil level gauge, oil filling plug and drain valve if not hermetically sealed, tap for capacitance and loss factor measurement, removable without disturbing bushing CTs.
4.2.8.3	Arcing Horns	Not required
4.2.8.4	Termination on HV side bushing	By bimetallic terminal connectors suitable for ACSR/AAAC conductor / Cable connection through cable box with disconnecting link as per Annexure A Scope of Supply
4.2.8.5	Termination of LV side bushing	Cable connection through cable box with disconnecting link as per Annexure A Scope of Supply
4.2.8.6	Minimum creepage distance of bushing	As per Annexure C, Cl. 38.0
4.2.8.7	Protected creepage distance	At least 50 % of total creepage distance
4.2.8.8	Continuous Current rating	Minimum 20 % higher than the current corresponding to the minimum tap of the transformer

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4.2.8.9	Rated thermal short time current	As per Annexure C Cl. 38.0
4.2.8.10	Atmospheric protection for clamp and fitting of iron and steel	Hot dip galvanizing as per IS 2633
4.2.8.11	Bushing terminal lugs in oil and air	Tinned copper
4.2.8.12	Sealing washers /Gasket ring	Nitrile rubber/ Expanded TEFLON(PTFE) as applicable
4.2.9	HV , LV, LV Neutral cable box	Required / Not required as Annexure A Scope of supply
4.2.9.1	Material of Construction	Sheet Steel min 4 mm thick. Inspection Covers shall be min 3mm thick
4.2.9.2	Cable entry	At bottom through detachable gland plate with cable clamps of non magnetic material
4.2.9.3	Cable size for HV	As per Annexure C , Cl. 15.4
4.2.9.4	Cable size for LV	As per Annexure C , Cl. 15.5
4.2.9.5	Cable size for LV Neutral	As per Annexure C , Cl. 15.6
4.2.9.6	Detachables Gland Plate material for HV, LV, LV Neutral box	As per Annexure D GTP Cl. 24.4 , 25.4, 26.4
4.2.9.7	Gland plate thickness for HV, LV, LV Neutral box	As per Annexure D GTP Cl. 24.5, 25.5, 26.5
4.2.9.8	Cable gland for HV, LV, LV Neutral cables	As per Cl. 4.8 of this spec. and suitable for cable size as per Annexure D GTP Cl. 24.1 , 25.1, 26.1
4.2.9.9	Cable lug for LV Neutral cables	As per Cl. 4.9 of this spec. and suitable for cable size as per Annexure D GTP Cl. Cl. 24.1, 25.1, 26.1
4.2.9.10	Essential parts	<ul style="list-style-type: none"> i) Disconnecting chamber ii) Flexible disconnecting link of tinned copper iii) Tinned Copper Busbar for Purchaser's cable termination with busbar supports iv) Detachable gland plate as per Annexure D GTP Cl. 24.4, 24.5, 25.4, 25.5, 26.4, 26.5 v) Earthing boss for the cable box vi) Earthing link for the gasketed joints at two point for each joint vii) Earthing provision for cable Armour/ Screen viii) Flange type Inspection cover with handle for inspecting bushing and busbars on top as well as on front cover ix) Removable front cover with handle x) Drain plug xi) Rainhood on gasketed vertical joint xii) Danger plate made of Anodized aluminum with white letters on red background on HV and LV side fixed by rivets. xiii) Phase marking plate inside cable box near termination as well as on front cover of cable box made of Anodized aluminum with black letters on satin silver

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		background on HV and LV side fixed by rivets. xiv) Support Insulators for the busbars shall be epoxy resin cast type.
4.2.9.11	Terminal Clearances	As per Annexure C Technical particulars
4.2.9.12	Termination height required for cable termination	Min 1000 mm
4.2.9.13	Essential provision for LV Neutral / cable box	<ul style="list-style-type: none"> i) Neutral shall be outdoor type bushing OR with cable box. Box shall have adequately sized inspection cover suitable for inspection of bushings / replacement / maintenance of neutral CT. For Outdoor Bushing the NCT shall be mounted in IP55 box. ii) Knife switch with locking arrangement to be provided to disconnect the neutral from grounding. Connection from Neutral bushing to the knife switch shall be with 100x12mm Tinned copper bus bar. Bus Bar shall brought down to the bottom of the transformer supported by suitable support insulator made of epoxy resin cast (insulator shall be suitable for outdoor application suitable for connecting. iii) Knife switch shall be suitable for connecting 2 runs of 75 x 10 mm size GS strip. iv) Height of knife switch shall be at maximum 1500 mm. Housing of Knife switch shall be suitable for easy & quick operations.
4.2.10	Current Transformers	
4.2.10.1	HV and LV WTI CT	As per Annexure D GTP Cl. 29.0
4.2.10.1.1	Rating	As per Annexure D GTP Cl. 29.0
4.2.10.1.2	Mounting	In the turret of the bushing
4.2.10.1.3	Essential provision	<ul style="list-style-type: none"> i) CT mounting shall be such that CT can be replaced without removing tank cover. ii) CT secondaries shall be wired upto TB with TB spec. as per Cl. 4.7 of this specification.
4.2.10.2	Neutral CT	
4.2.10.2.1	Type	Cast resin
4.2.10.2.2	Rating	As per Annexure D GTP Cl.28.0
4.2.10.2.3	Location of NCT	Shall be provided In neutral cable box or separate box with TB arranged for secondaries. Bushing type neutral CT is not acceptable.
4.2.10.2.4	Essential provision	<ul style="list-style-type: none"> i) CT mounting shall be such that CT can be replaced without removing the neutral cable box. ii) CT secondaries shall be wired upto TB with TB spec. as per Cl. 4.7 of this specification.

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4.2.11	Marshalling Box Cubicle	
4.2.11.1	Material of Construction	CRCA sheet steel of thickness min 2.5 mm for load as well as non load bearing member, with toughened glass window in front of gauges
4.2.11.2	Major equipments in Marshalling box	i) Mechanical gauge for HV and LV WTI ii) Mechanical gauge for OTI iii) Electronic WTI and OTI Scanner iv) Other panel accessories listed elsewhere. v) DC contactors to be provided for all trouble signals. Same shall be wired up to TB
4.2.11.3	Gland Plate	Min. 3 mm thick detachable with knockout 6 x 1 inch
4.2.11.4	Contacts wired to terminal block	WTI alarm and Trip OTI alarm and Trip Buchholz relay Alarm and Trip OSR Trip Contacts MOG low level alarm MOG on OLTC low level alarm PRV main tank Trip PRV OLTC Trip Sudden pressure relay trip WTI and OTI relay contacts of the temperature scanner. Note: 2NO +2NC auxiliary contacts for all the above to be provided for customer use (By using auxiliary relay)
4.2.11.5	Signals to be wired to terminal block	WTI CT NCT Sensor for temperature scanner Capillaries for WTI and OTI 4 to 20 mA signals for WTI and OTI repeater located elsewhere.
4.2.11.6	Ingress protection	IP 55 plus additional rain canopy to be provided
4.2.11.7	Welding	Continuous welding on joints, welding at regular intervals on joints and filling of gaps with use of M seal not accepted.
4.2.11.8	Cable entry	Bottom for all cables
4.2.11.9	Panel internal Access	Front only through front door double leaf with anti theft hinges.
4.2.11.10	Pane back access	None
4.2.11.11	Mounting of marshalling box	Tank / Separately mounted as per GTP Cl. 27.1
4.2.11.12	Panel supply	240 V AC, single Phase , 50 Hz,
4.2.11.13	Panel accessories	i) Cubicle lamp with door switch and separate MCB ii) Approved space Heaters controlled by thermostat and separate MCB iii) Incoming MCB for the incoming supply iv) Panel wiring diagram fixed on back of panel door on Aluminum plate engraved fixed by rivet v) Stainless steel door handle with lock &

		<p>additional facility for padlock</p> <p>vi) Earthing boss for the marshaling box</p> <p>vii) Single phase power plug industrial type 15/5 Amp. With MCB</p> <p>viii) Single phase preventer.</p>
4.2.11.14	Painting of marshalling box	As per Cl. 4.10 of the specification
4.2.11.15	Hardware, Gasket, Cables and Wires, Terminal blocks, Cable gland, Cable lugs of marshalling box	As per Cl. 4.3, 4.4, 4.6, 4.7, 4.8, 4.9 of the specification respectively.
4.2.11.16	Fan motor control if installed in Marshalling box or separate Fan Control Cubicle	<p>i) 2 x 50 % fans</p> <p>ii) Complete fan control with MCB, Contactor, Bimetallic relay, in starter circuit with type 2 Coordinated rating as per IS</p> <p>iii) Automatic control from WTI contact</p> <p>iv) Provision for manual control both from local / remote.</p>
4.2.11.17	Control Cable Length	All the control Cable shall have Minimum 15 Meter of length including NIFPS control cable and OTI WTI.
4.3	Hardware	
4.3.1	External	M 12 Size & below Stainless Steel & above M 12 Hot Dip galvanized Steel
4.3.2	Internal	Cadmium plated except special hardware for frame parts and core assembly as per manufacturer's design
4.4	Gasket	
4.4.1	For Transformer , OLTC chamber, PT chamber, surfaces interfacing with oil like inspection cover etc.	Nitrile rubber based
4.4.2	For Cable boxes, Marshalling box, OLTC drive mechanism etc.	Neoprene rubber based
4.5	Valves	
4.5.1	Material of construction	Brass
4.5.2	Type	Both end flanged gate valve / butterfly valve depending on application
4.5.3	Size	As per manufacturer's standard
4.5.4	Essential provision	Position indicator, locking rod, padlocking facility, valve guard, cover plate.
4.6	Cable routing on Transformer	
4.6.1	Control cable specification	PVC insulated, extruded PVC inner sheathed, armoured, extruded PVC outer sheathed 1100 V grade control cable as per latest edition of IS 1554 part 1 minimum 2.5 sqmm for signals and 4 sqmm for CT with multistrand copper conductor

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4.6.2	Specification of wires to be used inside marshalling box , OLTC drive mechanism box	PVC insulated multistrand flexible copper wires of minimum 2.5 sqmm size, 1100 V grade as per latest edition of relevant IS
4.6.3	Essential provision for Capillary routing from Transformer to Marshalling box	Routing shall be done in such a way that adequate protection is available from mechanical and fire damage.
4.7	Terminal Blocks to be used by the vendor	Nylon 66 material, minimum 4 sq mm, screw type for control wiring and potential circuit. Terminal blocks to be located in such a way to achieve the termination height as min 250mm from gland plate
4.7.1	Essential provision for CT terminals	Sliding link type disconnecting terminal block screwdriver operated stud type with facility for CT terminal shorting material of housing melamine/ Nylon66
4.8	Cable glands to be used by the vendor	Nickel plated brass double compression weatherproof cable gland
4.9	Cable lugs to be used by the vendor	
4.9.1	For power cables	Long barrel medium duty Aluminium lug with knurling on inside surface
4.9.2	For Control Cable	Tinned copper pre insulated Pin, Ring, Fork type as applicable. For CT connection ring type lug shall be used.
4.10	Painting of transformer, Conservator, OLTC, Radiator, Cable boxes marshalling box	
4.10.1	Surface preparation	By 7 tank pretreatment process or shot blasting method
4.10.2	Finish on internal surfaces of the transformer interfacing with oil	Bright Yellow heat resistant and oil resistant paint two coats. Paint shall neither react nor dissolve in hot transformer insulating oil.
4.10.3	Frame parts	Bright Yellow heat resistant and oil resistant paint two coats. Paint shall neither react nor dissolve in hot transformer insulating oil.
4.10.4	Finish on inner surface of the Marshalling box	White Polyurethane paint anti condensation type two coats , minimum dry film thickness 80 microns
4.10.5	Finish on outer surface of the transformer, conservator, radiator, cable boxes, marshalling box	Smoke Grey (IS shade 692) Polyurethane paint two coats , minimum dry film thickness 80 microns

