

NOTICE INVITING TENDER (NIT)

FOR

SUPPLY

OF

**ONAF COOLED POWER TRANSFORMERS OF RATING
20/25MVA**

NIT NO: CMC/BY/20-21/RB/SV/49 Rev01

Due Date for Submission: 21.04.2021, 15:00 HRS

**BSES YAMUNA POWER LIMITED (BYPL)
CONTRACTS & MATERIALS DEPT.,
SHAKTI KIRAN BUILDING, KARKARDOOMA,
DELHI-110032
CIN: U40109DL2001PLC111525
WEBSITE: www.bsesdelhi.com**

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VOLUME – I: INFORMATION TO BIDDER (ITB)

SECTION – I: REQUEST FOR QUOTATION

1.00 EVENT INFORMATION

- 1.01 BSES Yamuna Power Ltd (hereinafter referred to as “BYPL”) invites sealed tenders in 2 envelopes for supply from reputed manufacturers.

Sl. No.	Item Description	Estimated Cost (₹)	Cost of EMD (₹)	Delivery at
1	Supply & Supervision of ONAF Power Transformer of rating, 20/25MVA 33/11KV & 66/11KV	12.00 Crore	12.00 Lakh	Delhi Sites

The bidder must qualify the requirements as specified in clause 2.0 stated below.

All envelopes shall be duly super scribed “**BID FOR SUPPLY OF ONAF POWER TRANSFORMERS OF RATING 20/25MVA**” “**NIT NO: CMC/BY/20-21/RB/SV/49 Rev01 DUE ON 21.04.2021, 15:00 Hr.**”

Bid shall be submitted in two (02) parts. Details of part are as follow:

Part A – Techno Commercial Bid

Part B – Price Bid

- 1.1. The schedule of specifications with detail terms & conditions can be obtained from address given below against submission of non-refundable demand draft of ₹ 1,180/- drawn in favour of BSES Yamuna Power Ltd, payable at Delhi or Online transfer of requisite amount through NEFT/ RTGS. The tender documents & detail terms and conditions can also be downloaded from the website www.bsesdelhi.com --> **BSES YAMUNA POWER LTD --> Tender --> Open Tenders**
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.

- 1.2. Bids will be received up to **21.04.2021, 15:00 Hr.** at the address given below.
Part A of the Bid shall be opened on **22.04.2021, 15:00 Hr.**

Part B of the Bid will be opened in case of Techno-Commercially Qualified Bidders and the date of opening of same shall be intimated in due course. It is the sole responsibility of the bidder to ensure that the bid documents reach this office on or before the last date.

**Head of Department
Contracts & Materials Deptt.
BSES Yamuna Power Ltd
Reception, Ground Floor
Shaktikiran Building, Karkardooma
Delhi 110032**

- 1.3 BSES Yamuna Power Ltd reserves the right to accept/reject any or all tenders without assigning any reason thereof in the event of following:
- Tender fee of requisite value.
 - Earnest Money Deposit (EMD) of requisite value & validity is not deposited in shape of Bank Guarantee drawn in favor of BSES Yamuna Power Ltd, payable at Delhi or Online transfer of requisite amount through NEFT/RTGS
 - The offer does not contain prices indicating break-up towards all taxes & duties in prescribed format.

- d) Complete Technical details are not enclosed as per the Technical Bid Submission Checklist
- e) Tender is received after due date and time.
- f) Technical offer contains any prices.
- g) Prices are not FIRM and subject to Price Variation.

2.00 QUALIFICATION CRITERIA

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

2.01 Technical Criteria:

SI No.	Criteria	Documents to be submitted by bidder
1	The bidder should be a manufacturer of Power Transformers and should be approved by PGCLIL/NTPC/EIL/Rinfra. Joint venture/collaboration with other firm/company is not acceptable.	manufacturing and factory incorporation certificate
2	The bidder must possess their own Type Tested design on similar or higher rating – (Short Circuit, Impulse & Temperature rise) carried out at CPRI/ERDA.	Relevant Details/Report
3	The Bidder should have in-house testing facilities as per relevant IS for testing of Power Transformer.	Relevant Details
4	The bidder should have executed at least 05 Nos or more of 25 MVA (33 KV or higher class) each year consistently in last 3 years from the date of opening of technical bid.	i. Summary list of executed Purchase orders ii. Purchase order copies iii. Material delivery clearance certificate copy or delivery completion certificates
5	The bidder should submit the 2 year satisfactory Performance Certificates for Transformer of similar or higher ratings from 2 reputed companies.	Performance certificates
6	The bidder should have infrastructure in India for providing service & spare support to BYPL. The relevant documents including details of manufacturing units, locations and works from where supply, spares & service against this tender shall be proposed to be furnished.	Relevant Details/certificates
7	The bidder must possess valid ISO 9001:2015 certification or above.	Valid copy of Certification

2.02 Commercial Criteria:

SI No.	Criteria	Documents to be submitted by bidder
1	The bidder must have adequate Financial Stability and status to meet the financial obligation pursuant to the scope of supply and shall have average annual turnover	Duly certified CA certificate to be submitted

SI No.	Criteria	Documents to be submitted by bidder
	of minimum ₹ 150 Crore during last three (3) Financial Years (FY 2017-18, 2018-19 & 2019-20)	
2	An undertaking (self-certificate) that the bidder has not been blacklisted/debarred by any central/state government institution including electricity boards and also confirm that there is no pending litigation with government on account of executing similar order.	Undertaking
3	The bidder should have registered under GST ACT and shall submit copy of GST Registration Number, PAN, PF, ESI 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 applicable laws/rules etc.	Relevant Statutory Documents Copy/ Undertaking

Notwithstanding anything stated above, BYPL reserves the right to assess bidder's capability to perform the contract, assess the capability and installed capacity of the Bidder for carrying out the supplies, should the circumstances warrant such assessment in the overall interest of the purchaser. In this regard the decision of the purchaser is final.

3.00 BIDDING AND AWARD PROCESS

Bidders are requested to submit their offer strictly in line with this tender document. **NO DEVIATION IS ACCEPTABLE.** BYPL shall response to the clarifications raised by various bidders and the will be distributed to all participating bidders through through BYPL website/e-mail.

3.01 BID SUBMISSION

Please mention our NIT Number: - on the Tender and drop the same in our Tender Box placed at:

BSES Yamuna Power Ltd, Reception, Ground Floor, Shaktikiran Building, Karkardooma, Delhi 110032

The bids and the outer envelope shall be addressed to:

Head of Department

Contracts & Materials Deptt.

BSES Yamuna Power Ltd, Shaktikiran Building, Karkardooma, Delhi 110032

Kindly Note:

- Bidder will inform BYPL through mail within 02 hours from the submission or before the due date & time of submission to TPC & Buyer:
 1. Mr Santosh Singh, E-mail: Santosh.Kum.Singh@relianceada.com,
 2. Mr Sumit Verma, E-mail: sumit.ra.verma@@relianceada.com,
- Tender documents shall be submitted at main gate in tender box
- Authorized person of TPC will collect the documents from tender box at scheduled time of tender submission and verify the bid documents with mails received. A confirmation of receipt shall be sent to bidder through mail by TPC on the same day
- Bidder has to ensure that tender copy is dropped in correct box designated for tender submission only
- BYPL shall not be responsible for any wrong placement of tender document by bidder

Sr. No	Descriptions	Type of Documents
Commercial :		
1	Tender Fee - Demand Draft (Rs.1180/-) (Incl GST)	Non-refundable demand draft for Rs 1180/- in case the forms are downloaded from website
2	EMD	In prescribed stamp paper & format
3	Power-of-Attorney	In prescribed stamp paper & format
4	PQR Compliances	Documentary evidence in support of qualifying criteria like: 1. Details of constitution of the company (Proprietary/Limited/etc along with the details), Memorandum of Association of the company 2. Bidders shall submit the certified annual Balance sheets for the last completed three (3) financial years 3. Supportive document on Positive Net worth. Credit rating/solvency certificate from competent authority. 4. Copies of Orders, Execution /Performance Certificate & Other Documents to support qualification Criteria
5	Signed Tender document	Original Tender documents duly stamped & signed on each page as token of acceptance
6	Black listing undertaking	Bidder should submit a Self-undertaking signed by its Authorized Signatories that the Bidder or any of their sub-contractor has not been blacklisted/barred by any Govt. Organization or Regulatory Agencies in India or abroad.
7	Commercial Terms and Conditions	Acceptance on Commercial Terms and Conditions viz Delivery schedule/period, Payment terms, PBG etc.
8	Acceptance on Reverse Auction	Duly signed Acceptance Form For Participation In Reverse Auction Event as per attached format
9	Bid Form (Unpriced) Duly Signed	Duly Signed Bid Form as per attached format
10	Un price Bid Duly Signed	Duly Signed Un price Bid as per attached format
Technical:		
11	Technical Details/ Filled in GTP/Drawings	Bidder shall submit duly filled GTP with all Technical documents and Drawings.
12	Type Test Reports	Bidders shall submit the copy of type test reports in their technical bids in support of technical specifications
13	Testing Facilities	Bidder shall submit the details of testing facilities available at their works/factory.
14	Organization Chart & Manpower Details.	Bidder shall submit the details of Organization & Manpower with qualification and experience.

- PART B** :: **FINANCIAL BID** comprising of (01 original only)
- Price strictly in the Format enclosed indicating Break up of basic price, taxes & duties, transportation etc

3.02 TIME SCHEDULE

The bidders should complete the following within the dates specified as under:

S.No.	Steps	Due date
1	Last Date of Sale of Bid Documents	20.04.2021
2	Last Date of receipt of pre-bid queries, if any (Queries to be submitted via e-mail)	13.04.2021
3	Last Date of Receipt of Bid Documents	21.04.2021, 15:00HRS
4	Date & Time of Opening of PART A - Technical and Commercial Bid	22.04.2021, 15:00HRS

This is a two part bid process. Bidders are to submit the bids in 2(Two) parts
Both these parts should be furnished in separate sealed covers super scribing NIT no. DUE DATE OF SUBMISSION, with particulars as **PART-A TECHNICAL BID & COMMERCIAL TERMS & CONDITIONS** and **Part-B FINANCIAL BID** and these sealed envelopes should again be placed in another sealed cover which shall be submitted before the due date & time specified.

Part – A:: Technical Bid should not contain any cost information whatsoever and shall be submitted within the due date.

PART B:: This envelope will be opened internally after techno-commercial evaluation and only of the qualified bidders.

Bidder has to submit the item wise price bifurcation in bid. Un priced copy must be attached with the Part A (Technical Bid). Reverse Auction will be carried out on individual item wise rates.

REVERSE AUCTION CLAUSE :: Purchaser reserves the right to use reverse auction as optional tool through SAP – SRM as an integral part of the entire tendering process. All techno-commercially qualified bidders shall participate in reverse auction.

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. Bidder to submit their acceptance as per format attached ANNEXURE-C

BIDS RECEIVED AFTER DUE DATE AND TIME MAY BE LIABLE TO REJECTION

4.00 AWARD DECISION

- 4.01 Purchaser intends to award the business on a lowest bid basis, so suppliers are encouraged to submit the bid competitively. The decision to place purchase order/LOI 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.

- 4.02 In the event of your bid being selected by purchaser (and / or its affiliates) and you 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 NIT/RFQ.
- 4.03 In case any supplier is found unsatisfactory during the delivery process, the award may be cancelled and BYPL reserves the right to award other suppliers who are found fit.
- 4.05 Repeat Order: BYPL reserves the right to place repeat order at the same rates & terms & conditions as per this tender against additional requirement subject to mutual agreement between BYPL & Supplier.
- 4.06 Quantity Variation: The purchaser reserves the rights to vary the quantity by (\pm) 50% of the tender quantity during the execution of the contract.
- 4.07 Quantity Splitting: The purchaser reserves the right to distribute the procurable quantity on one or more than one of the eligible tenders. If the quantity is to be split, quantity distribution shall be in the manner detailed below:
 a) If the quantity is to be split among 2 bidders, it will be done in the ratio of 70:30 on L1 price.
 b) If the quantity is to be split among 3 bidders, it will be done in the ratio of 50:30:20 on L1 price.
 Note: In case quantity needs to be distributed and order splitting is required, distribution of quantity shall be maximum among three (3) bidders

5.00 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 reserve 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/NIT.

6.00 SUPPLIER CONFIDENTIALITY

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

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

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

7.00 CONTACT INFORMATION

Technical clarification, if any, as regards this RFQ shall be sought in writing and sent by e-mail/post/courier to following addresses. The same shall not be communicated through phone

Address	Name/ Designation	E-mail Address
Technical		
CES Dept. 3 rd Floor, B-Block, BSES Yamuna Power Ltd Shaktikiran Building, Karkardooma, Delhi 110032	Gaurav Sharma AVP (HOD-CES)	gaurav.a.sharma@relianceada.com
	Srinivas Gopu DGM (CES)	srinivas.gopu@relianceada.com
	Abhishek Harsh DGM (CES)	abhishek.harsh@relianceada.com
Commercial		
C&M Dept. 3 rd Floor, A-Block, BSES Yamuna Power Ltd Shaktikiran Building, Karkardooma, Delhi 110032	Rakesh Bansal VP (HOD-C&M)	rakesh.bansal@relianceada.com
	Rajesh Srivastava VP (Head-Procurement)	rajesh.r.srivastava@relianceada.com
	Sumit Verma DGM (C&M)	sumit.ra.verma@relianceada.com

SECTION – II: INSTRUCTION TO BIDDERS

A. GENERAL

1.00 BSES Yamuna 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 material 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/IS along with Packing, Forwarding, Transportation and Unloading and proper stacking at Purchaser’s stores/site.

Testing & commissioning supervision included in the scope including all operational checks, wiring checks, etc as applicable.

3.0 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 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 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:

- (a) Request for Quotation (RFQ)
- (b) Instructions to Bidders
- (c) General Terms & Conditions of Contract (T&C)
- (d) Delivery schedule
- (e) Price Formats & Summary T&C
- (f) Bid Form
- (g) Acceptance Format – RA
- (h) EMD BG Format
- (i) Vendor code of conduct
- (j) Appendix
- (k) Technical Specifications (TS)

- 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.

6.0 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 web site www.bsedelhi.com and the same 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. The same shall be published as a corrigendum in website www.bsedelhi.com
- 6.04 Purchaser shall reserve the rights to following:
- a) extend due date of submission,
 - b) modify tender document in part/whole,
 - c) cancel the entire tender

6.05 Bidders are requested to visit website regularly for any modification/clarification/corrigendum/addendum of the bid documents.

C. PREPARATION OF BIDS

7.0 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.

8.0 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 Technical Specification.
- (b) All the Bids must be accompanied with the required EMD as mentioned in the Section-I against each tender.
- (c) Tender documents duly stamped and signed on each page by authorized signatory.

9.0 BID FORM

9.01 The Bidder shall submit one "Original" and one "Copy" of the Bid Form and the appropriate Price Schedules and Technical Data Sheets duly filled in as per attached specification enclosed with the Bidding Documents.

9.02 EMD

Pursuant to Clause 8.0(b) above, the bidder shall furnish, as part of its bid, a EMD amounting to as specified in the Section-I. The EMD is required to protect the Purchaser against the risk of Bidder's conduct which would warrant forfeiture.

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

- (a) Bank Guarantee drawn in favour of BSES Yamuna Power Ltd, payable at Delhi.
- (b) EMD shall be valid for One Hundred Twenty (120) days after due date of submission drawn in favour of BSES Yamuna Power Ltd

The EMD may be forfeited in case of:

- (a) the Bidder withdraws its bid during the period of specified bid validity

or

(b) the case of a successful Bidder, if the Bidder does not

- (i) Accept the Purchase Order, or

(ii) Furnish the required performance security BG.

10.0 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/ Price Variation Clause will be treated as non-responsive and rejected.**

11.0 BID CURRENCIES

11.01 Prices shall be quoted in Indian Rupees Only.

12.0 PERIOD OF VALIDITY OF BIDS

12.01 Bids shall remain valid for 120 days from the due date of submission of the Bid.

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 and sent by post/courier

13.0 ALTERNATIVE BIDS

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

14.0 FORMAT AND SIGNING OF BID

14.01 The original Bid Form and accompanying documents (as specified in Clause 5.0), clearly marked "Original Bid" plus Duplicate Soft copy in USB flash drive 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. The Bid submitted on behalf of companies registered with the Indian Companies Act, for the time being in force, shall be signed by persons duly authorized to submit the Bid on behalf of the Company and shall be accompanied by certified true copies of the resolutions, extracts of Articles of Association, special or general Power of Attorney etc. to show clearly the title, authority and designation of persons signing the Bid on behalf of the Company. Satisfactory evidence of authority of the person signing on behalf of the Bidder shall be furnished with the bid. A bid by a person who affixes to his signature the word 'President', 'Managing Director', 'Secretary', 'Agent' or other designation without disclosing his

principal will be rejected.

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

- 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 (hard copies) & One Duplicate Soft copy in USB flash drive 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 Bid & EMD". The price bid shall be inside another sealed envelope with superscribed "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 opening".

- 15.03 The Bidder has the option of sending the Bids in person. Bids submitted by Email/Telex/Telegram /Fax will be rejected. No request from any Bidder to the Purchaser to collect the proposals from Courier/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 on or before the due date & time of submission.

- 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 6.0, 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

- 17.01 Each Bidder shall submit only one Bid by itself. No Joint venture is acceptable. A Bidder who submits or participates in more than one Bid will cause all those Bids to be rejected.

18.0 LATE BIDS

- 18.01 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 may be rejected and returned unopened to the Bidder.

19.0 MODIFICATIONS AND WITHDRAWAL OF BIDS

- 19.01 The Bidder is not allowed to modify or withdraw its Bid after the Bid's submission subject to any corrigendum/addendum/modifications in the tender documents uploaded in website.

E. EVALUATION OF BID

20.0 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.

21.0 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.

22.0 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. Purchaser may ask for submission of original documents in order to verify the documents submitted in support of qualification criteria.

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 & qualifying 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:

INFORMATION TO BIDDER (ITB) NIT NO: CMC/BY/20-21/RB/SV/49	Page 13 of 15	Bidders seal & Signature
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(a) Delivery Schedule

(b) Conformance to Qualifying Criteria

(c) 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 adjustments in price, which result from the above procedures, 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 If any Bidder wishes to contact the Purchaser on any matter related to the Bid, from the time of Bid opening to the time of contract award, the same shall be done in writing only.

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

Submission of bids shall not automatically construe qualification for evaluation. The Purchaser reserves the right to accept or reject any Bid and to annul the Bidding process and reject all Bids at anytime prior to award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders 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 to other bidders in the tender, provided it is required for timely execution of project & provided he agrees to come to the lowest rate. Purchaser reserves the right to distribute the entire tender quantity at its own discretion without citing any reasons thereof.

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 GAURANTEE

Within 15 days of the receipt of Notification of Award/ Letter of Intent from the Purchaser, the successful Bidder shall furnish the Performance Bank Guarantee for an amount of 10% (Ten percent) of the Contract Price. The Performance Bond shall be valid for a period of 24 months from the date of Commissioning or 30 months from the date of last dispatch whichever is earlier plus 3 months claim period. . Upon submission of the performance security, the EMD shall be released.

30.0 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 for award 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 Terms and Conditions of Contract.

INFORMATION TO BIDDER (ITB) NIT NO: CMC/BY/20-21/RB/SV/49	Page 15 of 15	Bidders seal & Signature
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APPENDIX I

(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*] (herein after called the "Bidder") has submitted its bid dated [*date of submission of bid*] for the supply of [*name and/or description of the goods*] (here after 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 Yamuna Power Ltd., with its Corporate Office at Shaktikiran Building, Karkardooma, Delhi - 110032, (herein after called —the "Purchaser") in the sum of Rs..... (Rupees..... only) 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:

- 1 If the Bidder withdraws its Bid during the period of bid validity specified by the Bidder on the Bid Form; or
2. If the Bidder, having been notified of the acceptance of its Bid by the Purchaser during the period of bid validity:
 - (a) fails or refuses to execute the Contract Form, if required; or
 - (b) fails or refuses to furnish the performance security, In accordance with the Instructions to Bidders/ Terms and 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 condition(s), specifying the occurred condition or condition(s).

