

# **U.P. JAL VIDYUT NIGAM LIMITED**

(A U.P. Govt. Enterprise)



**TENDER SPECIFICATION No. 03/EE(DESIGN)/2020-21  
FOR PROCUREMENT OF  
3 No. 67.5 MVA, 11/132 KV (OFWF)  
GENERATOR-TRANSFORMERS  
(EQUIPPED WITH SCADA COMPATIBLE FEATURES)  
AND  
ERECTION, TESTING & COMMISSIONING OF ABOVE  
INCLUDING  
DISMANTLING & SHIFTING OF EXISTING 60 MVA GT's  
AT  
RIHAND HEP  
(Sonebhadra, U.P.)**

***To be Submitted to :***

**Executive Engineer (Design)  
U.P. JAL VIDYUT NIGAM LTD.  
Shakti Bhawan Extn., 12<sup>th</sup> Floor,  
Ashok Marg, Lucknow-226001  
Website : [www.upjvn.org](http://www.upjvn.org)**

**Tender Notice No. : 03/EE(Design)/2020-21**

***Last date of submission e-bids online : 15.02.2021 (14:00 Hrs.)  
Last date of submission of bid hardcopy : 17.02.2021 (14.00 Hrs.)  
Date of Opening (Part-I) of Tender : 17.02.2021 (15:00 Hrs.)  
Pre bid meeting Date : 28.01.2021 (15:00Hrs)***



## U.P. JAL VIDYUT NIGAM LTD.

(A Govt. of Uttar Pradesh Enterprise)

Shakti Bhawan Extn., 12<sup>th</sup> Floor, Ashok Marg, Lucknow-226001

Phone : (0522) 2610028, 2610029

### e-Tender Notice No. 03/EE(Design)/2020-21

Online e-Tenders in two parts are invited from manufacturers for Supply, Erection, Testing & Commissioning of 3 Nos. Generator-Transformers at Rihand Hydro-electric Project, Pipri, Sonebhadra (U.P.) as detailed below.

Description of Item	Cost of Tender inclusive of GST @ 18% (Rs.)	Earnest Money (Rs.)	Date of Opening (Part-I)
67.5 MVA, 11/132 KV, oil-immersed water-cooled with forced oil (OFWF) circulation type Outdoor Service Generator Transformers for Rihand HEP	10,000 + 1,800 = 11,800/-	Rs. 10.00 Lacs	17.02.2021

Part-I of the e-bid shall contain uploaded techno-commercial bid along with documents in support of deposition of tender fee & earnest money (EMD). If EMD is submitted in form of BG then the original copy of same shall be submitted along with hardcopy of techno-commercial bid. Bid without tender fee and EMD shall not be considered. Part-II shall contain price bid. Tender can be downloaded from and uploaded on e-procurement website: [www.etender.up.nic.in](http://www.etender.up.nic.in). Tender (Part-I) shall be opened on 17.02.2021 (at 15.00 hrs). Last date for submission of e-bids online and hardcopy of techno-commercial bids shall be 15.02.2021 (upto 14.00 hrs.) and 17.02.2021 (upto 11:00 hrs.) respectively. Date of opening of price bid shall be intimated later. Undersigned reserves the right to accept or reject any or all the bids without assigning any reason thereof. Bidders should keep themselves updated in regard to publication of corrigendum (if any) by visiting e-procurement portal regularly. If the date of opening will be a holiday, the tender shall be opened on next working day at the same time.

**EXECUTIVE ENGINEER(DESIGN)**

**“Save Electricity in the interest of Nation”**

**Website : [www.upjvn.org](http://www.upjvn.org)**

**U.P. JAL VIDYUT NIGAM LTD.**  
**(A Govt. of Uttar Pradesh Enterprise)**  
**12<sup>th</sup> Floor, Shakti Bhawan Extn., 14-Ashok Marg, Lucknow-226001**  
Website: [www.upjvn.org](http://www.upjvn.org)

**E-TENDER INVITING NOTICE NO. 03/EE(DESIGN)/2020-21**

1.	Name of Work	Supply, Erection, Testing & Commissioning of 3 Nos. Transformers 67.5 MVA, 11/132 KV, oil immersed water cooled with forced oil circulation (OFWF) type outdoor service at Rihand Hydro-Electric Project, Pipri, Sonbhadra (U.P.)
2.	Period of Supply & Work	09 months for complete supply 01 month for work of Erection, Testing & Commissioning of each transformer
3.	Tender No.	03/EE(DESIGN)/2020-21
4.	Last date and time for submission of E-bids (Technical and Financial) at E-procurement Website <a href="http://etender.up.nic.in">http://etender.up.nic.in</a>	15.02.2021 up to 14:00 hrs
5.	Last date and time for submission of hard copy of requisite fee, EMD and annexure enclosed with Tender Document in the office of the Executive Engineer (Design), UPJVNL, 12 <sup>th</sup> Floor, Shakti Bhawan, Lucknow	17.02.2021 upto 11:00 hrs
6.	Date and time of opening of e-bid Part-I (Technical bid)	17.02.2021 at 15:00 hrs
7.	Date and time of opening of e-bid Part-II (Price bid)	To be announced later on
8.	Place of opening of E-bids	Office of the Executive Engineer (Design) U.P. Jal Vidyut Nigam Ltd., 12 <sup>th</sup> Floor, Shakti Bhawan, Lucknow
9.	Address for communication	Executive Engineer (Design) U.P. Jal Vidyut Nigam Ltd., 12 <sup>th</sup> Floor, Shakti Bhawan, Lucknow
10.	E-mail address	<a href="mailto:eedesignnm@upjvn.org">eedesignnm@upjvn.org</a>
11.	Bid Document Cost	Rs. 11,800.00 including GST through RTGS in <b>U.P. Jal Vidyut Nigam Ltd., United Bank of India, Station Road Branch, Lucknow A/c No. 1499010100375. (IFSC Code UTBI0LSR563).</b>
12.	Earnest Money	Rs. 10,00,000.00 RTGS in U.P. Jal Vidyut Nigam Ltd., <b>United Bank of India, Station Road Branch, Lucknow A/c No. 1499010100375. (IFSC Code UTBI0LSR563) OR</b> Bank Guarantee of any Nationalised Bank in the favour of <b>“U.P. Jal Vidyut Nigam Ltd.”. Please refer Page I-9 Clause 1.4</b>

- Note:** (1) Bidders are requested to visit e-procurement website of U.P. Government [www.etender.up.nic.in](http://www.etender.up.nic.in). regularly for any correction/amendments/modification/extension till the date of submission of tender.
- (2) If EMD is deposited in the form of Bank Guarantee, the hard copy of the original BG shall be submitted within stipulated time along with hardcopy of techno-commercial bid, failing which tender is liable to be rejected.
- (3) Prebid meeting date 28.01.2021 (15:00 hrs) at UPJVNL Office, 12<sup>th</sup> Floor, Shakti Bhawan (Extn.), 14-Ashok Marg, Lucknow.

**Executive Engineer (Design)**

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## **I - INSTRUCTIONS TO TENDERERS**

## **I- INSTRUCTIONS TO e-TENDERERS**

### **1.0 GENERAL :**

e-Tenders are invited for supply of 3 Nos. 67.5 MVA, 11/132 KV Generator-Transformers (equipped with SCADA compatible features) including work of Erection, Testing & Commissioning; dismantling & shifting of existing 3 Nos. 60 MVA Generator-Transformers at Rihand HEP (Pipri, Distt.-Sonebhadra) as per specifications and schedule of Quantities & Prices (B.O.Q.) from manufacturers of these equipments.

### **1.1 PREPARATION OF TENDER :**

- 1.1.1** Before submission of the tender, Tenderers are required to make themselves fully conversant with the Technical Specification, Drawings, Instructions to Tenderers, General requirements of specifications including schedules and General Conditions of Contract of Form 'A' so that no ambiguity arises at a later date in this respect.
- 1.1.2** Any inconsistency or ambiguity in the offers made by tenderer shall be interpreted to the maximum advantage of U.P. Jal Vidyut Nigam Ltd. ("Purchaser"/"Nigam") and disadvantage to the tenderer. The tenderer shall have no right to question the interpretation of the Purchaser in all such cases and the same shall be binding on the tenderer.
- 1.1.3** The tender should be prepared and submitted strictly in accordance with the instructions contained in these specifications. The tender shall be complete in all respects. Tender must be submitted in the manner specified on the attached prescribed schedules and/or copies thereof. To complete the proposal, the tenderer must fill in the tender form, declaration, all schedules and data sheet, annexed with the specification item by item in accordance with the instructions and notes supplementary there-to. The interpolations, insertions, cutting and corrections made in the tender offers should be duly signed by the Tenderer, failing which offer is liable to be rejected.
- 1.1.4** Each tenderer shall supply the data required in sheets annexed with the specification by typing at appropriate places against each item to facilitate preparation of comparative statements. These sheets must be properly signed by authorised representative of the Tenderer/Manufacturer testifying the data submitted. All schedules must be duly filled in and shall be enclosed with each copy of the tender. In case the Tenderer does not supply any of the required information at the time of tender, necessary loading may be made while evaluating the prices of his offer without giving him any further opportunity to supply or clarify the same. The tenderers are notified that in case the required information are not furnished in the specified proforma/schedules attached with the specification, the Purchaser shall not be responsible for any error in the evaluation of their tenders on this account. Further, the failure to comply with this requirement may result in the rejection of the tender at the discretion of the Purchaser.

**1.1.5** A set of technical, descriptive and illustrative literature alongwith drawings must accompany each copy of the tender so that a clear understanding of the equipment offered is obtained. The Hard copy of techno-commercial documents duly signed & stamped must be posted by Registered Post/Speed Post/Courier, sufficiently in advance so as to reach the Purchaser by the scheduled date and time of submission of tender. **Hardcopies of techno-commercial bid received after the date and time of submission even on account of postal delay shall not be considered and tender is liable to be rejected.** The tenderers are, therefore, requested to ensure in their own interest that tenders are delivered in time.

**1.1.6** Nigam reserves the right to accept or reject any or all the offers or to reject the entire tender or part thereof at any stage without assigning any reason thereof.

**1.1.7 POWER PLANT INFORMATION :**

Power plant information is indicated in ‘General Requirements of Specifications’ of this Bidding Document. **The bidder is free to visit the plant in question for obtaining any first hand information and interact with plant authorities before submitting their offer.** For this the firm may contact the Nigam’s Engineer sufficiently in advance. Bidder shall fully inform themselves of local conditions and plant layout/parameters etc. and take the same into account while preparing their bid.

**1.2 PREQUALIFYING CONDITIONS :**

Tenders meeting conditions stipulated in following clauses will only be considered. Tenderers are advised to submit authentic documents satisfying the following requirements towards pre-qualifying conditions for this tender in Part-I alongwith E.M.D., Technical Particular/Specification and Commercial Conditions. Part-II, i.e. online price bid of only those tenderers shall be opened, who are found to meet the requirement for qualification against this tender.

**1.2.1 QUALIFICATION OF TENDERER :**

- (a) The Tenderers shall either themselves be manufacturers of the equipments offered (transformers) or accredited representatives of such manufacturers in India or of their Principals abroad with whom they may be having collaboration.
- (b) Relevant documents in support of the above must be furnished alongwith undertaking of the manufacturer. If these documents are not furnished alongwith the tenders, the offer will be liable to be rejected summarily.

**1.2.2 (a) OPERATIONAL EXPERIENCE :**

- (i) Offered (67.5 MVA, 11/132 KV transformers) or higher capacity transformers (11/132KV or higher voltage class) should have given at least three years proven trouble free operational service in tropical climate. Operational performance certificate confirming at least 3 years of satisfactory operational experience from the end user(s) shall have to be necessarily enclosed along with the offer. **However such supplies shall have been executed within preceding 07 years which is to be reckoned from the last day of the previous month from publication of the tender.**



(ii) **Bidder shall further confirm that performance of transformers supplied by them in the last 3 years shall not have experienced any technical snag which has resulted in non-service from these transformers in the Schedule-P.**

(iii) In case of equipment being manufactured in India under valid FOREIGN COLLABORATION, operating experience in tropical climate of offered collaborator's equipment shall also be acceptable provided copy of valid collaboration agreement for the equipment offered is submitted with the tender.

(b) **MANUFACTURING EXPERIENCE :**

The manufacturer must have manufactured at least 3 Nos. of 67.5 MVA transformer or higher capacity (11/132 KV or higher voltage class). The manufacturer must have experience of manufacturing & supply of such transformers to various State Electricity Board/ Central or State PSUs/ Government Departments or other renowned private sector/ power utilities.