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5.0 Minimum Protective devices on Transformer

5.1	Spring loaded with detachable diaphragm type pressure relief valve with two trip contacts for the main tank of LSM model with limit switch design, IP 65 with additional rain hood.	Required
5.2	Spring loaded with detachable diaphragm type pressure relief valve with two trip contacts for OLTC of LSM model with limit switch design, IP 65 with additional rain hood.	Required
5.3	Double float bucholz relay with alarm and trip contacts, service and test position, with test cock for the main tank, Terminal box shall be IP 65 with drain plug for rain water draining. Additional rain hood shall be provided.	Required
5.4	Oil surge relay with two contacts, service and test position, with test cock for OLTC tank, Terminal box shall be IP 65 with drain plug for rain water draining. Additional rain hood shall be provided.	Required
5.5	Sudden pressure relay with trip contact for the main tank	Required
5.6	Oil temperature indicator metallic bulb type 150 mm diameter with maximum reading pointer, potential free independent adjustable alarm and trip contacts, resetting device with temperature sensing element	Required
5.7	HV and LV Winding temperature indicator 150 mm diameter with maximum reading pointer, two sets of potential free independent adjustable alarm and trip contacts, resetting device with temperature sensing element, thermal image coil	Required
5.8	2 nos. PT 100 sensors / RTDs for winding temperature indication and Oil temperature indication wired up to TBs in marshalling box for external connection.	Required
5.9	Magnetic switching for all the protective devices including Bucholz(alarm and Trip) OSR,SPR,WTI and OTI. Mercury switching is not acceptable	Required

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6.0 Fittings and Accessories on Transformer

6.1	Rating and Diagram Plate	Required
6.1.1	Material	Anodized aluminum 16SWG
6.1.2	Background	SATIN SILVER
6.1.3	Letters, diagram & border	Black
6.1.4	Process	Etching
6.1.5	Name plate details	<p>Following details shall be provided on rating and diagram plate as a minimum</p> <ul style="list-style-type: none"> i) Type / kind of transformer with winding material ii) standard to which it is manufactured iii) manufacturer's name iv) transformer serial number v) month and year of manufacture vi) rated frequency in Hz vii) rated voltages in kV viii) number of phases ix) rated power in kVA x) type of cooling (ONAN) xi) rated currents in A xii) vector group symbol xiii) 1.2/50μs wave impulse voltage withstand level in kV xiv) power frequency withstand voltage in kV xv) impedance voltage at rated current and frequency in percentage at principal, minimum and maximum tap xvi) load loss at rated current; xvii) no-load loss at rated voltage and frequency xviii) auxiliary loss xix) continuous ambient temperature at which ratings apply in $^{\circ}$C xx) top oil and winding temperature rise at rated load in deg C; xxi) temperature gradient of HV and LV winding xxii) winding connection diagram xxiii) weight of radiator xxiv) volume and weight of oil in radiator xxv) transport weight of transformer xxvi) weight of core and frame xxvii) weight of winding xxviii) weight of core and windings xxix) weight of tank and fittings xxx) total weight xxxi) volume of oil xxxii) weight of oil xxxiii) NCT, WCT, details

Spec

		xxxiv) type of OLTC xxxv) tapping details xxxvi) name of the purchaser xxxvii) PO no and date xxxviii) Guarantee period
6.2	Instruction Plate for OLTC anodized aluminium black lettering on satin silver background fixed by rivet	Required
6.3	Oil filling Instruction Plate anodized aluminium black lettering on satin silver background fixed by rivet	Required
6.4	Valve schedule plate anodized aluminium black lettering on satin silver background fixed by rivet	required
6.5	Instruction Plate anodized aluminium black lettering on satin silver background for flexible air cell for oil conservator	Required
6.6	Terminal marking Plate for Bushing, WTI, OTI, & RTD anodized aluminium black lettering on satin silver background fixed by rivet	Required
6.7	Company Monogram Plate	Required
6.8	Lifting Lugs/ bollards with antiskid head to lift complete transformer with oil	Required
6.9	Lashing Lug	Required
6.10	Jacking Pad with Haulage hole to raise or lower complete transformer with oil	Required
6.10.1	Essential provision for jacking pads	Designed in such a way that jacking of complete transformer with oil shall be possible with 3 nos jacking pads out of 4 nos jacking pads provided as a minimum
6.11	Rollers	Detachable Bidirectional Roller Assembly with corrosion resistant bearing, fitting/nipple for lubrication or with permanently lubricated bearing, anti-earthquake clamping device & locking device. The wheels shall be capable of swiveling when transformer is lifted with provision for locking the swivel movement. Roller shall be suitable for 90 lb rail. Suitable anti-rolling clamp for 90 lb rail minimum 4 nos. shall be provided.
6.12	Pockets for OTI, WTI & RTD on tank	Required
6.13	Pockets for ordinary thermometer on tank cover, top and bottom header of radiator, top of each radiator	Required
6.14	Ordinary thermometer 4 nos	Required
6.15	Drain valve (gate valve) for the main tank, 80 mm	Required

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6.16	Drain valve (gate valve) for OLTC, 50 mm	Required
6.17	Drain valve (gate valve) for all headers, 50 mm	Required
6.18	Filter valve (gate valve) at top and bottom of the main tank, 50 mm	Required
6.19	Sampling valve (gate valve) at top and bottom of the main tank, 15 mm	Required
6.20	Vacuum breaking valve (gate valve), 25 mm	Required
6.21	Drain Plug on tank Base	Required
6.22	Air Release Plug on various fittings and accessories	Required
6.23	Earthing pad on tank for transformer earthing complete with non ferrous nut , bolt, washers, spring washers etc.	Required
6.24	Vacuum pulling pipe with blanking plate on main conservator pipe work	Required
6.25	Rainhood (canopy) for Buchholz relay, PRV,MOG on main transformer and OLTC, OSR relay of OLTC	Required
6.26	Rainhood for vertical gasketed joints , in cable boxes	Required
6.27	Oil level gauge on tank for transformer shipment	Required
6.28	Earthing bridge by tinned copper strip jumpers on all gasketed joints at at least two points for electrical continuity	Required
6.29	Aluminium Ladder with anticlimbing device and safety flap, with lockable hinged plate for at least 1.5 m from ground level. Ladder shall be located in such a way that it avoids any hindrance to operation of nearby electrical / mechanical accessories etc.	Required
6.30	OLTC panel as specified	Required
6.31	Skid base welded type	Required
6.32	Core , Frame to tank Earthing	Required
6.33	Danger plate made of anodized aluminium white lettering on red background fixed by rivet	Required
6.34	Identification plate in English for all accessories, protective devices, instruments, thermometer/ RTD pockets, Earthing terminals, all inspection covers, cable boxes, marshalling boxes, etc. made of anodized aluminium black lettering on satin silver background fixed by rivet	Required

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6.35	Provision for Valves and NRV for mounting of Nitrogen Injection Fire Protection System (NIFPS).	Required
6.36	Separate structure for mounting cooling fans Note: Mounting of cooling fans on Radiator fins is not acceptable	Required
6.37	Terminal box of contacts from Earth, Core and Yoke with shorting link at top cover of Transformer	Required, The IR test will be performed on these terminals on trailer prior to unloading at site

7.0 OLTC

7.1	Requirement	For 33kV – CTR make EQ16 or equivalent. For 66kV – CTR make FQ 16 or equivalent No in-tank OLTC acceptable.
7.2	OLTC Gear Location	Side mounted on Conservator side not in front of HV bushing
7.3	Type of OLTC gear	The tapings shall be controlled by a high speed resistor transition type gear in which tap change is carried out virtually under 'no volt' 'no ampere' conditions and the selector switches do not make and break any current, main current is never interrupted and a resistor is provided to limit the arcing at diverter contacts to a minimum suitable for outdoor mounting and continuously rated for operating at all positions including positions in the middle of tap change. In particular, the tap change gear shall be suitable when delivering the full output plus permissible overload and operating the lowest voltage tap on the HV side. The value of the transition resistor shall be indicated on the rating plate of the OLTC with continuous current rating with reference to design ambient temperature specified.
7.4	Tappings	As per Cl. 34 of Annexure C
7.5	Operation of OLTC Gear	Selection of Local / Remote Operation by selector switch on OLTC drive mechanism.
7.5.1	Local operation	From OLTC drive mechanism through pistol grip rotary switch as well as emergency mechanical hand operation.
7.5.2	Remote operation	From Digital RTCC provided by customer /SCADA depending on the selection of control on Digital RTCC panel

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7.6	Safety Interlocks in OLTC	<p>Following safety interlock to be provided in OLTC as a minimum</p> <ul style="list-style-type: none"> i) Positive completion of tap changing step once initiated ii) Blocking of reverse tap change command during a forward tap change already in progress until the mechanism resets and vice-versa iii) Cutting of electrical circuits during mechanical operation iv) Mechanical stops to prevent overrunning of the mechanism at the end taps v) Interlock to avoid continuous tap change which will cut off motor supply in such events vi) Raise / Lower command in OLTC and Digital RTCC (Provided by Customer) shall be positively interlocked
7.7	Features of OLTC	<ul style="list-style-type: none"> i) OLTC mechanism and associated controls shall be housed in an outdoor , IP 55, weatherproof, verminproof, and dust proof cabinet ii) It shall be ensured that oil in compartments containing contacts making and breaking current, compartments containing contacts not making and breaking current and main transformer tank does not mix iii) The hand cranking arrangement shall be such that it can be operated at standing height from ground level. iv) Mechanical indicator to indicate completion of tap change operation shall be provided with suitable (Green & Red) colour code to confirm correct method of completion of tap change operation v) Contactors shall be placed in the OLTC Driving mechanism in such a way that the name- plate shall be visible on opening of door. vi) Protective cover shall be provided for raise and lower push buttons, external ON-OFF switch, which are mounted on OLTC Driving mechanism door. This is required to prevent unauthorized person operating these buttons. vii) It shall be possible to remove the