This guarantee will remain in force up to and including One Hundred Twenty (120) days after the due date of submission bid, and any demand in respect thereof should reach the Bank not later than the above date.

(Stamp & signature of the bank)

Signature of the witness

BID FORM

To

Head of Department
Contracts & Material Deptt.
BSES Yamuna Power Ltd
Shaktikiran Building, Karkardooma,
Delhi 110032

Sir,

1 We understand that BYPL is desirous of procuring..... for it's licensed distribution network area in Delhi

2 Having examined the Bidding Documents for the above named works, we the undersigned, offer to deliver the goods in full conformity with the Terms and Conditions and technical specifications for the sum indicated in Price Bid or such other sums as may be determined in accordance with the terms and conditions of the contract. The amounts are in accordance with the Price Schedules attached herewith and are made part of this bid.

3 If our Bid is accepted, we under take to deliver the entire goods as) as per delivery schedule mentioned in Section IV from the date of award of purchase order/letter of intent.

4 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 Terms and Conditions.

5 We agree to abide by this Bid for a period of 120 days from the due date of bid submission and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

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

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

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

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

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

Signature..... In the capacity of

.....duly authorized to sign for and on behalf of

(IN BLOCK CAPITALS)

ACCEPTANCE FORM FOR PARTICIPATION IN REVERSE AUCTION EVENT

(To be signed and stamped by the bidder)

BSES Yamuna Power Ltd (hereinafter referred to as "**BYPL**") intends to use the reverse auction through SAP-SRM tool as an integral part of the entire tendering process. All the bidders who are found as techno commercial qualified based on the tender requirements shall be eligible to participate in the reverse auction event.

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

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

Signature & seal of the Bidder

ANNEXURE - SCHEDULE OF DEVIATIONS

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

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

SL No.	Clause No.	Page No.	NIT Clause descriptions	Details of Clarification/deviation with justifications

Technical Bid Submission Check List

S. No.	Description	BYPL Requirement	Bidder's Compliance
1	Tender No.	Required	
2	Technical Specification reference number	Required	
3	Communication Details		
3.1	Name of the Bidder	Required	
3.2	Name of Authorized contact person	Required	
3.3	Contact No. of Authorized contact person	Required	
3.4	E-mail id of Authorized contact person	Required	
4	Document Submission Format		
4.1	Documents shall be submitted in Box file/spiral binding. Any other format is not acceptable	Required	
4.2	Index of documents with page numbers for each document	Required	
4.3	Separator with document description shall be provided before each document	Required	
5	Qualifying Requirement Compliance		
5.1	Summary of compliance of qualifying criteria in tabular form along with summary of documentary proof provided	Required	
5.2	Detailed Documents supporting compliance of qualifying criteria	Required	
6	Drawings/ Documents as per Technical Specification.		
6.1	Signed copy of technical specification	Required	
6.2	Type Test reports of offered model/ type/ rating	Required	
6.3	Guaranteed Technical particulars (GTP)	Required	
6.4	Deviation Sheet	Required	
6.5	Detailed Drawings	Required	
6.6	Manufacturer's quality assurance plan	Required	
6.7	Other drawing/ documents mentioned in technical specification	Required	
7	Soft copy of complete technical bid in pen drive	Required	
8	Samples as per technical specification.	Required	

Note: Submission of Technical bid check list along with all items mentioned in the check list is mandatory. Order of documents shall be strictly as per the technical bid check list. Bids with incomplete/ wrong information are liable for rejection.

VENDOR CODE OF CONDUCT

Purchaser is committed to conducting its business in an ethical, legal and socially responsible manner. To encourage compliance with all legal requirements and ethical business practices, Purchaser has established this Vendor Code of Conduct (the "Code") for Purchaser's Vendors. For the purposes of this document, "Vendor" means any company, corporation or other entity that sells, or seeks to sell goods or services, to Purchaser, including the Vendor's employees, agents and other representatives.

Fundamental to adopting the Code is the understanding that a business, in all of its activities, must operate in full compliance with the laws, rules and regulations of the countries in which it operates. This Code encourages Vendors to go beyond legal compliance, drawing upon internationally recognized standards, in order to advance social and environmental responsibility.

I. Labour and Human Rights

Vendors must uphold the human rights of workers, and treat them with dignity and respect as understood by the international community.

- . Fair Treatment - Vendors must be committed to a workplace free of harassment. Vendors shall not threaten workers with or subject them to harsh or inhumane treatment, including sexual harassment, sexual abuse, corporal punishment, mental coercion, physical coercion, verbal abuse or unreasonable restrictions on entering or exiting company provided facilities.

- . Antidiscrimination - Vendors shall not discriminate against any worker based on race, colour, age, gender, sexual orientation, ethnicity, disability, religion, political affiliation, union membership, national origin, or marital status in hiring and employment practices such as applications for employment, promotions, rewards, access to training, job assignments, wages, benefits, discipline, and termination. Vendors shall not require a pregnancy test or discriminate against pregnant workers except where required by applicable laws or regulations or prudent for workplace safety. In addition, Vendors shall not require workers or potential workers to undergo medical tests that could be used in a discriminatory way except where required by applicable law or regulation or prudent for workplace safety.

- . Freely Chosen Employment - Forced, bonded or indentured labour or involuntary prison labour is not to be used. All work will be voluntary, and workers should be free to leave upon reasonable notice. Workers shall not be required to hand over government-issued identification, passports or work permits as a condition of employment.

- . Prevention of Under Age Labor - Child labor is strictly prohibited. Vendors shall not employ children. The minimum age for employment or work shall be 15 years of age, the minimum age for employment in that country, or the age for completing compulsory education in that country, whichever is higher. This Code does not prohibit participation in legitimate workplace apprenticeship programs that are consistent with Article 6 of ILO Minimum Age Convention No. 138 or light work consistent with Article 7 of ILO Minimum Age Convention No. 138.

- . Juvenile Labor - Vendors may employ juveniles who are older than the applicable legal minimum age for employment but are younger than 18 years of age, provided they do not perform work likely to jeopardize their health, safety, or morals, consistent with ILO Minimum Age Convention No. 138.

- . Minimum Wages - Compensation paid to workers shall comply with all applicable wage laws, including those relating to minimum wages, overtime hours and legally mandated benefits. Any Disciplinary wage deductions are to conform to local law. The basis on which workers are being paid is to be clearly conveyed to them in a timely manner.

- . Working Hours - Studies of good manufacturing practices clearly link worker strain to reduced productivity, increased turnover and increased injury and illness. Work weeks are not to exceed maximum set by local law. Further, a work week should not be more than 60 hours per week, including overtime, except in emergency or unusual situations. Workers should be allowed at least one day off per seven-day week.

. Freedom of Association - Open communication and direct engagement between workers and management are the most effective ways to resolve workplace and compensation issues. Vendors are to respect the rights of workers to associate freely and to communicate openly with management regarding working conditions without fear of reprisal, intimidation or harassment. Workers' rights to join labour unions seek representation and or join worker's councils in accordance with local laws should be acknowledged.

II. Health and Safety

Vendors must recognize that in addition to minimizing the incidence of work-related injury and illness, a safe and healthy work environment enhances the quality of products and services, consistency of production and worker retention and morale. Vendors must also recognize that ongoing worker input and education is essential to identifying and solving health and safety issues in the workplace.

The health and safety standards are:

. Occupational Injury and Illness - Procedures and systems are to be in place to prevent, manage, track and report occupational injury and illness, including provisions to: a) encourage worker reporting; b) classify and record injury and illness cases; c) provide necessary medical treatment; d) investigate cases and implement corrective actions to eliminate their causes; and e) facilitate return of workers to work.

. Emergency Preparedness - Emergency situations and events are to be identified and assessed, and their impact minimized by implementing emergency plans and response procedures, including: emergency reporting, employee notification and evacuation procedures, worker training and drills, appropriate fire detection and suppression equipment, adequate exit facilities and recovery plans.

. Occupational Safety - Worker exposure to potential safety hazards (e.g., electrical and other energy sources, fire, vehicles, and fall hazards) are to be controlled through proper design engineering and administrative controls, preventative maintenance and safe work procedures (including lockout/tagout), and ongoing safety training. Where hazards cannot be adequately controlled by these means, workers are to be provided with appropriate, well-maintained, personal protective equipment. Workers shall not be disciplined for raising safety concerns.

. Machine Safeguarding - Production and other machinery is to be evaluated for safety hazards. Physical guards, interlocks and barriers are to be provided and properly maintained where machinery presents an injury hazard to workers.

. Industrial Hygiene - Worker exposure to chemical, biological and physical agents is to be identified, evaluated, and controlled. Engineering or administrative controls must be used to control overexposures. When hazards cannot be adequately controlled by such means, worker health is to be protected by appropriate personal protective equipment programs.

. Sanitation, Food, and Housing - Workers are to be provided with ready access to clean toilet, facilities potable water and sanitary food preparation, storage, and eating facilities. Worker dormitories provided by the Participant or a labour agent are to be maintained clean and safe, and provided by the Participant or a labour agent, hot water for bathing and showering, and adequate heat and ventilation and reasonable personal space along with reasonable entry and exit privileges.

. Physically Demanding Work - Worker exposure to the hazards of physically demanding tasks, including manual material handling and heavy or repetitive lifting, prolonged standing and highly repetitive or forceful assembly tasks is to be identified, evaluated and controlled.

III. Environmental

Vendors should recognize that environmental responsibility is integral to producing world class products. In manufacturing operations, adverse effects on the environment and natural resources are to be minimized while safeguarding the health and safety of the public.

The environmental standards are:

- . Product Content Restrictions - Vendors are to adhere to applicable laws and regulations regarding prohibition or restriction of specific substances including labeling laws and regulations for recycling and disposal. In addition, Vendors are to adhere to all environmental requirements specified by Purchaser.
- . Chemical and Hazardous Materials -Chemical and other materials posing a hazard if released to the environment are to be identified and managed to ensure their safe handling, movement storage, recycling or reuse and disposal.
- . Air Emissions - Air emissions of volatile organic chemicals, aerosols, corrosives, particulates, ozone depleting chemicals and combustion by-products generated from operations are to be characterized, monitored, controlled and treated as required prior to discharge.
- . Pollution Prevention and Resource Reduction -Waste of all types, including water and energy, are to be reduced or eliminated at the source or by practices such as modifying production, maintenance and facility processes, materials substitution, conservation, recycling and re-using materials.
- . Wastewater and Solid Waste - Wastewater and solid waste generated from operations industrial processes and sanitation facilities are to be monitored, controlled and treated as required prior to discharge or disposal.
- . Environmental Permits and Reporting - All required environmental permits (e.g. discharge monitoring) and registrations are to be obtained, maintained and kept current and their operational and reporting requirements are to be followed.

IV. Ethics

Vendors must be committed to the highest standards of ethical conduct when dealing with workers, Vendors, and customers.

- . Corruption, Extortion, or Embezzlement - Corruption, extortion, and embezzlement, in any form, are strictly prohibited. Vendors shall not engage in corruption, extortion or embezzlement in any form and violations of this prohibition may result in immediate termination as an Vendor and in legal action.
- . Disclosure of Information - Vendors must disclose information regarding its business activities, structure financial situation, and performance in accordance with applicable laws and regulations and prevailing industry practices.
- . No Improper Advantage - Vendors shall not offer or accept bribes or other means of obtaining undue or improper advantage.
- . Fair Business, Advertising, and Competition - Vendors must uphold fair business standards in advertising, sales, and competition.
- . Business Integrity - The highest standards of integrity are to be expected in all business interactions. Participants shall prohibit any and all forms of corruption, extortion and embezzlement. Monitoring and enforcement procedures shall be implemented to ensure conformance.
- . Community Engagement - Vendors are encouraged to engage the community to help foster social and economic development and to contribute to the sustainability of the communities in which they operate.
- . Protection of Intellectual Property - Vendors must respect intellectual property rights; safeguard customer information; and transfer of technology and know-how must be done in a manner that protects intellectual property rights.

V. Management System

Vendors shall adopt or establish a management system whose scope is related to the content of this Code. The management system shall be designed to ensure (a) compliance with applicable laws, regulations and customer requirements related to the Vendors’ operations and products; (b) conformance with this Code; and (c) identification and mitigation of operational risks related to this Code. It should also facilitate continual improvement.

The management system should contain the following elements:

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- . Company Commitment - Corporate social and environmental responsibility statements affirming Vendor's commitment to compliance and continual improvement.
- . Management Accountability and Responsibility - Clearly identified company representative[s] responsible for ensuring implementation and periodic review of the status of the management systems.
- . Legal and Customer Requirements - Identification, monitoring and understanding of applicable laws, regulations and customer requirements.
- . Risk Assessment and Risk Management - Process to identify the environmental, health and safety and labour practice risks associated with Vendor's operations. Determination of the relative significance for each risk and implementation of appropriate procedural and physical controls to ensure regulatory compliance to control the identified risks.
- . Performance Objectives with Implementation Plan and Measures - Areas to be included in a risk assessment for health and safety are warehouse and storage facilities, plant/facilities support equipment, laboratories and test areas, sanitation facilities (bathrooms), kitchen/cafeteria and worker housing /dormitories. Written standards, performance objectives, and targets an implementation plans including a periodic assessment of Vendor's performance against those objectives.
- . Training - Programs for training managers and workers to implement Vendor's policies, procedures and improvement objectives.
- . Communication - Process for communicating clear and accurate information about Vendor's performance, practices and expectations to workers, Vendors and customers.
- . Worker Feedback and Participation - Ongoing processes to assess employees' understanding of and obtain feedback on practices and conditions covered by this Code and to foster continuous improvement.
- . Audits and Assessments - Periodic self-evaluations to ensure conformity to legal and regulatory requirements, the content of the Code and customer contractual requirements related to social and environmental responsibility.
- . Corrective Action Process - Process for timely correction of deficiencies identified by internal or external assessments, inspections, investigations and reviews.
- . Documentation and Records - Creation of documents and records to ensure regulatory compliance and conformity to company requirements along with appropriate confidentiality to protect privacy.

The Code is modeled on and contains language from the Recognized standards such as International Labour Organization Standards (ILO), Universal Declaration of Human Rights (UDHR), United Nations Convention against Corruption, and the Ethical Trading Initiative (ETI) were used as references in preparing this Code and may be useful sources of additional information

**GENERAL CONDITIONS OF CONTRACT
(GCC-SUPPLY)**

GENERAL CONDITIONS OF CONTRACT (GCC)-SUPPLY

The General Condition of Contract shall form a part of specifications, contract document.

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 BSES Yamuna Power 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 BYPL in accordance with the specification.
- 2.09** "Contract" shall mean the "Letter of Acceptance/Purchase Order" issued by the Purchaser.
- 2.10** "Contract Price" shall mean the price referred to in the "Letter of Acceptance/Purchase Order".
- 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.

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 to proceed with the work past a hold point only after clearance by purchaser or a witness waiver letter from BYPL.

- 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 only be dispatched after receipt of dispatch Instructions issued by the Purchaser.
- 5.05** All in-house testing and inspection shall be done with out any extra cost. The in-house inspection shall be carried out in presence of BSES/BSES authorized third party inspection agency. Cost of Futile/abortive visit(s) shall be debited from the invoices.
- 5.06** Purchaser reserves the right to send any material being supplied to any recognized laboratory for testing, wherever necessary and the cost of testing shall be borne by the Bidder. 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 bidder's representative.

6.0 Inspection & Test Charges

- 6.01 GOODS shall be inspected by BUYER and/or third party inspection agency nominated by BUYER. Inspection shall carry out stage wise/final inspection as per agreed QA /QC procedure. In addition, inspection of GOODS shall be carried out at our Site/stores. SELLER shall, however, repair/replace the damaged/rejected GOODS to the satisfaction of BUYER at no extra cost.
- 6.02 Inspection charges are included in total order value, however BUYER will bear third party inspection charges. In case of futile/abortive visit of BUYER's inspector at SELLER'S works, the cost towards the same shall be debited from the SELLER's invoices.
- 6.03 GOODS covered by this PURCHASE ORDER shall not be dispatched in whole or in part until SELLER has received a written Release for Shipment Notice from BUYER or their designated representative.
- 6.04 Inspection call shall be raised minimum 15(fifteen) days in advance from delivery schedule mentioned in PO and duly filled Format issued by BYPL

7.0 Handling and Storage

- 7.01 Material Safety Data Sheet (MSDS), detail handling & storage instruction sheet/manual, wherever applicable, to be furnished before commencement of supply and one copy is to be submitted in store/site with First Lot.

8.0 Packing, Packing List & Marking

- 8.01 **Packing:** Supplier shall pack or shall cause to be packed all Commodities in crates/boxes/drums/containers/cartons and otherwise in such a manner as shall be reasonably suitable for shipment by road or rail to BYPL, Delhi/New Delhi stores/site without undue risk of damage in transit.
- 8.02 **Packing List:** The contents of each package shall be itemized on a detailed list showing the exact weight, extreme outside dimensions (length, width & weight) of each container/box/drum/carton, Item SAP Code, PO No & date. One copy of the packing list shall be enclosed in each package delivered.

9.0 Prices/Rates/Taxes

9.01 Price basis for supply of materials

- a) Bidder to quote their prices on Landed Cost Basis and separate price for each item for supply to BYPL Delhi/New Delhi stores inclusive of packing, forwarding, loading at manufacturer's premises, payment of GST, Freight, any other local charges. **Octroi is presently not applicable in Delhi and however if applicable shall be reimbursed at actuals.**
- b) The above supply prices shall also include unloading at BYPL Delhi/New Delhi stores/site.
- c) Transit insurance will be arranged by Bidder.

10.0 Taxes & Duties

- 10.01 Prices for Goods are on Ex- Works basis. For the Goods covered under the GST laws, all taxes that are applicable under CGST, SGST, UGST, IGST and GST Compensation Cess shall be payable extra.
- 10.02 For the Goods not covered in the GST laws, the applicable ED, VAT / CST shall be payable extra at applicable rates.
- 10.03 GSTIN of BSES YAMUNA POWER LTD - 07AABCC8569N1Z0
CST No of BSES YAMUNA POWER LTD -07740254593
TIN NO of BSES YAMUNA POWER LTD - 07740254593
PAN NO of BSES YAMUNA POWER LTD - AABCC8569N
- 10.04 At the end of each month, the SELLER must submit their detail of invoices and amount thereof to the concerned officer in charge, within 07 days after the close of the respective month of which supply relates. Non submission of the said request would be treated as good as that the SELLER has no requirement of reconciliation.

11.0 Invoicing Instructions

- 11.01 Invoices in triplicate [1) Original for recipient, 2) Duplicate for Transporter, 3) Triplicate for supplier] shall be made out and delivered to the following address: BSES YAMUNA POWER LIMITED, SHAKTI KIRAN BUILDING, KARKARDOOMA, DELHI-110032.
MDCC will be released separately for Capex & Opex. Invoice will be submitted by supplier as per the MDCC.
- 11.02 Vendor shall obtain GST registration in the State from where the supply will be carried out. Vendors supplying Goods to the Purchaser shall have a valid GST registration number and shall submit GST Tax Invoice and other documents as per SGST Act, CGST Act, IGST Act, UTGST Act, GST Compensation Cess Act and Rules made there under. Failure to submit GST Tax Invoice shall be liable for withholding SGST, CGST, IGST, UTGST, GST Compensation Cess amount charged by the vendor while releasing the payment.
- 11.03 Invoice in the name of BSES YAMUNA Power Limited & address of the store/site mentioned in the MDCC. Invoice should contain all information as required under GST Invoice, Debit Note and Credit Rules. The government has notified rules of invoicing under GST along with a template of invoice(GST INV-01) covering the elements such as supplier's details, GSTIN No, HSN Codes, item details, GST tax rates, etc that need to be presented by the supplier.
- 11.04 Vendor to carefully examine and charge relevant CGST / SGST, UGST, IGST and GST compensation cess as applicable to the transactions.

11.05 Timely provision of invoices / Debit Notes / Credit Notes:

11.05.1 Vendor to timely provide invoice / Debit note / Credit note to enable Purchaser to claim tax benefit on or before stipulated time period. All necessary adjustment entries (Credit Note, Purchase Returns, Debit Notes) shall be made within the time lines prescribed under the GST Laws.