**Manufacturer must submit evidence in form of successfully executed copies of P.O. to corroborate manufacturing experience of 03 such transformers. The said order(s) must have been executed during last 07 years which is to be reckoned from last day of the previous month from publication of tender.**

(c) **TECHNICAL SPECIFICATIONS :**

Offered equipment shall conform to the requirement and provisions of Technical Specifications as annexed hereto. Drawings, GTP's and technical write-up shall be annexed with the offer.

### **1.2.3 TESTING FACILITIES :**

The tenderer must have all necessary facilities at their works for carrying out such routine and acceptance tests as prescribed in the relevant ISS and any other routine and acceptance test as specified in the specification. Documentary evidence of existence of such facilities will be uploaded alongwith the tender.

### **1.2.4 TYPE TEST :**

(A) **FOR BIDS UNDER CLAUSE 1.2.2 (a) (i) & (iv)**

The offered (67.5 MVA, 11/132 KV) or higher capacity (11/132 KV or higher voltage class) equipment must have been fully type tested as per relevant ISS and/or any other specified International Standards. Photocopy of such type test reports/ certificates (**not more than 5 year old**) must be uploaded alongwith tender bid. The type test certificates of Proto type manufactured and tested by foreign collaborators of the tenderer at their works shall not be acceptable for indigenously manufactured equipment.

**(B) FOR BIDS UNDER 1.2.2 (a) (iii)**

- (i) The collaborator's equipment should have been type tested and type test report of the collaborators must be submitted with the tender.
- (ii) The collaborator's equipment shall have at least three years operating experience under tropical conditions.
- (iii) The indigenously manufactured equipment as offered should have been type tested and test reports submitted with the tender.

**1.2.5 SPARES :**

Tenderers shall enclose with their price bid a proposed list of recommended spares required for at least 5 years trouble free operational service of the Generator-Transformer.

**1.2.6 NON-BLACK LISTING CERTIFICATE :**

The Tenderer shall submit a declaration in the enclosed Schedule 'N' confirming that their firm has not been blacklisted in the last 5 years.

**1.2.7 FINANCIAL CRITERIA :**

Annual financial turnover of the firm on an average during the last three years should not be less than Rs. 15.00 Crores.

Net worth of the firm should not be negative in the immediate preceding financial year in which the bid is invited. Supporting documentary evidence to verify these parameters shall be uploaded by the bidder along with their offer.

All statements and claims should be duly supported by authenticated copies of documents without which the tender is liable to be rejected summarily.

**1.3 SUBMISSION OF e-BID:**

- 1.3.1** The Bid Submission module of e-procurement website <http://etender.up.nic.in> enables the bidders to submit the e-bids online against this bidding published by the purchaser. Bid may be submitted only during the period and time stipulated in the bidding. Bidders are advised start the Bid Submission process well in advance so that they can submit their bids in time. The bidders shall submit their bids taking into account the server time, displayed in the e-procurement website. This server time is the time by which the bid submission activity will be allowed till the permissible time on the last date of submission stipulated in the schedule. The bidders cannot submit their bids after the completion of bid submission period. For delay in submission of bids due to any reasons, shall be responsibility of the bidder. The bidders shall follow the instructions mentioned herein under for submission of their e-bids:

- (i) For participating in bids through the e-bidding system, it is necessary for the bidders to be the registered users of the e-procurement website <http://etender.up.nic.in>. The bidders shall first register themselves on the e-bidding website, if they have not done so previously, using the option “Click here to enroll” available on the home page of the website.
- (ii) In addition to the normal registration, the bidder has to register with their Digital Signature Certificate (DSC) in the e-bidding system and subsequently he/she will be allowed to carry out his/her bid submission activities. Registering the Digital Signature Certificate (DSC) is a onetime activity. Before proceeding to register their DSC, the bidder shall first log on to the e-bidding system using the User Login option on the home page with the logging Id and Password with which they have registered as per clause (i) above. For successful registration of DSC on e-procurement website <http://etender.up.nic.in> the bidder must ensure that they possess class-2/Class-3 DSC issued by any certifying authorities duly approved by Controller of Certifying Authorities. The bidder is also advised to register their DSC on e-procurement website well in advance before bid submission period & time so that they do not face any problem while submitting their e-bid against this bidding. The bidder can perform User Login creation and DSC registration exercise as described in clause (i) and (ii) above even before bid submission period starts. The purchaser shall not be held responsible if the bidder tries to submit their e-bid at the last moment of submission of bid, but could not submit due to DSC registration problem.
- (iii) The bidder can search for active bidding through “Search Active Biddings” link, select a bidding in which they are interested in and then move it to ‘My Biddings’ Folder using the option available in the Bid Submission menu. After selecting and viewing the bidding, for which the bidder intends to bid, from “My Biddings” folder, the bidder can place their bid by clicking “pay Offline” option available at the end of the view bidding form. Before this, the bidder should download the bidding document and price Schedule/Bill of Quantity (BOQ) and study them carefully. The bidder shall keep all the documents ready as per the requirements of bidding document in the PDF format except the Price Schedule/Bill of Quantity (BOQ) which shall be in the XLS Format (EXCEL sheet).
- (iv) After clicking the ‘Pay offline’ option, the bidder shall be redirected to the relevant page of Terms and conditions. The bidder shall read the terms and conditions before proceeding to fill in the Bidding fee EMD offline payment details. After entering and saving the Bidding Fee and EMD details, the bidder shall click “Encrypt & Upload” option given in the offline payment details form so that “Bid Document Preparation and Submission” window appears to upload the

documents as per technical (Fee details, Qualification details, Bid Form and Technical Specification details) and financial (Bid Form and Price Schedule/BOQ) schedules/packets given in the bidding details. The details of the Demand Draft or any other accepted instrument which is to be physically sent in the original before opening of technical bids, should tally with the details available in the scanned copy and the data entered during with submission time otherwise the bid submitted shall not be accepted.

- (v) Next, the bidder should upload the Technical Bid Documents for fee details (Bidding fee and EMD), Qualification details as per PQC, and Financial Bid documents as per BOQ of bidding document. Before uploading, the bidder has to select the relevant Digital Signature Certificate. They may be prompted to enter the digital signature certificate password, if necessary. For uploading, the bidder should click “Browse” button against each document label in Technical and Financial schedules/packets and then upload the relevant PDF/XLS files already prepared and stored in the bidder’s computer.
- (vi) The Bidder shall click “Encrypt” next for successfully encrypting and uploading of required documents. During the above process, the bid documents are encrypted/locked electronically with the DSC’s of the Bid openers to ensure that the bid documents are protected, stored and opened by concerned bid openers only.
- (vii) After successful submission of bid documents, a page giving the summary of bid submission will be displayed that the process of e-bid submission is completed. The bidder can take a printout of the summary using the “print” option available in the window as an acknowledgement for future reference.
- (viii) Purchaser reserves the right to cancel any or all Bids without assigning any reason.
- (ix) The Bidders are advised to upload the scanned documents with minimum of 150 dpi scanner to ensure readable uploaded e-Bids.

### **1.3.2 Deadline for Submission of E-Bids :**

- a) e-bids (Technical and Financial) must be submitted by the bidders at e-procurement website <http://etender.up.nic.in> not later than submission end date.
- b) The Purchaser may at this discretion, extends this deadline for submission of bids by amending the bid documents.

### **1.3.3 Late Bids :**

The server time indicated in the Bid Management window on the e-procurement website <http://etender.up.nic.in> will be the time by which the bid submission activity will be allowed till the permissible date and time schedule in the bidding.

Once the bid submission period is over the bidder cannot submit their bid. Bidder has to start the Bid Submission well in advance so that the submission process is completed within the scheduled period, failing which; it shall be the bidder's responsibility.

**1.3.4 Withdrawal and Resubmission of E-Bids :**

- a) At any point of time, a bidder may withdraw their bid submitted online before the bid completion of bid submission period. For withdrawing, the bidder shall first log in using their login id and password and subsequently by their Digital Signature Certificate on the e-procurement website <http://etender.up.nic.in>. The bidder shall then select "My Bids" option in the Bid Submission menu. The page listing all the bids submitted by the bidder shall be displayed. Click "View" to see the details of the bid to be withdrawn. After selecting the "Bid Withdrawal" option, the bidder has to click "Yes" to the message "Do you want to withdraw this bid?" displayed in the Bid Information window for the selected bid. The bidder also has to enter the reason for withdrawing the bid and upload the same for withdraw before clicking the "Submit" button. The bidder has to confirm again by pressing "Ok" button before finally withdrawing their selected bid.
- b) The bidder has to request the purchaser with a letter, attaching the proof of withdrawal and submission of bid security/EMD in the office of purchaser for taking back the bid security/EMD as per the manual procedure.
- c) No bid may be withdrawn in between the period fixed for submission of bids and the period of expiry. Withdrawal of a bid during this interval may result in the Bidder's forfeiture of their bid security.
- d) The bidder can resubmit their bid as and when required till the scheduled bid submission end date and time. The bid submitted earlier will be replaced by the new one. The bid security submitted by the bidder earlier will be used for revised bid and the new bid submission summary generated after the successful submission of the revised bid will be considered for evaluation purposes. For resubmission, the bidder shall first log in using their Login id and password and subsequently by their Digital Signature Certificate on the e-procurement website <http://etender.up.nic.in>. The bidder should then select "My Bids" option in the Bid Submission menu. The page listing all the bids submitted by the bidder will be displayed. Click "View" to see the details of the bid to be resubmitted. After selecting the "Bid Resubmission" option, click "Encrypt & Upload" to upload the revised bid documents by following the methodology provided in clauses 1(d) to 1(g).
- e) The bidders can submit their revised bids as many times as possible by uploading their bid documents within the schedule period for submission of e-bids.
- f) No bid can be resubmitted subsequently after the period for submission of bids is over.

- 1.3.5** Bidders are advised to study the bid document carefully. Submission of bids against the tender notice shall be deemed to have been done after careful study and examination of the procedures, terms and conditions stipulated in the bid documents with full understanding of its implications.
- 1.3.6** The bid document is available at e-procurement website <http://etender.up.nic.in>. Interested bidders may view, download the bidding document, seek clarification and submit their bid online up to the prescribed date and time through uploading on e-procurement website <http://etender.up.nic.in>.
- 1.3.7** The bidders are required to pay non-refundable fee of Rs. 11800.00 (inclusive of GST) towards the cost of bidding document through RTGS in **U.P. Jal Vidyut Nigam Ltd., United Bank of India, Station Road Branch, Lucknow A/c No. 1499010100375. (IFSC Code UTBI0LSR563). Fifth letter being Zero in IFSC code.**
- Bidder will have to upload scanned copy of pay in slip, duly signed, in support of aforesaid fee deposition, against respective cover of e-tender in part-1.
- 1.3.8** All bids must be accompanied by a Bid Security (EMD) which shall be paid through RTGS in **U.P. Jal Vidyut Nigam Ltd., United Bank of India, Station Road Branch, Lucknow A/c No. 1499010100375. (IFSC Code UTBI0LSR563). Fifth letter being Zero in IFSC code.**

**OR**

Bank Guarantee in prescribed proforma, pledged in favour of U.P. Jal Vidyut Nigam Ltd., Lucknow from a scheduled Bank in India, executed on a non-judicial stamp paper of Rs. 100/- as per U.P. Stamp Act on the Specified Performa appended with form 'A' (only applicable when amount of earnest money exceeds Rs. 5,000/-)

Bidder will have to upload scanned copy of pay in slip, duly signed in support of RTGS payment deposited against EMD. In case EMD is in form of Bank Guarantee then apart from uploading scanned copy of BG, scanned copy of issuing bank confirmation mail is also to be uploaded.

Offers without proper earnest money and without requisite validity shall not be considered under any circumstances. The earnest money shall be refunded after tender is finalized. The earnest money of successful tenderer shall however be retained till such time he deposits security.

The original copy of bid document fee, EMD (in case of BG), Power of Attorney made in the name of individual whom signed bid document digitally through DSC & Commitment in prescribed format as per Annexure on non judicial stamp paper of Rs. 100.00 along with other documents like validity, schedule, etc. each should be furnished to the office of **Executive Engineer (Design), Lucknow** within stipulated time, failing which the Part-II of bid shall not be considered for opening.

- 1.3.9** The bids shall be electronically opened in the presence of bidder's representatives, who choose to attend, at the prescribed venue, date and time mentioned above.

- 1.3.10** The Purchaser reserves the right to cancel any or all the bids/annul the bidding process without assigning any reason thereof.
- 1.3.11** In the event of date specified for bids opening, being declared a holiday then the bid shall be opened on next working day at schedule time.
- 1.3.12** All the required documents shall submitted/uploaded by the bidder electronically in the PDF format. However, the Financial Bid should be uploaded in the XLS format.
- 1.3.13** Quantity as mentioned in e-Tender Notice is tentative and may vary up to any extent as per site requirement.
- 1.3.14** The e-Bid is of two cover system and shall consist of:
- A. COVER-I (Technical Bid)
    - a) Documents to meet the qualification criteria specified in PQC.
    - b) Details of the Commercial terms and conditions, all the schedules specified in bid documents pertaining to commercial terms and conditions.
    - c) Tender cost
    - d) EMD (Bid Security)
  - B. COVER-II (Price Bid)
    - Price schedule only (BOQ).