		<p>top cover of the OLTC tank without difficulty. The OLTC Conservator, piping & Oil Surge Relay shall be placed accordingly.</p> <p>viii) The tap change equipment shall be so designed that if the mechanism is stuck in an intermediate position, the transformer shall be capable of delivering full load without any damage.</p> <p>ix) Limit switches may be connected in the control circuit of the operating motor provided that a mechanical de-clutching mechanism is incorporated. Otherwise it shall be directly connected to the operating motor circuit and mechanical stop.</p> <p>x) Thermal devices or other means shall be provided to protect the motor and control circuits</p> <p>xi) The tap changer shall be capable of permitting parallel operation with other transformers for which necessary wiring and accessories, if any, shall be provided.</p> <p>xii) The control scheme for the tap changer shall be provided for independent control of the tap changers when the transformers are in independent service. In addition, provision shall be made to enable parallel operation control also at times so that the tap changer will be operated simultaneously when one unit is in parallel with another it will not become out of step and this will eliminate circulating current. Additional features like Master/ Follower and visual indication during the operation of motor shall also be incorporated.</p> <p>xiii) OLTC shall be suitable for bi-directional power flow in transformer</p> <p>xiv) Mechanical indicator and operation counter shall be visible through glass window OLTC drive mechanism door</p> <p>xv) External ON /OFF switch in addition to door switch.</p> <p>xvi) All HRC fuses shall be located in such a way that they are easily</p>
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		<p>replaceable.</p> <p>xvii) Motor Protection relay shall be provided with single phasing preventer for both current and voltage unbalance.</p> <p>xviii) All accessories inside drive mechanism shall be provided with metallic label , no sticker permitted.</p>
7.8	Essential BOM for OLTC drive mechanism (indicative only , Bidder to provide all necessary components to complete the function of the OLTC)	<p>i) Control circuit transformer 415/55-0-55 V, adequate capacity</p> <p>ii) Local remote selector switch 1 Pole, 2 Way, 6A, pistol grip</p> <p>iii) Retaining Switch Raise/Lower</p> <p>iv) Handle Interlock switch</p> <p>v) Raise / Lower switch 1 Pole, 2 Way, 6A, Pistol Grip</p> <p>vi) Lower limit switch</p> <p>vii) Raise limit switch</p> <p>viii) Tap Changer Motor, 415 V AC, 3 phase, adequate rating</p> <p>ix) Motor protection relay with single phasing preventor</p> <p>x) Motor control contactors Raise/ Lower</p> <p>xi) Stepping Relay</p> <p>xii) Out of step switch</p> <p>xiii) Tap position indicator</p> <p>xiv) Operation counter</p> <p>xv) Emergency stop Push button</p> <p>xvi) Tap change incomplete scheme with timer</p> <p>xvii) Required indication lamp</p>
7.9	Essential provision of accessories on OLTC	<p>i) Pressure relief valve</p> <p>ii) Oil surge relay</p>
7.10	Drive mechanism accessories	<p>i) Cubicle lamp with door switch and separate fuse / MCB with external ON / OFF switch on front cover of OLTC drive mechanism</p> <p>ii) Approved space Heaters controlled by thermostat and separate fuse /MCB</p> <p>iii) Incoming Fuse switch / MCB for the incoming supply</p> <p>iv) Panel wiring diagram fixed on back of panel door Aluminium engraved fixed by rivet</p> <p>v) Nylon 66 Terminal block min 4 sq mm screw type, with 10 % spare terminals</p> <p>vi) Stainless steel door handle with lock & additional facility for padlock.</p> <p>vii) Earthing boss</p>
7.11	Hardware, Gasket, Cables and Wires,	As per Cl. 4.3, 4.4, 4.6, 4.7, 4.8, 4.9 of the

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	Terminal blocks, Cable gland, Cable lugs of OLTC Drive mechanism	specification respectively.
7.12	OLTC and drive mechanism painting	As per Cl. 4.10 of the specification
7.13	RTCC Panel	Not In the Scope Of Supply

8.0 Approved make of components

8.1	CRGO	Nippon/JFE/Posco
8.2	Copper	Birla copper/Sterlite
8.3	Pre compressed Pressboard	Raman Board, Mysore/ Senapathy Whiteley
8.4	Laminated Wood	Permalli Wallance / Rochling Engineers
8.5	Oil	Apar/Savita/Raj
8.6	Condensor Bushings (OIP)	CGL/BHEL/ABB/ALSTOM
8.7	Porcelain Bushing	CJI/ /BHEL
8.8	Steel	TATA/Jindal/SAIL
8.9	Lugs/Glands	Jainson/Dowells/Comet
8.10	Radiators	CTR/Hi-Tech Radiators/Tarang Engineers
8.11	Fans	Marathon / Khaitan
8.12	Magnetic Oil Level Indicator	Sukrut /Yogya
8.13	Pressure relief valve	Sukrut / Qualitrol
8.14	Bucchholz Relay	Proyog / ATVUS
8.15	Oil surge Relay	Proyog / ATVUS
8.16	Winding Temperature Indicator	Precimeasure / Perfect Controls / Pradeep sales
8.17	Oil Temperature Indicator	Precimeasure / / Perfect Controls/ Pradeep Sales
8.18	Sudden Pressure Relay	Sukrut / Qualitrol
8.19	Aircell	Sukrut(Unirub)/Pronol / Rubber Product
8.20	Neutral CT	Pragati /ECS / KAPPA
8.21	WCT	Pragati / ECS / KAPPA
8.22	Switch	L&T (Salzer) / Siemens
8.23	HRC Fuse Links	Siemens / L&T/GE
8.24	Fuse base	Siemens / L&T/GE
8.25	AC Contactors & O/L Relay	L&T / Siemens / Schneider
8.26	Terminals	Connectwell / Elmex
8.27	Push buttons / Actuator	L&T / Siemens
8.28	Thermostat	Velco

8.29	Heater	Velco
8.30	Voltmeter Selector Switch	Siemens
8.31	Control selector switch	Siemens
8.32	Auxiliary Relays	ABB/Siemens/Schneider/L&T/GE
8.33	Timers	L&T /Siemens
8.34	Tap Position Indicator	Accord
8.35	Annunciator	Accord
8.36	Digital tap change counter	Selectron
8.37	LED cluster type indication lamp	L&T/ Siemens/ Schneider/ABB
8.38	NIFPS	CTR

Note – Any other make of component to be approved by purchaser

9.0 Quality assurance

9.1	Quality Assurance Program	<p>To be submitted before contract award. Program shall contain following</p> <ul style="list-style-type: none"> i) The structure of the polarization ii) The duties and responsibilities assigned to staff ensuring quality of work iii) The system for purchasing, taking delivery and verification of materials iv) The system for ensuring quality of workmanship v) The system for control of documentation vi) The system for the retention of records vii) The arrangements for the Supplier's internal auditing viii) A list of the administration and work procedures required to achieve and verify Contract's quality requirements. These procedures shall be made readily available to the Purchaser for inspection on request. ix) The manufacturers shall have dedicated quality personnel at each step of manufacturing. x) Manufacturers who are not approved vendors with BSES / REL can be considered after validation of their factory for quality processes.
9.2	Quality Plan	<p>To be submitted by the successful bidder for approval. Plan shall contain following as a minimum.</p> <ul style="list-style-type: none"> i) An outline of the proposed work and programme sequence i) The structure of the Supplier's organization for the contract ii) The duties and responsibilities assigned to staff ensuring quality of work for the contract iii) Hold and notification points iv) Submission of engineering documents required by the specification

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		<ul style="list-style-type: none"> v) The inspection of materials and components on receipt vi) Reference to the Supplier's work procedures appropriate to each activity vii) Inspection during fabrication/construction viii) Final inspection and test ix) Successful bidder shall include submittal of Mills invoice, Bill of lading, Mill's test certificate for grade, physical tests, dimension and specific watt loss per kG for the core material to the purchaser for verification in the quality plan suitably.
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10.0 Progress Reporting

10.1	Outline Document	To be submitted for purchaser approval for outline of production, inspection, testing, inspection, packing, dispatch, documentation programme
10.2	Detailed Progress report	To be submitted to Purchaser once a month containing <ul style="list-style-type: none"> i) Progress on material procurement ii) Progress on fabrication iii) Progress on assembly iv) Progress on internal stage inspection v) Reason for any delay in total programme vi) Details of test failures if any in manufacturing stages vii) Progress on final box up viii) Constraints ix) Forward path

11.0 Submittals

11.1	Submittals required with bid	<ul style="list-style-type: none"> i) Completed technical data schedule; ii) Descriptive literature giving full technical details of equipment offered; iii) Outline dimension drawing for each major component, general arrangement drawing showing component layout and general schematic diagrams; iv) Type test certificates, where available, and sample routine test reports; v) Detailed reference list of customers already using equipment offered during the last 5 years with particular emphasis on units of similar design and rating; vi) Details of manufacturer's quality assurance standards and programme and ISO 9000 series or equivalent national certification; vii) Deviations from this specification. Only deviations approved in writing before award of contract shall be accepted; viii) Recommended spare parts and consumable items
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		<p>for five years of operation with prices and spare parts catalogue with price list for future requirements</p> <ul style="list-style-type: none"> ix) Transport / Shipping dimension and weights, space required for handling parts for maintenance x) Write up on oil preservation system xi) Write up on OLTC xii) Quality Assurance Program
11.2	Submittals required after award for Approval (A), Reference I, and subsequent distribution	<ul style="list-style-type: none"> i) Programme for production and testing (A) ii) Guaranteed Technical Particulars (A) iii) General description of the equipment and all components, including brochures I iv) Calculations to substantiate choice of electrical, structural, mechanical component size/ratings (A) v) Detailed dimension drawing for all components, general arrangement drawing showing detailed component layout and detailed schematic and wiring drawings for all components like marshalling box and OLTC drive mechanism box vi) Detailed loading drawing to enable the Purchaser to design and construct foundations for the transformer I vii) Transport / shipping dimensions with weights, wheel base details, untanking height etc I viii) Terminal arrangements and cable box details (A) ix) Flow diagram of cooling system showing no of cooling banks (A) x) Drawings of major components like Bushing , CT etc (A) xi) Valve schedule diagram plate (A) xii) Instruction plate for flexible separator (A) xiii) Rating and diagram plate with OLTC connection details xiv) List of makes of all fittings and accessories (A) xv) Statement drawing attention to all exposed points in the equipment at which contact with or in close proximity to other metals and stating clearly what protection is employed to prevent corrosion at each point (A) xvi) Detailed installation and commissioning instructions xvii) Quality Plan
11.3	Submittals required at the final hold point prior to dispatch	<ul style="list-style-type: none"> i) Inspection and test reports carried out in manufacturer's works (A) ii) Test certificates of all bought out items iii) Operation and maintenance Instructions as well as

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		trouble shooting charts
11.4	Drawing and document sizes	Standard size paper A0, A1, A2, A3, A4
11.5	No of drgs /Documents required at different stages	As per Annexure A Scope of Supply