11.05.2 In case of receipt of advance, the Vendor undertakes to raise the tax invoice. Purchaser, upon payment of advance, shall issue payment voucher as per applicable GST laws and rules. Four copies of the invoices need to be provided by suppliers and wherever the law requires, an Electronic Reference Number for each invoice.
Documents and devices to be carried by a person-in-charge of a conveyance under.

12.0 Terms of payment and billing

12.01 For Supply of Equipment's:

100% payment shall be made within 45 days from the date of receipt & acceptance of material at store/site on against submission of following documents against dispatch of each consignment at our Vendor Support Cell (VSC):

- a) Signed copy of accepted Purchase Order (for first payment)
- b) LR / RR / BL as applicable
- c) Challan as applicable
- d) Two (02) copies of Supplier's detailed Recipient Invoice showing Commodity description, quantity, unit price, total price and basis of delivery, and being 100% of the value of the consignment claimed.
- e) Two (02) copies of Supplier's transporter invoice duly received by BYPL Stores & Original certificate issued by BYPL confirming receipt of the subject material at Stores/Site and acceptance of the same as per the provisions of the contract.
- f) Two (02) copies Packing List / Detailed Packing List
- g) Approved Test certificates / Quality certificates, if applicable
- h) Certificate of Origin, if applicable
- i) Material Dispatch Clearance Certificate (MDCC)
- j) Insurance Policy / Certificate, if applicable
- k) Warranty / Guarantee Certificate, if applicable
- l) Check list for bill submission.

12.02 Purchaser has the right to recover tax loss, interest and penalty suffered due to any non-compliance of tax laws by the Vendor. In the event, Purchaser is not able to avail any tax credit due to any short coming on the part of the Vendor (which otherwise should have been available to Purchaser in the normal course), then the Vendor at his own cost and effort will get the short coming rectified. If for any reason the same is not possible, then the Vendor will make 'good' the loss suffered by Purchaser due to the tax credit it lost . In such event, any amount paid to the Vendors shall be first attributable to the tax (GST) charged in the invoice and the balance shall be considered towards the 'value' of supply of goods/ services.

12.03 Purchaser shall deduct "Tax Deducted at Source" wherever applicable and at the rate prescribed under the GST Laws or any other Indian law and remit the same to the Government. Necessary TDS certificates as per law shall be issued by the purchase to the vendor.

12.04 Any liability arising out of dispute on the tax rate, classification under HSN, calculation and payment of tax to the Government will be to the Vendor's account.

12.05 Where the supply of Goods are liable to GST under reverse charge mechanism, then the supplier should clearly mention the category under which it has been registered and also that "the liability of payment of GST is on the Recipient of Supply".

13.0 Tax Indemnity Clause

13.01 Vendor (along with its affiliates in India or overseas including any agent/ third party contractor or any other person appointed by such affiliates for the purpose of this agreement) agrees that it will be solely responsible for performing all compliances and making payments of all taxes (direct tax or indirect tax including but not limited to income-tax, transfer pricing, value added tax, SGST, CGST, IGST, UTGST, GST Compensation Cess custom duty, excise duty, Research and Development Cess, etc.), cesses, interest, penalties or any other tax/ duty/ amount/ charge/ liability arising either out of laws/ regulations applicable in India and overseas or because of a demand/ recovery initiated by any revenue authority under laws/ regulations applicable in India or overseas.

13.02 In case any tax liability (including but not limited to income-tax, transfer pricing, value added tax, SGST, CGST, IGST, UTGST, GST Compensation Cess custom duty, excise duty, Research and Development Cess, etc.), cesses, interest, penalties or any other tax/ duty/ amount/ charge/ liability becomes payable by Purchaser due to failure of the Vendor, or any of its affiliates in India or overseas including any agent/ third party contractor or any other person appointed by such affiliates for the purpose of this agreement, to comply with the relevant laws/ regulations applicable in India or overseas, Vendor undertakes to indemnify Purchaser for an amount equal to amount payable by Purchaser.

13.03 Further, Vendor undertakes to keep Purchaser indemnified at all times against and from all other actions, proceedings, claims, loss, damage, costs and expenses which may be brought against Purchaser or suffered or incurred by Purchaser and which shall have arisen either directly or indirectly out of or in connection with failure of The Vendor, or any of its affiliates in India or overseas including any agent/ third party contractor or any other person appointed by such affiliates for the purpose of this agreement, to comply with relevant obligations/ compliance under any law/ regulations applicable in India and overseas.

13.04 The parties agree to follow the following process in case any communication of demand, arising out non-compliance by Vendor (along with its affiliates in India or overseas including any agent/ third party contractor or any other person appointed by such affiliates for the purpose of this agreement), is received by Purchaser:

13.04.1 On Purchaser receiving any communication from a competent authority demanding tax liability (including but not limited to income-tax, transfer pricing, value added tax, SGST, CGST, IGST, UTGST, GST Compensation Cess custom duty, excise duty, Research and Development Cess, etc.), cesses, interest, penalties or any other tax/ duty/ amount/ charge/ liability, Purchaser shall, within 5 common working days from the date of receipt of such communication (save where the period to respond to the relevant authority is less than five days, in which case, as soon as reasonably possible) inform Vendor in writing of such communication.

13.04.2 Pursuant to receiving communication from Purchaser, Vendor shall suggest to accept the communication and pay the demand amount to the competent authority. In such an event, Vendor shall reimburse such amount paid to Purchaser within 5 working days from the date of payment by Purchaser to the competent authority.

13.04.3 If Vendor advises in writing and Purchaser agrees to dispute the demand, then Purchaser shall dispute the matter with competent authority as per due process prescribed under the regulations

and Purchaser shall not pay the Tax Demand. In such scenario, cost of litigation including but not limited to Counsel cost, filing fees, other related charges, should be reimbursed by Vendor to Purchaser. Additionally, If any coercive steps of recovery are initiated by the department, then Purchaser would pay such amount (including by way of adjustment of refunds due to it) and the same would be reimbursed by Vendor within 5 working days from date of such recovery from Purchaser. Purchaser will take all necessary steps to avoid such recovery measures.

13.04.4 On determination of the demand through an Order issued by a Tribunal or any other similar Authority, by whatever name called, under any law applicable in India or overseas, if the demand or any part thereof becomes payable and is paid by Purchaser, then Vendor undertakes to reimburse such amount to Purchaser within 10 days from the date of payment. Alternatively, if on determination of the demand through an Order, no amount is payable by Purchaser then any refund arising to Purchaser due to such an Order shall be passed on to Vendor within 10 days from the date of receipt of refund.

14.0 The Micro, Small and Medium Enterprises (MSME)

14.01 If the SELLERS establishment is covered under the purview of The Micro, Small and Medium Enterprises Development Act, 2006 and its amendments, he shall declare so within the bid of its status failing which it will be presumed that it is a non-MSME unit. Also submit a copy of Udyog Aadhaar (UA) & Udyam Registration Number.

15.0 Price Validity

15.01 All bids submitted shall remain valid, firm and subject to unconditional acceptance by Delhi for 120 days from the due date of submission. For awarded suppliers, the prices shall remain valid and firm till contract completion.

16.0 Performance Guarantee

16.01 To be submitted within fifteen (15) days from the date of issuance of the Letter of Award/PO, supplier shall establish a performance bond in favor of BYPL 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 24 months from the date of Commissioning or 30 months from the date of last dispatch whichever is earlier plus 3 months claim period.

16.02 Bank guarantee shall be drawn in favour of BSES Yamuna Power Ltd as applicable. The performance Bank guarantee shall be in the format as specified by BYPL.

17.0 Forfeiture

17.01 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 BYPL of this Performance Bond, to the relevant bank referred to above, together with a simple statement that supplier has failed to comply with any term or condition set forth in the Contract.

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

18.0 Release

18.01 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.

19.0 Defects Liability Period/Guarantee/Warranty

19.01 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.

19.02 If during the Defects Liability Period any GOODS are found to be defective, they shall be promptly replaced or rectified by BIDDER at its own cost (including the cost of dismantling and (reinstallation) on the instructions of BUYER and if removed from SITE for such purpose, shall be removed and re-delivered to SITE by BIDDER at its own cost.

20.0 Return, Replacement or Substitution

20.01 BYPL shall give Supplier notice of any defective Commodity promptly after becoming aware thereof. BYPL may in its discretion elect to return defective Commodities to Supplier for replacement, free of charge to BYPL, or may reject such Commodities and purchase the same or similar Commodities from any third party. In the latter case BYPL 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. BYPL may set off such costs against any amounts payable by BYPL to Supplier. Supplier shall reimburse BYPL for the amount, if any, by which the price of a substitute Commodity exceeds the price for such Commodity as quoted in the Bid. BUYER at its sole discretion shall have the opinion to dispose the material or GOODS so rejected and not taken back within forty-five days from the date of intimation of rejection.

21.0 Effective Date of Commencement of Contract

21.01 The date of the issuance of the Letter of Acceptance/Purchase Order shall be treated as the effective date of the commencement of Contract.

22.0 Time – The Essence Of Contract

22.01 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.

23.0 The Laws and Jurisdiction of Contract:

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

23.02 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 Delhi in India

24.0 Events of Default

24.01 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 BYPL.

25.0 Consequences of Default.

- (a) If an Event of Default shall occur and be continuing, BYPL may forthwith terminate the Contract by written notice.
- (b) In the event of an Event of Default, BYPL 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 BYPL may incur as a result of Supplier's default.

26.0 Penalty for Delay

26.01 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 basic (ex-works) price for every week delay of undelivered units or part thereof for individual mile stone deliveries.

26.02 The total amount of penalty for delay under the contract will be subject to a maximum of ten percent (10%) of the basic (ex-works) price of total undelivered units.

26.03 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.

22.4 If Penalty is levied as per the Order terms & conditions; BYPL will raise Invoice of the penalty amount along with applicable GST rates. Accordingly, after set off of the penalty Invoice amount, net payment shall be made.

27.0 Variation in Taxes, Duties & Levies

27.1 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. In case of reduction in taxes, duties and levies, the benefits of the same shall be passed on to BUYER.

27.2 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.

27.3 Notwithstanding what is stated above, changes in Taxes, Duties & Levies shall applied 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.

27.4 PURCHASE ORDER value shall not be subject to any variation on account of variation in Exchange rate(s).

28.0 Taxes & Duties on raw materials & bought out components

28.01 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.

28.02 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.

29.0 Force Majeure

29.01 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.

- 29.02 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 :
- (i) The following events and circumstances :
 - a) Effect of any natural element or other acts of God, including but not limited to storm, flood, earthquake, lightning, cyclone, landslides or other natural disasters.
 - b) Explosions or fires
 - (ii) War declared by the Government of India, provided that the ports at Mumbai are declared as a war zone.
 - (iii) Dangers of navigation, perils of the sea.
- 29.03 Notice of Events of Force Majeure If a force majeure event prevents a party from performing any obligations under the Contract in part or in full, that party shall:
- i) Immediately notify the other party in writing of the force majeure events within 7(seven) working days of the occurrence of the force majeure event
 - ii) Be entitled to suspend performance of the obligation under the Contract which is affected by force majeure event for the duration of the force majeure event.
 - iii) Use all reasonable efforts to resume full performance of the obligation as soon as practicable
 - iv) Keep the other party informed of all such efforts to resume full performance of the obligation on a regular basis.
 - v) Provide prompt notice of the resumption of full performance or obligation to the other party.
- 29.04 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.
- 29.05 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.
- 29.06 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.
- 29.07 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.

- 29.08 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.
- 29.09 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."

30.0 Transfer and Sub-Letting

- 30.01 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.

31.0 Recoveries

- 31.01 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.

32.0 Waiver

- 32.01 Failure to enforce any condition herein contained shall not operate as a waiver of the condition itself or any subsequent breach thereof.

33.0 Indemnification

- 33.01 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.

34.00 Documentation

- 34.01 The Bidder shall procure all equipment from BYPL approved sources as per attached specifications. The Bidder's shall submit 5 copies of Material/Type Test Certificates, O&M Manuals, and Approved & As-built drawings, related to various equipment. The Bidder's shall ensure for the strict compliance to the specifications and Field Quality Procedures issued by BYPL Engineer in-charge.

35.0 Transit Insurance

- 35.01 Transit Insurance shall be arranged by the Bidder.
- 35.02 DAMAGE / LOSS OF CARGO IN TRANSIT: Vendor shall be solely responsible for coordinating with the concerned insurance company for procuring insurance for material and/or Goods, processing claim lodgment and settlement. Notwithstanding the insurance cover, in case of loss / damage to material and/or Goods, in any manner and for any cause whatsoever, Vendor shall cause the damaged cargo to be replaced and delivered to the Purchaser with new material and/or Goods within 30 days of such loss / damage. The Vendor shall be solely responsible for all expenses in relation to the replacement and delivery in such circumstances.

36.0 Limitation of Liability

36.01 Except as provided otherwise in the Contract and except for willful misconduct or gross negligence, neither Party shall be liable to the other Party for loss of use of any Works, loss of profit, loss of any contract or any other indirect or consequential loss or damage which may be suffered by the other Party in connection with the Contract. The total liability of the Supplier to the Purchaser under the Contract shall not exceed the Contract Value. Except that this Clause shall not limit the liability of the Supplier:

- (a) Under any other provisions of the Contract which expressly impose a greater liability,
- (b) In cases of fraud, willful misconduct or illegal or unlawful acts, or
- (c) In cases of acts or omissions of the Supplier which are contrary to the most elementary rules of diligence which a conscientious Supplier would have followed in similar circumstances.

37.0 Liability of Suppliers

37.1 Subject to the due discharge of its obligations under the Contract and except in case of gross negligence or willful misconduct on the part of the Supplier or on the part of any person acting on behalf of the Supplier, with respect to any loss or damage caused by the Supplier to the Purchaser's property or the Site, the Supplier shall not be liable to the Purchaser for the following:

- (a) For any indirect or consequential loss or damage; and
- (b) For any direct loss or damage that exceeds:
 - (i) The total payments made and expected to be made to the Supplier under the Contract including reimbursements, if any; or
 - (ii) The insurance claim proceeds which the Supplier may be entitled to receive from any insurance purchased by the Supplier to cover such a liability, whichever is higher.

37.2 This limitation of liability shall not affect the Supplier's liability, if any, for damage to any third party, caused by the Supplier or any Person or firm acting on behalf of the Supplier in executing the Works.

37.3 Notwithstanding anything contained in the Contract, the Supplier shall not be liable for any gross negligence or willful misconduct on the part of the Purchaser or any of its affiliates, any vendor, or any party, other than Supplier and/or, its directors, officers, agents or representatives or its affiliates, or SubSupplier, or the vendor or any third party engaged by it.

37.4 Notwithstanding anything contained in the Contract, including but not limited to approval by the Purchaser of any drawings, documents, vendor list, supply of information or data or the participation of the Purchaser in any meeting and/or discussion or otherwise, shall not absolve the Supplier from any of its liabilities or responsibilities arising in relation to or under the Contract.

38.0 Intellectual Property Rights and Royalties

38.1 The Supplier shall indemnify the Purchaser and the Purchaser's Representative from and against all claims and proceedings on account of infringement (or alleged infringement) of any patent rights, registered designs, copyright, design, trademark, trade name, know-how or other intellectual property rights (hereinafter collectively referred to as "**Intellectual Property Rights**") in respect of the Works, Supplier's Equipment, machines, Works method, Plant, Materials, or anything whatsoever required for the execution of the Works and from and against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto. In the event of infringement of any Intellectual Property Rights of any third party as a result of the execution of the Works (or any part thereof) by the Supplier, the Supplier shall rectify, modify or replace, at its own cost, the Works, Plant or Materials or anything whatsoever required for the Works so that infringement ceases to exist or, in the alternative, the Supplier shall procure necessary rights/ licenses from the affected third party so that there is no infringement of Intellectual Property

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Rights.

- 38.2 The Supplier shall be promptly notified of any claim made against the Purchaser. The Supplier shall, at its cost, conduct negotiations for the settlement of such claim, and any litigation or arbitration that may arise from it. The Purchaser or the Purchaser's Representative shall not make any admission which might be prejudicial to the Supplier, unless the Supplier has failed to take over the conduct of the negotiations, litigation or arbitration within a reasonable time after having been so requested. In the event of Supplier failing to act at the Purchaser's Representative's notice, the Purchaser shall be at full liberty to deduct any such amount of pending claim from any amount due to the Supplier under the Contract or any other contract and the balance portion of claim shall be treated as debt due from the Supplier.
- 38.3 All Intellectual Property Rights in respect of any Plant, Materials, Drawings and Designs, plans, documents, specifications, data, materials, know how, charts, information, etc., provided to the Supplier by the Purchaser pursuant to this Contract for the execution of the Works, belongs to and shall continue to belong to the Purchaser and the Supplier shall not have any rights in the same other than the limited right for its use for the purpose of execution of the Works.
- 38.4 Intellectual Property Rights in respect of any Plant, Materials, Drawings and Designs, plans, calculations, drawings, documents, know-how and information relating to the Works which are proprietary to the Supplier and/ or its third party licensors ("**Supplier's IPR**") shall continue to vest with the Supplier and/ or its third party licensors and the Supplier shall grant and/ or procure from its third party licensors, at its own cost, a worldwide, perpetual, royalty free, non-exclusive license (along with the right to sub-license) to use and reproduce such Supplier's IPR for the use, operation, maintenance and repair of the Works.
- 38.5 If any patent, trademark, trade name, registered design or software is developed by the Supplier or its SubSupplier specifically for the execution of the Works, then all Intellectual Property Rights in respect of such design, trademark, trade name or software shall be the absolute property of the Purchaser and shall not be utilized or retained by the Supplier (or its SubSuppliers) for any purpose other than with the prior written consent of the Purchaser.
- 38.6 If the Supplier uses proprietary software (whether customized or off the shelf) for the purpose of storing or utilizing records in relation to the Works, the Supplier shall obtain at its own expense, the grant of a worldwide, royalty-free, perpetual licence or sublicense (including the right to sublicense) to use such software, in favour of the Purchaser provided that the use of such software under the licence or the sublicense may be restricted to use any such software only for the design, construction, reconstruction, manufacture, installation, completion, reinstatement, extension, repair and operation of the Works or any part thereof.
- 38.7 If any software is used by the Supplier for the execution of the Works over which the Supplier or a third party holds pre-existing title or other rights, the Supplier shall obtain for the Purchaser, a worldwide, royalty free, perpetual license for the right to use and apply that software (together with any modifications, improvements and developments thereof).

39.0 Acceptance

- 39.01 Vendor confirms to have gone through the Policy of BYPL on legal and ethical code required to be followed by vendors encapsulated in the "Vendor Code of Conduct" displayed on the official website of BYPL (www.bsesdelhi.com) also, which shall be treated as a part of the contract/PO/WO. Vendor undertakes that he shall adhere to the Vendor code of Conduct and also agrees that any violation of the Vendor Code of Conduct shall be treated as breach of the contract/PO/WO. In event of any such breach, irrespective of whether it causes any loss/damage, Purchaser (BYPL) shall have the right to recover loss/damage from Vendor. The Contractor/Vendor hereby indemnifies and agrees to keep indemnified the Purchaser (BYPL) against any claim/litigation arising out of any violation of Vendor Code of Conduct by the Contractor/Vendor or its officers, agents & representatives etc.
- 39.02 Acceptance of the CONTRACT implies and includes acceptance of all terms and conditions enumerated in the CONTRACT in the technical specification and drawings made available to Contractor consisting of general conditions, detailed scope of work, detailed technical specification, detailed equipment drawing and complete scope of work.
- 39.03 Contractor and Company contractual obligation are strictly limited to the terms set out in the CONTRACT. No amendments to the concluded CONTRACT shall be binding unless agreed to in writing for such amendment by both the parties
- 39.04 We expect your services and supplies are aligned to our Vision, Mission and Values. Please refer to the following link to know about our Vision, Mission and Values; <https://www.bsesdelhi.com/web/bypl/about-bses>

QUANTITY AND DELIVERY REQUIREMENTS

Sl. No.	BYPL SAP Code	Item Description	Specification	Total Qty. (Nos)	Tentative Delivery Schedule	Destination
1	2100015886 & 2100010394	SUPPLY & SUPERVISION OF T/C OF ONAF POWER TRANSFORMER OF RATING 20/25MVA 33/11KV & 66/11KV	SP-TRPU-01-R6	06	Within 03-04 Months from the PO @ 03 Nos per month	BYPL Delhi Sites/Stores

The delivery schedule shown above is tentative. PO(s) will be released as per the actual requirement. However, supplier has to deliver the material within the delivery schedule provided.