The Bidder's bid and the document uploaded thereto shall be considered as forming a part of contract document.

- NOTE:**(i) The bidder shall send original copy of BG validity (if applicable) along with the hardcopy of bid by Registered post, Courier or in person so as to reach the Nigam within stipulated time. Nigam will not be responsible for any postal delays.
- (ii) Any bid which is not uploaded according to the instruction stipulated above is liable for rejection.
- (iii) Part-II of only those Tenderer will be opened online at a later date that are found to satisfy qualifying requirements against this tender. Date of opening of Part-II will be informed to such Tenderer later.

**1.4 EARNEST MONEY (To be submitted in Tender Bid Part-I-A) :**

- 1.4.1** Tenderer is required to deposit earnest money as specified in the tender notice. The earnest money shall be accepted in any of the following forms only:-

All bids must be accompanied by a Bid Security (EMD) which shall be paid through RTGS in U.P. Jal Vidyut Nigam Ltd., **United Bank of India, Station Road Branch, Lucknow A/c No. 1499010100375. (IFSC Code UTBI0LSR563). Fifth letter being zero.**

**OR**

Bank Guarantee in prescribed proforma, pledged in favour of U.P. Jal Vidyut Nigam Ltd., Lucknow from a scheduled Bank in India, executed on a non-judicial stamp of Rs. 100.00 as per U.P. Stamp Act on the Specified Performa appended with form 'A' (only applicable when amount of earnest money exceeds Rs. 5,000/-)

Bidder will have to upload scanned copy of pay in slip, duly signed in support of RTGS payment deposited against EMD. In case EMD is in form of Bank Guarantee then apart from uploading scanned copy of BG, scanned copy of issuing bank confirmation mail is also to be uploaded.

Offers without proper earnest money & requisite validity shall not be considered under any circumstances. The earnest money shall be refunded after tender is finalized. The earnest money of successful tenderer shall however be retained till such time he deposits security.

The original copy of bid document fee, EMD (in case of BG), Power of Attorney made in the name of individual whom signed bid document digitally through DSC & Commitment in prescribed format as per Annexure on non judicial stamp paper of Rs. 100.00 along with other documents like validity, schedule, etc. each should be furnished to the office of **Executive Engineer (Design), Lucknow** within stipulated time, failing which the Part-II of bid shall not be considered for opening.

Any deviation or addition from the text of the specified proforma of Bank Guarantee shall render the Bank Guarantee invalid for the purpose of online opening of Tender Bid Part-II (Price-Bid).

**1.4.2** Offers without earnest money shall not be considered under any circumstances.

## **1.5 TENDER BID PART-I (TECHNICAL & COMMERCIAL)**

Besides other relevant information the following documents duly filled in must also accompany in Tender Bid Part-I :

1. Schedule A : Tender Form
2. Schedule B : Pre-qualification details of the tender
3. Schedule C : Declaration (Validity)
4. Schedule D : Proforma for joint undertaking by Collaborator/ Associate and the Tenderer
5. Schedule E : General Particulars
6. Schedule F : List of drawing and literature.
7. Schedule G : Deviations from "Technical Specifications" & its price incidence
8. Schedule H : Deviations from "Instructions to Tenderers" & its price incidence
9. Schedule I : Deviations from "General Requirements of Specifications" and its price incidence
10. Schedule J : Deviations from "General Conditions of Contract: Form - A" and its price incidence
11. Schedule K : List of recommended spare parts and their prices.
12. Schedule L : List of recommended special tools & tackles and their prices.



13. Schedule M : List of recommended Tests and Testing Instruments and their prices.
14. Schedule N : Non-blacklisting certificate.
15. Schedule O : Schedule of Quoted Guaranteed Delivery.
16. Schedule P : Certificate of past performance consistency.
17. Schedule Q : Declaration of Networth.
18. Complete technical details, specifications and literature of the equipment offered.
19. Income tax clearance certificate.

**1.5.1** On the date of tender opening at the notified time, Part-I of the tender shall be opened in the presence of authorised representatives of the participating bidders, if any. After checking the completeness and correctness of Tender cost & Earnest Money, Part-I-B of only those bidders shall be opened whose offer contains tender cost and earnest money of specified amount and in the desired form.

Part-II containing price bid of only those tenderers will be opened online after due intimation at a later date, who are found to satisfy the qualifying requirements against this tender. Date of opening of Part-II will be informed to qualified tenderers.

**1.5.2** Any action on the part of a tenderer to revise the price(s) and / or change(s), the structure of price (s) at his own instance after the opening of the tender may result in rejection of the tender and/or **debaring the tenderer from participation in purchases by the NIGAM for one year in the first instance.**

## **1.6 VALIDITY :**

The Tenders shall be valid for a period of Nine (9) months from the date of opening of the tender or any extended date of opening. Tenders with lower validity period, are liable to be rejected.

## **1.7 PRICE AND PRICE STRUCTURE :**

**1.7.1** The prices shall be quoted online as per BOQ in Cover-II (Price Bid).

### **1.7.2 GST :**

The Basic Unit Ex-works Prices quoted should be exclusive of GST on finished products, which however, will be paid extra at actuals on production of relevant original vouchers. However GST should be mentioned in specified column of BOQ. **GST (Goods and Services Tax) shall be paid to contractor as per existing rules and regulations as legally applicable on production of valid GST registration. Any amendment as per government policies on tax structure shall be applicable accordingly.** GST will be paid extra at actual on production of relevant original vouchers.

## **1.8 EVALUATION OF TENDER :**

**1.8.1** In comparing the tenders and in making awards, the Nigam may consider such factors as compliance with specifications, relative quality and adaptability of suppliers or services, experiences, record of integrity in dealing, ability to furnish repairs and maintenance services, the time of delivery, capability to perform, and available facilities such as adequate shops, plant, equipment, technical organisation etc.

- 1.8.2** In case prices of some items are given in lump-sum where unit prices are required, Nigam reserves the right to evaluate unit prices on the basis of the quoted lump-sum prices.
- 1.8.3** In case, where the Tenderer does not quote component of packing, forwarding, freight and insurance charges as asked for in BOQ, their quoted unit prices shall be loaded by appropriate additional factors on ex-works prices as below towards the component not included in the quotation for comparison purpose so as to derive ranking of bidders. In the event of order being placed on the firm no extra payment exceeding the total amount (in conformance to the quoted BOQ) shall be made by the Nigam.
- (a) Packing charges @ 0.75%
  - (b) Forwarding charges @ 0.25%
  - (c) Freight for Ist 500 Km. @ 2%
  - (d) Freight for every next 250 Km. or part thereof @ 0.5% thereof.  
(For this purpose distance shall be taken from tenderer's works station to destination site. In case the distance is less than 500 km, loading shall be done for a minimum distance of 500 Km)
  - (e) Transit Insurance @ 0.5%
  - (f) Insurance for 45 days storage after receipt of equipment at destination station @ 0.5%
- The comparison of price quoted by bidders will be done in lines with aforesaid loading criteria.
- 1.8.4** In case delivery/completion period is quoted more than the stipulated period as specified in tender document, then for period exceeding the specified delivery period loading will be done @2% of quoted price per month, for evaluation purpose. The sole purpose of this evaluation will be for deriving ranking of bidders & no extra payment exceeding the total amount (in conformance to BOQ) shall be made by the Nigam.
- 1.8.5** In case any advance payment is demanded, loading by interest charges @ 20% per annum till the completion of delivery period shall be done on the advance asked for. In case of demand of payment is in excess of specified payment terms of Form 'A', i.e. 80% against R/R through bank, the loading will be done @ 20% per annum on the amount in excess of 80% for a period of one month.
- 1.8.6** Any rebate/discount linked with quantity, terms of payment and any other conditions shall not be considered for the purpose of evaluation and comparison of such offers vis-a-vis others. However, the same may be availed while placing orders with such successful Tenderer.
- 1.8.7** If the tenderer fails to quote price for any of the item(s)/component(s) as asked for and is intended to be included in the scope of supply, erection, testing & commissioning the highest quoted price for the same among all the other tenderers shall be considered for the purpose of computation of prices.
- 1.8.8** For any deviation in the Nigam's Terms and Conditions which are not acceptable to Nigam, or for any condition of Tenderer which does not cause any financial implication, no loading may be done.

- 1.8.9** Loading on any other account as may be deemed necessary in the opinion of the Nigam to bring the various offers at par to each other for comparison purposes, may be done at the discretion of the Nigam.
- 1.8.10** The prices shall be computed inclusive of GST for comparison purpose.
- 1.8.11** Bank charges, if any, for documents to be negotiated through Bank, shall, in no way be borne by Nigam. It shall be to the Bidder's account.
- 1.9 PRICE VARIATION :**
- 1.9.1** The Tenderers are required to quote variable price only without ceiling limit on either side. The price variation shall be admissible as per the latest relevant IEEMA price variation formula as applicable for the equipment (of the tendered capacity and rating). The ruling date of basic prices of raw materials published in IEEMA circular shall be the date as on first working day of the calendar month, one month prior to the date of tendering. **The tenderer shall furnish upload online as well as the photo copy of the IEEMA Circular of Basic rates of raw materials and the latest IEEMA price variation clause as applicable along with tender bid part-1.** No other price variation formula shall be accepted under any circumstances.
- 1.9.2** The price variation shall be allowed on Ex-works prices only for the contractual delivery period.
- 1.9.3** The component of packing and forwarding, freight and insurance charges shall remain FIRM in all respects throughout the currency of the contract.
- 1.9.4** Tenderer shall quote FIRM prices only for the spare parts, type tests, and charges for Erection, Testing and Commissioning of the equipments.
- 1.9.5** No price variation shall be claimed against documents to be negotiated through bank.
- 1.9.6** Bank charges, if any, for documents to be negotiated through bank, shall be borne by the tenderer.
- 1.9.7** In the event of despatch of equipment beyond contractual delivery period, the claims shall be raised only after allowing for the due price reduction as per provisions of the order.
- 1.9.8** Since the Tenderers have been asked to quote unit variable (Ex-work) prices only without any ceiling limit on either side, no advantage shall be given to those tenderers who quote either "FIRM" price or "VARIABLE PRICES WITH CEILING".
- 1.9.9** The ruling date of basic prices of raw materials for the price variation purpose shall be same for all the offers. In case, it is prior to the notified date, the quoted Ex-works prices shall be brought as per IEEMA formula. However, no loading shall be considered for dates mentioned beyond date.
- 1.10 SPLITTING OF ORDER :**
- 1.10.1** The Nigam reserves the right to split the order among various tenderers in any manner Nigam chooses without assigning any reasons what-so-ever.

**1.11 AWARD OF CONTRACT :**

- 1.11.1** The Nigam is not bound to accept the lowest or any tender and may reject any or all the tenders without assigning any reason.
- 1.11.2** The successful tenderer if required to do so, may have to enter into a contract agreement with the Nigam as per General Conditions of Form 'A' and General Requirement of Specifications attached with the tender specification.
- 1.11.3** For signing the contract a duly authorised representative of the successful Tenderer shall be required to sign and accept the contract at Lucknow at a reasonable notice.
- 1.11.4** Tenderer shall ensure to put initials on each and every page of the tender. Last page of each document forming part of the tender shall bear full signature under official seal fully disclosing the name, designation and relation-ship with the firm of the signatory. In case of a partnership concern the tender may be signed by all the partners of the firm or by one of them holding power of attorney (copy to be furnished alongwith the offer). In case of Corporation/Companies tender may be signed either by the President or Secretary or any other person authorised to tender in the legal name of corporation/company (copy of such authority to be furnished alongwith the offer).

Besides, the Tenderer shall also furnish the following informations :

- (i) Name, designation, profession with postal addresses of all the partners/ directors and other persons authorised to conduct business in respect of this tender.
- (ii) Postal addresses of the firm's works, Registered Head Office, Sales Office and Local Office etc.
- (iii) Names and postal addresses of their authorised local representative/Liasion Officers.

**1.12 INCOME TAX CLEARANCE CERTIFICATE :**

The tenderers shall furnish Income Tax Clearance Certificates of current as well as of the preceding year from the competent authority, with the tender. Alternatively, the Tenderer shall give valid reason for his inability to furnish such a certificate. The Nigam reserves the right to reject any tender, if such details are not furnished or the reasons for the tenderer's inability to furnish such certificates, are not given with the tender.

**1.13 GST :**

The tender shall furnish GST registration certificate bearing GSTIN. Percentage of GST & amount shall be explicitly mentioned under the respective column of BOQ failing which the same shall be loaded separately during computation of ranking of bidders. However no extra payment exceeding total amount (in conformance to the quoted BOQ) shall be made by the Nigam.