12.0 Inspection & Testing

12.1	Inspection and Testing during manufacture	
12.1.1	Tank and Conservator	<ul style="list-style-type: none"> i) Check correct dimensions between wheels demonstrate turning of wheels through 90 deg and further dimensional check. ii) Check for physical properties of materials for lifting lugs, jacking pads etc. All load bearing welds, including lifting lug welds shall be subjected to required load tests. iii) Leakage test of the conservator as per CBIP. iv) Certification of all test results. v) Oil leakage test on all tanks at normal head of oil plus 35 kN/sqm at the base of the tank for 24 hrs vi) Vacuum and Pressure test on tank as type test as per CBIP vii) Leakage test of radiators as per CBIP
12.1.2	Core	<ul style="list-style-type: none"> i) Vendor to submit the documentary evidence for procurement of CRGO laminations and prove that they have procured / used new core material. During in process inspection at lamination sub vendor, Customer shall randomly select / seal lamination for testing at ERDA / CPRI (Accredited NABL labs) for Specific core loss, accelerated ageing test, surface insulation resistivity, AC permeability and magnetization, Stacking factor, ductility etc. This testing shall be in the scope of vendor. ii) Check on the quality of varnish if used on the stampings. <ul style="list-style-type: none"> a) Measurement of thickness and hardness of varnish on stampings. b) Solvent resistance test to check that varnish does not react in hot oil. c) Check overall quality of varnish by sampling to ensure uniform hipping color, no bare spots. No ever burnt varnish layer and no bubbles on varnished surface. iii) Check on the amount of burrs. iv) Bow check on stampings. v) Check for the overlapping of stampings. Corners of the sheet are to be apart. vi) Visual and dimensional check during assembly stage. vii) Check on complete core for measurements of iron-loss and check for any hot spot by exciting the core

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		<p>so as to induce the designed value of flux density in the core.</p> <p>viii) Check for inter laminar insulation between core sectors before and after pressing.</p> <p>ix) Visual and dimensional checks for straightness and roundness of core, thickness of limbs and suitability of clamps.</p> <p>x) High voltage test (2 KV for one minute) between core and clamps.</p> <p>xi) Certification of all test results.</p>
12.1.3	Insulating Materials	<p>i) Sample check for physical properties of materials.</p> <p>ii) Check for dielectric strength.</p> <p>iii) Visual and dimensional checks.</p> <p>iv) Check for the reaction of hot oil on insulating materials.</p> <p>v) Certification of all test results.</p>
12.1.4	Windings	<p>i) Sample check on winding conductor for mechanical properties and electrical conductivity.</p> <p>ii) Visual and dimensional check on conductor for scratches, dept. mark etc.</p> <p>iii) Sample check on insulating paper for PE value, Bursting strength, Electric strength.</p> <p>iv) Check for the reaction of hot oil on insulating paper.</p> <p>v) Check for the bending of the insulating paper on conductor.</p> <p>vi) Check and ensure that physical condition of all materials taken for winding is satisfactory and free of dust.</p> <p>vii) Check for absence of short circuit between parallel strands.</p> <p>viii) Check for Brazed joints wherever applicable.</p> <p>ix) Measurement of voltage ratio to be carried out when core/ yoke is completely restocked and all connections are ready.</p> <p>x) Certification of all test results.</p>
12.1.4.1	Checks before drying process	<p>i) Check conditions of insulation on the conductor and between the windings.</p> <p>ii) Check insulation distance between high voltage connection distance between high voltage connection cables and earthed and other live parts.</p> <p>iii) Check insulation distance between low voltage connection and earthed and other parts.</p> <p>iv) Insulation test of core earthing.</p> <p>v) Check for proper cleanliness</p> <p>vi) Check tightness of coils i.e. no free movement.</p> <p>vii) Certification of all test results.</p>
12.1.4.2	Checks during drying process	<p>i) Measurement and recording of temperature and drying time during vacuum treatment.</p> <p>ii) Check for completeness of drying.</p> <p>iii) Certification of all test results.</p>

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12.1.5	Oil	As per BSES specification.
12.1.6	Test on fittings and accessories	As per manufacturer's standard
12.2	Routine / Acceptance tests	<p>The sequence of routine testing shall be as follows</p> <ul style="list-style-type: none"> i) Visual and dimension check for completely assembled transformer ii) Measurements of voltage ratio iii) Measurements of winding resistance at each taps. iv) Vector Group and polarity test v) *Measurements of insulation resistance and polarization index vi) Separate sources voltage withstand test. vii) Measurement of iron losses and exciting current at rated frequency and 90%, 100% and 110% rated voltage. viii) Induced over voltage withstand test. ix) Load losses measurement at principal, minimum and maximum taps. x) Impedance measurement of principal, minimum and maximum taps of the transformer. x) Routine test of tanks xi) Induced voltage withstand test (to be repeated if type tests are conducted). xii) Measurement of Iron loss (to be repeated if type test are conducted). xiii) Measurement of capacitance and Tan Delta for transformer winding and HV bushing and Tan Delta for transformer oil (for all transformers). xiv) Phase relation test; Polarity, angular displacement and phase sequence. xv) Ratio of HVWTI CT, LV WTI CT and neutral CT xvi) Excitation and Knee point voltage test on class PS core of neutral CT: <ul style="list-style-type: none"> xviii) Routine Test on on-load tap changer. xix) IR test from terminals mentioned in Clause no 6.37 xviii) Oil leakage test on assembled transformer xviii)Magnetic balance test <ul style="list-style-type: none"> xix) Measure the auxiliary loss (Loss of fan) xx) Power frequency voltage withstand test on all auxiliary circuits. xxi) Certification of all test results. xxii) Temperature rise test as per IS# xxiii) SFRA <p>Note 1: *Insulation resistance measurement shall be carried out at 5kV. Value of IR should not be less than 2000 Mohms. Polarisation Index ($PI = IR_{10min}/IR_{1min}$) should not be less than 1.5 (If one minute IR value is above 5000 Mohms and it is not be possible to obtain an accurate 10 minutes</p>

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		<p>reading, in such cases polarisation index can be disregarded as a measure of winding condition.</p> <p>Note 2: #Temperature rise test is necessary to be carried out on 5% of the order quantity (subject to minimum 1) at the manufacturer's works. Purchaser's engineer, will at his discretion, select transformer for temp. rise test at manufacturer's works and witness the same for comparison with type test results.</p> <p>Note 3: CRGO shall be verified as per annexure CR</p>
12.3	Type Tests	<p>Following type test shall be carried out on one transformer of each rating & type per lot offered from the lot offered for inspection.</p> <ul style="list-style-type: none"> i) Impulse withstand test on all three HV and LV limbs of the transformers for chopped wave as per standard ii) Temperature rise test as per IS iii) Dissolved gas analysis before and after Temperature Rise Test to be carried out from CPRI/ERDA iv) Pressure relief device test v) Pressure and Vacuum test on tank* (*stage inspection).
12.4	Special Tests	<p>Following tests shall be carried out on one transformer of each rating and type</p> <ul style="list-style-type: none"> i) Measure of zero seq. impedance (Cl. 16.10 IS 2026 Part I). <ul style="list-style-type: none"> ii) Measurement of acoustic noise level (Cl. 16.12 of IS 2026 Part I). iii) Measurement of harmonic level on no load current. iv) CRGO testing for Specific core loss, accelerated ageing test, surface insulation resistivity, AC permeability and magnetization, Stacking factor, ductility etc. v) Oil testing to be tested at ERDA/CPRI labs, whose samples shall be selected & sealed by customer inspection engineer.
12.5	Site Acceptance test	<p>Following tests shall be conducted while receiving the Power Transformer.</p> <ul style="list-style-type: none"> i) Insulation Resistance from terminal box mentioned in clause no 6.37. The test shall be conducted on following basis: <ul style="list-style-type: none"> a) The IR test will be performed on the terminals mentioned in clause no 6.37 on trailer prior to unloading at site. b) The results shall be compared with the results obtained during inspection. c) The IR value in any of the tests (Factory as well as site) should not be less than

		<p>1000M Ohm</p> <p>d) To access internal physical damage during transportation, Transformer will not be received if the site results are less than 1000MOhm.</p> <p>ii) SFRA with same kit done at factory (Instrument shall be in Vendors scope</p>
12.5	Note for Type test and Special test	Cost of the above tests, if extra, shall be quoted separately by the Bidder, which shall be considered in the price evaluation.
12.6	Notification to bidders	<p>The product offered must be of type tested design with valid type test report of not more than five (5) years.</p> <p>In case the product offered is never type tested for tests as per above list, type tests to be conducted by bidder at his own cost at Govt. recognized independent test laboratory / Internationally accredited test lab or at manufacturer's facility if it is approved by competent authority</p> <p>Valid Type test reports for Dynamic Short circuit test as per IS may be forwarded for customer's review and approval.</p> <p>In case the product offered is never tested for dynamic short circuit the same to be conducted by bidder at his own cost at Govt. recognized independent test laboratory / Internationally accredited test lab.</p>

13.0 Packing, Shipping, Handling and Storage

13.1	Packing	
13.1.1	Packing protection	Against corrosion, dampness, heavy rains, breakage and vibration
13.1.2	Packing for accessories and spares	Robust wooden non returnable packing case with all the above protection
13.1.3	Packing details	<p>On each packing case details required as follows</p> <p>i) Individual serial number;</p> <p>ii) Purchaser's name;</p> <p>iii) PO number;</p> <p>iv) Destination; ;</p> <p>v) Supplier's name;</p> <p>vi) Name and address of supplier's agent</p> <p>vii) Description and numbers of contents;</p> <p>viii) Manufacturer's name</p> <p>ix) Country of origin</p> <p>x) Case measurements</p> <p>xi) Gross and net weights in kilograms</p> <p>xii) All necessary slinging and stacking instructions.</p>

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13.2	Shipping	The bidder shall ascertain at an early date and definitely before the commencement of manufacture, any transport limitations such as weights, dimensions, road culverts, overhead lines, free access etc. from the manufacturing plant to the project site; and furnish to the Purchaser confirmation that the proposed packages can be safely transported, as normal or oversize packages, upto the plant site. Any modifications required in the infrastructure and cost thereof in this connection shall be brought to the notice of the Purchaser.
13.3	Handling and Storage	As per manufacturer's instruction

14.0 COMMISSIONING SUPPORT

Supervision of Erection and Commissioning inclusive of all testing equipments/instruments shall be included for minimum 3 days for each Transformer.

It includes following:

- a) BRPL will give vendor 7 days advance notice prior to erection testing and commissioning of Transformer.
- b) After successful erection testing and commissioning of Transformer Vendor shall issue erection quality check certificate to BRPL.

15.0 TRAINING

- a) Training on installation, commissioning, operation and maintenance shall be included in the proposal.
 - at factory
 - at site after installation

16.0 Deviations

Deviations from this Specification shall be stated in writing with the tender by reference to the Specification clause/GTP/Drawing and a description of the alternative offer. In absence of such a statement, requirements of the Specification shall be met without exception.

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Annexure - A

Scope of supply

The scope of supply shall include following

- 1.1 Design, manufacture, assembly, testing at stages of manufacture as per Cl. 12 of this specification, final testing at manufacturer works on completely assembled transformer before dispatch, packing, transportation, delivery and submission of all documentation for the Power transformer with all accessories as below and ratings & requirements as specified in Annex C.