Schemes may be executed in the phased manner. Site details are as follow:

(A) 20/25MVA 33/11KV

1. Karawal Nagar Grid
2. Dwarka- puri Grid
3. Seelampur Grid
4. Town Hall Grid
5. Preet Vihar Grid

(B) 20/25MVA 66/11KV

1. Location to be provided later on

APPENDIX II

FORMAT OF PERFORMANCE BANK GUARANTEE
(To be executed on a Non-Judicial Stamp Paper of appropriate value)

This Guarantee made at _____ this [____] day of [____] 20XX

1. WHEREAS M/s BSES Yamuna Power Limited, a Company incorporated under the provisions of Companies Act, 1956 having its Registered Office at Shaktikiran Building, Karkardooma, Delhi 110032, India hereinafter referred to as the " Owner "; (which expression shall unless repugnant to the context or meaning thereof include its successors, administrators, executors and assigns).
2. AND WHEREAS the Owner has entered into a contract for _____(Please specify the nature of contract here) vide Contract No. _____ dated _____(hereinafter referred to as the "Contract") with M/s. _____, (hereinafter referred to as "the Supplier", which expression shall unless repugnant to the context or meaning thereof be deemed to mean and include each of their respective successors and assigns) for providing services on the terms and conditions as more particularly detailed therein.
3. AND WHEREAS as per clause ____ of conditions of Contract, the Suppliers are obliged to provide to the Owners an unconditional bank guarantee for an amount equivalent to ten percent (10%) of the total Contract Value for the timely completion and faithful and successful execution of the Contract from [_____] *pl. specify the name of Bank*) having its head/registered office at [_____] through its branch in _____(*pl. specify the name of Branch through which B.G is issued*) hereinafter referred to as "the Bank", (which expression shall unless it be repugnant to the context or meaning thereof be deemed to include its successors and permitted assigns).
4. NOW THEREFORE, in consideration inter alia of the Owner granting the Suppliers the Contract, the Bank hereby unconditionally and irrevocably guarantees and undertakes, on a written demand, to immediately pay to the Owner any amount so demanded (by way of one or more claims) not exceeding in the aggregate [Rs.].....(*in words*) without any demur, reservation, contest or protest and/or without reference to the Supplier and without the Owner needing to provide or show to the Bank ,grounds or reasons or give any justification for such demand for the sum/s demanded.

APPENDIX II NIT NO: CMC/BY/20-21/RB/SV/49	Page 1 of 6	Bidders seal & Signature
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5. The decision of the Owner to invoke this Guarantee and as to whether the Supplier has not performed its obligations under the Contract shall be binding on the Bank. The Bank acknowledges that any such demand by the Owner of the amounts payable by the Bank to the Owner shall be final, binding and conclusive evidence in respect of the amounts payable by the Supplier to the Owner. Any such demand made by the Owner on the Bank shall be conclusive and binding, notwithstanding any difference between the Owner and the Supplier or any dispute raised, invoked, threatened or pending before any court, tribunal, arbitrator or any other authority.
6. The Bank also agrees that the Owner at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor without proceeding against the Suppliers notwithstanding any other security or other guarantee that the Owner may have in relation to the Supplier's liabilities.
7. The Bank hereby waives the necessity for the Owner first demanding the aforesaid amounts or any part thereof from the Suppliers before making payment to the Owner and further also waives any right the Bank may have of first requiring the Owner to use its legal remedies against the Suppliers, before presenting any written demand to the Bank for payment under this Guarantee.
8. The Bank's obligations under this Guarantee shall not be reduced by reason of any partial performance of the Contract. The Bank's obligations shall not be reduced by any failure by the Owner to timely pay or perform any of its obligations under the Contract.
9. The Bank further unconditionally and unequivocally agrees with the Owner that the Owner shall be at liberty, without the Bank's consent and without affecting in any manner its rights and the Bank's obligation under this Guarantee, from time to time, to:
 - (i) vary and/or modify any of the terms and conditions of the Contract;
 - (ii) Forebear or enforce any of the rights exercisable by the Owner against the Suppliers under the terms and conditions of the Contract; or
 - (iii) Extend and/or postpone the time for performance of the obligations of the Suppliers under the Contract;

and the Bank shall not be relieved from its liability by reason of any such act or omission on the part of the Owner or any indulgence shown by the Owner to the Suppliers or any other reason whatsoever which under the law relating to sureties would, but for this provision, have the effect of relieving the Bank of its obligations under this Guarantee.

10. This Guarantee shall be a continuing bank guarantee and shall not be discharged by any change in the constitution or composition of the Suppliers, and this Guarantee shall not be affected or discharged by the liquidation, winding-up, bankruptcy, reorganisation, dissolution or insolvency of the Suppliers or any of them or any other circumstances whatsoever.
11. This Guarantee shall be in addition to and not in substitution or in derogation of any other security held by the Owner to secure the performance of the obligations of the Suppliers under the Contract.
12. NOTWITHSTANDING anything herein above contained, the liability of the BANK under this Guarantee shall be restricted to _____ *(insert an amount equal to ten percent (10%) of the Contract Value)* and this Guarantee shall be valid and enforceable and expire on _____ *(pl. specify date)* or unless a suit or action to enforce a claim under this Guarantee is filed against the Bank on or before the date of expiry.
13. On termination of this Guarantee, all rights under the said Guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities hereunder.
14. The Bank undertakes not to revoke this Guarantee during its validity except with the prior written consent of the Owner and agrees that any change in the constitution of the Bank or the Suppliers shall not discharge our liability hereunder.
15. Owner may assign this Guarantee to any Person or body whether natural, incorporated or otherwise under intimation to the Bank. The Bank shall be discharged of its obligations hereunder by performance in accordance with the terms hereof to such assignee without verifying the validity / legality / enforceability of the assignment.
16. This Guarantee shall be governed by the laws of India. Any suit, action, or other proceeding arising out of, connected with, or related to this Guarantee or the subject matter hereof shall be subject to the exclusive jurisdiction of the courts of **Delhi**, India.

Dated this day of 20XX at

(Signature)

.....

(Name)

.....

(Designation with Bank Stamp)

Attorney as per

Power of Attorney No.....

Date.....

<p>APPENDIX II NIT NO: CMC/BY/20-21/RB/SV/49</p>	<p>Page 3 of 6</p>	<p>Bidders seal & Signature</p>
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BYPL BANK DETAIL WITH IFSC CODE:

1. Name of the Bank: Axis Bank Limited
2. Branch Name & Full Address: C-58, Basement & Ground Floor, Preet Vihar, Main Vikas Marg,
New Delhi 110092
3. Branch Code: 055
4. Bank Account No: 911020005246583
5. IFSC Code: UTIB0000055



FORMAT OF WARRANTY/GUARANTEE CERTIFICATE

BSES YAMUNA POWER LIMITED Shaktikiran Building, Karkardooma, Delhi -110032.

Ref. Purchase Order No. :

Dear Sir,

We hereby confirm that the.....dispatched to BSES YAMUNA POWER LTD vide invoice no.....
DT.....is exactly of the same nature and description as per above mentioned Purchase Order.

We further confirm that we will replace/repair our.....free of cost If found any manufacturing defect during.....months from the date of dispatch of material or.....months from the data of commissioning whichever is earlier.

Vendors Name & Signature

UNDERTAKING GST

The Vendor shall give an undertaking in the following words on each invoice in the absence of which tax payment as on the Vendor's invoice may be withheld.

"The tax component as mentioned in the invoice shall be deposited with GST Department as per law by way of actual payment or by way of legal set off as per law. The turnover billed shall be duly declared in my GST returns a copy of which shall be filed with the Purchaser. Should the input tax credit to the Purchaser be denied by way of any lapse on the part of the Vendor, the same shall be paid on demand and in any case the Purchaser is authorized to deduct the tax equivalent amount from the amount payable to the Vendor"

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SUMMARY OF COMMERCIAL TERMS AND CONDITIONS

SI No	Item Description	AS PER BYPL	BIDDER'S CONFIRMATION
1	Validity	120 days from the date of submission of bid	
2	Price basis	a) " Firm ", FOR Delhi store basis. Prices shall be inclusive of all taxes & duties, freight upto Delhi stores. b) Unloading at sites/stores shall be in vendor's scope c) Transit insurance in Bidders scope	
3	Payment terms	100% payment shall be made within 45 days from the date of receipt & acceptance of material at store/site against submission documents	
4	Delivery schedule	GTP/Drawings/QAP/etc to be submitted within 15 days to the concern official in BYPL for Transmittal approval. BYPL shall approve/ provide comments on the submitted drawings within 7 days of first submission. Delivery shall be completed within 03-04 Months from the LOI/PO @ 03 Nos per month	
5	Defect Liability period	60 months after commissioning or 66 months from the last date of receipt, whichever is earlier	
6	Penalty for delay	1% (One) of the basic value (ex-works value) of undelivered units per week of delay or part thereof, subject to maximum of 10% (Ten) of the total basic value (ex-works value) of undelivered units.	
7	Performance Bank Guarantee	10% of total PO value valid for 24 months after commissioning or 30 months from the last date of receipt, whichever is earlier plus 3 months towards claim period.	

VOLUME – II

PRICE BID FORMAT

ALL PRICES IN INR (₹)

S. No.	DESCRIPTION OF GOODS	HSN CODE (8 Digit Mandatory)	UoM	QTY (A)	UNIT BASIC PRICE INCL FREIGHT (₹) (B)	UNIT GST & CESS AS APPLICABLE (CGST & SGST/UTGST or IGST) (₹) (C)		UNIT LANDED RATE (All Inclusive) (₹) (D = B+C)	TOTAL LANDED VALUE (₹) (E = DXA)
						%	AMT		
1	SUPPLY & SUPERVISION OF T/C OF ONAF POWER TRANSFORMER OF RATING 20/25MVA 33/11KV		Nos	5					
2	SUPPLY & SUPERVISION OF T/C OF ONAF POWER TRANSFORMER OF RATING 20/25MVA 66/11KV		Nos	1					
3	TRANSPORTATION OF TRANSFORMER FROM STORE TO SITE MAY ALSO BE FURNISHED IN CASE THE SITE IS NOT READY (I.E., LOADING, TRANSPORTATION & UNLOADING)		PU	1					
GRAND TOTAL LANDED VALUE (₹)									
In words									

NOTE: Cost of all tests as per technical specification is to be included. No separate charges will be paid.

The Un-priced bid should be marked as **"Quoted"** and to be submitted with Part – A

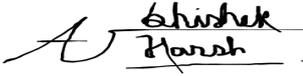
We declare that the following are our quoted prices in INR for the entire packages.

Date: _____ Bidders Name: _____
 Place: _____ Bidders Address: _____
 Signature: Designation:
 Printed Name: Common Seal:

VOLUME – III

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

Revision	06	
Date	19.03.2021	
Pages	Page 1 of 83	
Prepared by	Abhishek Harsh	 8267d7c3-82b5-46cb-b5a6-867ee7820a34
Reviewed by	Srinivas Gopu	 5d32525e-ed3a-4f41-b1c7-b8a5e77d1519
Approved by	Gaurav Sharma	 23dc2de2-95de-4472-99a7-dea873f472b6

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2.0 CODES & STANDARDS.....	4
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4.0 CONSTRUCTION & DESIGN	6
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8.0 APPROVED MAKE OF COMPONENTS.....	24
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TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

RECORD OF REVISION

Revision No	Item clause no. /	Nature of Change	Approved By
R6	4.2.9.1.2	Cable box Doors Included	GS
R6	4.2.11.1	Marshalling Box material steel grade changed	GS
R6	4.2.11.6	Power supply unit auxiliary voltage is changed	GS
R6	4.2.11.9	Control cable length is specified	GS
R6	11.5	Site Acceptance tests included	GS
R6	14.0	Document matrix is included	GS
R6	Annexure D	Transformer Oil technical details revised	GS
R6	Annexure E	Manufacturing quality assurance plan	GS

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

1.0 SCOPE OF SUPPLY

For scope of supply, refer Annexure A

2.0 CODES & STANDARDS

Material, equipment and methods used in the manufacture of power transformer shall conform to the latest edition of following:

IEC 34	Rotating Electrical Machines. (E.g. For Cooler Fan Motors.)
IEC 38	Standard Voltages.
IEC 71	Co-ordination of Insulation.
IEC 76	Power transformers
IEC 156	Method for Determination of the Electric Strength for Insulating Oils.
IEC 44	Current Transformers.
IEC 214	On-Load Tap- Chargers
IEC 242	Standard Frequencies for Centralized Network Control Installations.
IEC 296	Specification for Unused Mineral Insulating Oils for Transformer and switchgear.
IEC 354	Loading Guide for Oil-Immersed Power Transformers.
IEC 445	Identification of Equipment Terminals and of Terminations of Certain Designated Conductors, Including General Rules for an Alphanumeric System.
IEC 529	Degrees of Protection Provided by Enclosures (IP Code)
IEC 542	Application Guide for On-Load Tap- changers.
IEC 551	Determination of Transformer and Reactor Sound Levels.
IEC 606	Application Guide for Power Transformer.
IEC 616	Terminal and Tapping Markings for Power Transformers.
IEC 947	Low- Voltage Switchgear and Control gear.
IEC 60127	Bushing for alternating voltages above 1000V
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.
IS 335	Insulating oil
IS 1271	Thermal evaluation and classification of electrical insulation
IS 2099	Bushing for Alternating voltage above 1000V
IS 16227	Current Transformers
IS 3347	Dimensions for porcelain Transformer bushing
IS 3637	Gas operated relays
IS 3639	Fitting & Accessories for power transformers
IS 4201	Application guide for CT's
IS 2026 pt-7	Guide for loading of oil immersed transformers
IS 8478	Application guide for On-load tap changer
IS 8468	On-load tap charger
IS 10028	Code of practice for selection, installation & maintenance of transformers
IS 13947	LV switchgear and control gear part-1
IS 2026	Power transformers
IS 5	Colours for ready mix paints
IS 6272	Industrial Cooling Fans
IS5561	Electrical power connectors
IS 325	Three phase induction motors.

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

	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:

- a. Guaranteed Technical Particulars (GTP)
- b. This Specification
- c. Referenced Standards
- d. Approved Vendor Drawings
- e. 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%
3.1.2	Transient condition	- 20% or + 10% combined variation of voltage and frequency
3.1.4	Service condition	Refer Annexure C
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
3.1.9	Radio influence voltage	Refer Annexure C
3.1.10	Harmonic currents	Refer Annexure C
3.1.11	Partial discharge	Refer Annexure C
3.1.12	Parallel operation	Shall be designed to operate in parallel with transformer.
	Major parameters	
	Rating	Refer Annexure C
	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 rise winding	Refer Annexure C
3.2.8	Flux density	Refer Annexure C
3.2.9	Current density	Refer Annexure C
3.2.10	Tappings on HV winding	Refer Annexure C
3.2.11	Design clearances	Refer Annexure C

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

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 if fans mounted in future.	Required
4.2	Major parts	
4.2.1	Tank	
4.2.1.1	Material of construction	Robust mild steel plate without pitting and low carbon content
4.2.1.2	Plate thickness	Adequate for meeting the requirements of pressure and vacuum type tests as per CBIP. Test will be conducted on each transformer tank for design validation.
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
4.2.1.4	Tank feature	<ul style="list-style-type: none"> i) Adequate space at bottom for collection of sediments ii) Stiffeners provided for rigidity and Designed to prevent accumulation of water iii) No internal pockets in which gas / air can accumulate iv) No external pockets 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 a 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

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

		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 ear thing Inspection covers should be provided with jacking screws & handle and shall not weigh more than 25 KG . 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.
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 °C
4.2.2.2	Conservator oil preservation system	By flexible rubber bag (air cell) placed inside conservator
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

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

		<p>rays.</p> <ul style="list-style-type: none"> 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 Buccholz 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 manner 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 body should be Aluminum pressure die casted, shot blasted and power coated. ii) Container and oil cup should be 143R grade UV resistant polycarbonate. iii) All gaskets should be of nitrile cork (RC 70C) rubber. iv) Breather should be flanged type not threaded type v) Breather piping shall not have any Valve placed in between vi) Breather shall be removable type mounted at a height of 1400 mm from ground level. vii) Silica Gel used in breather should be of ROUND BALL type & 2.5 mm dia. viii) Breather shall be tested for 0.35 kg/cm for all joints
4.2.3	Conservator for OLTC & Diverter Chamber	
4.2.3.1	Capacity	<ul style="list-style-type: none"> i) 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. ii) Conservator for OLTC & Diverter chamber shall be single with partition inside & with clear visible indication separately for both OLTC & Diverter chamber.
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

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

		<ul style="list-style-type: none"> 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 ocated 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) Breathers 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	Material	Pressed Steel
4.2.4.2	Thickness	Minimum 1.2 mm
4.2.4.3	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
4.2.4.4	Essential provision if radiators mounted separately	Expansion bellow to be provided in the pipes between main tank and radiator headers
4.2.4.5	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 manpower.
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	Premium grade minimum M3 or better
4.2.5.3	Lamination thickness	Max. 0.23 mm with insulating coating on both sides
4.2.5.4	Design flux density at rated conditions at principal tap	As per manufacturers design.
4.2.5.5	Maximum flux density at 10%	As per Annexure C , Cl. 36.0

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	over excitation / over fluxing	
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 structure 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 2 kV 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	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
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) Connection 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) Conductor width on edge exceeding six times its thickness

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		<ul style="list-style-type: none"> v) Transposed at sufficient intervals. vi) Threaded connection with locking facility vii) Winding leads rigidly supported, using guide tubes if practicable viii) Winding structure and major insulation not to obstruct free flow of oil through ducts ix) Provision of taps as indicated in the technical particulars
4.2.6.6	Essential provision for core coil assembly	<ul style="list-style-type: none"> i) Core coil assembly shall be mounted on bottom of the tank. ii) Earthing of core clamping structure and earthing of magnetic circuit shall be in line with CBIP reference manuals.
4.2.7	Transformer Oil	Should be in accordance with specification as per Annex D of this document.
4.2.8	Bushings and terminations	
4.2.8.1	Type below 52 kV	Oil communicating , outdoor, removable
4.2.8.2	Type 52kv 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 CT'S.
4.2.8.3	Arcing horns.	Not required.
4.2.8.4	Termination on HV side bushing	By bimetallic 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 on LV side bushing	Cable connection through cable box with disconnecting link as per annexure A, scope supply.
4.2.8.6	Minimum creepage distance of bushing	As per annexure C cl 39.0
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.
4.2.8.9	Rated thermal short time current	As per annexure C Cl 39.0
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.	Tinner copper.
4.2.8.12	Sealing washers /gasket ring.	RC 70C Nitrile Cork
4.2.9	HV, LV, LV Neutral cable box	Required.
4.2.9.1.1	Material of construction	Sheet steel min 4.0 mm thick. Inspection covers shall be min 3mm thick.
4.2.9.1.2	Cable box doors (33kV and	The doors should be internal anti theft hinge

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	11kV Cable boxes)	with minimum opening angle of 120°, minimum 3 nos. with lockable handle & with padlocking facility
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 15.1
4.2.9.4	Cable size for LV	As per Annexure C Cl 15.2
4.2.9.5	Cable size for LV neutral	As per Annexure C Cl 15.3
4.2.9.6	Detachables gland plate material for HV, LV, LV Neutral box	As per GTP
4.2.9.7	Gland plate thickness for HV, LV, LV Neutral box	As per GTP
4.2.9.8	Cable gland for HV, LV, LV Neutral cables	As per GTP
4.2.9.9	Cable lug for LV Neutral cables	As per CL 4.8 of this spec and suitable for cable size as per GTP
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 Owner's cable termination with busbar supports iv) Detachable gland plate as per Schedule 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 points 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) Anti theft hinged type door with lockable handle & with padlocking facility for cable box. 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 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	Minimum 1000 mm
4.2.9.13	Essential provision for LV	i) Neutral shall be outdoor type bushing