**1.14 DEVIATION :**

The offer should be strictly in line with the conditions, specifications and other requirements mentioned in this tender specification document. No deviations are permitted except under special circumstances. Should the tenderer wish to depart from the General requirements or Technical Specifications or General Conditions of Contract Form-A, in any way, he must draw specific attention to such departure (s).

All such deviations shall specifically be filled up, in the relevant Deviation Schedule. If deviations are not specifically recorded in these schedules and submitted alongwith the tender document, it will be presumed that there are no deviations and this interpretation will be binding upon the Tenderer.

Nigam is, however, not bound to accept all or any deviations as mentioned in such schedules. Tenderers are also advised not to enclose their own standard or printed Terms and Conditions for sale etc. as the same shall not be considered.

**1.15 CANVASSING :**

No tenderer shall canvass any Official or the Engineer of the NIGAM, with respect to his own or other tender. Contravention of this condition will result in rejection of the tender. This clause shall not be deemed to prevent the Tenderer from supplying to the Engineer any further information/clarification asked for by the Engineer.

**1.16 COURT OF COMPETENT JURISDICTION :**

All disputes arising out of and touching or relating to the subject matter of agreement, shall be subject to the jurisdiction of Local Courts of Lucknow and High Court Bench of Judicature at Lucknow only.

**1.17 CONSTRUCTION OF EQUIPMENTS :**

Equipments offered shall be standard design and construction conforming to the requirements of National and/or International Standards and Technical Specifications of this tender document.

**1.18 MAKE OF EQUIPMENT :**

Equipments of only reputed and standard make, having been supplied to various State Electricity Boards and other Power Utilities for more than three years and also already in successful operation, shall be accepted by Nigam against this tender. Tenderers are advised to note this condition while making their offer.

**1.19 DELIVERY : 09 months for complete supply**

01 months for work of Erection, Testing & Commissioning of each transformer

All the equipments are required to be delivered as per Schedule of Quoted Guaranteed Delivery i.e. SCHEDULE 'O'. The bidder should submitted QAP and BAR chart encompassing various stages of engineering and details of supplies & works for the quoted delivery, Erection, Testing & Commissioning period.

**1.20 FOREIGN EXCHANGE :**

Tenderer offering equipments without involving any foreign exchange commitment on part of the Nigam will only be considered.

**1.21 PRE-BID CONFERENCE :**

The firm is requested to visit Rihand Hydro Power Station before Tender (Part-I) opening date so as to inspect the existing Generator-Transformers, space available, connections made and all pertinent works related to accessories. They are also requested to clear their technical doubts for Erection, Testing & Commissioning. Nigam will hold a pre-bid conference at Nigam head quarter on the specified date, so that all clarifications/doubt of e-bidders can be sorted out.

## **II - GENERAL REQUIREMENTS OF SPECIFICATIONS**

## **II - GENERAL REQUIREMENTS OF SPECIFICATIONS**

### **2.1 SCOPE :**

**2.1.1** This specification covers design, manufacture, assembly, testing, delivery of 3 No. 67.5 MVA, 11/132 KV Generator-Transformers equipped with SCADA compatible features complete with all accessories and auxiliary equipments required for its satisfactory operation at Rihand Hydro Electric Project of UPJVNL. The scope also includes Erection, Testing & Commissioning of Generator Transformers along with dismantling & shifting of existing 3 Nos. 60 MVA each Generator-Transformers at Rihand HEP.

**2.1.2** Equipments shall be offered complete with all parts that are necessary or usual for their efficient operation. Such parts shall be deemed to be within scope of the Contract whether specifically mentioned or not. Equipments in all respect shall incorporate the highest quality of modern engineering design and workmanship.

Irrespective of approval of drawings, inspection/test report and dispatch authorization by the Nigam, the contractor shall remain responsible for completeness and correctness of the equipment. Compliance in respect of the provisions of Indian Electricity Act and Rules as in force at the time of supplies shall be the sole responsibility of the contractor.

**2.1.3** The General Conditions of Contract Form 'A' copy of which is attached hereto, form an integral part of this specification. The Contractor shall supply all material and perform all work in strict accordance therewith. In the event of conflict between the "General Conditions of Contract" and this "Specification", the latter shall prevail.

**2.1.4** The General requirement of specifications comprises of this chapter and detailed technical specifications. These are supplementary to each other and are essential for complete interpretation of the Nigam's requirements.

### **2.2 STANDARDS :**

**2.2.1** Except as modified in these specifications, all materials and equipment shall conform to the requirement of the latest editions of relevant ISS/IEC.

**2.2.2** However, in the event of the offered/offering equipment conforming to standards other than ISS/IEC standards, the salient point of comparison between the standards adopted and relevant ISS/IEC standards shall be indicated clearly in the proposal. In the event of the Contractor's specifications, drawings, forms and tables etc., being found to disagree with the requirements of this specification at any stage, these specifications shall be binding, unless the departure has been duly approved in writing by the Purchaser.

**2.3****PROJECT DATA :**

(i)	Location	Rihand HEP, Pipri, Distt.- Sonebhadra
(ii)	Altitude	Not exceeding 1000 meter
(iii)	Climatic Conditions	Hot and humid tropical climate conducive to rust and fungus growth
	(a) Design Maximum ambient Air Temperature	50 <sup>0</sup> C
	(b) Maximum daily average ambient Temperature	
		In Shade 47.2 <sup>0</sup> C
		In Sun 65.5 <sup>0</sup> C
	(c) Minimum ambient Air Temperature in shade	0 <sup>0</sup> C
	(d) Relative Humidity	100% Max. 10% Min.
	(e) Wind Load	195 kg./sq.m.
	(f) Seismic Level	0.3 g.
	(g) Isoceraunic Level (Td/year)	50
	(h) Average annual rainfall	1200 mm
	(i) Maximum water level (SML)	880 feet
	(j) Minimum water level (SML)	830 feet

**2.4****SYSTEM PARTICULARS :**

(i)	Rated system voltage	132 KV (±10%)
(ii)	System frequency	50 Hz. This may vary by ±5%
(iii)	Number of phases	Three
(iv)	Neutral	Effectively Earthed
(v)	Fault level	6000 MVA



Auxiliary electrical equipments shall be suitable for operation on the following supply system :

- |     |  |  |
|-----|--|--|
| (a) | Power device (like drive motors)   | 415 V, 3 Phase, 4 wire<br>50 Hz effectively<br>Earthed A.C. system     |
| (b) | Lighting fixtures, space heaters and fractional horse power motors and control devices | 250 V, 2 wire, 50 Hz<br>AC supply with one point grounded              |
| (c) | DC alarm, Control and protective devices   | 2 wire ungrounded DC<br>supplies from station<br>batteries of 220 V DC |

All devices must be suitable for continuous operation on AC/DC supplies over the entire range of permitted/allowed voltage variations.

## **2.5 ERECTION, TESTING & COMMISSIONING :**

The contractor shall Erect, Test & Commission all three Generator-Transformers at site after dismantling & shifting of existing old ASEA Sweden make G.T. (60 MVA each).

- 2.5.1** The Contractor shall submit a list of all special tools and instruments required for erection, testing and commissioning of new G.T. and shifting of existing G.T.

## **2.6 DRAWINGS AND MANUALS :**

- 2.6.1** The Contractor shall submit the following drawings & GTPs :

- (a) General Arrangement drawings of the Generator-Transformers.
- (b) OIP condenser type H.V. bushing.
- (c) Oil communicating type porcelain LV bushing.
- (d) Basic Electrical diagram.
- (e) Control schematic including SCADA compatibility arrangement.
- (f) Detailed drawing, general arrangement and schematic of marshalling box.
- (g) Detailed schematic of cooling (OFWF) arrangement.
- (h) Foundation plan
- (i) Detailed dimensional drawings & descriptive literature of all the components supplied.
- (j) Guaranteed Technical Particulars (GTPs).
- (k) Bimetallic terminal connector for 145 KV bushing
- (l) Bi-directional roller assembly
- (m) Bus duct mounting flange details
- (n) Rating & diagram plate
- (o) Tank design drawing
- (p) Detailed schematic and catalogue of online moisture monitoring system.

- 2.6.2** In addition, the Contractor shall submit to the Engineer within reasonable time, but at least 1 month before despatch of equipments, the complete bill of material with each item identifiable in the detailed drawings with references. This will also form detailed packing list of the equipment.

**2.6.3** The Engineer shall return to the Contractor one print of each drawing (s) stamped (a) “APPROVED” or (b) marked up with comments. In case of (a), no further resubmission of drawings is required for Engineer’s approval. In case of (b), the Contractor shall correct his original drawings to conform to the comments made by the Engineer and re-submit the same in manner stated above, within two weeks after the receipt of the comments print by him.

**2.6.4** The Contractor on receipt of prints stamped “APPROVED” shall furnish the following drawings to the Engineer of the Contract :

- (a) 3 Sets of prints of each drawings for consignee and 5 sets for Engineer of the Contract.
- (b) 3 sets of detailed bill of material for consignee and 5 sets for Engineer of the Contract.
- (c) One direct reading and reproducible copy of each drawings and bill of material.

All the prints of drawings, bills of materials and the reproducible are to be forwarded to the Engineer of the Contract, before any despatches are made.

**2.6.5 MANUALS :**

The Contractor shall furnish bound copies of erection, testing, commissioning and operation, maintenance manuals giving detailed instructions, procedures, precautions for all the equipments supplied by him. The manuals shall be specific to the equipments supplied and not of general nature.

**The Contractor shall submit two preliminary copies of such manuals to the engineer for review and approval.**

Thereafter, 3 sets of final approved manuals for the consignee and 3 sets for Engineer of the Contract shall be sent before despatch of the equipment to the Engineer of the Contract.

**2.7 RAW MATERIAL :**

The Contractor shall themselves be responsible for timely arrangement/ procurement of all the raw-materials required for the manufacture of all tendered items and shall furnish their test certificates to the Nigam. However, depending on the policy of the Government of India, the NIGAM may issue essentiality certificates, for arrangement of such raw materials through CEA, DOE, DGTD or others, who may allot the same to the Contractor, at their discretion directly, from any of the producers of such raw materials or other source, but without any financial liability to the Nigam or affecting/linking the delivery of the equipment with the availability of raw material against such certificates or recommendations.

## **2.8 TESTING AND INSPECTION :**

### **2.8.1 TESTING :**

The Nigam shall have the right to witness any type, routine and acceptance test on the equipment offered. Witnessing of such test or their approval would not relieve the Contractor of his responsibility to supply the equipment as per this specification.

### **2.8.2 QUALITY ASSURANCE PROGRAMME :**

The Contractor shall ensure strict quality assurance over all the manufacturing, testing, processing and other activities, including the suppliers of the raw materials etc. Detailed Quality Assurance Programme (QAP) will be submitted with the tender, giving step by step checks and counter checks, tests, sampling procedures etc., to ensure quality of the equipment to meet the requirements. This shall also include the test details for type, routine and acceptance tests required. Such Q.A.P. shall be approved by the Nigam before implementation.

### **2.8.3 INSPECTION :**

**2.8.3.1** The Nigam reserves the right to inspect any machinery and material to ensure that approved Q.A.P. is being strictly implemented by the Contractor or his suppliers under this contract, and to reject any item found defective in workmanship or design, or otherwise unsuitable for the use and purpose intended, or which is not in accordance with the intent of this Contract. The Contractor should, on demand by the Nigam, rectify or replace such defective or unsuitable equipment, or the Nigam may, at the Contractor's expense, rectify or replace such defective or unserviceable equipment, whether before or after supply.

**2.8.3.2** The Contractor shall advise the Nigam at least 15 days in advance as to when the equipment will be ready for stage/final Inspection at their works.

**2.8.3.3** The Nigam's Inspecting Engineers/ authorised Third Party Inspector shall at times have access to all parts of shops where the equipment is being manufactured and also shall be provided with all reasonable inspection facilities by the Contractor.

**2.8.3.4** No equipment to be furnished or used in connection with this Contract shall be despatched until factory inspection and acceptance test have been carried out satisfactorily. Such factory inspection of the equipment or approval of acceptance tests shall not however, relieve, the Contractor from full responsibility for supplying equipments conforming to the requirements of this Contract, nor prejudice any claim, right or privilege which the Nigam may have, because of the use of defective or unsatisfactory equipment. Should Nigam waive the right to inspect any equipment, such waiver shall not relieve the Contractor in any way from obligation under this Contract.

**2.8.3.5** The Contractor is required to record the following certificates on the invoices and challans of each and every consignment :

"Certified that material being despatched against the above invoice and challan has been inspected and tested by the representative of the Nigam on ....., (date) and all the test results were satisfactory, as per approved test certificates enclosed".