Sr. No	Description	Scope of Supply
1.0	Fully assembled transformer with all major parts like conservator, Radiators, Marshalling box, Protective devices as per Clause 5.0 of this specification, Fittings and accessories as per Clause 6.0 of this specification	YES
1.1	OLTC as per this specification	YES
1.2	RTCC panel as per this specification	No
1.3	HV, LV, LV NEUTRAL cable boxes	YES
1.4	Support steel material for support of cable boxes from ground	YES
1.5	Foundation Bolts for complete transformer	YES
1.6	Nickel Plated brass double compression weather proof glands for HV and LV cables	No
1.7	Long barrel medium duty Aluminium lugs for power cables	YES
1.8	Nickel Plated brass double compression weatherproof glands and tinned copper lugs for control cable termination in Marshalling box for vendor's cables	YES
1.9	Cables and wires for transformer accessories and internal wiring of Marshalling box	YES
1.10	Touch up paint, minimum 5 litres	YES
1.11	Extra Transformer oil 10 % in non returnable drums	YES
1.12	One spare complete set of gaskets	YES
1.13	One set (4 nos in a set) of anti rolling clamp for 90 lb rail	YES

1.14	Ordinary Thermometers 4 nos	YES
1.15	Recommended spares as per manufacturer	YES
1.16	Provision for mounting of NIFPS system	YES
2.0	Routine testing as per Cl. 12 of this specification	YES
3.0	Type testing as per Cl. 12 of this specification	YES
4.0	Special testing as per Cl. 12 of this specification	YES
5.0	Submission of Documentation as detailed below	YES

2.0 Submission of documents

Submission of drawings, calculations, catalogues, manuals, test reports shall be as follows

	Along with offer	For Approval after award of contract	Final after approval / *After completion of delivery	Remarks
Drawings	3 copies (Typical drgs)	4 copies	12 copies + 1 soft copy in CD	See Clause 11 for various drawings required
Calculations	3 copies (Typical)	4 copies	6 copies + 1 soft copy in CD	See Clause 11 for details
Catalogues	1 copy		12 copies + 1 soft copy in CD	
Instruction manual for the transformer	1 copy		12 copies + 1 soft copy in CD	
Type Test Report & Routine Test Report*	2 copies (Type test and sample Routine Test)		12 copies + 1 soft copy in CD Routine Test Report	

3.0 Delivery schedule

- 3.1 Delivery period start date - from date of purchase order
- 3.2 Delivery period end date - as agreed with supplier
- 3.3 Material dispatch clearance - after inspection by purchaser and written dispatch clearances from purchaser

Annexure B

Service Conditions

2.0.0	Delhi Atmospheric conditions	
a)	Average grade atmosphere :	Heavily polluted, dry
b)	Maximum altitude above sea level	1000 M
c)	Ambient Air temperature	Highest 50 deg C, Average 40 deg C
	Design ambient air temperature	50 deg C
d)	Relative Humidity	90 % Max
e)	Seismic Zone	4
f)	Rainfall	750 mm concentrated in four months

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Annexure – C

Technical particulars (Data by purchaser)

Sr No	Description	Data by purchaser	
1.0	Location of equipment	OUTDOOR	
2.0	Reference design ambient temperature	40 deg C	
3.0	Type	Oil immersed, core type, step down	
4.0	Type of cooling	ONAN / ONAF(see note 1)	
5.0	Reference standard	IS: 2026	
6.0	No. of phases	3	
7.0	No. of windings per phase	2	
8.0	Rated frequency (Hz)	50 Hz	
9.0	Rated voltage (kV)		
9.1	HV winding	33	66
9.2	LV winding	11	11
10.0	Vector Group Reference	Dyn11	Dyn11
11.0	Nominal Continuous Rating, MVA		
11.1	For 20/25MVA		
	ONAN	20	20
	ONAF	25	25
11.2	For 25/31.5MVA		
	ONAN	25	25
	ONAF	31.5	31.5
12.0	Impedance at Principal tap at rated frequency with IS tolerance	12 % (for 20 MVA) 15% (for 25MVA) 15%(31.5MVA)	12 % (for 20 MVA) 15% (for 25MVA) 15%(31.5MVA)
13.0	Maximum no load loss at rated condition allowed without any positive tolerance, kW	12kW (For upto 25MVA) 14kW (For 31.5MVA)	12kW (for Upto 25MVA) 14kW (For 31.5MVA)
14.0	Maximum load loss at rated condition @ 75 deg C and principal tap allowed without any positive tolerance, kW	85kW (for 25MVA) 115kW (for 31.5MVA)	85 kW (for 25MVA) 115kW (for 31.5MVA)

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15.0	Terminal connection / Cable / Conductor Size		
15.1	HV side	33 kV	66 kV
		By 2 runs of 3 C x 400 sq.mm A2XFY, 33 kV (E) grade cable	By Single / Double ACSR "ZEBRA" conductor per phase
15.2	LV side	<ol style="list-style-type: none"> 1) By 3 runs of 1C x 1000 sqmm per phase A2XY unarmoured cable 11 kV (E) grade cable (For 25MVA) 2) By 4 runs of 1C x 1000 sqmm per phase A2XY unarmoured cable 11 kV (E) grade cable (For 31.5MVA) 	<ol style="list-style-type: none"> 1) 3 runs of 1C x 1000 sqmm per phase A2XY unarmoured cable 11 kV (E) grade cable 2) 4 runs of 1C x 1000 sqmm per phase A2XY unarmoured cable 11 kV (E) grade cable
15.3	LV neutral	By G.S Strip minimum 2x 75 x 10 mm size	By G.S Strip minimum 2x 75 x 10 mm size
16.0	Highest system voltage HV side, kV	36	72.5
17.0	Highest system voltage LV side, kV	12	12
18.0	Lightning Impulse withstand voltage , kV peak		
18.1	For nominal system voltage of 11 kV	75	
18.2	For nominal system voltage of 22 kV	125	
18.3	For nominal system voltage of 33 kV	170	
18.4	For nominal system voltage of 66 kV	325	
18.0	Power Frequency Withstand Voltage kV rms		
18.1	For nominal system voltage of 11 kV	28	
18.2	For nominal system voltage of 22 kV	50	
18.3	For nominal system voltage of 33 kV	70	
18.4	For nominal system voltage of 66 kV	140	
19.0	Clearances Phase to Phase , mm		

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19.1	For nominal system voltage of 11 kV	280
19.2	For nominal system voltage of 22 kV	330
19.3	For nominal system voltage of 33 kV	350
19.4	For nominal system voltage of 66 kV	700
20.0	Clearances Phase to Earth , mm	
20.1	For nominal system voltage of 11 kV	140
20.2	For nominal system voltage of 22 kV	230
20.3	For nominal system voltage of 33 kV	320
20.4	For nominal system voltage of 66 kV	660
20.5	Ground clearance – Live part to ground for 66kV – mm	4000
21.0	System Fault Level , HV side	1500 MVA for 33 kV 3600 MVA for 66 kV
22.0	System Fault Level , LV side	500 MVA for 11 kV
23.0	Short Circuit withstand Capacity of the transformer	
23.1	Three phase dead short circuit at secondary terminal with rated voltage maintained on the other side	For 3 secs.
23.2	Single phase short circuit at secondary terminal with rated voltage maintained on other side	For 3 secs.
24.0	System earthing	
24.1	HV	Solidly earthed
24.2	LV	Solidly earthed
25.0	Overload Capability	As per IS 6600
26.0	Noise Level	Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard



27.0	Radio Influence Voltage	Maximum 250 microvolt
28.0	Harmonic suppression	Transformer to be designed for suppression of 3 rd , 5 th , 7 th harmonic voltages and high frequency disturbances.
29.0	Partial Discharge	Transformer to be free from partial discharge upto 120 % of rated voltage as the voltage is reduced from 150 % of rated voltage i.e. there shall be no significant rise above background level
30.0	Temperature rise of top oil by thermometer	40 deg C
31.0	Temperature rise of winding by resistance	45 deg C
32.0	Note for the bidders	(left blank)
33.0	Tappings to be provided on HV winding for OLTC	+ 5 % to -15 % @ step of 1.25 % 16 taps, 17 tap positions, Tap no.5 is principal tap
34.0	Maximum flux density allowed in the core at extreme over excitation / over fluxing	1.9 Tesla
35.0	Maximum current density allowed at any tap	3.0 A / sqmm.
36.0	AVR input voltage / aux. supply	(Not applicable)
37.0	Bushing Parameters	
37.1	Rated current	1000A for 33kV bushing 2000A for 11kV bushing
37.2	Creepage factor for all bushing mm / KV	31 mm / kV minimum
37.3	Rated thermal short time current for all bushing	25 times rated current for 2 secs.
37.4	Angle of mounting	0 to 90 degree
37.5	Cantilever withstand load	2000N for 66kV bushing 1250N for 33kV bushing 2000N for 11kV bushing
37.6	Overall Length(Approx)	1085mm for 66kV bushing 678mm for 33kV bushing 503mm for 11kV bushing
37.7	Diameter of base	100mm



Note 1:

For ONAN and ONAF rating the temperature rise of the transformer shall be within the values specified at sl. No. 31.0 and 32.0 above. Under ONAF cooling 20% spare cooling fans shall be provided. Design of cooling equipment and control shall comply to CBIP clause no. 2.1.3 of Section A (general)

Note 2 :

The transformers will be evaluated against the losses guaranteed by the bidders with capitalization of losses as per figures indicated under sl.no. 30.1, 30.2 and 30.3 above. However, the maximum loss figures acceptable are as per cl. 13.0 & 14.0 of Annexure C. In the event of measured loss figures during testing exceeding the guaranteed loss figures of the successful bidder penalty shall be levied at a rate of 1.25 times the figures mentioned above for no load, load losses and cooler loss.

Javed

Annexure-N (Technical specification of NIFPS)**1.0.0 SUPPLY AND SCOPE WORK**

Design, manufacture, testing of the assembled system at manufacturer's works before dispatch, packing and supply at site, erection and commissioning of the Nitrogen Injection Fire Protection system

Installation testing and commissioning of Nitrogen Injection Fire Protection system shall be in scope of bidder. All material including Pipes, ducts control cables, tools, tackles, hardware, testing equipments and manpower required for the work shall be in scope of bidder except for any type of civil work like fire wall, soak pit etc. Bidder if feels shall conduct physical survey of the power transformer to check feasibility and quantum of work involved.

2.0.0 INTRODUCTION

Nitrogen Injection Fire Protection System (NIFPS) shall use nitrogen as fire quenching medium. The protective system shall prevent transformer / Reactor oil tank explosion and possible fire in case of internal faults. In the event of fire by external causes such as bushing fire, OLTC fires, fire from surrounding equipment etc, it shall act as a fast and effective fire fighter without any manual intervention. It shall accomplish its role as fire preventer and extinguisher without employing water and / or carbon dioxide. Fire shall be extinguished within 3 minutes (Maximum) of system activation and within 30 seconds (maximum) of commencement of nitrogen injection.