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	neutral cable box	<p>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.</p> <p>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.</p> <p>iii) Knife switch shall be suitable for connecting 2 runs of 75 x 10 mm size GS strip.</p> <p>iv) Height of knife switch shall be at maximum 1500 mm. Housing of Knife switch shall be suitable for easy & quick operations.</p>
4.2.10	Current Transformers	
4.2.10.1	WTI CT	As per GTP
4.2.10.1.1	Rating	As per GTP
4.2.10.1.2	Mounting	In the turret of the bushing
4.2.10.1.3	Essential provision	<p>i) CT mounting shall be such that CT can be replaced without removing tank cover</p> <p>ii) CT secondaries shall be wired upto TB with TB spec. as per Cl. 4.7 of this specification</p>
4.2.10.2	Neutral CT	
4.2.10.2.1	Type	Cast resin
4.2.10.2.2	Rating	As per GTP
4.2.10.2.3	Location of NCT	Separate box with TB arrangement for secondary Bushing type not acceptable.
4.2.10.2.4	Essential provision	<p>i) CT mounting shall be such that CT can be replaced without removing the neutral cable box.</p> <p>ii) CT secondary shall be wired upto TB</p>
4.2.10.2.5	Size of NCT Box	Overall size of NCT box shall not exceed 1200x600x1000 mm including canopy on top.
4.2.11	Marshalling Box Cubicle	
4.2.11.1	Material of construction	Construction of Marshalling Box should be stainless steel 304 grade (Min) with powder coating of specified colour shed
4.2.11.2	Door hinges of marshalling box should be from inner side and should not be exposed to rain.	Required
4.2.11.3	Gland plate mounting should	Required

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	be from inside only.	
4.2.11.4	Digital Temp scanner	Not Required
4.2.11.5	TTB with LED for all TRIP & ALARM signals.	Not Required
4.2.11.6	Major equipments in Marshalling box	<ul style="list-style-type: none"> i) Mechanical gauge for WTI -2 No's ii) Mechanical gauge for OTI- 1 No iii) Power supply unit (PSU) for remote monitoring of OTI and WTI temperatures. PSU suitable for 48V-265V AC/DC supply. iv) Make of OTI and WTI is Precimeasure 1005AH/1007H model with PSU v) Capillaries for WTI and OTI min 15M length vi) Control & Protection Equipment for Fan Control vii) Other panel accessories listed elsewhere
4.2.11.7	Gland plate	Min. 3 mm thick detachable with knockout
4.2.11.8	Contacts wired to terminal block	<ul style="list-style-type: none"> i) WTI alarm and trip ii) OTI alarm and trip iii) Buchholz relay alarm and trip iv) OSR trip contacts v) MOG low level alarm vi) MOG on OLTC low level alarm vii) PRV main tank trip viii) PRV OLTC trip ix) Sudden pressure relay trip
4.2.11.9	Signals to be wired to terminal block	<ul style="list-style-type: none"> i) WTI CT ii) NCT iii) Capillaries for WTI and OTI iv) 4 to 20 mA signals for WTI and OTI repeater located elsewhere
4.2.11.10	Ingress protection	IP 55 plus additional rain canopy to be provided
4.2.11.11	Welding	Continuous welding on joints, welding at regular intervals on joints and filling of gaps with use of M seal not accepted
4.2.11.12	Cable entry	Bottom for all cables
4.2.11.13	Panel internal Access	Front only through front door double leaf with antitheft hinges
4.2.11.14	Pane back access	None
4.2.11.15	Mounting of marshalling box	Tank / separately mounted as per GTP
4.2.11.16	Panel supply	415 V AC, Three phase, 50 Hz
4.2.11.17	Panel accessories	<ul style="list-style-type: none"> i) Cubicle lamp with door switch and separate fuse / MCB ii) Approved space heaters controlled by thermostat and separate fuse / MCB iii) Incoming fuse switch / 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 &

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		<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>
4.2.11.18	Fan motors control installed in marshaling box or separate fan control cubicle	<p>i) 2 x 50% fans</p> <p>ii) Complete fan control with fuse switch, 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> <p>v) Fan Control Cubicle should be separately mounted.</p> <p>vi) 2RC/2RS type bearings shall be used instead of ball bearings.</p> <p>vii) Fan enclosure shall be perforated sheet with holes at motor side with ground support.</p>
4.2.11.19	Control Cable Length	All the control Cable shall have minimum 15 Meters of length for all control cable, OTI, WTI Capillaries and NIPFPS control cables also.
4.3	Hardware	
4.3.1	External	M12 size & below Stainless Steel & above M12 Hot Dip galvanized steel.
4.3.2	Internal	Cadmium plated except special hardware for frame parts and core assembly as per manufacturer's design
4.3.3	Provision of fully enclosed Aluminium hoods/Canopy for following accessories of power transformer for protection against water ingress.	All Oil Surge Relays, Buchholz Relay, Pressure release Valve.
4.4	Gasket	
4.4.1	For transformer, OLTC chamber, PT chamber, surfaces interfacing with oil like inspection cover etc.	RC 70C Nitrile Cork
4.4.2	For cable boxes, marshaling box, OLTC drive mechanism etc.	RC 70C Nitrile Cork
4.4.3	Tank top cover gasket	It shall be double O ring type sealing arrangement seating over a double groove made in transformer tank & top cover.
4.5	Valves	
4.5.1	Material of construction	Gun metal
4.5.2	Type	Both end flanged gate valve / butterfly valve depending on application
4.5.3	Size	As per manufacture's standard

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4.5.4	Essential provision	Position indicator, locking rod, padlocking facility, valve guard, cover plate.
4.6	Cable routing on Transformer	Control cable for accessories on transformer tank to marshalling box and WTI, OTI Capillaries shall be routed through perforated Covered GI trays
4.6.1	Control cable specification	i) PVC insulated, extruded PVC inner sheathed, armoured, extruded PVC outer sheathed 1100V grade control cable as per latest edition of IS 1554 Part 1 ii) Minimum 2.5 sqmm for signals and 4 sqmm for CT with multistrand copper conductor
4.6.2	Specification of wires to be used inside marshalling box, OLTC drive mechanism.	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 6 sqmm stud type screw driver operated for control wiring and potential circuit. Terminal blocks to be located in such a way to achieve the termination height as min 250 mm from grand 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 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 bi-metallc 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 resistance 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 resistance 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 costs, minimum dry film thickness 80 microns

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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 micros
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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 buccholz 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 rainwater draining. Additional rain hood shall be provided.	Reed Switch Type shall be required
5.4	Oil surge relay with two contacts, services and test position, with test cock for OLTC tank, terminal box shall be IP 65 with drain plug for rainwater 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	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 No's PT 100 sensors/RTDs for winding emperature indication wired upto TB's in marshalling box for external connection.	Required

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5.9	Magnetic switching for all the protective devices including Buchholz (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) Manufacture's name iv) Transformer serial number v) Month and year 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 \square 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

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		<p>radiator</p> <p>xxv) Transport weight of transformer</p> <p>xxvi) Weight of core and frame</p> <p>xxvii) Weight of winding</p> <p>xxviii) Weight of core and winding</p> <p>xxix) Weight of tank and fittings</p> <p>xxx) Total weight</p> <p>xxxii) Volume of oil</p> <p>xxxii) Weight of oil</p> <p>xxxiii) NCT, WCT, details</p> <p>xxxiv) Type of OLTC</p> <p>xxxv) Tapping details</p> <p>xxxvi) Name of the purchaser</p> <p>xxxvii) PO no and date</p> <p>xxxviii) Guarantee period</p>
6.2	Instruction plate for OLTC anodized aluminum black lettering on satin silver background fixed by rivet	Required
6.3	Oil filling instruction plate anodized aluminum black lettering on satin silver background fixed by rivet	Required
6.4	Valve schedule plate anodized aluminum black lettering on satin silver background fixed by rivet	Required
6.5	Instruction plate anodized aluminum 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 aluminum 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 minimum
6.11	Detachable bi-directional roller assembly with corrosion resistant bearing, fitting / nipple for lubrication or with permanently lubricated bearing, anti earthquake locking device. The wheels shall be capable	Required

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	of swiveling when transformer is lifted with provision for locking the swivel movement. Roller shall be suitable for 90 lb rail. Suitable antirolling clamp for 90 lb rail minimum 4 nos. shall be provided	
6.12	Pockets for OTI, WTI, & RTD on tank	Required (with one spare pocket for future use)
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
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 fitting 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 Buccholz relay, PRV 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 copper strip jumpers on all gasketed joints 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	Required

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	any hindrance to operation of nearby electrical/mechanical accessories etc.	
6.30	Transformer and OLTC monitoring Relay (Digital RTCC relay)	Not in bidder's scope (Digital and analog signals shall be provided on transformer by bidder)
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 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 silver background fixed by rivet	Required
6.35	Provision for Valves and NRV for mounting of Nitrogen fire protection System	Required
6.36	Separate structure for mounting of cooling fans	Required
6.37	Terminal box of contacts from, 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	<ul style="list-style-type: none"> i) For 33kV – CTR make EQ16 or equivalent. ii) 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	<ul style="list-style-type: none"> i) 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' condition and the selector switches do not make and break any current, main current is never interrupted and a resistor is provided to limit the arching at diverter contacts to a minimum suitable for outdoor mounting and continuously rated for operating at all position including positions in the middle of tap change. In particulars, 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. ii) The value of the transition resistor shall be

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		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. 35 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.
7.6	Safety interlocks in OLTC	<p>Following safety interlock to be provided in OLTC as 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 relay shall be positively interlocked
7.7	Feature of OLTC	<ul style="list-style-type: none"> i) OLTC mechanism and associated controls shall be housed in an outdoor, IP 55, weatherproof, vermin proof 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) Contractors 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

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		<p>mechanism door. This is required to prevent unauthorized person operating these buttons.</p> <p>vii) It shall be possible to remove the 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 struck 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 transformer 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 mcb shall be located in such a way that they are easily replaceable.</p> <p>xvii) Motor protection relay shall be provided with single phasing prevent 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	i) Control circuit transformer 415/55-0-55 V,

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	mechanism (indicative only, bidder to provide all necessary components to complete the function of the OLTC)	<p>adequate capacity</p> <ul style="list-style-type: none"> ii) Local remote selector switch 1 pole, 2 way, 6A, pistol grip iii) Retaining switch raise / lower iv) Handle interlock switch v) Raise / lower switch 1 pole, 2way, 6A, pistol grip vi) Lower limit switch vii) Raise limit switch viii) Tap changer motor, 415 V AC, 3 phase, adequate rating ix) Motor protection relay with single phasing preventor x) Motor control contactors raise / lower xi) Stepping relay xii) Out of step switch xiii) Tap position indicator xiv) Operation counter xv) Emergency stop push button xvi) Tap change incomplete scheme with timer xvii) Required indication lamp
7.9	Essential provision of accessories on OLTC	<ul style="list-style-type: none"> i) Pressure relief valve ii) Oil surge relay
7.10	Drive mechanism accessories	<ul style="list-style-type: none"> i) Cubical lamp with door switch and separate fuse / MCB with external ON /OFF switch on front cover of OLTC drive mechanism ii) Approved space heaters controlled by thermostat and separate fuse / MCB iii) Incoming fuse switch / MCB for the incoming supply iv) Panel wiring diagram fixed on back of panel door aluminium engraved fixed by rivet v) Nylon 66 terminal block min 4 sqmm screw type, with 10% spare terminals vi) Stainless steel door handle with lock & additional facility for padlock vii) Earthing boss
7.11	Hardware, Gasket, Cables and Wires, Terminal blocks, Cable gland, Cable lugs of OLTC drive mechanism	As per Cl. 4.3, 4.4, 4.6, 4.7, 4.8, 4.9 of the 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

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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/Jayshree Insulators/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 /Yogna
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/ATVUS
8.19	Aircell	Sukrut(Unirub)/Pronol / Rubber Product
8.20	Neutral CT	Pragati /ECS / KAPPA/ Reputed equivalent
8..21	WCT	Pragati / ECS / KAPPA/ Reputed equivalent
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/Girish
8.29	Heater	Velco/Girish
8.30	Voltmeter Selector Switch	Siemens/ equivalent
8.31	Control selector switch	Siemens/ equivalent
8.32	Auxiliary Relays	Jyoti / Easun Rayrole
8.33	Timers	L&T /Siemens
8.34	Tap Position Indicator	Accord

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8.35	Annunciator	Accord
8.36	Digital tap change counter	Selectron
8.37	LED cluster type indication lamp	MIMIC/ Siemens/ Binay

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

9.0 QUALITY ASSURANCE

9.1	Quality assurance	To be submitted before contract award. Program shall contain following i) The structure of the organization. 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 arrangements for the suppliers internal auditing vii) The system for retention of records. viii) A list of the administration and work procedures required to achieve and verify contracts quality requirements. These procedures shall be made readily available to the purchaser for inspection on request.
9.2	Quality plan	To be submitted by the successful bidder for approval. Plan shall contain following as a minimum i) An outline of the proposed work and programme sequence ii) The structure of the suppliers organization for the contract. iii) The duties and responsibilities assigned to staff ensuring quality of work for he contract. iv) Hold and notification points. v) Submission of engineering documents required by the specification. vi) The inspection of materials and components on receipt vii) Reference to the suppliers work procedures appropriate to each activity viii) Inspection during fabrication /construction. ix) Final inspection and test. x) Successful bidders shall include submittal of Mills invoice, Bill of lading, Mills test certificate for grade, physical tests, dimension, specific watt loss per KG for the core material to the purchaser for verification in the quality plan suitably.
9.3	Manufacturing Quality Assurance Plan	Refer Annexure G

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10.0 PROGRESS REPORTING

10.1	Online document	To be submitted for purchaser approval for outline of production , inspection,testing,packing dispatch ,documentation programme
10.2	Detailed progress report	To be submitted to the purchaser once a month containing 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 INSPECTION & TESTING

11.1	Inspection and Testing during manufacture	
11.1.1	Tank and conservator	i) Check correct dimension between wheels demonstrate turning of wheels through 90 deg and further dimensional check. ii) Check for physical properties of material 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.
11.1.2	Core	i) Vendor to submit the documentary evidence for procurement of CRGO laminations and prove that they have procured/used new core material. ii) During in process inspection at lamination sub vendor, BSES shall randomly select/seal lamination for testing at ERDA/CPRI(Accredited NABL labs) for specific core loss,accelerated geing test ,surface insulation resistivity,AC permeability and magnetization, stacking factor,ductility etc.this testing shall be in the scope of vendor. iii) Check on the quality of varnish if used on the stampings. <ol style="list-style-type: none"> Measurement of thickness and hardness of varnish on stampings Solvent resistance test to check that varnish does not react in hot oil. Check over all quality of varnish by sampling to

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		<p>ensure uniform hipping color, no bare spot. No ever burnt varnish layer and no bubbles on varnished surface</p> <ul style="list-style-type: none"> iv) Check on the amount of burrs v) Bow check on stamping vi) Check for the overlapping of stampings. Corners of the sheet are to be apart vii) Visual and dimensional check during assembly stage. viii) Check on complete core for measurements of iron- loss and check for any hot spot by exciting the core so to include the designed value of flux density in the core ix) Check for inter laminar insulation between core sectors before and after pressing x) Visual and dimensional check for straightness and roundness of core, thickness of limbs and suitability of Clamps xi) High voltage test (2kV for one minute) between core and clamps xii) Certification of all test results
11.1.3	Insulating material	<ul style="list-style-type: none"> i) Sample check for physical properties of material ii) Check for dielectric strength iii) Visual and dimensional checks iv) Check for the reaction of hot oil on insulating materials v) Certification of all test results
11.1.4	Windings	<ul style="list-style-type: none"> i) Sample check on winding conductor for mechanical properties and electrical conductivity ii) Visual and dimensional check on conductor for scratches, dept. mark etc. iii) Sample check on insulating paper for PE value, bursting strength, electric strength iv) Check for the reaction of hot oil on insulating paper v) Check for the binding of the insulating paper on conductor vi) Check and ensure that physical condition of all materials taken for winding is satisfactory and free of dust vii) Check for absence of short circuit between parallel strands viii) Check for Brazed joints wherever applicable ix) Measurement of voltage ratio to be carried out when core / yoke is completely restocked and all connections are ready x) Certification of all test results
11.1.4.1	Checks before drying process	<ul style="list-style-type: none"> i) Check conditions of insulation on the conductor and between the windings ii) Check insulation distance between high voltage connection cables and earthed and other live parts iii) Check insulation distance between low voltage connection cables and earthed and other parts iv) Insulation test of core earthing v) Check for proper cleanliness vi) Check tightness of coils i.e. no free movements vii) Certification of all test results

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11.1.4.2	Checks during drying process	<ul style="list-style-type: none"> i) Measurement and recording of temperature and drying time during vacuum treatment. ii) Check for completeness of drying iii) Certification of all test result.
11.1.5	Oil	<ul style="list-style-type: none"> i) As per IS 335 and annexure-I ii) 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 D of this specification
11.1.6	Test on fittings and accessories	As per manufacturer's standard
11.2	Routine tests/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 principal tap and two extreme taps. iv) Vector group and polarity test v) Measurements of insulation resistance and polarization index. vi) Separate source voltage withstand test. vii) Measurements of iron losses and exciting current at rated frequency and 90%, 100% and 110% rated voltage. viii) Induced voltage withstand test. ix) Load losses measurement. x) Impedance measurement at principal tap (HV and LV) of the transformer. xi) Routine test of tanks <ul style="list-style-type: none"> xii) Induced voltage withstand test (to be Repeated if type tests are conducted). xiii) Measurement of iron loss (to be repeated if type tests are conducted). xiv) Measurement of capacitance and Tan Delta for transformer oil (for all transformers). xv) Phase relation test, polarity, angular displacement and phase sequence. xvi) Ratio of HV WTI CT, LV WTI CT and neutral CT xvii) Excitation and knee point voltage test on class PS core of neutral CT. xviii) Routine test on on-load tap changer. xix) Oil leakage test on assembled transformer xx) Magnetic balance test xxi) Power frequency voltage withstand test on all auxiliary circuits xxii) Temperature rise test. xxiii) Impulse test on one sample randomly selected. xxiv) Certification of all test result xxv) SFRA <p>a) Insulation resistance measurement shall be carried out</p>

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		<p>at 5 kV. Value of IR should not be less than 1000M ohms. Polarization index (PI = IR10min/IR1min). should not be less than 1.5 (if one minute IR value is above 5000Mohms and it is not be possible to obtain an accurate 10 minutes reading, in such cases polarization index can be disregarded as a measure of winding condition.)</p> <p>b) Temperature rise test may be necessary to be carried out on 100% of the order quantity at the anufacturer's works or third party lab.</p>
11.3	Type tests	<p>On one transformer of each rating and type (In Govt. recognized independent test laboratory / Internationally accredited test lab or at manufacturer's facility if it is approved by component authority.</p> <p>i) Impulse withstand test on all three HV and LV limbs of the transformers for chopped wave as per standard</p> <p>ii) Temperature rise test as per IS</p> <p>iii) Dissolved gas analysis before and after Temperature Rise test</p> <p>iv) Pressure relief device test</p> <p>v) Pressure and Vacuum test on tank(stage inspection)</p>
11.4	Special tests	<p>On one transformer of each rating and type</p> <p>i) Dynamic & Thermal short circuit test short circuit test as per IS</p> <p>ii) Measure of zero seq. impedance (Cl.16.10 IS 2026 part-1)</p> <p>iii) 3) measurement of acoustic noise level (Cl.16.12 IS 2026 part-1)</p> <p>iv) Measurement of harmonic level on no load current</p> <p>v) High voltage withstand test shall be performed on the auxiliary equipment and wiring after complete assembly.</p> <p>vi) CRGO testing for specific core loss, accelerated ageing test, surface insulation resistivity, AC permeability and magnetization, stacking factor, ductility etc</p> <p>vii) Oil testing to be tested at CPRI/ERDA labs, whose samples shall be selected & sealed by customer.</p> <p>Cost of such tests, if extra, shall be quoted separately by the bidder.</p>
11.5	Site Acceptance test	<p>Following tests shall be conducted at BYPL site/store in presence of BYPL official. Material receipt note shall only be given once the material is successfully tested and found satisfactory by BYPL official:</p> <p>i) Magnetic Balance test</p> <p>ii) Measurement of Voltage ratio</p> <p>iii) Measurement of capacitance and Tan Delta for transformer winding and HV bushing (for all transformers).</p> <p>iv) Vector Group and Polarity</p> <p>v) Physical checks</p> <p>vi) Insulation Resistance & P.I</p>

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		<p>vii) Oil BDV viii) SFRA</p> <p>Note: Testing instruments shall be in scope of Vendor.</p>
11.6	Note for special tests and type test	Cost of the above tests, if extra, shall be quoted separately by the bidder which shall be considered in the price evaluation.
11.7	Notification to bidders	<p>The product offered must be of type tested design with valid type test report of not more than 5 years. 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 component 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>

12.0 PACKING, SHIPPING, HANDLING AND STORAGE

12.1	Packing	
12.1.1	Packing protection	Against corrosion, dampness, heavy rains, breakage and vibration.
12.1.2	Packing for accessories and spares	Robust wooden non returnable packing case with all the above protection
12.1.3	Packing details	<p>On each packing case details required as follows</p> <ul style="list-style-type: none"> i) Individual serial number: ii) Purchaser's name: iii) PO Number: iv) Destination: v) Suppliers name: vi) Name and address of suppliers agent vii) Description and numbers of contents: viii) Manufacturers name: ix) Country of origin;: x) Case measurements: xi) Gross and net weights in kilograms xii) All necessary slinging and stacking instructions.
12.2	Shipping	The bidder shall ascertain at an early date and definitely before the commencement of manufacture, any transport limitations such as weights, dimensions, roads culverts, overhead lines, free access etc. from the manufacturing plant to project site :and furnish to the purchaser confirmation that the proposed packages can be safely

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		transported, as normal or oversize packages up to the plant site. Any modifications required in the infrastructure and cost thereof in this connection shall be brought to the notice of the purchaser.
12.3	Handling and storage	As per manufacturers instruction.