**OR**

"Certified that inspection of material being despatched against the above invoice and challan has been waived off by the Chief Engineer (M.P.S.), UPJVN Ltd., Lucknow/ Engineer of the Contract vide letter No. .... dated ..... (copy enclosed) and all the acceptance and routine tests as per relevant standards and those provided in the Contract, have been conducted and all the test results were found satisfactory as per test certificates enclosed."

**2.9 PRODUCTION SCHEDULE AND PROGRESS REPORT :**

The Contractor shall furnish detailed production schedule for all major components to be supplied. The schedule shall include dates of completion of:-

- (a) Engineering work.
- (b) Different phases of material procurement, manufacture and fabrication.
- (c) Delivery.

A report on actual progress in percentage and date of completion of each of the above items, shall be sent to the Nigam.

**2.10 PACKING AND DESPATCH OF EQUIPMENT :**

**2.10.1** All equipment/material shall be suitably packed for transport, carriage at site and outdoor storage during transit. The Contractor shall be responsible for any damage to the equipment during transit due to improper and inadequate packing. The cases containing fragile, or material easily prone to damage, shall be very carefully packed and marked with appropriate caution symbols i.e. 'FRAGILE', 'HANDLE WITH CARE', 'USE NO HOOK' etc. The contents of each package shall bear markings that can be readily identified from the packing list. Packing shall provide complete protection from moisture, termites and mechanical shocks etc. Wherever necessary, proper arrangements for attaching slings for lifting shall be provided. All packages shall be clearly marked with gross weight, signs showing "UP AND DOWN" sides of boxes, contents of each package, order no. and date, name of plant/equipment of which the material in package form parts and any handling and unpacking instruction considered necessary. Any material found short inside the packing cases shall be supplied by the Contractor without any extra cost. Tenderer shall ascertain, prior to shipment from concerned authorities, the transport limitations, like weight and maximum allowable package size for transportation.

All packing cases and packing materials shall become the property of the Purchaser.

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- 2.10.2** On receipt of intimation from the Contractor that the equipment/material is ready for inspection, the Nigam shall get the same inspected and if these are found to be in accordance with the specifications, terms and conditions contained herein, the Nigam shall intimate detailed despatch instructions to the Contractor and the Contractor shall despatch the equipment/material to the respective destination.

The Contractor shall intimate, at least ten days in advance, to the consignee (s), as well as to the Engineer, the probable date when the equipments are to be ready for despatch.

The Contractor shall also give a email/written intimation to the consignee (s) immediately after the despatch, of the equipment mentioning the specification number, name of equipment, R/R numbers, date of despatch, number of packages, wagon number and approximate weight of each package to enable him to take the delivery and unload the material in case the despatch documents are not received by him in time.

- 2.10.3** A list in duplicate, containing details of equipment for verification at site shall also be placed inside each package and shall correspond with the advice note and approved bill of materials.
- 2.10.4** Bills (s) duly pre-receipted in triplicate in accordance with approved terms of payment and together with all necessary despatch documents, shall be sent to Consignee (s) under registered cover with intimation to the Engineer of the Contract.
- 2.10.5** Any demurrage/wharfage or other charges payable due to non implementation of any of the above instructions shall go to the Contractor's account.

**2.11 REJECTION :**

- 2.11.1** The Nigam reserves the right to reject any equipment if, during the tests at works or at site, the test values achieved, do not comply with the respective standards/specifications and exceed the tolerable limits.
- 2.11.2** Contractor shall replace a rejected equipment with a new equipment, complying with the guaranteed values as promptly as possible and at no extra cost to the Nigam. Nigam reserves the right to retain any rejected equipment and take it into service until the Contractor supplies the new equipment.

**2.12 MODE OF DESPATCH :**

- 2.12.1** The Equipments are to be despatched from the Contractor's work to the destination as per the despatch instructions given by the Nigam.
- 2.12.2** All equipments may be dispatched by Rail or Road ensuring minimum risk of damage during trans-shipment.

## **2.13 INSURANCE :**

- 2.13.1** The Contractor shall arrange, secure and maintain insurance as may be necessary to protect his own interests and the interests of the NIGAM against all risks. The risks that are to be covered under the insurance shall include, but not be limited to the loss or damage in transit, theft, pilferage/riot, civil commotion, weather conditions, accidents of all kinds, fire, war risks etc. during transportation only.
- 2.13.2** Insurance is to be taken for the F.O.R. destination value of the equipment for transit from the manufacturer's works to destination plus 45 days storage thereafter.
- 2.13.3** All damages and shortages of the equipment after its delivery to destination railway station and transportation to stores and storage thereafter shall be notified by the consignee, by registered post to the Contractor or his authorised representative, within 30 days for making good the damage or loss by way of replacement of the equipment damage or lost.
- 2.13.4** The Contractor shall take up the matter with insurance company for finalisation of claims and the Nigam shall provide required information. All further action in connection with making and settling of claims, if any, will be carried out by the Contractor for which no extra payment will be made.
- The Contractor shall be responsible to make good the damage or loss by way of repairs and/or replacement of the equipment free of cost, irrespective of the fact whether claim is accepted by the Insurance Co. or not, without waiting for claims settlement.
- 2.13.5** The Scope of such insurance shall cover the entire value of the Contract from time to time.

## **2.14 TERMS OF PAYMENT :**

- 2.14.1 Supply Portion:** Payment against supplies shall be made unitwise through running payment. 80% payment against supply of each Generating Transformer complete in all respects shall be made after receipt of the same in good condition and checking of the same at the destination site and 10% payment of the supply portion for each GT on satisfactory completion of erection, testing & commissioning of the supplied GT. Balance 10% payment will be made after expiry of 24 months from the date of commissioning of the transformer or 36 months from the date of receipt of the materials respectively at site for each transformer. The payment of spares shall be made at the time of payment of the last supplied transformer.

**OR**

100% payment of supply portion for each Generating Transformer against supply of each Generating Transformer complete shall be made after the receipt of the same in good condition and its subsequent erection, testing & commissioning at the destination site through running payment on submission of 10% Performance Bank Guarantee, valid for 24 months from actual date of commissioning or 36 months from the date of receipt of the materials at site. The payment of spares shall be made at the time of payment of the last supplied transformer.

**2.14.2 Work Portion:**

90% payment of work portion for each Generating Transformer will be made after completion of satisfactory work for each GT through running payment and balance 10% payment will be made after expiry of 24 months for each GT.

OR

100% payment of work portion for each Generating Transformer shall be made after completion of satisfactory work for each GT through running payment against submission of 10% Performance Bank Guarantee, which shall only be released after expiry of 24 months.

**2.14.3** In case as-executed drawings and manuals are not submitted by the supplier, a deduction of 2% shall be made. This amount will be released only on the certificate from the Engineer of the contract about receipt of all drawings & reproducible manuals.

**2.14.4** Prices of such equipment/material which are delivered beyond the contractual delivery period shall be subject to price reduction at the rate of ½ (half) percent per week reckoned on the contract value of such portion only of the plant subject to 10 (ten) percent of the contract value of such portion of the plant.

**2.14.5** For any delay in erection, testing & commissioning work beyond the contracted period as mentioned herein, the penalty price reduction shall be applicable as per Clause 32 of the General Conditions of contract Form 'A'.

**2.14.6** Charges of bank commission, if any, shall be borne by the supplier.

**2.14.7** The supplier shall be responsible for timely intimation to the consignee about the R/R and in the event of his lapse, the demurrage/wharf-age shall be to the supplier account.

**2.15 DELIVERY PERIOD:**

All the equipments with accessories are required to be delivered as per Schedule of Quoted Guaranteed Delivery i.e. SCHEDULE 'O' alongwith completion period of each Generating Transformer against their installation, testing and commissioning.

**2.15.1** Delivery and work period of these GTs shall be as under :

Delivery : All 3 GTs shall be delivered at site within 9 months time which shall be reckoned from the issue of LOI or agreement whichever is earlier.

Work : Duration for Erection, Testing & Commissioning shall be one month for each transformer to be reckoned from the issue of work indent by UPJVNL, after receipt and check of material at site.

**2.15.2** The quoted delivery period shall be counted from the date of issue of letter of intent (LOI) or detailed order/agreement, whichever is earlier.

**2.15.3** Date of despatch documents (R/R) shall be deemed to be as the date of delivery, but for the despatches made by road transport, the date of delivery shall be taken as the date on which the material has been delivered to the purchaser at destination.

**2.15.4** Delivery should be quoted specifically and explicitly and should be guaranteed under price reduction clause no. 2.14.4 as stated above.

- 2.15.5** The delivery should be affected in serviceable lot/sets of equipment. In case of part despatch, the delivery shall be deemed to have been effected when last component/ part of the equipment of serviceable lot/set has been delivered.
- 2.15.6** Road Permit/ E-way bill in this regard should be arranged by the contractors and the same should be accompanied with material while transporting, as per rule complete in all respect.
- 2.16** **CONSIGNEE AND DESPATCH DETAILS :**
- 2.16.1** Executive Engineer, Electricity Generation Division, Pipri (Distt.: Sonebhadra) U.P. Jal Vidyut Nigam Ltd., shall be the consignee.
- 2.16.2** Material shall be despatched from manufacturer's works to destination i.e. Executive Engineer, Electricity Generation Division, Pipri in Distt. - Sonebhadra (U.P.).
- 2.17** **SECURITY DEPOSIT :**
- The Contractor shall at the time of signing the agreement shall furnish the security deposit @ 2% of the total value of the Order/Agreement in shape of bank draft in favour of U.P. JAL VIDYUT NIGAM LIMITED, payable at Lucknow or Bank Guarantee in the prescribed proforma from any scheduled bank of the country. This security deposit shall remain valid for the period till the supplies & works are completed as per provisions of the purchase order/agreement.
- 2.18** **PERFORMANCE BANK GUARANTEE :**
- The Contractor shall have to deposit performance bank guarantee amounting to 10% of the contract value, valid for 24 months from actual date of commissioning of equipment or 36 months from the date of receipt of equipment at site, as a guarantee towards the actual and faithful performance of the equipment being supplied under this specification. Bank Guarantee shall be in the prescribed proforma of the Nigam from any Scheduled Bank of the country.
- 2.19** **DEVIATION FROM SPECIFICATION :**
- This specification is mainly for the guidance of the Tenderer/Manufacturer. These requirements of necessity include some specific elements of construction and materials, but are not intended to preclude ingenuity of design or improvement.
- If the Tenderer proposes any deviations from this specification, these will be considered provided they are necessary either to improve the utility, performance and efficiency or to secure overall economy. This will be clearly and explicitly explained in the tender such deviations shall also be brought out clause by clause in the prescribed schedule.
- 2.20** **QUANTITY :**
- The total quantity of Generator-Transformer shall be three as mentioned in the "Schedule of Quantities & Prices".



**2.21 TRAINING OF ENGINEERS :**

The Contractor shall depute his Senior Engineer/Specialist to Rihand HEP, Pipri for training/familiarisation course with the equipments & techniques covered under the specifications, including training in commissioning, operation, maintenance and trouble shooting aspects, etc. related to the supplied Generator-Transformers.

**2.22 DISPATCH INSTRUCTIONS :**

Dispatches shall be made only after the instructions for the same are issued by the Nigam. The name of the consignee and other details shall be as provided in the purchase order.

**2.23 ARBITRATION :**

It shall be as per relevant provisions of Form-A. In case the Arbitrator nominated by Chairman of the Nigam refuses or neglects, Chairman of the Nigam may nominate another person in his place.

**2.24 JUDICIAL JURISDICTION :**

All the disputes out of and touching or relating to subject matter of Agreement/ Contract/Purchase Order shall be subject to the jurisdiction of local courts of Lucknow and High Court of Judicature at Allahabad only.

## **SCHEDULES**

**SCHEDULE 'A'**  
**TENDER FORM**

**Tender Specification No.: 03/EE(Design)/2020-21**

From :

To

The Executive Engineer (Design)  
U.P. Jal Vidyut Nigam Ltd.  
12<sup>th</sup> Floor, Shakti Bhawan Extn.,  
Ashok Marg,  
Lucknow-226001.

Sir,

With reference to your invitation to tender for the above I/We hereby offer to the U.P. Jal Vidyut Nigam Ltd. the items in the schedule of prices and delivery annexed or such portion thereof as you determine in strict accordance with the annexed conditions of contract Form 'B', specification and schedules of Rates to the satisfaction of the Purchaser or in default thereof to forfeit and pay to the U.P. Jal Vidyut Nigam Ltd. money mentioned in the said conditions.

The rates quoted are inclusive prorata and in full satisfaction of all claims.

I/We agree to abide by this tender for the period of 270 days from the date fixed for opening of the same.

A sum of Rs. \_\_\_\_\_ in the form of \_\_\_\_\_ in favour of U.P. Jal Vidyut Nigam Ltd., LUCKNOW is enclosed with Part-1 of the offer as earnest money.