3.0.0 APPLICABLE CODES AND STANDARDS

The design and installation of the complete fire protection system shall comply with the latest applicable Indian standards

- a) **IS 10028 (Part II)** : Code of practice for selection, installation, and maintenance of transformer
- S **Tariff Advisory Committee** : Regulations for the electrical equipment of buildings
- S **National fire Codes 1993 of National Fire Protection Association (NFPA) USA**
- d) **Central Electricity Authority, The Gazette of India, Extraordinary 2010** : Safety provisions for electrical installations and apparatus of voltage exceeding 650V

4.0.0 ACTIVATION OF THE FIRE PROTECTIVE SYSTEM

Mal-functioning of fire prevention / extinguishing system could lead to interruption in power supply. The supplier shall ensure that the probability of chances of malfunctioning of the fire protective system is practically zero. To achieve this objective, the supplier shall plan out his scheme of activating signals which should not be too complicated to make the fire protective system inoperative in case of actual need and should not be



dependent on auxiliary power source. The system shall be provided with automatic control for fire prevention and fire extinction without any manual intervention. Besides automatic control, remote electrical push button control at Control box and local manual control in the fire extinguishing cubicle shall also be provided. The following electrical-signals shall be required for activating the fire protective system under prevention mode / fire extinguishing mode.

4.1.0 Auto Mode

4.1.1 For prevention of fire :

Differential relay operation + Buchholz relay paralleled with pressure relief valve or RPRR (Rapid Pressure Rise Relay) + Tripping of all or one circuit breakers (on HV & LV/IV side) associated with transformer / reactor is the pre-requisite for activation of system. The system shall have sufficient Input modules.

4.1.2 For extinguishing fire :

Fire detector + Buchholz relay paralleled with pressure relief valve (PRV) or sudden pressure relay (SPR) + tripping of all circuit breakers (on HV & LV/IV side) associated with transformer / reactor is the pre-requisite for activation of system.

4.2.0 Manual Mode (Local / Remote electrical)

Tripping of all circuit breakers (on HV & LV/IV side) associated with transformer/reactor is the pre-requisite for activation of system.

4.3.0 Manual Mode (Mechanical)

Tripping of all circuit breakers (on HV & LV/IV side) associated with transformer / Reactor is the pre-requisite for activation of system.

The system shall be designed to be operated manually in case of failure of power supply to fire protection system.

5.0.0 GENERAL DESCRIPTION

Nitrogen injection fire protection system should be a dedicated system for each oil filled transformer / reactor. It should have a Fire Extinguishing Cubicle (FEC) placed on a plinth at 5-7m away (as per statutory requirement) from transformer / reactor or placed next to the fire wall if fire wall exists. The FEC shall be connected to the top of transformer / reactor oil tank for depressurization of tank and to the oil pit as per Indian standard and CBIP from its bottom through oil pipes. The fire extinguishing cubicle should house a pressurized nitrogen cylinder(s) which is connected to the oil tank of transformer/reactor oil tank at bottom. The Transformer Conservator Isolation Valve (TCIV) is fitted between the conservator tank and Buchholz relay.

Cable connections are to be provided from signal box to the control box in the control room, control box to fire extinguishing cubicle, TCIV to signal box and any other wiring to ensure proper functioning of the fire protection system. Fire detectors placed on the top of transformer/reactor tank are to be connected in parallel to the signal box by Fire survival cables. Control box is also to be connected to relay panel in control room for receiving system activation signals. All panel or control equipments shall be fire proof so as to ensure that they do not fail themselves in event of fire.

David

6.0.0 OPERATION

On receipt of all activating signals, the system shall drain pre-determined volume of hot oil from the top of tank (i.e top oil layer), through outlet valve, to reduce tank pressure by removing top oil and simultaneously injecting nitrogen gas at high pressure for stirring the oil at pre-fixed rate and thus bringing the temperature of top oil layer down. Transformer conservator isolation valve blocks the flow of oil from conservator tank in case of tank rupture / explosion or bushing bursting. Nitrogen occupies the space created by oil drained out and acts as an insulating layer over oil in the tank and thus preventing aggravation of fire.

7.0.0 SYSTEM COMPONENTS

Nitrogen injection fire protection system shall broadly consist of the following components. However, all other components which are necessary for fast reliable and effective working of the fire protective system shall be deemed to be included in the scope of supply.

7.1.0 Fire Extinguishing Cubicle (FEC)

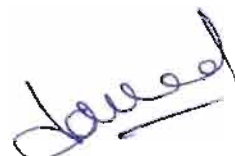
The FEC shall be made of CRCA sheet of 3 mm (minimum) thick complete with the base frame, painted inside and outside with post office red colour (shade 538 of IS-5). It shall have hinged split doors fitted with high quality tamper proof lock. The degree of protection shall be IP55. The following items shall be provided in the FEC.

- a. Nitrogen gas cylinder with regulator and falling pressure electrical contact manometer
- b. Oil drain pipe with mechanical quick drain valve.
- c. Control equipment for draining of oil of pre-determined volume and injecting regulated volume of nitrogen gas
- d. Pressure monitoring switch for back-up protection for nitrogen release
- e. Limit switches for monitoring of the system
- f. Butterfly valve with flanges on the top of panel for connecting oil drain pipe and nitrogen injection pipes for transformer/reactors
- g. Panel lighting (CFL Type)
- h. Oil drain pipe extension of suitable sizes for connecting pipes to oil pit.

7.2.0 Control box

Control box is to be placed in the control room for monitoring system operation, automatic control and remote operation. Control supply will be 50/220VDC (15% tolerance) based on site requirement. The following alarms, indications, switches, push buttons, audio signal etc. shall be provided.

- a. System on
- b. TCIV open
- c. Oil drain valve closed
- d. Gas inlet valve closed
- e. TCIV closed*
- f. Fire detector trip *
- g. Buchholz relay trip
- h. Oil drain valve open*
- i. Extinction in progress *



- j. Cylinder pressure low *
- k. Differential relay trip
- l. PRV / SPR trip
- m. Master relay of Transformer/reactor trip
- n. System out of service *
- o. Fault in cable connecting fault fire detector
- p. Fault in cable connecting differential relay
- q. Fault in cable connecting Buchholz relay
- r. Fault in cable connecting PRV / SPR
- s. Fault in cable connecting transformer /reactor trip
- t. Fault in cable connecting TCIV
- u. Auto/ Manual / Off
- v. Extinction release on / off
- w. Lamp test
- x. Visual/ Audio alarm*
- y. Visual/ Audio alarm for DC supply fail *

Suitable provision shall be made in the control box, for monitoring of the system from remote substation using the substation automation system.

7.3.0 Transformer Conservator Isolation Valve

Transformer conservator isolation valve (TCIV) to be fitted in the conservator pipe line, between conservator and buchholz relay which shall operate for isolating the conservator during abnormal flow of oil due to rupture / explosion of tank or bursting of bushing. The valve shall not isolate conservator during normal flow of oil during filtration or filling or refilling, locking plates to be provided with handle for pad locking. It shall have proximity switch for remote alarm and indication glass window for visual inspection for physical checking of the status of valve.

The TCIV should be of the best quality as malfunctioning of TCIV could lead to serious consequence. The closing of TCIV means stoppage of breathing of transformer/reactor. Fire survival cable connecting TCIV shall be terminated in transformer marshalling box.

7.4.0 Fire detectors

The system shall be complete with adequate number of fire detectors (quartz bulb) fitted on the top cover of the transformer / reactor oil tank. The system generates signal after sensing higher temperature. The placing of fire detectors and numbers shall be designed and finalized by bidder as per requirement.

7.5.0 Signal box

It shall be mounted away from transformer / reactor main tank, preferably near the transformer marshalling box, for terminating cable connections from TCIV & fire detectors and for further connection to the control box. The degree of protection shall be IP55.

7.6.0 Cables

Fire survival cables (capable to withstand 750° C.) of 4 core x 1.5 sq. mm size for connection of fire detectors in parallel shall be used. The fire survival cable shall conform to BS 7629-1, BS 8434-1, BS 7629-1 and BS 5839-1, BS EN 50267-2-1 or relevant Indian standards.

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Fire Retardant Low Smoke (FRLS) cable of 12 core x 1.5 sq. mm size shall be used for connection of signal box / marshalling box near transformer/reactor and FEC mounted near transformer/reactor with control box mounted in control room.

Fire Retardant Low Smoke (FRLS) cable of 4 core x 1.5 sq. mm size shall be used for connection between control box to DC and AC supply source, fire extinguishing cubicle to AC supply source, signal box/ marshalling box to transformer conservator isolation valve connection on transformer/reactor.

7.7.0 Pipes

Heavy duty pipe connecting the transformer/reactor tank for oil rain, and for nitrogen injection shall be provided. Pipes connecting oil tank laid underground, shall be preferably be used for interconnection. Pipes, complete with connections, flanges, bends and tees etc. shall be supplied along with the system.

7.8.0 Other items

- 7.8.1 Oil drain and nitrogen injection openings with gate valves on transformer / reactor tank at suitable locations.
- 7.8.2 Flanges with dummy piece in conservator pipe between Buchholz relay and conservator Tank for fixing TCIV.
- 7.8.3 Fire detector brackets on transformer / reactor tank top cover.
- 7.8.4 Spare potential free contacts for activating the system i.e. in differential relay, Buchholz relay, Pressure Relief Device / RPRR, Circuit Breaker of transformer/reactor
- 7.8.5 Pipe connections between transformer / reactor and FEC and between FEC and oil pit required for collecting top oil.
- 7.8.6 Cabling for fire detectors mounted on transformer /reactor top cover
- 7.8.7 Inter cabling between signal box, control box and Fire Extinguishing Cubicle (FEC).
All external cables from / to the system i.e. signal box to control box and control box to FEC shall be provided by the purchaser. All internal cables within the system i.e. between detectors / signal box / marshalling box / FEC / TCIV shall be in the scope of NIFPS supplier.
- 7.8.8 Butterfly valves /Gate valves on oil drain pipe and nitrogen injection pipe which should be able to withstand full vacuum.
- 7.8.9 Supports, signal box etc. which are to be painted with enamelled paint.

The doors, removable covers and panels shall be gasketed all round with neoprene gaskets.

8.0.0 MANDATORY SPARES

Cylinder filled with Nitrogen of required capacity per substation	1 No.
Fire Detectors per transformer	3 No's.
Regulator assembly per sub-station	1 No.

9.0.0 TESTS

Reports of all type test conducted as per relevant IS/IEC standards in respect of various bought out items including test reports for degree of protection for FEC /control box / signal box shall be submitted by the supplier.

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The supplier shall demonstrate the functional test associated with the following:

- Fire Extinguishing Cubicle, Control Box.
- Fire Detector.
- Transformer Conservator Isolation Valve

The performance test of the complete system shall be carried out after erection of the system with transformer at site.