13.0 DEVIATIONS

13.1	Deviation	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, it will be assumed that the bidder complies fully with this specification. No deviation will be acceptable post order.
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14.0 DRAWINGS AND DOCUMENTS

Drawing submission shall be as per the matrix given below. All documents/ drawing shall be provided on A3/A4 sheet in box file with separators for each section. PDF shall also be provided of all documents via USB. Deviation sheet and GTP shall be provided in excel sheet. Language of the documents shall be English only. Deficient/ improper document/ drawing submission may liable for rejection.

S.no	Documents to be submitted	With the bid	After Award	
			For Approval	Prior to dispatch
1	Copy of specification along with company seal & signature on each page.	✓	✓	
2	Guaranteed technical particulars	✓	✓	
3	Outline dimension drawing for each major component, general arrangement drawing showing component layout and general schematic diagrams.	✓	✓	
4	Type test certificates, where available, and sample routine test reports	✓	✓	
5	Detailed reference list of customers already using equipment offered during the last 5 years with particular emphasis on units of similar design and rating	✓		
6	Details of manufacturers quality assurance standard and programme and ISO 9000 series or equivalent national certification.	✓		

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S.no	Documents to be submitted	With the bid	After Award	
			For Approval	Prior to dispatch
7	Deviations from this specification. Only deviations approved in writing before award of contract shall be accepted.	✓		
8	Recommended spare parts and consumable items for the five years of operation with prices and spare parts catalogue with price list for future requirements.	✓		
9	Transport / shipping dimension and weights, space required for handling parts for maintenance	✓		
10	Write up on oil preservation system.	✓	✓	
11	Write up on OLTC.	✓	✓	
12	Quality assurance program.	✓	✓	
13	Programme for production and testing		✓	
14	General description of the equipment and all components, including brochures		✓	
15	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.		✓	
16	Calculations to substantiate choice of electrical, structural, mechanical component size, ratings		✓	
17	Detailed loading drawing to enable the purchaser to design and construct foundations for the transformer.		✓	
18	Transport /shipping dimension with weights ,wheel base details, untanking height etc.		✓	
19	Terminal arrangements and cable box details		✓	
20	Flow diagram of cooling system showing no. of cooling banks		✓	
21	Drawings of major components like bushing,CT etc		✓	
22	Valve schedule diagram plate		✓	

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S.no	Documents to be submitted	With the bid	After Award	
			For Approval	Prior to dispatch
23	Instruction plate for flexible separator		✓	
24	Rating and diagram plate with OLTC connection details		✓	
25	Lists of makes of all fittings and accessories		✓	
26	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		✓	
27	Detailed installation and commissioning instructions		✓	
28	Inspection and test reports carried out in manufacturers works			✓
29	Test certificates of all bought out items.			✓
30	Operation and maintenance instructions as well as trouble shooting charts.			✓

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ANNEXURE – A – SCOPE OF SUPPLY

Design, manufacture, assembly, testing at stages of manufacture as per Cl. 11 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 cable	No
1.7	Long barrel medium duty Aluminum 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 liters.	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
2.0	Routine testing as per Clause 11 of this specification	YES
3.0	Type testing as per Clause 11 of this specification	YES
4.0	Special testing as per Clause 11 of this specification	YES
5.0	Submission of Documentation as per clause 13 of this specification	YES

ANNEXURE – B – SERVICE CONDITIONS

1.0	Delhi Atmospheric condition	
1.1	Average grade atmosphere	Heavily polluted, dry
1.2	Maximum altitude above sea level	1000M
1.3	Ambient air temperature	50 deg C
1.4	Relative humidity	90% Max
1.5	Seismic zone	4
1.6	Rainfall	750 mm concentrated in four months

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ANNEXURE – C – TECHNICAL PARTICULARS (DATA BY OWNER)

Sr No	Description	Data by Owner	
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	
5.0	Reference standard	IS: 2026	
6.0	No. of phases	3	
7.0	No. of winding 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, KVA		
11.1	For 20/25 MVA		
	ONAN	20	20
	ONAF	25	25
11.2	For 25/31.5 MVA		
	ONAN		25
	ONAF		31.5
12.0	Impedance at principal tap at rated frequency with IS tolerance		
12.1	For 20/25 MVA	15% (for 25MVA)	15% (for 25MVA)
12.2	For 25/31.5 MVA	15% (for 31.5MVA)	15% (for 31.5MVA)
13.0	Maximum no load loss at rated condition allowed without any positive tolerance kW		
13.1	For 20/25 MVA	12kW (for 25 MVA),	12kW (for 25 MVA),
13.2	For 25/31.5 MVA	14 kW (for 31.5 MVA)	14 kW (for 31.5 MVA)
14.0	Maximum load loss at rated condition @ 75 deg C and principal tap allowed without any positive tolerance, kW		
14.1	For 20/25 MVA	85 kW (for 25MVA),	85 kW (for 25MVA),

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14.2	For 25/31.5 MVA	115 kW (for 31.5 MVA	115 kW (for 31.5 MVA
15.0	Terminal connection / cable / conductor size		
15.1	HV side	33kV	66 kV
		By 2 runs of 3C X400sq mm A2XFY ,33kV(E) grade cable for 20/25 MVA.	By single /Double ACSR "ZEBRA" conductor per phase
15.2	LV side	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)	
15.3	LV neutral	By G .S. strip mim 2x75x10 mm size	By G.S. strip min 2x75x10 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 33 kV	170	
18.3	For nominal system voltage of 66 kV	325	
19.0	Power frequency withstand voltage kV rms		
19.1	For nominal system voltage of 11 kV	28	
19.2	For nominal system voltage of 33 kV	70	
19.3	For nominal system voltage of 66 kV	140	
20.0	Clearances phase to phase, mm		
20.1	For nominal system voltage of 11 kV	280	
20.2	For nominal system voltage of 33 kV	350	
20.3	For nominal system voltage of 66 kV	700	
21.0	Clearances phase to earth, mm		
21.1	For nominal system voltage of 11 kV	140	

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21.2	For nominal system voltage of 33 kV	320
21.3	For nominal system voltage of 66 kV	660
22.0	System fault level, HV side	1000 MVA for 22kV 1500 MVA for 33 kV 3600 MVA for 66 kV
23.0	System fault level, LV side	500 MVA for 11 kV
24.0	Short circuit withstand capacity of the transformer	
24.1	Three phases dead short circuit at secondary terminal with rated voltage maintained on the other side	For 3 secs.
24.2	Single phase short circuit at secondary terminal with rated voltage maintained on the other side	For 3 secs.
25.0	System earthing	
25.1	HV	Solidly earthed
25.2	LV	Solidly earthed
26.0	Overload capability	As per IS 6600
27.0	Noise level	Shall not exceed limit as per NEMA TR- 1 with all accessories running measured as per IEC 551 / NEMA standard
28.0	Radio influence voltage	Maximum 250 microvolt
29.0	Harmonic suppression	Transformer to be designed for suppression of 3 rd , 5 th , 7 th harmonic voltage and high frequency disturbances
30.0	Partial discharge	10 Pico C
31.0	Loss capitalization formulae	As per CBIP manual (see note2)
31.1	No load loss capitalization figure	Rs. 4,09,979 per KW
31.2	Load loss capitalization figure	Rs. 2,26,718 per KW
31.3	Cooler Losses capitalization figure	Rs. 85,000 per KW
32.0	Temperature rise of top oil by thermometer	40 deg C
33.0	Temperature rise of winding by resistance	45 deg C
34.0	Note for the bidders	(left blank)

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35.0	Tapping to be provided on HV winding for OLTC	For 33/11 kV & 66/11kVTransformer +10% to -10% @step of 1.25 % 16 taps, 17 tap positions
36.0	Maximum flux density allowed in the core extreme over excitation /over fluxing, Tesla	1.9 Tesla
37.0	Maximum current density allowed	3.0 Amperes per sqmm @ lowest tap.
38.0	AVR input voltage/ Auxiliary supply	Not applicable
39.0	Bushing parameters	
39.1	Rated Current for 20/25 MVA Xmer	1250 A for 33 kV bushing 2000 A for 11kV bushing
39.2	Creepage factor for all bushing mm /KV	31 mm / kV minimum
39.3	Rated thermal short time current for all bushing	25 times rated current for 2 secs
39.4	Angle of mounting	0 to 90 degree
39.5	Cantilever withstand load	for 33 kV bushing- as per std. vendor 2000N for 11kV bushing
39.6	Overall Length (Approx)	for 33 kV bushing- as per std. vendor 503 mm for 11 kV bushing
39.7	Diameter of base	100 mm

Note 1: For ONAN and ONAF rating the temperature rise of the transformer shall be within the values specified at sl .no. 32.0 and 33.0 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 no load and load losses guaranteed by the bidders with capitalization of losses as per figures indicated under sl no. 31.1, 31.2 and 31.3 above. However the maximum loss figure acceptable are as per cl 13.0 14.0 of Annexure C. In case of deviation in loss figure on higher side, the technical offer won't be considered for evaluation. 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 both no load, load losses and cooler loss.

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ANNEXURE – D – TECHNICAL SPECIFICATION FOR TRANSFORMER OIL

Codes and standards

Latest revision of following codes and standards with all amendments-

Cl no.	Standard no	Title
1.1	IS 335	New insulating oils
1.2	IS1783	Drums for oils

2.0 Properties

Sr No	Item description	Specification requirement
2.1	Function	
2.1.1	Viscosity	
2.1.1.1	Viscosity at 40°C	15 mm ² /s, Max
2.1.1.2	Viscosity at 0°C	1800 mm ² /s, Max
2.1.2	Pour Point	- 10°C, Max
2.1.3	Water content	30 mg/Kg, Max
2.1.4	Breakdown voltage	
2.1.4.1	New unfiltered oil	30 kV, Min
2.1.4.2	After filtration	70 kV, Min
2.1.5	Density at 20°C	0.895 g/ml, Max
2.1.6	Dielectric dissipation factor at 90°C	0.005, Max
2.1.7	Particle Content	Manufacturer to specify the data
2.2	Refining/Stability	
2.2.1	Appearance of oil	Clear, free from sediment and suspended matter
2.2.2	Acidity	0.01 mg KOH/g, Max
2.2.3	Interfacial tension at 27°C	0.04 N/m, Min
2.2.4	Total sulphur content	Manufacturer to specify the data
2.2.5	Corrosive sulfur	Not-corrosive
2.2.6	Potentially Corrosive sulfur	Not-corrosive
2.2.7	DBDS	Not detectable (<5 mg/kg)
2.2.8	Inhibitor	Not detectable (<0.01%)
2.2.9	Metal Passivator	Not detectable (<5 mg/kg)
2.2.10	Other additives	Manufacturer to specify the data
2.2.11	2-furfural and related Compounds content	Not detectable (<0.05 mg/kg) for each individual compound
2.3	Performance	
2.3.1	Oxidation stability, test duration 164 h	
2.3.1.1	Total acidity	1.2 mg KOH/g, Max
2.3.1.2	Sludge	0.8%, Max
2.3.1.3	DDF at 90°C	0.5, Max
2.3.2	Gassing Tendency	Manufacturer to specify the data
2.3.3	ECT	Manufacturer to specify the data

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2.4	Health,safety and Environment	
2.4.1	Flash point	135°C, Min
2.4.2	PCA content Max	3%, Max
2.4.3	PCB content	Not detectable (<2 mg/Kg)

ANNEXURE – E – SPECIFICATION FOR NITROGEN INJECTION FIRE PROTECTION SYSTEM

General

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. 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.

1.2 Codes & Standards

The design and installation of the complete fire protection system shall comply with the latest applicable Indian standards. Wherever Indian standards are not available relevant British / I.E.C. Codes shall be followed. The following standards / codes shall be followed in particular.

- a. Approval certificate from Loss Prevention Association (LPA)
- b. National fire Codes 1993 of National Fire Protection Association (NFPA) USA.

The entire fire protection system shall be designed, erected and commissioned in accordance with the regulation of Tariff Advisory Committee (TAC). In the absence of TAC regulations NFPA regulation shall be adhered to.

1.3 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. The system shall be provided with automatic control for fire prevention and fire extinction. 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.

1.3.1 Auto Mode

1.3.1.1 For prevention of fire

- a. Differential relay operation
- b. Buchholz relay paralleled with pressure relief valve or RPRR (Rapid Pressure Rise Relay)
- c. Tripping of all circuit breakers (on HV &LV/IV side) associated with transformer / reactor is the pre-requisite for activation of system.

1.3.1.2 For extinguishing fire

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

1.3.2 Manual Mode (Local / Remote)

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

1.3.3 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.

1.4 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 suitable distance away from transformer / reactor. The FEC shall be connected to the top of transformer / reactor oil tank for depressurization of tank and to the oil pit (capacity approximately equal to 10% of total volume of oil in transformer/reactor tank) 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, from control box to fire extinguishing cubicle and from TCIV to signal box. 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.

1.5 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.

1.6 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 deemed to be included in the scope of supply.

1.6.1 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.

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

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

1.6.2 Control box

Control box is to be placed in the control room for monitoring system operation, automatic control and remote operation. 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. 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.**

1.6.3 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

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provided with handle for pad locking. It shall have proximity switch for remote alarm, indication with visual position indicator.

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.

Locking plates shall be provided for pad locking.

1.6.4 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.

1.6.5 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.

1.6.6 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.

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.

1.6.7 Pipes

Pipes, complete with connections, flanges, bends and tees etc. shall be supplied along with the system.

1.7 Other items

- a. Oil drain and nitrogen injection openings with gate valves on transformer / reactor tank at suitable locations.
- b. Flanges with dummy piece in conservator pipe between Buchholz relay and conservator Tank for fixing TCIV.
- c. Fire detector brackets on transformer / reactor tank top cover. Spare potential free contacts for activating the system i.e. in differential relay, Buchholz
- d. relay, Pressure Relief Device / RPRR, Circuit Breaker of transformer/reactor Pipe connections between transformer / reactor and FEC and between FEC and oil pit required for collecting top oil.
- e. Cabling for fire detectors mounted on transformer / reactor top cover
- f. Inter cabling between signal box, control box and Fire Extinguishing Cubicle (FEC).
- g. All external cables from / to the system i.e. signal box to control box and control box to

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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.

- h. Butterfly valves /Gate valves on oil drain pipe and nitrogen injection pipe which should be able to withstand full vacuum.
- i. Supports, signal box etc. which are to be painted with enameled paint.

1.8 Technical Particulars

Fire extinction period from commencement of nitrogen injection.	30 secs Max
Fire extinction period from the moment of system activation	3 Minutes maximum
Fire detectors' heat sensing temperature	Vendor to specify
Heat sensing area per detector	Vendor to specify
Transformer Conservator Isolation valve setting –min	Vendor to specify
Capacity of nitrogen cylinder	Vendor to specify
Power supply For Control For service / lighting	220 V DC, variation -15 %, +10 % 230 AV AC variation + - 10 %

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

1.9 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.

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

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

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

1.11 Documentation

1.11.1 To be submitted along with offer

- a. General outline of the system.
- b. Detailed write-up on operation of the offered protection system including maintenance and testing aspects / schedules.
- c. Technical Data particulars (GTP)

d. Data regarding previous supplies, date of commissioning, performance feedback etc.

1.11.2 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.

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

ANNEXURE – F – SPECIFICATION FOR SILICAL GEL BREATHER

This specification is intended to cover the manufacturing, testing at manufacturer's works, supply and delivery of "Silica Gel Breather" to the purchaser.

Scope of Supply

Silica Gel Breather shall be as per REL specification suitable for use in Power Transformer (Main

Tank conservator & OLTC conservator) & for Distribution Transformer (Tank Conservator)

2.0 General

Silica Gel Breather offered by seller shall be suitable for continuous operation of prevailing climatic conditions as mentioned in Annexure –B

3.0 Specific Requirement

3.1 Breather

A	Body	Aluminium pressure die caste Short Blasted & Powder Coated
B	Container	Polycarbonate : 143R grade
C	Oil Cup	Polycarbonate : 143R grade
D	Gasket	Nitrile Cork (RC70C) for main body & oil cup gasket
E	Silica Gel	Round ball type of size 2-5 mm (deep Blue)
F	Paint	Powder Coated
G	Mounting	Threaded for existing Transformers. Flanged type for New Transformers
H	Hardware	Stainless Steel
I	Flange Type, Size & hardware	Flange should be of circular shape with diameter of & with hardware of M10 bolts.

3.2 The indicating grade of Silica Gel, which shall be filled in the breather, is hard Blue Round Ball with considerable absorption power of moisture & hence signaling the saturation degree by changing colour (from Blue to Pink).

3.3 The breather shall have clear visibility of Gel colour & of oil level with dust particles in the oil cup from distance.

3.4 Breather should breathe only from the inlet holes provided for breathing. Air should not enter anywhere from the body of breather.

3.5 Silica Seal shall be applied on gasket for better air tightening.

3.6 Gel removing & refilling method is specially designed to avoid skilled labour requirement at site & consequent air leakages.

3.7 Oil filling indicator on oil cup.

3.8 Application

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Transformer Size	Rating	Silica Gel Quantity in KG	
		Main Tank Conservator	OLTC Conservator
Power Transformer	20 & 31.5 MVA	5.0 Kg	1.0 Kg

3.9 Silica Gel

Sl. No	Properties	Requirement
1	Particle Size	Round ball type of size 2.5 mm (deep Blue)
2	Bulk Density	570-700 g/l
3	Moisture Adsorption Capacity 1. R.H. = 100% 2. R.H. = 50% 3. R.H. = 40% 4. R.H. = 20%	25 % (min)
4	Appearance	99.5% (min)
5	Friability	99.5% (min)
6	Chlorides percent by mass (max)	0.04%
7	Sulphates percent by mass (max)	0.5%
8	Cobalt percent by mass (max)	0.5%
9	Ammonium Compounds by mass (max)	0.001%
10	Loss on drying	4% (max)
11	pH of Aqueous extract	5-6.5%
12	Loss on Attrition	< 2.5 %

Marking

A Sticker label Indicating manufacturer's Name, Sr. No. Gel capacity etc. shall be provided at suitable place. Container may also marked with the Standard mark.

5.0 Testing

Breather container shall be suitably blanked & pressure tested with air at 0.35 Kg/cm for 30 minutes. There shall not be any leakages from gasketed joints. Test certificates from accredited laboratory shall be submitted.

6.0 Prototype

Before starting manufacture of the quantity ordered, the successful bidder shall submit a prototype for approval. Unless the prototype is inspected and approved, manufacturing shall not be started. The necessity of submitting prototype shall be ascertained before starting of manufacturing.

7.0 Packing & Keeping Quality

The material shall be packed in clean, dry & air tight container. The material stored in original air tight containers shall continue to satisfy all the properties of Silica Gel for not less than 6 months from date of packing.