I/We hereby undertake and agree to execute a contract in accordance with the condition of the contract.

Encl : As above

Date \_\_\_\_\_ Day of \_\_\_\_\_ 20..... Yours faithfully,

Witness

(Name & Signature)

(Signature of the tenderer in full)

Address :

Name

Occupation :

Seal

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## **SCHEDULE 'B'**

**Tender Specification No.: 03/EE(Design)/2020-21**

### **PREQUALIFICATION DETAILS OF THE TENDER**

1. Manufacturer details :  
Manufacturer registration certificate issued by the Industries Deptt. permitting manufacture is to be attached.\*
2. Operational Experience :  
The following details are to be furnished ONLY in respect of Tendered item (s) for last five financial years.
  - (a) Sl.No.
  - (b) Complete postal address including designation of the authority placing order.
  - (c) Order No. & date
  - (d) Quantity ordered
  - (e) Period of supply
  - (f) Station where the equipment installed and the period from which in actual service.
  - (g) Period of trouble free service.
3. Manufacturing Experience  
The following details are to be furnished ONLY in respect of Tendered item(s)

Sl. No.	Complete postal address including designation of authority placing order	Quantity ordered	Quantity manufactured during last five years**
			2015-2016
			2016-2017
			2017-2018
			2018-2019
			2019-2020

\* Documentary evidence/copy of certificates issued by the end user(s) has to be enclosed by the bidder failing which bid may be rejected summarily.

\*\* In case the quantity manufactured is less than qualifying figures, previous years may also be included.

4. **Testing Facilities :**

Sl.No.	Name of tests	Details of testing equipment required and available	Range up to which tests can be performed	Place of testing
1	2	3	4	5
(1)	ROUTINE : (a) (b) (c)			
(2)	ACCEPTANCE : (a) (b) (c)			
(3)	TYPE : (a) (b) (c)			

- NOTE :** (i) In case facility of tests is not available at the works, where such tests would be carried out, be specified.
- (ii) The Tenderer is required to give the details of Testing facilities available in works against Column 2. Mention the name of tests and correspondingly in column 3 : specify the instruments which will be employed to perform the tests.

5. **Type Testing of Product :**

It is required that a Xerox copy of complete type test report (not more than 5 year old) of the product is uploaded with Part-1 of the Tender document failing which it will be presumed that the product is not type tested.

Signature

Name

Designation

Company Seal

Date

**SCHEDULE 'C'**

**DECLARATION  
(VALIDITY)**

**Tender Specification No.: 03/EE(Design)/2020-21**

(To be executed on non-judicial stamp paper of Rs. 10/- with a revenue stamp of Rs. 1/- affixed)

Tender invited by

Executive Engineer (Design)  
U.P. Jal Vidyut Nigam Limited  
12<sup>th</sup> Floor, Shakti Bhawan Extn.,  
Ashok Marg, Lucknow – 226 001.

Tender for

Name of Tenderer

Specification No. & date of opening

IN CONSIDERATION of the U.P. Jal Vidyut Nigam Ltd. having treated the Tenderer to be an eligible person whose tender may be considered, the Tenderer hereby agrees to the condition that the proposal in response to the above invitation shall not be withdrawn within 270 days (or any extension thereof) from the date of opening of the tender, also to the condition that if thereafter the Tenderer, does withdraws proposal within the said period, the Earnest Money deposited by them may be forfeited to the U.P. Jal Vidyut Nigam Ltd., at the discretion of the Nigam, the Nigam may debar the Tenderer from tendering for a minimum period of one year reckoned from the date of opening of the tender.

Signed this                      day of                      20....

Place;

Signed by

State title (whether  
Proprietor / Partner)

Witness:

Address:

Signature:

Name of the firm  
Address of the firm  
Seal of the firm

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## **SCHEDULE ‘D’**

**Tender Specification No.: 03/EE(Design)/2020-21**

**PROFORMA FOR JOINT UNDERTAKING BY THE  
COLLABORATOR/ASSOCIATE AND THE TENDERER  
(To be stamped in accordance with U.P. State Act.)**

To

Executive Engineer (Design)  
U.P. Jal Vidyut Nigam Ltd.  
12<sup>th</sup> Floor, Shakti Bhawan Extn.,  
Ashok Marg, Lucknow-226001.

Dear Sir,

(In terms of “Instruction to Tenderers” in the specification no. .... for the design, manufacture, testing, delivery, erection & commissioning as specified), of .....  
..... (Name of the Equipment).

It is a condition that the tenderer as well as their collaborator/associate shall jointly and severally undertake the responsibility for the successful performance of the Contract (hereinafter referred to as “the Contract”) which is qualified for the award on the basis of the expertise of collaborator/associate.

We, ..... having our registered office at ..... (hereinafter referred to as “the Collaborator/Associate” which expression shall include our successors, administrators, executors and assigns) and we, ..... having our registered office at \*\* held jointly and severally liable and bound upto U.P. Jal Vidyut Nigam Ltd. (hereinafter referred to as “the Purchaser” which expression shall include its successors administrators and assigns)\*\*\* overall responsibility for the design manufacture, testing, delivery performance etc. of ..... (Name of equipment) in accordance with the Contract.

The Collaborator/Associate hereby agree to depute their technical experts from time to time to the Contractor’s works/project site as mutually agreed upon between the Nigam and the Contractor in order to discharge the Contractor’s obligations as stipulated in the contract. The Tenderer and the Collaborator/Associate hereby agree that this undertaking shall be irrevocable and it shall form an integral part of the contract.

---

\*\* (hereinafter called as “the Tenderer or Contractor”) are

\*\*\* for the successful performance of the contract, including the

IN WITNESS there of the Collaborator/Associate and the Tenderer have through their authorised representatives, set their hands and seal on this ..... day of ..... 20....

	WITNESS	COLLABORATOR/ASSOCIATE
I.		Signature
		Name
	(Office Address)	Designation
		Seal
		TENDERER
	WITNESS	
		Signature
II.		Name
		Designation
	(Office Address)	Seal



## SCHEDULE 'E'

**Tender Specification No.: 03/EE(Design)/2020-21**

### SCHEDULE OF GENERAL PARTICULARS

1.	Name of Manufacturer : a) Registered Office Address b) Head Office Address c) email address											
2.	Works : a) Location with full Postal Address. b) Total space occupied in sq. meters (approximate within 5%). c) Constructed area in sq. meters (approximate within 5%).	..... sq.mt. ..... sq.mt.										
3.	Name & Address of local representative (if any) with Telephone Number.											
4.	Name & Address of the concerned officer of the manufacturer to whom all reference shall be made for expeditious coordination.											
5.	Whether the tenderer is sole Proprietor/ Partnership Concern/Private Ltd. Company/Public Undertaking.											
6.	Name of Foreign collaborator, if any.											
7.	Whether the designs are their own or obtained from other sources. If from the other sources the same may be indicated.											
8.	The name, designation, qualification and experience of the engineers employed by the tenderer in design, development and manufacturing of the quoted equipment.	Detailed list to be attached by the bidder										
9.	(a) Authorised capital of the Company. (b) Annual financial turnover (average during the last 3 financial years)	Rs. _____ Rs. _____										
10.	Total Annual turnover of the firm during last five financial years.	<table border="1"> <tr><td>2015-2016</td><td>Rs. _____</td></tr> <tr><td>2016-2017</td><td>Rs. _____</td></tr> <tr><td>2017-2018</td><td>Rs. _____</td></tr> <tr><td>2018-2019</td><td>Rs. _____</td></tr> <tr><td>2019-2020</td><td>Rs. _____</td></tr> </table>	2015-2016	Rs. _____	2016-2017	Rs. _____	2017-2018	Rs. _____	2018-2019	Rs. _____	2019-2020	Rs. _____
2015-2016	Rs. _____											
2016-2017	Rs. _____											
2017-2018	Rs. _____											
2018-2019	Rs. _____											
2019-2020	Rs. _____											
11.	Net worth of the company (should be positive) (Copy of audited balance sheet with pertinent data duly highlighted to be attached as evidence)	..... (as per Schedule Q)										

12.	Actual Production per year of the equipment quoted during last five financial years giving quantity and bill value.	2015-2016 2016-2017 2017-2018 2018-2019 2019-2020	Rs. _____ Rs. _____ Rs. _____ Rs. _____ Rs. _____	Qty. _____ Qty. _____ Qty. _____ Qty. _____ Qty. _____
13.	Manufacturing capacity per month of the quoted equipment.			
14.	State the name and designation of your relative(s), if any, working in U.P. Jal Vidyut Nigam Ltd.			
15.	Security deposit @2% is to be deposited at the time of placement of order/ agreement. Whether or not willing to deposit, if no, state reasons.			
16.	Whether Certificates for satisfactory performance of offered equipment attached or not. If yes, specify the quantity capacity and date of issue to which it refers.	Enclosed/ Not Enclosed.		
17.	(A) Whether quoted Ex-works prices for Transformer are firm  (B) If variable, mention details of IEEMA PVC & its base date	Yes/No		
18.	Whether Packing, forwarding, freight & insurance cover (for transit plus 45 days storage thereafter) has been quoted besides ex-works prices (All these charges are to be clubbed.)			
19.	Whether the quoted prices are also applicable for any reduced quantity of order.	Yes/No		
20.	Terms of payment as mentioned in relevant clause 2.14 (Terms of Payment) as specified in the General Requirement of Specifications are acceptable or not?	Yes/No		
21.	Details of GST registration number a) Central b) State			
22.	Income Tax clearance certificate current and the preceding year enclosed or not.	Yes/No		

23.	Whether the Tenderer is agreeable to supply the equipment in case of the deviations stipulated by them are not acceptable to the Purchaser.	Yes/No
24.	Give two references (name, Designation and complete postal address) who can certify the Tenderers financial status and capability to undertake such supply orders. One of the reference should be any scheduled nationalised bank of India.	1. ----- ----- ----- 2. ----- ----- -----
25.	Have you offered any discount and, if so, then what is the rebate/discount in Rs. per unit.	
26.	GSTIN Information for purpose of sale of tender documents a) Name of Firm b) Address c) State d) Pincode e) GSTIN No. (Copy of registration certificate to be enclosed)	----- ----- ----- ----- -----

Seal of the Company

Full Signature

Name

Designation

Date

**SCHEDULE 'F'**

**Tender Specification No.: 03/EE(Design)/2020-21**

**LIST OF DRAWING AND LITERATURE ENCLOSED WITH THE TENDER**

<b>Sl.No.</b>	<b>Drawing/Literature No.</b>	<b>Title</b>

Seal of Company

Signature

Name

Designation

Date

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## **SCHEDULE 'G'**

**Tender Specification No.: 03/EE(Design)/2020-21**

### **DEVIATIONS FROM 'TECHNICAL SPECIFICATIONS' & ITS PRICE INCIDENCE**

(All deviations from the "Technical Specifications" shall be filled in clause by clause, in this schedule. Compliance with the specifications will be taken as granted if the deviations are not specifically mentioned in this schedule. In case there are no deviation(s) the 'NIL' information should be furnished. In case the tenderer is required to agree to the standard clause, then he may indicate the amount by which the tender price will thereby be increased or decreased).

Sl. No.	Page No.	Clause No. and stipulation in UPJVN's specification	Deviation	Price incidence (increase/decrease)

The Tenderer hereby certifies that the above mentioned are the only deviations from the "Technical Specifications".

Seal of Company

Full Signature

Name

Designation

Date

## **SCHEDULE 'H'**

**Tender Specification No.: 03/EE(Design)/2020-21**

### **DEVIATIONS FROM 'INSTRUCTIONS TO TENDERERS' & ITS PRICE INCIDENCE**

(All deviations from the "Instructions to Tenderers" shall be filled in clause by clause, in this schedule. Compliance with the Specifications will be taken as granted if the deviations are not specifically mentioned in this schedule. In case there are no deviation(s), the "NIL" information should be furnished. In case the tenderer is required to agree to the standard clauses, then he may indicate the amount by which the tender price will there by increased or decreased.)

Sl. No.	Page No.	Clause No. and stipulation in UPJVN's specification	Deviation	Price incidence (increase/ decrease)

The Tenderer hereby certifies that the above mentioned are the only deviations from the "Instructions to Tenderers".

Seal of Company

Full Signature

Name

Designation

Date

## **SCHEDULE 'I'**

**Tender Specification No.: 03/EE(Design)/2020-21**

### **DEVIATIONS FROM 'GENERAL REQUIREMENTS OF SPECIFICATIONS' & ITS PRICE INCIDENCE**

(All deviations from the "General Requirements of Specifications" shall be filled in clause by clause, in this schedule. Compliance with the Specifications will be taken as granted if the deviations are not specifically mentioned in this schedule. In case there are no deviation(s), the "NIL" information should be furnished. In case the tenderer is required to agree to the standard clauses, then he may indicate the amount by which the tender price will there by increased or decreased.)