10.0.0 DOCUMENTS TO BE SUBMITTED

10.1.0 To be submitted along with offer

- 10.1.1 General outline of the system.
- 10.1.2 Detailed write-up on operation of the offered protection system including maintenance and testing aspects / schedules.
- 10.1.3 Technical Data particulars (GTP), the format of which is attached in Annexure A of the specification
- 10.1.4 Data regarding previous supplies, date of commissioning, performance feedback etc.
- 10.1.5 Document related to Type test / proof of design as required by statutory body / electrical inspector

10.2.0 To be submitted after award of contract:

Detailed dimensional layout drawing of the system with complete bill of materials, clearances from ground and other live points, details of detectors, equipment layout drawings, detailed drawings pertaining to signal box, control box, FEC equipment, wiring and schemes, 4 sets of testing, commissioning, Operation and Maintenance manual along with soft copies (in CDs) shall be submitted by the supplier.

11.0.0 PACKING, SHIPPING, HANDLING & SITE SUPPORT

11.1.0	Packing Protection	The packing shall be fit to withstand rough handling during transit and storage at destination. The test set should be properly protected against corrosion, dampness & damage.
11.2.0	Packing for accessories and spares	Robust non-returnable packing case with all the above protection & identification Label. The bidder should get the packing list approved before dispatching the material.
11.3.0	Packing Identification Label	On each packing case, following details are required:
11.3.1	Individual serial number	
11.3.2	Purchaser's name	
11.3.3	PO number (along with SAP item code, if any) & date	
11.3.4	Equipment Tag no. (if any)	
11.3.5	Destination	
11.3.6	Manufacturer / Supplier's name	
11.3.7	Address of Manufacturer / Supplier / it's agent	
11.3.8	Description	

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11.3.9	Country of origin	
11.3.10	Month & year of Manufacturing	
11.3.11	Case measurements	
11.3.12	Gross and net weight	
11.3.13	All necessary slinging and stacking instructions	
11.4.0	Shipping	The seller shall be responsible for all transit damage due to improper packing.
11.5.0	Handling and Storage	Manufacturer instruction shall be followed.
11.6.0	Detail handling & storage instruction sheet / manual to be furnished before commencement of supply.	

12.0.0 DEVIATIONS

List of deviations shall be stated in writing with the tender by reference to the Specification clause / GTP/ Drawing. In absence of such a statement, requirements of the Specification shall be assumed to be met without exception by the bidder.

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Annexure-O (Technical specification of Transformer Oil)

Sr. No.	Item Description	Specification Requirement
A	Function	
1	Viscosity Max.	15 mm ² /s at 40 ^o C 1800 mm ² /s at 0 ^o C
2	Pour Point, Max	- 10 ^o C
3	Water content, Max	30 mg/Kg
4	Breakdown voltage	
	i) New unfiltered oil. Min.	30 kV
	ii) After filtration Min.	70 kV
5	Density Max.	0.895 g/ml at 20 ^o C
6	Dielectric dissipation factor (DDF) at 90 ^o C, Max	0.005 at 90 ^o C,
7	Particle Content	Value to be provided by the vendor
B	Refining/Stability	
1	Appearance of oil	Clear, free from sediment and suspended matter
2	Acidity Max	0.01 mg KOH/g
3	Interfacial tension at 27 ^o C, Min	40 mN/m
4	Total sulphur content	Value to be provided by the vendor
5	Corrosive sulphur	Not-corrosive
6	Potentially Corrosive sulphur	Not-corrosive
7	Dibenzyl Disulphide (DBDS)	Not detectable (<5 mg/kg)
8	Inhibitor	Not detectable (<0.01%)
9	Metal Passivator	Not detectable (<5 mg/kg)
10	Other additives	Type and concentration of additives to be provided
11	2-furfural and related Compounds content	Not detectable (<0.05 mg/kg) for each individual compound
C	Performance	
1	Oxidation stability	
a)	Total acidity, Max	1.2 mg KOH/g
b)	Sludge Max	0.8%
c)	Dielectric dissipation factor (DDF) at 90 ^o C, Max	0.5
1	Gassing Tendency	Value to be provided by the vendor
2	Electrostatic charging tendency (ECT)	Value to be provided by the vendor
D	Health, safety and Environment	
1	Flash point Min.	135 ^o C,
2	Polycyclic Aromatics content (PCA) Max	3%
3	Polychlorinated Biphenyls (PCB) content	Not detectable (<2 mg/Kg)

Done

Annexure-G (Technical specification of Material Tracking-GPS Device)

Supply of GPS Device shall be in Vendors scope, however it shall be returned to Vendor once Goods are received.

Detailed requirement of GPS Device is as below:

Once the material is dispatched after Final clearance Transport Vehicle shall have GPS Tracking Device and status of dispatch of material shall be sent to all the stake holders via SMS thru GPS Device.

Approve make is Map my India Asset Tracking device.

Annexure-I (Cancellation of Inspection Call)

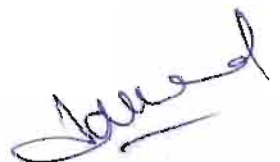
Penalty equivalent to cost incurred in assigning the inspector shall be levied on vendor in following case:

- 1) Inspector reaches the factory and equipment is not ready for inspection
- 2) Inspection call cancelled by Vendor after making all arrangements (booking tickets and hotel) are done by buyer.
- 3) Any deficiency found in equipment/material during inspection and re inspection is called for.

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Annexure-CR (Technical specification for purchase of CRGO ,its handling and its testing)

- 1) Core material shall be directly procured either from the BSES approved manufacturer or through their authorized service centre/distributor and not through any contractor.
- 2) Vendor should have hydraulic core lifting facility to avoid any jerk at the time of core building.
- 3) BSES may appoint recognized testing authority like CPRI /ERDA with their instruments & engineer's team and measure no load loss, load loss and percentage impedance of the transformer at supplier's works at Vendor cost . Bidder shall agree and give them full co-operation during their stay & testing at shop floor. The losses & impedance values so obtained will be considered as final.
- 4) Following stage inspections will be carried out by purchaser or by third party engineers appointed by BSES :
 - A) Verification & inspection of the mother coil at port & putting stamp & seal may be inspected by BSES.
 - B) Reconciliation of mother coil by checking stamp & seal at factory before slitting. One sample of CRGO to be sealed for testing at ERDA/CPRI.
 - C) Bidder should have in house core cutting facility for proper monitoring & control on quality. In case it is done outside cutting shall be done in presence of BSES.
- 5) Following documents to be submitted during the stage inspection :
 - A) Invoice of supplier
 - B) Mills test certificates
 - C) Packing list
 - D) Bill of lading
 - E) Bill of entry certificates by customs



Annexure - D

Guaranteed Technical Particulars (Data by Seller)

Sr.	Particulars	Specified / Required	Offered
1.0	General		
1.1	Make		
1.2	Type	As per Cl. 3.0 of Annexure C	
2.0	Nominal Continuous Rating, KVA		
2.1	ONAN	As per Annexure C	
2.2	ONAF	As per Annexure C	
3.0	Rated voltage (kV)		
3.1	HV Winding	As per Cl. 9.1 of Annexure C	
3.2	LV Winding	As per Cl. 9.2 of Annexure C	
4.0	Rated current (Amps)		
4.1	HV Winding, ONAN / ONAF		
4.2	LV Winding, ONAN / ONAF		
5.0	Connections		
5.1	HV Winding	As per Cl. 10.0 of Annexure C	
5.2	LV Winding	As per Cl. 10.0 of Annexure C	
5.3	Vector Group reference	As per Cl. 10.0 of Annexure C	
6.0	Impedance at principal tap rated current and frequency, %		
6.1	Impedance	As per Cl. 12.0 of Annexure C	
6.2	Reactance		
6.3	Resistance		
6.4	Impedance at lowest tap rated current and frequency, %		
6.5	Impedance at highest tap rated current and frequency, %		
7.0	Resistance of the winding at 75° C ,at principal tap,		

	ohm		
7.1	a) HV		
7.2	b) LV		
8.0	Zero sequence impedance, ohm		
8.1	a) HV		
8.2	b) LV		
9.0	Guaranteed maximum losses principal tap full load and 75°C without any positive tolerance kW		
9.1	No load losses (max.)	As per Cl. 13.0 of Annexure C	
9.2	Load losses (max.)	As per Cl. 14.0 of Annexure C	
9.3	Cooler fan losses (max.)		
9.4	Total Isq R losses of windings @ 75 deg C		
9.5	Total stray losses @ 75 deg C		
9.6	Total losses (max.)		
9.7	No load loss at maximum permissible voltage and frequency (approx.) kW		
10.0	Temperature rise over reference design ambient of 40 deg C		
10.1	Top oil by thermometer °C	40 °C	
10.2	Winding by resistance °C	45 °C	
10.3	Winding Gradient at rated current , deg C		
10.3.1	HV		
10.3.2	LV		
11.0	Efficiency		

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11.1	Efficiency at 75°C and unity power factor %		
11.1.1	at 110% load		
11.1.2	at 100% load		
11.1.3	at 80% load		
11.1.4	at 60% load		
11.1.5	at 40% load		
11.1.6	at 20% load		
11.2	Efficiency at 75°C and 0.8 power factor lag %		
11.2.1	at 110% load		
11.2.2	at 100% load		
11.2.3	at 80% load		
11.2.4	at 60% load		
11.2.5	at 40% load		
11.2.6	at 20% load		
11.3	Maximum efficiency %		
11.4	Load and power factor at which it occurs		
12.0	Regulation, (%)		
12.1	Regulation at full load at 75°C		
12.1.1	at unity power factor		
12.1.2	at 0.8 power factor lagging		
12.2	Regulation at 110% load at 75°C		
12.2.1	at unity power factor		
12.2.2	at 0.8 power factor lagging		
13.0	Tappings		
13.1	Type		
13.2	Capacity		
13.3	Range-steps x % variation	As per Cl. 34.0 of Annexure C	
13.3	Taps provided on HV winding (Yes / No)	Yes.	