8.0 Compliance Status / Deviation

Bidder shall indicate compliance status for every requirement & feature, on the right hand side margin of the specification.

9.0 Documents Comprising The Bid

The bidder shall complete the bid proposal sheets inclusive of copy of the specification duly filled in with compliance status, quality & operational manuals, Test certificates etc.

Indicating the material to be supplied, a brief description of the goods, their quantity and prices. In absence of these documents, the offer shall be considered incomplete & may be rejected.

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

ANNEXURE – G – MANUFACTURING QUALITY ASSURANCE PLAN

SL NO	COMPONENT & CHARACTERISTICS	CLASS	TYPE OF CHECK	QUALITY OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
								S	M	O	
1	2	3	4	5	6	7	8	9			10
A	RAW Material										
1	Winding Conductor (PICC)										
1.1	Bare Dimensions & Finish of Conductor	Major	Measurement	1 sample per size per lot	MFR. STD / IS 13730 Part 27	MFR. STD / IS 13730 Part 27	Supplier's TC	P	V	R	
1.2	Increase in dimensions due to Paper covering	Major	Measurement	-DO-	-DO-	-DO-	-DO-	P	V	R	
1.3	Resistivity @ 20°C	Major	Electrical	-DO-	-DO-	-DO-	-DO-	P	V	R	
1.4	No of Layers	Critical	Measurement	-DO-	-DO-	-DO-	-DO-	P	V	R	
1.5	Conductor Tensile strength	Critical	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
1.6	Conductor Elongation	Critical	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
1.7	% Overlap of Paper	Critical	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
1.8	Corner Radius	Critical	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
1.9	Kraft Paper Insulation										
1.9.1	Thickness	Major	Measurement	1 sample per size per lot	MFR. STD/ IEC 60554	MFR. STD/ IEC 60554	Supplier's TC	P	V	R	
1.9.2	Apparent Density	Major	Chemical	-DO-	-DO-	-DO-	-DO-	P	V	R	

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SL NO	COMPONENT & CHARACTERISTICS	CLASS	TYPE OF CHECK	QUALITY OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
								S	M	O	
1	2	3	4	5	6	7	8	9			10
1.9.3	Air Permeability	Major	Chemical	-DO-	-DO-	-DO-	-DO-	P	V	R	
1.9.4	Tensile Index (Longitudinal and Transverse)	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
1.9.5	Electrical Strength in Air	Major	Electrical	-DO-	-DO-	-DO-	-DO-	P	V	R	
1.9.6	Ash Content	Major	Chemical	-DO-	-DO-	-DO-	-DO-	P	V	R	
1.9.7	pH of 5% Aqueous Extract	Major	Chemical	-DO-	-DO-	-DO-	-DO-	P	V	R	
1.9.8	Conductivity of 5% Aqueous Extract	Critical	Chemical	-DO-	-DO-	-DO-	-DO-	P	V	R	
1.9.9	Moisture Content	Major	Chemical	-DO-	-DO-	-DO-	-DO-	P	V	R	
1.9.10	Heat Stability	Major	Chemical	-DO-	-DO-	-DO-	-DO-	P	V	R	
1.9.11	Degree of Polymerization	Major	Chemical	-DO-	-DO-	-DO-	-DO-	P	V	R	
1.9.12	Elongation (MD & CMD)	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
1.9.13	Tear index	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
2.0	CRGO Laminations (Watt absorption)										
2.1	Specific Core Loss	Major	Electrical	Random	MFR. STD/IS 3024	MFR. STD/IS 3024	Supplier's TC	P	V	R	
2.2	Surface Insulation resistance	Major	Electrical	-DO-	-DO-	-DO-	-DO-	P	V	R	

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SL NO	COMPONENT & CHARACTERISTICS	CLASS	TYPE OF CHECK	QUALITY OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
								S	M	O	
1	2	3	4	5	6	7	8	9			10
2.3	Ageing Test	Major	Measurement	-DO-	-DO-	-DO-	-DO-	P	V	R	
2.4	Stacking Factor	Major	Measurement	-DO-	-DO-	-DO-	-DO-	P	V	R	
2.5	Waviness	Major	Measurement	-DO-	-DO-	-DO-	-DO-	P	V	R	
2.6	Edge Burr	Major	Visual	-DO-	-DO-	-DO-	-DO-	P	V	R	
2.7	Sample testing for Checking Specific Core loss, accelerated ageing test, Surface insulation resistivity, AC permeability and magnetization, stacking factor, Ductility	Major	Electrical	100%	MFR. STD/IS 3024	MFR. STD/IS 3024	--	--	P	W	Sample will be randomly selected by BSES & will be send for testing at CPRI/ERDA lab.
3.0	Un-impregnated Laminated Wood										
3.1	Thickness	Major	Visual	1 sample size / LOT	MFR.D STD/ IEC 61061	MFR.D STD/IEC 61061	Supplier's TC	P	V	R	
3.2	Density	Major	Chemical	-DO-	-DO-	-DO-	-DO-	P	V	R	
3.3	Moisture Content	Major	Chemical	-DO-	-DO-	-DO-	-DO-	P	V	R	
3.4	Oil Absorption	Major	Chemical	-DO-	-DO-	-DO-	-DO-	P	V	R	
3.5	Cross breaking strength	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
3.6	Compressive Strength	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	

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SL NO	COMPONENT & CHARACTERISTICS	CLASS	TYPE OF CHECK	QUALITY OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
								S	M	O	
1	2	3	4	5	6	7	8	9			10
3.7	Electric Strength in Oil	Major	Electrical	-DO-	-DO-	-DO-	-DO-	P	V	R	
3.8	Shrinkage in oil	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
3.9	Tensile Strength	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
4.0	Press Boards (Pre-compressed)										
4.1	Thickness	Major	Measurement	1 sample/Size/LO T	MFR. STD/ IEC 60641	MFR. STD/ IEC 60641	Supplier's TC	P	V	R	
4.2	Tensile Strength (MD & CMD)	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
4.3	Shrinkage in Air (MD & CMD)	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
4.4	Moisture Content	Major	Chemical	-DO-	-DO-	-DO-	-DO-	P	V	R	
4.5	Oil Absorption	Major	Chemical	-DO-	-DO-	-DO-	-DO-	P	V	R	
4.6	Electrical Strength in Oil and air	Major	Electrical	-DO-	-DO-	-DO-	-DO-	P	V	R	
4.7	pH of 5% aqueous extract	Major	Chemical	-DO-	-DO-	-DO-	-DO-	P	V	R	
4.8	Conductivity of 5% aqueous extract	Major	Chemical	-DO-	-DO-	-DO-	-DO-	P	V	R	
4.9	Compressibility	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
4.10	Ash Content	Major	Chemical	-DO-	-DO-	-DO-	-DO-	P	V	R	

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SL NO	COMPONENT & CHARACTERISTICS	CLASS	TYPE OF CHECK	QUALITY OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
								S	M	O	
1	2	3	4	5	6	7	8	9			10
4.11	Apparent density	Major	Chemical	-DO-	-DO-	-DO-	-DO-	P	V	R	
4.12	Elongation (MD & CMD)	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
5.0	Tank and its accessories										
5.1	Structural steel										
5.1.1	Thickness	Major	Measurement	Random	MFR. STD / IS 2062	MFR. STD / IS 2062	Suppliers TC	P	V	R	
5.1.2	Yield Strength	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
5.1.3	Tensile Strength	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
5.1.4	Elongation	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
5.1.5	Bend test	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
5.2	Manufacturing of Tank and acc.										
5.2.1	Dimension check	Major	Measurement	100%	MFR. Spec/ DRG	MFR. Spec/ DRG	MFR. Fabrication report	P	W	R	
5.2.2	Joint preparation	Major	Measurement	100%	-DO-	-DO-	-DO-	P	V	R	
5.2.3	Assembly and alignment	Major	Visual and measurement	100%	MFR. Spec/ DRG	MFR. Spec/ DRG	MFR. Fabrication report	P	V	R	
5.2.4	DP Test on Welds on	Major	DP Test	100%	-DO-	-DO-	-DO-	P	W	R	

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								S	M	O	
1	2	3	4	5	6	7	8	9			10
	Load bearing members eg. Jack Pads										
5.2.5	Pressure test	Major	Mechanical	On One unit	CBIP	CBIP	Test Report	--	P	W	STAGE INSPECTION
5.2.6	Vacuum test	Major	Mechanical	On One unit	CBIP	CBIP	Test Report	--	P	W	STAGE INSPECTION
5.2.7	Leakage test										
5.2.7.1	Main Unit	Major	Mechanical	100%	MFR. STD	MFR. STD	Test report	P	W	R	
5.2.7.2	Conservator	Major	Mechanical	100%	MFR. STD	MFR. STD	Test report	P	W	R	
5.2.7.3	Pipes	Major	Mechanical	100%	MFR. STD	MFR. STD	Test report	P	W	R	
5.2.8	Surface preparation	Major	Visual	100%	MFR. STD	MFR. STD	MFR. Fabrication report	P	V	R	
5.2.9	Final Paint Coat (including Primer), Thickness & Shade	Major	Measurement	100%	MFR. STD	MFR. STD	Test report	P	V	R	
5.2.10	Paint Peel off test	Major	Visual	100%	MFR. STD	MFR. STD	Test report	--	P	R	
6.0	Porcelain insulators										
6.1	Make and rating	Critical	Visual	100%	IS 8603/IS 2099/App.Drg.	IS 8603/IS 2099/App.Drg.	Supplier's TC	P	V	R	
6.2	Visual inspection for surface smoothness, any	Critical	Visual	100%	-DO-	-DO-	-DO-	P	V	R	

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								S	M	O	
1	2	3	4	5	6	7	8	9			10
	damage, etc.										
6.3	Important dimension including Creepage distance	Major	Measurement	One sample /size / lot	-DO-	-DO-	-DO-	P	V	R	
6.4	All Routine electrical tests	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	
7.0	Magnetic Oil Gauge										
7.1	Make and dimensions	Major	Physical	100%	App.Drg./ Supplier Catalogue	App.Drg./ Supplier Catalogue	Supplier's TC	P	V	R	
7.2	Test for level (eg at 30° Max)	Major	Mechanical	100%	-DO-	-DO-	-DO-	P	V	R	
7.3	Switch contact test	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	
7.4	Leakage test	Major	Mechanical	100%	-DO-	-DO-	-DO-	P	V	R	
7.5	Switch operating and setting	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	
7.6	Di-electric test at 2 KV AC between live terminal and body	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	
8.	Buchholz relay										
8.1	Make and type	Critical	Visual	100%	App.Drg./ Supplier Catalogue /IS 3637	App.Drg./ Supplier Catalogue /IS 3637	Supplier's TC	P	V	R	

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								S	M	O	
1	2	3	4	5	6	7	8	9			10
8.2	Bore size	Major	Measurement	One/size	-DO-	-DO-	-DO-	P	V	R	
8.3	Porosity and element test	Major	Critical	100%	-DO-	-DO-	-DO-	P	V	R	
8.4	Gas volume and surge test	Major	Mechanical	One/Size	-DO-	-DO-	-DO-	P	V	R	
8.5	HV test at 2 KV AC & IR test	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	
8.6	Continuity for alarm/Trip	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	
9.0	Marshalling cum cooler control box										
9.1	Dimensions	Critical	Measurement	100%	MFR. STD / App. DRG.	MFR. STD / App. DRG.	Supplier's TC	P	W	R	
9.2	Make and rating of Components	Major	Visual	100%	-DO-	App Make	Supplier's TC	P	W	R	
9.3	Functional test	Major	Electrical	100%	-DO-	MFR. STD / DRG	Supplier's TC	P	W	R	
9.4	HV test at 2 KV AC for 1 min	Major	Electrical	100%	-DO-	MFR. STD / DRG	Supplier's TC	P	W	R	
9.5	IP 55 test on marshalling cum cooler control box	Major	Environment	--	--	--	Test report	--	--	R	Supplier's Test certificate shall be submitted for review
10.0	Radiator										

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								S	M	O	
1	2	3	4	5	6	7	8	9			10
10.1	Dimension, number of sections	Major	Measurement	100%	MFR. DRG	VTD DRG	Supplier's TC	P	V	R	
10.2	Leakage Test with Air	Major	Visual	100%	As per CBIP	As per CBIP	Supplier's TC	P	V	R	
10.3	Paint shade	Major	Visual & Measurement	Random	MFR. Specs /Drg	MFR. Specs /Drg	Supplier's TC	P	V	R	
10.4	Surface Preparation	Major	Measurement	100%	SA 2.5 of ISO 8503/2	SA 2.5 of ISO 8503/2	Supplier's TC	P	V	R	
11	OLTC and drive mechanism										
11.1	Make, Rating and model	Major	Visual	100%	MFR. Spec/ IS 8468 /IEC 214-1989	MFR. Spec/ IS 8468 /IEC 214-1989	Supplier's TC	P	V	R	
11.2	Copper Contact surface finish	Major	Visual	100%	IS 8468	IS 8468	Supplier's TC	P	V	R	
11.3	Contact Resistance test	Major	Visual	100%	Supplier's STD	Supplier's STD	Supplier's TC	P	V	R	
11.4	Electrical Routine test	Major	Electrical	100%	IS 8468/ IEC 214	IS 8468/ IEC 214	Supplier's TC	P	V	R	
11.5	Mechanical test on diverter switch including pressure test	Major	Mechanical	100%	-DO-	-DO-	-DO-	P	V	R	
11.6	HV test for Auxiliary	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	

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								S	M	O	
1	2	3	4	5	6	7	8	9			10
	circuit										
11.7	Mechanical test on Tap selector switch with motor drive	Major	Mechanical	100%	-DO-	-DO-	-DO-	P	V	R	
11.8	Pressure test for Oil Compartment	Major	Mechanical test	100%	-DO-	-DO-	-DO-	P	V	R	
12.0	Transformer Oil	Major	Testing	One Sample from each lot	Annexure D of BSES spec.	Annexure D of BSES spec.	STC	P	V	R	One sample of oil shall be drawn from each lot of Transformer offered for final inspection by BSES representative and same shall be tested at CPRI/ERDA lab as per relevant std.
13.0	OTI / WTI										
13.1	Make and Model	Critical	Visual	100%	MFR. STD/App. Drg.	MFR. STD/App. Drg.	Suppliers TC	P	P	R	
13.2	Calibration	Major	Electrical	100%	-DO-	-DO-	-DO-	P	P	R	
13.3	Check for alarm & trip	Major	Electrical	100%	-DO-	-DO-	-DO-	P	P	R	

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								S	M	O	
1	2	3	4	5	6	7	8	9			10
	signal operation against set value										
13.4	HV test	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	
13.5	Switch Setting	Major	Mechanical	100%	-DO-	-DO-	-DO-	P	P	R	
14.0	Bushing Metal parts										
14.1	Dimension Checks	Major	Mechanical	100%	MFR. STD /IS 3347	MFR. STD /IS 3347	Supplier's TC	P	V	R	
14.2	Surface Finish	Major	Visual	100%	-DO-	-DO-	-DO-	P	V	R	
15.0	Current Transformers										
15.1	Dimensions, make	Major	Measurement	100%	MFR. STD /App. DRG. / IS 2705	MFR. STD /App. DRG. / IS 2705	Supplier's TC	P	P	R	
15.2	Rating and terminal marking	Major	Physical	100%	MFR. APPD. DRG	MFR. APPD. DRG	Supplier's TC	P	P	R	
15.3	Measurement of ratio and phase angle error	Major	Electrical	100%	IS 2705	IS 2705	Supplier's TC	P	V	R	
15.4	High Voltage test	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	
15.5	Inter-Turn insulation test	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	
15.6	Knee Point Voltage	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	Only for CI-PS CT
15.7	Excitation Current	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	Only for CI-PS

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								S	M	O	
1	2	3	4	5	6	7	8	9			10
											CT
15.8	Secondary winding resistance	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	Only for CI-PS CT
15.9	Polarity	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	
16.0	Valves/ Butterfly valves										
16.1	Make & operation	Critical	Visual	100%	APP.drg./MFR. STD	APP.drg./MFR. STD	Supplier's TC	P	P	R	
16.2	Leakage test for body	Major	Mechanical	100%	-DO-	-DO-	-DO-	P	P	R	
16.3	Leakage test for top spindle	Major	Mechanical	100%	-DO-	-DO-	-DO-	P	P	R	
16.4	Mounting dimensions	Major	Measurement	100%	-DO-	-DO-	-DO-	P	P	R	
16.5	Material of Body & Seat	Major	Chemical & measurement	1 sample per lot	-DO-	-DO-	-DO-	P	V	R	
17.0	Air Cell										
17.1	Make	Critical	Visual	100%	MFR. STD/App. drg.	MFR. STD/App. drg.	Supplier's TC	P	V	R	
17.2	Dimensional check	Major	Measurement	100%	-DO-	-DO-	-DO-	P	V	R	
17.3	Pressure test for 24 hrs. for leakage	Major	Mechanical	100%	-DO-	No Visible Damage	-DO-	P	V	R	
17.4	Inflation and deflation test (10 times)	Critical	Mechanical	100%	-DO-	-DO-	-DO-	P	V	R	

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								S	M	O	
1	2	3	4	5	6	7	8	9			10
18.0	Pressure relief Valve										
18.1	Make	Critical	Visual	100%	MFR. STD/ App. Drg.	MFR. STD/ App. Drg.	-DO-	P	P	R	
18.2	Operating pressure	Major	Mechanical	100%	-DO-	-DO-	-DO-	P	P	R	
18.3	Switch Contact test	Major	Electrical	100%	-DO-	-DO-	-DO-	P	P	R	
18.4	Mounting dimensions	Major	Measurement	100%	-DO-	-DO-	-DO-	P	V	R	
18.5	HV test between body & terminal	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	
19.0	Fan Motor & Cooler Fan										
19.1	Verification of Make & rating	Major	Physical	100%	MFR. STD/App. DRG.	MFR. STD/App. DRG.	Supplier's TC	P	V	R	
19.2	Input current power speed	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	
19.3	HV test at 2.0 KV	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	
19.4	Insulation resistance test	Major	Electrical	100%	-DO-	-DO-	-DO-	P	V	R	
20.0	Gasket										
20.1	Appearance & Finish	Major	Mechanical	1 sample per size per lot	IS 4253-II, 1980	IS 4253-II, 1980	Supplier's TC	P	V	R	
20.2	Hardness, IRHD	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
20.3	Tensile Strength	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	

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								S	M	O	
1	2	3	4	5	6	7	8	9			10
20.4	Compressibility	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
20.5	Compression set	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
20.6	Flexibility	Major	Mechanical	-DO-	-DO-	-DO-	-DO-	P	V	R	
21.0	Silica gel Breather										
21.1	Type / model	Major	Visual	100%	MFR. STD /DRG	MFR. STD /DRG	Supplier's TC	P	V	R	
21.2	Color of Gel	Major	Visual	100%	-DO-	-DO-	-DO-	P	V	R	
B	In Process										
1	Winding										
1.1	Check for Visual, physical and dimensional Parameters and no. of parallel conductors.										
1.1.1	Measurement of axial height, OD & ID& current density calculation.	Major	Measurement	100%	MFR. Data/Drg	MFR. Data/Drg	QC report	--	P	W	
1.1.2	Copper Conductor size (Bare & covered)	Major	Measurement	100%	-DO-	-DO-	-DO-	--	P	W	
1.1.3	No. of Turns / Disc	Major	Measurement	100%	-DO-	-DO-	-DO-	--	P	R	
1.2	Winding height	Major	Measurement	100%	-DO-	-DO-	-DO-	--	P	W	