Sl. No.	Page No.	Clause No. and stipulation in UPJVN's specification	Deviation	Price incidence (increase/ decrease)

The Tenderer hereby certifies that the above mentioned are the only deviations from the "General Requirements of Specifications".

Seal of Company

Full Signature

Name

Designation

Date

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## **SCHEDULE 'J'**

**Tender Specification No.: 03/EE(Design)/2020-21**

### **DEVIATIONS FROM 'GENERAL CONDITIONS' CONTRACT FORM-A & ITS PRICE INCIDENCE**

(All deviations from the "General Conditions" of Contract Form 'A' shall be filled in clause by clause, in this schedule. Compliance with the Specifications will be taken as granted if the deviations are not specifically mentioned in this schedule. In case there are no deviation(s), the "NIL" information should be furnished. In case the tenderer is required to agree to the standard clauses, then he may indicate the amount by which the tender price will there by increased or decreased.)

Sl. No.	Page No.	Clause No. and stipulation in UPJVN's specification	Deviation	Price incidence (increase/decrease)

The Tenderer hereby certifies that the above mentioned are the only deviations from the "General Conditions" of the Contract Form-A.

Seal of Company

Full Signature

Name

Designation

Date



## **SCHEDULE 'K'**

**Tender Specification No.: 03/EE(Design)/2020-21**

### **LIST OF RECOMMENDED SPARE PARTS & THEIR PRICES**

(Tenderer shall give below a list of spare parts recommended for at least five years trouble free operation of equipment offered by them and its prices).

Sl. No.	Catalogue No. if any	Name of the Component	Recommended Qty. in Nos.	Unit Prices	
				Ex-works	F.O.R. Destination (All inclusive)

Seal of Company

Full Signature

Name

Designation

Date

## **SCHEDULE 'L'**

**Tender Specification No.: 03/EE(Design)/2020-21**

### **LIST OF RECOMMENDED SPECIAL TOOLS & TACKLES AND THEIR PRICES**

(Tenderer shall give below a list of recommended special tools and tackles required for erection, commissioning, operation and maintenance of equipment offered by him).

Sl. No.	Particulars	Recommended Qty.	Unit Prices	
			Ex-works	F.O.R. Destination (All inclusive)

The Tenderer hereby certifies that the above are the only special tools and tackles required for erection, commissioning operation and maintenance of the equipments offered by him.

Seal of Company

Full Signature

Name

Designation

Date

## **SCHEDULE 'M'**

**Tender Specification No.: 03/EE(Design)/2020-21**

### **LIST OF RECOMMENDED TESTS & TESTING INSTRUMENTS & THEIR PRICES**

(Tenderer shall give below the list of recommended tests sets and testing instruments required for erection, commissioning, operation and maintenance).

Sl. No.	Particulars	Quantity	Prices	
			Ex-works	F.O.R. Destination (All inclusive)

The Tenderer hereby certifies that the above are the only test sets and testing instruments for erection, commissioning operation and maintenance of the equipments offered by him.

Seal of Company

Full Signature

Name

Designation

Date

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## **SCHEDULE 'N'**

**Tender Specification No.: 03/EE(Design)/2020-21**

### **Non-Blacklisting Certificate**

We hereby confirm that our company has not been blacklisted by any UPPCL/UPRVUNL/NTPC or any other State/Central Government utilities in the last 5 years.

Place :

Signature of Bidder

Date :

Name

Designation/Status in the firm

Company Seal

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## SCHEDULE 'O'

**Tender Specification No.: 03/EE(Design)/2020-21**

### SCHEDULE OF QUOTED GUARANTEED DELIVERY

(Guaranteed delivery period will be reckoned from the date of issue of letter of intent or date of signing of detailed order, as the case may be.)

(For transport by rail, the date of R/R and for transport by road, the date of receipt of material at Purchaser's warehouse shall be considered as date of delivery).

Sl. No.	Equipment	Qty.	Quoted Delivery Ex-works/ Work Complete Period	
1.	67.5 MVA, 11/132 KV Generator Transformers (OFWF) with OCTC, marshalling kiosk, accessories, first filling of oil & 10% reserve oil as per specifications including spares, complete in all respects	3 Nos.	1 <sup>st</sup> T/F	
			2 <sup>nd</sup> T/F	
			3 <sup>rd</sup> T/F	
2.	Erection, Testing & Commissioning period of supplied transformer including dismantling & shifting of existing 60 MVA transformer	3 Nos.	1 <sup>st</sup> T/F	
			2 <sup>nd</sup> T/F	
			3 <sup>rd</sup> T/F	

Note: 1) Nigam intends to procure all 3 transformers in 9 months time.

2) Nigam intends to Erect, Test & Commission all three Transformers: **01 month per T/F**

Seal of Company

Full Signature

Name

Designation

Date

**SCHEDULE 'P'**

**Tender Specification No.: 03/EE(Design)/2020-21**

**CERTIFICATE OF PAST PERFORMANCE CONSISTENCY**

We hereby confirm that performance of Power/Generator-Transformers supplied by us in the last 3 years have not experienced any technical snag which has resulted in non-service from these transformers.

Seal of Company

Full Signature

Name

Designation

Date

**S-20**

## **SCHEDULE 'Q'**

**Tender Specification No.: 03/EE(Design)/2020-21**

### **DECLARATION OF NETWORTH**

We hereby declare that Networth of our company in the immediate preceding financial year in which the bid is invited is as under which is not negative :

<b>Particular</b>	<b>Financial Year</b>
Networth	.....

Seal of Company

Full Signature

Name

Designation

Date

**S-21**

## **PROFORMA OF BANK GUARANTEE FOR EMD**

(For depositing Earnest Money in case the amount exceeds Rs. 5000/- and to be furnished on non-judicial stamp paper of Rs. 100/-)

To,

U.P. Jal Vidyut Nigam Ltd.,  
Lucknow.

WHEREAS Sri ..... son of .....  
.....(address/Occupation).....  
(hereinafter referred to as “the Tenderer”).

**OR**

Sri ..... son of .....  
(address/occupation) ..... Sri ..... son of .....  
..... (address/occupation) .....  
(hereinafter referred to as “the Tenderers”).

**OR**

Sri ..... son of .....  
(address) ..... Sri ..... son of .....  
..... (address) .....  
.....

All carrying on business in partnership under the Indian Partnership Act, 1932 (Act No.-9 of 1932) and having their registered office at .....  
..... in the town of .....  
..... (hereinafter referred to as “the Tenderers”).

**OR**

.....  
(Name of the Company) a company registered under ..... (Name of the Act under which incorporated) and having its registered office at .....  
..... in the town of .....  
..... (hereinafter referred to as “the Tenderers”).

**OR**

..... (Name of the Company) a company registered under ..... (Name of the Act under incorporated) and having its registered office at ..... (hereinafter referred to as “the Tenderer”) has/have in response to your Tender Notice against specification no. ....  
..... for ..... offered to supply and/or execute the works as contained in the Tenderer’s letter no. ....

AND WHEREAS the Tenderer is required to furnish you a bank guarantee for the sum of Rs. .... as earnest money against the tenderer’s offer as aforesaid.

AND WHEREAS WE ..... (name of the Bank), have, at the request of the Tenderer agreed to give you his guarantee as hereinafter contained.

**F-1**



NOW, THEREFORE, in consideration of the premises we the undersigned, hereby covenant that the aforesaid tender of the Tenderer shall remain open for acceptance by you during the period of validity as mentioned in the tender or any extension thereof as you and the Tenderer may subsequently agree and if the Tenderer shall, for any reason back out, whether expressly or impliedly, from his said tender during the period of its validity or any extension thereof as aforesaid we hereby guarantee to you the payment of the sum of Rs. .... (Rupees ..... only) on demand, without demur notwithstanding the existence of any dispute between the U.P. Jal Vidyut Nigam Ltd. and the Tenderer in this regard AND we hereby further agree as follows :

- (a) That you may without affecting this guarantee grant time and other indulgence to or negotiate further with the Tenderer in regard to the conditions contained in the said tender and thereby modify these conditions or add thereto any further conditions as may be mutually agreed upon between you and the Tenderer.
- (b) That the guarantee herein before contained shall not be affected by any change in the constitution of our Bank or in the constitution of the Tenderer.
- (c) That any account settled between you and the Tenderer shall be conclusive evidence against us of the amount due here under and shall not be questioned by us.
- (d) That this guarantee shall commence from the date hereof and shall remain in force till the Tenderer, if his tender is accepted by you, furnishes the security as required under the said specifications and executes a formal agreement as therein provided or (till four months after the period of validity) or the extended period of validity, as the case may be, of the tender, whichever is earlier.
- (e) That the expressions “the Tenderers” and “the Bank” and “the U.P. Jal Vidyut Nigam Ltd.” herein used shall, unless such interpretation is repugnant to the subject or context, include their respective successors and assigns.

Yours faithfully,

**PROFORMA OF GUARANTEE BOND FOR SECURITY DEPOSIT**

**(@ 2% of the Contract Value)**

(To be used by approved Nationalised/Scheduled Bank on Non-judicial stamp paper of  
Rs. 100/-)

In consideration of the U.P. Jal Vidyut Nigam Ltd., Lucknow (hereinafter called “the Nigam”) having agreed to exempt M/s ..... (hereinafter called “the Contractor”) from the demand, under the terms and condition of Purchase Order dated ..... of the Executive Engineer, U.P. Jal Vidyut Nigam Ltd., Lucknow in favour of M/s ..... for supply of ..... (hereinafter called “the said P.O.”) of Security Deposit for the due fulfillment by the said Contractor(s) of the terms and conditions contained in the said P.O. on production of Bank Guarantee for Rs. .... (Rupees ..... only), We ..... Bank Ltd. (hereinafter referred as “the Bank”) do hereby undertake to pay to the Nigam an amount not exceeding Rs. .... against any loss of or damage caused to or suffered or would be caused to or suffered by the Nigam by reasons of any breach by the said Contractor(s) of any of the terms of conditions contained in the said P.O.

2. We, ..... Bank Ltd., do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Nigam stating that amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Nigam by reason of any breach by the said Contractor of any of the terms or conditions contained in the said P.O. or by reason of the Contractor(s) failure to perform the said P.O. Any such demand made on the bank shall be conclusive as regard the amount due and payable by the Bank under this guarantee shall be restricted to an amount not exceeding Rs. ....

3. We, ..... Bank Ltd., further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said P.O. and that it shall continue to be enforceable till all the dues of the Nigam under or by virtue of the said P.O. have been fully paid and its claims satisfied or discharged or till the Nigam or their only authorized officer certified that the terms and conditions of the said P.O. have been fully and properly carried out by the said Contractor(s) and accordingly discharges the guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before..... we shall be discharged from all liability under this guarantee thereafter.

4. We ..... Bank Ltd. further agree with the Nigam shall have the fullest liberty without affecting in any manner or obligation hereunder to vary any of the terms and conditions of the said P.O. or to extend time of performance by the said Contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Nigam against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said P.O. and we shall not be relieved from our liability by reason of any such variation, or extension, or extension(s) being granted to the said Contractor(s) or for any forebearance, act or commission on the part of the Nigam or any indulgence by the Nigam to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

**F-3**

5. We, ..... Bank Ltd. lastly undertake not to revoke the guarantee during its currency except with the previous consent of the Nigam in writing.

6. Notwithstanding anything contained above, the liability of the guarantor hereunder is restricted to the said sum of Rs. .... and this guarantee shall expire on the ..... day ..... of ..... 20 . Unless a claim under the guarantee is filed with the guarantor within six months of such date, all claims shall lapse and the guarantor shall be discharged from the guarantee.

Dated the ..... day of .... 20..... .

For ..... Bank Ltd.

**PROFORMA FOR PERFORMANCE BANK GUARANTEE**  
**(@ 10% of the Contract Value)**

**U.P. JAL VIDYUT NIGAM LIMITED, LUCKNOW**

THIS DEED OF GUARANTEE made on the ..... day of ..... 20... by the ..... (hereinafter called 'the Guarantor') of one part IN FAVOUR of the U.P. JAL VIDYUT NIGAM LIMITED (hereinafter called 'the Purchaser') of the other part.

WHEREAS in accordance with the purchase order dated the ..... day of .....20... (hereinafter called 'the Said Contract') entered into between the Purchaser & Messers ..... a company within the meaning of the Companies Act and having its registered office at ..... (hereinafter called 'the Contractor') the Contractor agreed to supply to the Purchaser the ..... as provided in the said Contract.

AND WHEREAS the payment terms under the said Contract provide that in order to take 100% payment of the Contract value the Contractor shall furnish to the Purchaser a bank Guarantee in the sum of 10% value of each consignment dispatched valid for .....