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14.0	OLTC Gear		
14.1	Make		
14.2	Type		
14.3	Reference std		
14.4	No of compartment		
14.5	Mounting arrangement	Side mounted	
14.6	Rated current, Amp	500A minimum for 33kV	
14.7	Rated step capacity, kVA		
14.8	Short circuit withstand for 2 secs , kA		
14.9	Time required for one step change,sec.		
14.10	Rated voltage for motor, V AC		
14.11	Rating of motor		
14.12	Rated voltage for auxiliaries, V		
14.13	Consumption of auxiliaries		
14.14	OLTC features as per specification , YES/ NO		
14.15	Does the overload rating of OLTC match with that of the transformer under all conditions, (Yes/No)		
16.0	Cooling system	-	
16.1	Type of cooling	As per Cl. 4.0 of Annexure C	
16.2	No. of cooling unit Groups		
16.3	Capacity of cooling units		
16.4	Mounting of radiators		
16.5	Number of Radiators		
16.6	Type & size of radiator header main valve		
16.7	Type & size of individual radiator valve		

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16.8	Total radiating surface , sqmm		
16.9	Thickness of radiator tubes, mm	Minimum 1.2 mm	
16.10	Schematic flow diagram of the cooling system furnished, (Yes/no)	-	
16.11	Number of cooler fans required for rated ONAF rating		
16.12	Number of standby cooler fans provided.		
16.3	Capacity of each cooler fan - kW		
16.4	Cooler fans rated voltage & variation		
16.5	Make of cooler fans		
17.0	Details of Tank		
17.1	Material	Robust mild steel plate without pitting and low carbon content	
17.2	Thickness of sides mm		
17.3	Thickness of bottom mm		
17.4	Thickness of cover mm		
17.5	Confirmation of Tank designed designed and tested for Vacuum, Pressure (Ref: CBIP Manual) , (Yes/ No)		
17.5.1	Vacuum mm of Hg. / (kN/m ²)	As per CBIP	
17.5.2	Pressure mm of Hg.	Twice the normal head of oil / normal pressure + 35kN/m ² whichever is lower, As per CBIP	
17.6	Is the tank lid sloped?	Yes	
17.7	Inspection cover provided (Yes / No)	as per clause	
17.8	Location of inspection cover (Yes / No)	as per clause	

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17.9	Min. dimensions of inspection cover (provide list of all inspection cover with dimension), mm x mm		
18.0	Core		
18.1	Type:	Core	
18.2	Core material grade	Premium grade minimum M4 or better	
18.3	Thickness of lamination mm	Max. 0.27 mm with insulation coating on both sides.	
18.4	Insulation of lamination	With insulation coating on both sides of the laminations	
18.5	Design flux density in the core at rated condition at principal tap, Tesla		
18.6	Maximum flux density allowed in the core at extreme overexcitation /overfluxing, Tesla	As per Cl. 35.0 of Annexure C	
18.7	Equivalent cross section area of core, mm ²	-	
18.8	Guaranteed No Load current at 100% / 110 % rated voltage , Amps(Max)	@ 100% - 0.5% of RFLC @ 110% - 1.0% of RFLC	
18.8.1	HV		
18.8.2	LV		
19.0	Type of Winding		
19.1	HV		
19.2	LV		
19.3	Conductor material	Electrolytic Copper as per relevant standard	
19.4	Maximum current density allowed , Amp per sqmm	As per Cl. 36.0 of Annexure C	
19.5	Gauge/area of cross section of conductor, sqmm		
19.5.1	a) HV		
19.5.2	b) LV		

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19.6	Maximum Current density achieved in winding, Amp per sqmm		
19.7	Insulating material		
19.7.1	HV Turn		
19.7.2	LV Turn		
19.7.3	LV Core	-	
19.7.4	HV - LV	-	
19.8	Insulating material thickness, mm		
19.8.1	HV Turn		
19.8.2	LV Turn	-	
19.8.3	LV to Core		
19.8.4	HV to LV		
		-	
20.0	Minimum design clearance, mm		
20.1	HV to earth in Air		
20.2	HV to earth in oil		
20.3	LV to earth in Air		
20.4	LV to earth in oil	-	
20.5	Between HV & LV in Air		
20.6	Between HV & LV in oil		
20.7	Top winding and yoke	-	
20.8	Bottom winding and yoke		
21.0	Insulating oil		
21.1	Quantity of oil Ltrs	-	
21.1.1	In the Transformer tank		
21.1.2	In each radiator		
21.1.3	In OLTC chamber		
21.1.4	Total quantity		
21.2	10% excess oil furnished?	Yes	
21.3	Type of Oil	New insulating oil as per BSES Specification	
21.4	Oil preservation system provided (Yes / No)	As per Clause 4.2.7 of the specification	
22.0	Bushing		
22.1	Make	-	
22.2	Type		

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22.3	Reference Standard		
22.4	Voltage class, kV		
22.4.1	HV side Bushing		
22.4.2	LV side line and neutral bushing		
22.5	Creepage factor for all bushing mm/KV	As per Cl. 38.0 of Annexure C	
22.6	Rated current, Amp.		
22.6.1	HV bushing		
22.6.2	LV line and neutral bushing		
22.7	Rated thermal short time current		
22.7.1	HV bushing	As per Cl. 38.0 of Annexure C	
22.7.2	LV line and neutral bushing	As per Cl. 38.0 of Annexure C	
22.8	Weight, Kg		
22.8.1	HV bushing		
22.8.2	LV line and neutral bushing		
22.9	Free space required for bushing removal, mm		
22.9.1	HV bushing		
22.9.2	LV line and neutral bushing		
23.0	Terminal connections		
23.1	HV	As per Cl. 15.1 of Annexure C	
23.2	LV	As per Cl. 15.2 of Annexure C	
23.3	LV Neutral	As per Cl. 15.3 of Annexure C	
24.0	H.V. Cable box / Terminals		
24.1	Suitable for cable / Conductor type , size	As per Cl. 15.4 of Annexure C	
24.2	Termination height, mm	1000 mm, minimum	
24.3	Gland Plate dimension, mm x mm		
24.4	Gland Plate material	Aluminium	
24.5	Gland Plate Thickness, mm	5 mm minimum	
24.5	Phase to		

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	clearance inside box / terminals, mm		
24.6	Phase to earth inside box / terminals, mm		
25.0	L.V line side Cable box		
25.1	Suitable for cable type , size	As per Cl. 15.5 of Annexure C	
25.2	Termination height, mm	1000 mm, minimum	
25.3	Gland Plate dimension, mm x mm		
25.4	Gland Plate material	Aluminium	
25.5	Gland Plate Thickness, mm	5 mm minimum	
25.6	Phase to clearance inside box, mm		
25.7	Phase to earth inside box, mm		
26.0	L.V neutral Cable box		
26.1	Suitable for cable type , size	As per Cl. 15.6 of Annexure C and for accommodating NCT spec. as per Cl. 4.2.9 of spec. and Cl. 28.0 Of Annexure D	
26.2	Termination height, mm		
26.3	Gland Plate dimension, mm x mm		
26.4	Gland Plate material	Aluminium	
26.5	Gland Plate Thickness, mm	5 mm minimum	
26.5	Phase to clearance inside box, mm		
26.6	Phase to earth inside box, mm		
27.0	Marshalling box cubicle provided as per clause no of spec. (Yes / No)		
27.1	Mounting of	Project specific to be filled up (Separate/	

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	Marshalling box	tank mounted)			
28.0	Neutral Current Transformer (NCT)				
28.1	Type				
28.2	Make				
28.3	Reference Standard				
28.4(a)	Neutral CT Ratio	33/11 kV 20/25 MVA, Dyn11		66/ 11 kV 20/25 MVA, Dyn11	
		Core 1 1600 / 1 A	Core 2 1600 / 1 A	Core 1 1600 / 1 A	Core 2 1600 / 1 A
28.4 (b)		33/11 kV 25/31.5 MVA, Dyn11		66/ 11 kV 25/31.5MVA, Dyn11	
		Core 1 1600-2000 / 1 A	Core 2 1600-2000 / 1 A	Core 1 1600-2000 / 1 A	Core 2 1600-2000 / 1 A
28.5	Burden, VA	-	20	-	20
28.6	Class of Accuracy	PS	5P20	PS	5P20
28.7	KPV, Volts, minimum	40(Rct +8	-	40(Rct+ 8	-
28.8	Resistance, ohm @ 75 deg C, maximum	1.0	-	1.0	-
28.9	Magnetizing current @ $V_k/4$, mA, maximum	30	-	30	-
28.10	Short time withstand current	26.3 kA for 3 sec.			
29.0	Winding Current Transformer (WCT)				
29.1	Type				
29.2	Make				
29.3	Reference Standard				
29.4	CT Ratio	33 / 11 kV, 20/25 MVA & 25/31.5MVA		66 / 11 kV, 20/25 MVA & 25/31.5MVA	
	HV LV	As per requirement		As per requirement	
29.5	Burden, VA	Manufacturer Std.			
29.6	Class of Accuracy	Manufacturer Std.			
30.0	Pressure release				

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30.1	Minimum pressure the device is set to rupture		
30.1.1	For Main Tank		
30.1.2	For OLTC		
31.0	Alarm and Trip contact ratings of protective devices		
31.1	Rated / making/ breaking currents , Amp @ Voltage for		
31.1.1	PRV for main Tank		
31.1.2	PRV for OLTC		
31.1.3	Buchholz Relay		
31.1.4	Oil Surge relay for OLTC		
31.1.5	Sudden Pressure Relay		
31.1.6	OTI		
31.1.7	WTI		
31.1.8	Magnetic Oil Gauge		
32.0	Fittings Accessories Each Transformer furnished as per Clause No. (Bidder shall attach separate sheet giving details, make and bill of materials)		
33.0	Painting: as per clause for the transformer, cable boxes, radiator, Marshalling box etc (Yes/No)		
34.0	Over all transformer dimensions	20/25 MVA & 25/31.5MVA	
34.1	Length, mm	6.5 metres maximum	
34.2	Breadth, mm	5.0 metres maximum	
34.3	Height, mm	5.0 metres maximum	
35.0	Transformer Tank		

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	Dimensions		
35.1	Length, mm		
35.2	Breadth, mm		
35.3	Height, mm		
36.0	Marshalling Box dimensions		
36.1	Length, mm		
36.2	Breadth, mm		
36.3	Height, mm		
37.0	Weight data		
37.1	Core, kG		
37.2	Frame parts, kG		
37.3	Core and frame, kG		
37.4	Total Winding, kG		
37.5	Core , Frame, Winding, kG		
37.6	Tank, kG		
37.7	Tank lid, kG		
37.8	Empty conservator tank, kG		
37.9	Each radiator empty, kG		
37.10	Total weight of all radiators empty, kG		
37.11	Weight of oil in Tank, kG		
37.12	Weight of oil in Conservator, kG		
37.13	Weight of oil in each Radiators, kG		
37.14	Total weight of oil in Radiators, kG		
37.15	OLTC gear including oil, kG		
37.16	Total Transport weight of the transformer, kG		
37.17	Total weight of the transformer with OLTC and all accessories		
38.0	Volume Data		
38.1	Volume of oil in main tank, litres		
38.2	Volume of oil between highest		

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	and lowest levels of main conservator, litres		
38.3	Volume of oil between highest and lowest levels of OLTC conservator, litres		
38.4	Volume of oil in each radiator, litres		
38.5	Total volume of oil in radiators, litres		
38.6	Volume of oil in OLTC, litres		
38.7	Transformer total oil volume, litres		
39.0	Shipping Data		
39.1	Weight of heaviest package, kG		
39.2	Dimensions of the largest package (L x B x H) mm		
40.3	Tests		
40.1	All in process tests confirmed as per Cl. (Yes/ No)		
40.2	All Type Tests confirmed as per Cl. (Yes / No)		
40.3	All Routine Tests confirmed as per Cl. (Yes/ No)		
40.4	All Special Tests confirmed as per Cl. (Yes/ No)		

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Annexure F**Recommended spares (Data by supplier)**

List of recommended spares as following –

Sr No	Description of spare part	Unit	Quantity
1		No	
2		No	
3			
4			
5			
6			
7			

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