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								S	M	O	
1	2	3	4	5	6	7	8	9			10
1.3	Visual inspection of Brazed joints as applicable	Major	Visual	100%	-DO-	-DO-	-DO-	--	P	R	
1.4	Tap Leads termination in case of tap winding	Major	Visual	100%	-DO-	-DO-	-DO-	--	P	R	
1.5	Current density calculation	--	--	--	--	--	--	--	P	W	
2.0	Core Assembly										
2.1	Visual & Key Dimensional check										
2.1.1	Diagonal distance	Major	Measurement	100%	MFR.Drg	MFR.Drg	QC report	--	P	W	
2.1.2	Window centre distance	Major	Measurement	100%	-DO-	-DO-	-DO-	--	P	W	
2.1.3	Window height	Major	Measurement	100%	-DO-	-DO-	-DO-	--	P	W	
2.2	Stack Thickness	Major	Measurement	100%	-DO-	-DO-	-DO-	--	P	W	
2.3	High Voltage test at 2 KV AC for 1 min between core & core clamp, Yoke bolt	Major	Electrical	100%	-DO-	-DO-	-DO-	--	P	W	
2.4	Pre-Core loss measurement	Major	Electrical	100%	-DO-	-DO-	-DO-	--	P	W	
3.0	Core-Coil Assembly										
3.1	Top & Bottom insulation	Major	Visual	100%	MFR.Data	MFR.Data	QC report	--	P	R	

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								S	M	O	
1	2	3	4	5	6	7	8	9			10
	arrangement				/DRG	/DRG					
3.2	Lead arrangement	Critical	Visual	100%	-DO-	-DO-	-DO-	--	P	R	
3.3	Tap & Lead End Brazing & Insulation	Critical	Visual	100%	-DO-	-DO-	-DO-	--	P	R	
3.4	Dimension of Coil After Shrinkage	Major	Measurement	100%	-DO-	-DO-	-DO-	--	P	R	
3.5	Verification of Major electrical clearances	Major	Visual & Measurement	100%	-DO-	-DO-	-DO-	--	P	R	
3.6	HV/LV Connection	Major	Visual	100%	-DO-	-DO-	-DO-	--	P	R	
4.0	Core-Coil Assembly Before Overing										
4.1	Initial Ratio test	Major	Measurement	100%	-DO-	-DO-	-DO-	--	P	R	
5.0	Core-coil assembly during drying										
5.1	Measurement & recording of temperature & drying time during vacuum treatment.	Major	Visual	100%	MFR.Data /DRG	MFR.Data /DRG	QC report	--	P	R	
5.2	Check for completeness of drying	Major	Visual	100%	MFR.Data /DRG	MFR.Data /DRG	QC report	--	P	R	
5.3	Certification of all test	Major	Visual	100%	MFR.Data /DRG	MFR.Data /DRG	QC report	--	P	R	

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								S	M	O	
1	2	3	4	5	6	7	8	9			10
6.0	Core-Coil Assembly After Overing										
6.1	Ratio Test & Magnetic Balance test	Major	Electrical	100%	-DO-	-DO-	-DO-	--	P	W	
6.2	Recording of time/Temp, Vacuum	Major	Measurement	100%	-DO-	-DO-	-DO-	--	P	R	
6.3	Record of Moisture extract	Major	Measurement	100%	MFR. STD	MFR. STD	QC report	--	P	R	
6.4	Verification of completeness & Drying	Major	Verify	100%	MFR. STD	MFR. STD	QC report	--	P	R	
6.5	Insulation resistance measurement by Megger	Major	Electrical	100%	MFR. STD	MFR. STD	Test report	--	P	R	
6.6	Earthing connection	Major	Visual	-DO-	MFR. STD	MFR. STD	QC Report	--	P	R	
7.0	Tanking										
7.1	Electrical clearance arrangement	Major	Measurement	100%	MFR. DRG	MFR. DRG	QC report	--	P	R	
7.2	Verification of Core-Frame Clamping arrangement	Major	Visual	100%	-DO-	-DO-	-DO-	--	P	R	
7.3	Core to frame insulation resistance test & HV test at 2 KV for min	Major	Electrical	100%	-DO-	-DO-	-DO-	--	P	R	

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								S	M	O	
1	2	3	4	5	6	7	8	9			10
8.0	Final Assembly for testing										
8.1	Fittings of external accessories	Major	Visual	100%	MFR. STD /DRG	MFR. STD /DRG	Job Card	--	P	R	
8.2	Internal Oil leakage test on main unit	Major	Visual	100%	CBIP	CBIP	QC report	--	P	R	
C	Final testing										
1	Routine Test										
1.1	Voltage Ratio test	Major	Electrical	100%	IS 2026	IS 2026	Test Report	--	P	W	
1.2	Winding Resistance at all tap corrected to 75°C	Major	Electrical	100%	IS 2026	IS 2026	Test report	--	P	W	
1.3	No Load Loss & Current @90%,100%&110% of rated voltage	Major	Electrical	100%	IS 2026	IS 2026	Test report	--	P	W	To be repeated after type test.
1.4	Impedance Voltage/Short Circuit Impedance(Principal Tap) Load Loss @Principal, Max, Mini Tap	Major	Electrical	100%	IS 2026	IS 2026	Test report	--	P	W	
1.5	Induced over voltage	Major	Electrical	100%	IS 2026	IS 2026	Test report	--	P	W	To be repeated after Impulse test
1.6	Separate Source Voltage	Major	Electrical	100%	IS 2026	IS 2026	Test report	--	P	W	

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								S	M	O	
1	2	3	4	5	6	7	8	9			10
	Test										
1.7	Insulation Resistance & PI(10 min / 1 min)	Major	Electrical	100%	--	--	Test report	--	P	W	By 5 KV Megger PI Shall be more than 1.5
1.8	Voltage Vector Relationship & Polarity	Major	Electrical	100%	IS 2026	IS 2026	Test report	--	P	W	
1.9	Magnetic Balance Test	Major	Electrical	100%	IS 2026	IS 2026	Test report	--	P	W	
1.10	Oil leakage test	Major	Visual	100%	CBIP	CBIP	Test report	--	P	W	
1.11	Auxiliary circuit insulation test for OLTC, 2.0 KV AC for 1 min	Major	Electrical	100%	--	Withstand 2 KV for 1 min	Test report	--	P	W	
1.12	Polarity check & Ratio Test of LVWTI CT/ HVWTI CT & NCT	Major	Electrical	100%	IS 2026	IS 2026	Test report	--	P	W	
1.13	Magnetic circuit Test at 2KV between Core & Frame	Major	Electrical	100%	IS 2026	IS 2026	Test report	--	P	W	
1.14	Measurement of auxiliary losses(Losses taken by Fan)	Major	Electrical	100%	IS 2026	IS 2026	Test report	--	P	W	
1.15	BDV test on Transformer Oil	Major	Electrical	100%	IS 2026	IS 2026	Test report	--	P	W	

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

SL NO	COMPONENT & CHARACTERISTICS	CLASS	TYPE OF CHECK	QUALITY OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
								S	M	O	
1	2	3	4	5	6	7	8	9			10
1.16	Routine Test on Tank	Major	Electrical	100%	IS 2026	IS 2026	Test report	--	P	W	
1.17	Power frequency withstand on auxiliary circuit	Major	Electrical	100%	IS 2026	IS 2026	Test report	--	P	W	
1.18	Measurement of Cap & tandelta of Wdg, Oil and HV bushing	Major	Electrical	100%	--	--	Test report	--	P	W	
1.19	Excitation & Knee point Vol. of PS Core of NCT.	Major	Electrical	100%	IS 2026	IS 2026	Test report	--	P	W	
1.20	Routine (Functional) Test on OLTC	Major	Electrical	100%	IS 2026	IS 2026	Test report	--	P	W	
1.21	SFRA	Major	Electrical	100%	IS 2026	IS 2026	Test report	--	P	W	
2.0	Type test (One unit of each type and rating of Transformer)										
2.1	Heat Run Test (Temp. Rise Test)	Major	Testing	One Unit	IS 2026	IS 2026	Test Report	--	P	W	
2.2	Impulse withstand Test on all HV & LV Limb for Chopped wave.	Major	Testing	One Unit	IS 2026	IS 2026	Test Report	--	P	W	
2.3	DGA Test Before & After temperature rise	Major	Testing	One Unit	Relevant std.	Relevant std.	Test Report	--	P	W	
2.4	Pressure relief device test	Major	Testing	One Unit	MFR. STD	MFR. STD	Test Report	--	P	W	
3.0	Other test										

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

SL NO	COMPONENT & CHARACTERISTICS	CLASS	TYPE OF CHECK	QUALITY OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
								S	M	O	
1	2	3	4	5	6	7	8	9			10
3.1	Marshalling cum cooler control box										
3.1.1	BOM verification	Major	Verification	100%	App MFR.Drg	App MFR.Drg	QC report	--	P	W	
3.1.2	Operation / Continuity of Wiring with OTI, WTI operation & other accessories	Major	Electrical	100%	MFR. STD	MFR. STD	QC report	--	P	W	
3.1.3	2 KV (HV test) on Marshalling cum cooler control box	Major	Electrical	100%	MFR. STD	MFR. STD	QC report	--	P	W	
3.1.4	Operation of Instruments(BR)	Major	Electrical	100%	MFR. STD	MFR. STD	QC report	--	P	W	
3.1.5	Visual & Dimensional check	Major	Measurement	100%	APPD MFR.Drg.	APPD MFR.Drg.	QC report	--	P	W	
4.0	Special Test (One unit of each type and rating of Transformer)										
4.1	Zero Phase Sequence Test	Major	Testing	One Unit	IS 2026	IS 2026	Test Report	--	P	W	
4.2	Noise Level Test	Major	Testing	One Unit	NEMA TR-1	NEMA TR-1	Test Report	--	P	W	
4.3	No Load Harmonic Test	Major	Testing	One Unit	IS 2026	IS 2026	Test Report	--	P	W	
4.4	HV Test on all auxiliary equipment and wiring after complete assembly	Major	Testing	One Unit	--	--	Test Report	--	P	W	

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

SL NO	COMPONENT & CHARACTERISTICS	CLASS	TYPE OF CHECK	QUALITY OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
								S	M	O	
1	2	3	4	5	6	7	8	9			10
D	Dispatch & Packing										
1.1	Identification & packing	Major	Visual	100%	As per packing list	As per packing list	Packing List	--	P	--	
1.2	Check for proper Packing	Major	Visual	100%	As per packing list	As per packing list	Packing List	--	P	--	
1.3	Visual check before dispatch	Major	Visual	100%	As per packing list	As per packing list	Packing List	--	P	--	

LEGEND:

S: Supplier
M: Main Contractor (Manufacturer)
O: Owner (BYPL)

P - Perform
V - Verify
R – Review
W- Witness

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

SCHEDULE – A

Guaranteed Technical Particulars (Data by Seller)

Sr.No.	Particular	Specified / Required	Offered
1.0	General		
1.1	Make		
1.2	Type	As per Annexure C of specification	
2.0	Nominal continuous rating, KVA		
2.1	ONAN	As per Cl 11.1 of Annexure C	
2.2	ONAF	As per Cl 11.2 of 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 Annexure C of specification	
5.2	LV winding	As per Annexure C of specification	
5.3	Vector group reference	Dyn11	
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		
6.6	Transformer X/R ratio		
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 at principal tap at full load and 75° C without any positive tolerance kW		
9.1	No load losses (max.)	As per Cl 13.0 Annexure C	
9.2	Load losses (max.)	As per Cl 14.0 Annexure C	
9.3	Cooler fan losses (max.)		
9.4	Total I ² R losses of windings @ 75 deg C		
9.5	Total stray losses @ 75 deg C		

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

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 °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 °C		
10.3.1	HV		
10.3.2	LV		
11.0	Efficiency		
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	Not less than 99.5 %	
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	Not less than 99.5 %	
11.2.5	At 40% load		
11.2.6	At 20% load		
11.3	Maximum efficiency %		
11.4	Load and power factor at which Max efficiency 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	Tapping		
13.1	Type		
13.2	Capacity		
13.3	Range-steps x % variation	As per Annexure C of specification	
13.4	Taps provided on HV winding (Yes/No)	Yes	
14.0	OLTC gear		
14.1	Make		
14.2	Type		
14.3	Reference std		

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

14.4	No of compartment		
14.5	Mounting arrangement	Side mounted type although External Intank Type is also preferable	
14.6	Rated current Amp		
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 Annexure C of specification	
16.2	No. of cooling unit groups		
16.3	Capacity of cooling units		
16.4	Mounting of radiators		
16.5	Number of radiators and Size		
16.6	Type & size of radiator header main valve		
16.7	Type & size of individual radiator valve		
16.8	Total radiating surface, sq mm		
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	Type and make of Fan motor		
16.12	No. of fan motor per bank (Working + Standby)		
16.13	Rated Power Input (kW)		
16.14	Rated Voltage, Speed of Motor		
16.15	Efficiency of motor at Full load(%)		
16.16	Locked Rotor current(Amps)		
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 and tested for vacuum pressure (Ref: CBIP manual) (Yes/No)		
17.5.1	Vacuum mm of Hg. / (kN/m ²)	As per CBIP	

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

17.5.2	Pressure mm of Hg	Twice the normal head of oil / normal pressure + 35 kN/m ² whichever is lower , As per CBIP	
17.6	Is the tank lid slopped?	Yes	
17.7	Inspection cover provided (Yes/No)		
17.8	Location of inspection cover (Yes/No)		
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 M3 or better	
18.3	Thickness of lamination mm	Max. 0.23 mm with insulating coating on both sides	
18.4	Insulation between core lamination		
18.5	Design flux density of the core at rated condition at principal tap, Tesla		
18.6	Maximum flux density allowed in the core at extreme overexcitation / overfluxing , Tesla		
18.7	Equivalent cross section area of core, mm ²		
18.8	Guaranteed No load current at 90% / 100% / 110% rated voltage & frequency (Amp)	@ 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 mm ²	As per Annexure C	
19.5	Gauge/area of cross section of conductor, mm ²		
19.5.1	HV		
19.5.2	LV		
19.6	Maximum current density achieved in winding (LV/HV/HVT) – Amps/ mm ²		
19.7	Insulating material		
19.7.1	HV turn		
19.7.2	LV turn		
19.7.3	LV- core		
19.7.4	HV-LV		

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

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 IS: 335, latest edition and Cl. 4.2.7 of the specification	
21.4	Oil preservation system provided (Yes/No)		
22.0	Bushing		
22.1	Make		
22.2	Type		
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 Annexure C of specification	
22.6	Rated current , Amp		
22.6.1	HV bushing		
22.6.2	LV line and neutral bushing		
22.7	Rated thermal short current		
22.7.1	HV bushing	As per Annexure C of specification	
22.7.2	LV line and neutral bushing	As per Annexure C of specification	
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		

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

23.0	Terminal connections		
23.1	HV	As per Annexure C of specification	
23.2	LV	As per Annexure C of specification	
23.3	LV Neutral	As per Annexure C of specification	
24.0	H.V. Cable box/Terminals		
24.1	Suitable for cable/conductor type size	As per Annexure C of specification	
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	
24.6	Phase to clearance inside box / terminals , mm		
24.7	Phase to earth inside box / terminals , mm		
24.8	Cable box door arrangement as per clause 4.2.9.2		
25.0	L.V line side cable box		
25.1	Suitable for cable type , size	As per Annexure C of specification	
25.2	Termination height , mm	1000 mm , minimum	
25.3	Gland plate dimension mm x mm		
25.4	Gland plate material	Aluminum	
25.5	Gland plate thickness , mm	5 mm minimum	
25.6	Phase to clearance inside box / terminals , mm		
25.7	Phase to earth inside box , mm		
25.8	Cable box door arrangement as per clause 4.2.9.2		
26.0	LV Neutral cable box		
26.1	Suitable for cable type , size	As per Annexure C of specification	
26.2	Termination height , mm		
26.3	Gland plate dimension mm x mm		
26.4	Gland plate material	Aluminum	
26.5	Gland plate thickness , mm	5 mm minimum	
26.6	Phase to clearance inside box, mm		
26.7	Phase to earth inside box , mm		
27.0	Marshalling box cubical provided as per clause no. 4.2.11 of spec. (Yes / no)		
27.1	Mounting of marshalling box	Separate mounted)	
28.0	Neutral Current Transformer (NCT)		
28.1	Type		
28.2	Make		
28.3	Reference standard		
28.4	Rated Voltage	12kV	
28.5	CT Ratios	20/25 MVA, Dyn11	25/31.5 MVA, Dyn11

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

		Core 1	Core 2	Core 1	Core 2	
		1600/1 A	1600/1A	2000/1 A	2000/1 A	
28.6	Burden ,VA	-	20	-	20	
28.7	Class of Accuracy	PS	5P20	PS	5P20	
28.8	KPV , volts , minimum	40(Rct +8)	-	40(Rct+ 8)	-	
28.9	Resistance, ohm @ 75 deg C, maximum	1	-	1	-	
28.10	Magnetizing current @ Vk/4 , mA , maximum	30	-	100	-	
28.11	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					
29.5	Burden ,VA	Manufacturer Std.				
29.6	Class of accuracy	Manufacturer Std.				
30.0	Pressure release device					
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					
34.1	Length , mm					

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

34.2	Breadth , mm		
34.3	Height , mm		
35.0	Transformer tank 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 and 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 radiator empty , kG		
37.11	Weight of oil in tank , kG		
37.12	Weight of oil in each conservator , kG		
37.13	Weight of oil in each radiators , kG		
37.14	Total weight of oil in radiator , kG		
37.15	OLTC gear including oil , kG		
37.16	Total transport weight of the transformer , kG		
37.17	Total transport weight of the transformer with OLTC and all accessories		
38.0	Volume data		
38.1	Volume of oil in main tank , liters		
38.2	Volume of oil between highest and lowest levels of main conservator ,liters		
38.3	Volume of oil between highest and lowest levels of OLTC conservator, liters		
38.4	Volume of oil in each radiator , liters		
38.5	Total volume of oil in radiators , liters		
38.6	Volume of oil in OLTC , liters		
38.7	Transformer total oil volume , liters		
39.0	Shipping data		

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

39.1	Weight of heaviest package, kG		
39.2	Dimensions of the largest package (L x B x H) mm		
40.0	Tests		
40.1	All in process tests confirmed as per Cl. (Yes /No)		
40.2	All types tests confirmed as per Cl. (Yes /No)		
40.3	All in routine tests confirmed as per Cl. (Yes /No)		
40.4	All in special tests confirmed as per Cl. (Yes /No)		

TECHNICAL SPECIFICATION FOR POWER TRANSFORMER

SCHEDULE – B

Guaranteed Technical Particulars of Transformer Oil

Bidder to submit hard copy duly filled & signed along with techno commercial offer. Bidder to submit separate GTP for each type of insulating oil

S no	Item description	Specification requirement	Data by Vendor
1.0	Manufacturer Name		
1.1		Address	
1.2		Contact person	
1.3		Contact telephone no	
2.0	Function		
2.1	Viscosity		
2.1.1	Viscosity at 40°C	15 mm ² /s, Max	
2.1.2	Viscosity at 0°C	1800 mm ² /s, Max	
2.2	Pour Point	- 10°C, Max	
2.3	Water content	30 mg/Kg, Max	
2.4	Breakdown voltage		
2.4.1	New unfiltered oil	30 kV, Min	
2.4.2	After filtration	70 kV, Min	
2.5	Density at 20°C	0.895 g/ml, Max	
2.6	Dielectric dissipation factor at 90°C	0.005, Max	
2.7	Particle Content	Manufacturer to specify the data	
3.0	Refining/Stability		
3.1	Appearance of oil	Clear, free from sediment and suspended matter	
3.2	Acidity	0.01 mg KOH/g, Max	
3.3	Interfacial tension at 27°C	0.04 N/m, Min	
3.4	Total sulphur content	Manufacturer to specify the data	
3.5	Corrosive sulfur	Not-corrosive	
3.6	Potentially Corrosive sulfur	Not-corrosive	
3.7	DBDS	Not detectable (<5 mg/kg)	
3.8	Inhibitor	Not detectable (<0.01%)	
3.9	Metal Passivator	Not detectable (<5 mg/kg)	
3.10	Other additives	Manufacturer to specify the data	
3.11	2-furfural and related Compounds content	Not detectable (<0.05 mg/kg) for each individual compound	
4.0	Performance		

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4.1	Oxidation stability, test duration 164 h		
4.1.1	Total acidity	1.2 mg KOH/g, Max	
4.1.2	Sludge	0.8%, Max	
4.1.3	DDF at 90°C	0.5, Max	
4.2	Gassing Tendency	Manufacturer to specify the data	
4.3	ECT	Manufacturer to specify the data	
5.0	Health,safety and Environment		
5.1	Flash point	135°C, Min	
5.2	PCA content Max	3%, Max	
5.3	PCB content	Not detectable (<2 mg/Kg)	