AND WHEREAS instead of furnishing separate guarantees as aforesaid the contractor wishes to furnish one guarantee in the sum of 10% value of the Contract valid for ..... and reckoned from the date .....

NOW THIS DEED WITNESSES AS FOLLOWS :

- F. In consideration of the promises the Guarantor hereby undertakes that the Contractor shall duly supply the aforesaid material of the correct quality and strictly in accordance with the said Contract failing which the Guarantor shall pay to the Purchaser on demand such amount or amounts as the Guarantor may be called upon to pay the maximum aggregate of Rs. .... being 10% of the Contract value.
2. The Guarantor shall pay to the Purchaser on demand the sum under Clause -1 above without demur and without requiring the Purchaser to invoke any legal remedy that may be available to it to compel the Guarantor to pay the same or to compel such performance by the Contractor; Provided that where the Guarantor considers the demand of the Purchaser unjustified, shall never the less pay the same though under protest to the Purchaser and shall not withhold payment on that account.
3. This guarantee shall come into force from the date hereof and shall remain valid for ..... calendar months from the date of the ..... of the last consignment of goods dispatched which date of dispatch according to contract is the ..... day of ..... . If however, the period of the Contract is for any reason extended thereby extending the said date and upon such extension, if the Contractor fails to furnish a fresh or renewed Bank Guarantee for the extended period, Guarantor shall pay to the Purchaser the said sum of Rs. .... or such lesser sum as the purchaser may demand.
4. The guarantee herein contained shall not be affected by any change in the constitution of the Guarantor or of the Contractor.

**F-5**

5. Any account settled between the Contractor and the Purchaser shall be conclusive evidence against the Guarantor of the amount due and shall not be questioned by the Guarantor.
6. The neglect or for bearance of the Purchaser in enforcement of payment of any moneys the payment whereof is intended to be hereby secured or the giving of time by the Purchaser for the payment thereof shall in no way relieve the Guarantor of its liability under this deed.
7. The Purchaser and the Contractor will be at liberty to carry out any modifications in said Contract during the term of the said Contract and any extension thereof, notice of which modification to the Guarantor is hereby waived.
8. The expression 'The Purchaser', 'The Guarantor' and 'The Contractor' shall unless there be anything repugnant to the subject or context include their respective successors and assigns.
9. Notwithstanding anything contained above, the liability of the Guarantor hereunder is restricted to the said sum of Rs. .... and this guarantee shall expire on the ..... day of ..... unless claim under the guarantee is filed within six months of such date, all claims shall lapse and the Guarantor shall be discharged from the guarantee.

IN WITNESS HEREOF :

For and behalf of the Guarantor has signed this deed on the day and year first above written.

Witness :

Signed by

1 .....  
.....

For and on behalf of  
the Guarantor

2. ....  
.....

**FORM - A**

## **FORM - A**

### **GENERAL CONDITIONS FOR THE SUPPLY OF PLANT AND THE EXECUTION OF WORKS IN THE U.P. JAL VIDYUT NIGAM LTD.**

1. In construing these general conditions and the annexed specification, the following words shall have the meanings herein assigned to them unless there is anything in the subject or context inconsistent with such construction.

2. “The Nigam” or the Nigam shall mean the U.P. Jal Vidyut Nigam Ltd. and shall include his successors and assigns.

The “Contractor” shall mean the Tenderer whose tender shall be accepted by the Nigam, and shall include such Tenderer’s heirs, legal representatives, successors and assigns.

The “Sub-Contractors” shall mean the person named in the contract for any part of the work or any person to whom any part of the work or any persons to whom any part of the Contract has been sublet with the consent in writing of the Engineer and the heirs, legal representatives, successors, and assigns of such person.

The “Engineer” shall mean the officer placing the order for the work with the contractor. and such other officer as may be authorised and appointed, in writing by the Nigam to act as Engineer for the purpose of the Contract in case no such officer has been so appointed, the Nigam or his duly authorised representative.

“Plant”, “Equipment”, “Material”, “Work” or “Works” shall mean respectively the plant and materials to be provided and work or works to be done by the contractor under the Contract.

The “Contract” shall mean and include the general conditions, specifications, schedules, drawings, Form of Tender, Covering Letter, Schedule of Prices, or the final General Conditions, Specifications and Drawing, and the agreement to be entered into under clause-3 of these General Conditions.

“The Specification” shall mean the Specification annexed to these General Conditions and the Schedule thereto (if any).

The “Site” shall mean the site of the proposed work as detailed in the Specification or any other place in Uttar Pradesh where work is to be executed under the Contract.

“Tests on Completion” shall mean such tests as are prescribed by the Specification to be made by the Contractor before the plant is taken over by the Nigam.

“Commercial Use” shall mean that use of the work which the contract contemplates or of which it is commercially capable.

“Month” shall mean Calendar month.

“Writing” shall include any manuscript, typewritten or printed statement, under or over signature or seal as the case may be.

**A-1**

Words importing persons, shall include Firms, Companies, Corporation and other bodies whether incorporated or not.

Words importing the singular only shall also include the plural and vice versa where the context requires.

**2. Contractor to inform himself fully:**

The Contractor shall be deemed to have carefully examined the General Conditions, Specifications, Schedules and Drawings. If he shall have any doubt as to the meaning of any portion of these General Conditions, or of the Specification, he shall, before signing the Contract, set forth the particulars thereof and submit them to the Engineer in writing, in order that such doubt may be removed.

**3. Contract:**

A formal agreement shall, if required by the Nigam, be entered into between the Nigam and the Contractor for the proper fulfillment of the Contract.

Further, if required by the Nigam, the Contractor shall deposit with the Nigam as security for the due and faithful performance of the Contract such sums not being less than one percent of the total value of the contract as may be fixed by the Nigam either in cash or in any other form approved by the Nigam. The security deposit shall be refunded to the Contractor on the satisfactory completion of tests and the taking over of the plant by the Nigam.

The Charges in respect of vetting and execution of the contract document shall be borne by the Contractor. The Contractor shall be furnished with an executed stamped counter part of the agreement. The import license fee will in each case have to be paid by the Contractor; import license may have to be taken in the Board's name.

After the tender has been accepted by the Nigam, all order or instructions to the Contractor shall, except as herein otherwise provided, be given by the Engineer on behalf of the Nigam.

**4. Contract Drawings:**

The Contractor shall submit in duplicate, to the Engineer for his approval, drawings of the General Arrangement of the works to be carried out and of such detailed drawings, other than shop drawings as may reasonably necessary.

Within fourteen days of the receipt of such drawings the Engineer shall signify his approval or otherwise of the same, and in the event of his disapproving the drawings, the contractor shall submit further drawings for approval.

Within a reasonable period of notification by the Engineer to the Contractor of his approval of such drawings, three sets in ink on tracing cloth or ferrographic prints mounted on cloth, of the drawing as approved shall be supplied to him by the Contractor and be signed by him and the Contractor respectively and be thereafter deemed to be the "Contract Drawings."



These drawings when so signed shall become the property of the Nigam and be deposited with the Engineer, and shall not be departed from in any way whatsoever except by the written permission of the Engineer as hereinafter provided. During the execution of the works, one of the sets of drawings shall be available for reference on the site.

In the event of the Contractor desiring to possess a signed set of drawings he shall supply four sets instead of three sets and in this case the Engineer shall sign the fourth set and return the same to the Contractor.

**The Contractor if required by the Engineer shall supply in addition copies of any drawings other than shop drawings which may reasonably be required for the purpose of the Contract and may make a reasonable charge for such copies.**

The Engineer, or his duly authorized representative, whose name shall have previously been communicated in writing to the Contractor shall have the right at all reasonable times, to inspect at the factory of the Contractor, drawings of any portion of the work.

**5. Mistake in Drawings:**

The Contractor shall be responsible for and shall pay for any alterations of the work due to any discrepancies, errors and omissions in the drawings or other particulars supplied by him, whether such drawings or particulars have been approved by the Engineer or not, provided that if such discrepancies, errors or omissions are due to inaccurate information of particulars furnished to the Contractor by the Engineer, any alterations in the work necessitated by reason of such inaccurate information or particular shall be paid for by the Nigam.

If any dimensions figured upon a drawing or a plan differ from those obtained by scaling the drawings or plan, the dimensions as figured upon the drawing or plan shall be taken as correct.

**6. Subletting of Contract:**

The Contractor shall not, without the consent, in writing of the Engineer or Nigam, which shall not be unreasonably withheld, assign or sublet his Contractor, or any substantial part thereof other than for raw materials, for minor details, or for any part of the work of which the makers are named in the Contract, provided that any such consent shall not relieve the Contractor from any obligation, duty, or responsibility under the Contract.

**7. Patent Rights:**

In the event of any claim or demand being made or action being brought against the Nigam for infringement or alleged infringement of letters-patent in respect of any machine, plant, work or thing used or supplied by the Contractor under this Contract or in respect of any method of using or working by the Nigam of such machine, Plant, work or thing, the Contractor will indemnify the Nigam against such claim or demand and all costs and expenses arising from or incurred by reasons of such claim or demand PROVIDED THAT the Nigam shall notify the Contractor immediately any claim is made and the Contractor shall be at liberty if he so desires with the assistance of the Nigam if required but at all the Contractor's own expense, to conduct all negotiations for the settlement of the same or any litigation that may arise there from and PROVIDED THAT no such machine, plant, work or thing shall be used by the Nigam for any purpose or in any manner other than that for which they have been supplied by the Contractor and specified under this Contract.

**7.(A) Training of Engineer:**

The Contractor shall train at his works.....Engineer/Engineers of the Nigam in the manufacture and assembly of machinery and its parts for a period of ..... . A separate agreement for such training shall be signed by the Engineer/Engineers selected for training, the Nigam and the Contractor on the form appended hereto.

**8. Quality of Material:**

The Plant shall be manufactured and constructed in the best and most substantial and most workmanlike manner and with materials of the best or of approved qualities for their respective users.

**9. Packing:**

The Contractor shall be responsible for security, protecting and packing the plant so as to avoid damage under normal condition of transport.

**10. Delivery:**

The cost of delivering the whole of the material F.O.R, at the railway station specified or on the site at the specification may define and the cost of packing and unless otherwise agreed, import duties and customs dues shall be borne by the Contractor.

**11. Fencing and lighting for works other than transmission lines:**

Except as hereinafter provided, that Nigam shall, unless otherwise specified be responsible for the proper fencing, guarding, lighting and watching of all works other than transmission lines comprised in the Contract and for the proper provision of temporary roadways, footways, guards and fences as far as the same may be rendered necessary by reason of the work for the accommodation and protection of foot-passengers or other traffic and of the owners and occupiers of adjacent property and of the public.

**For transmission lines:**

The Contractor shall at all times provide sufficient fencing, notice boards, lights at watchmen to protect and warn the public and guard the work of transmission lines and in case the contractor fails to make such provision or the provision made by him is considered by the Nigam to be inadequate, the Nigam may make such provision or further provisions as he may consider necessary and charge the cost thereof to the Contractor.

**For all works:**

If during the period of erection of a plant the Contractor or his workmen or servants shall injure or destroy any part of a building or other structure contiguous to the work in progress or if any damage shall be caused from any cause whatsoever to other works (whether in progress or completed) forming part of the work for which the plant is being installed or if any imperfections become apparent in these works the causes of which imperfections are

attributable to the Contractor or his workmen or servants, the Contractor shall make good such damages and imperfections and if he fails to do so within a reasonable time, the Nigam may cause the same to be made good and may deduct the cost thereof from any sum that may then or at any time thereafter become due to the Contractor or from his security deposit or the proceeds of sale thereof or of a sufficient portion thereof or may recover it otherwise.

**12. Power to vary or omit work:**

No alterations, amendments, omissions, additions, suspensions, or variations of the work (hereinafter referred to as "Variations") under the Contract as shown by the Contract drawings of the Specification shall be made by the Contractor except as directed in writing by the Engineer, but the Engineer shall have full power, subject to the provision hereinafter contained, from time to time during the execution of the Contract by notice in writing to instruct Contractor to make such variation without prejudice to the Contract, and the Contractor shall carryout such instructions and be bound by the same conditions as far as applicable, as though the said variations occurred in the specification. If any suggested variations would, in the opinion of the Contractor, if carried out, prevent him from fulfilling any of his obligations or guarantees under the Contract, he shall notify the Engineer thereof in writing, and the Engineer shall decide forthwith whether or not the same shall be carried out and if the Engineer confirms his instructions, the Contractor's obligations and guarantee shall be modified to such and extent as may be justified. The difference of cost, if any occasioned by any such variations, shall be added to, or deducted from, the contract price as the case may require. The amount of such difference, if any, shall be ascertained and determined in accordance with the rates specified in the schedules of Prices so far as the same may be applicable and where the rates are not contained in the said Schedules or are not applicable, the shall be settled by the Engineer and the Contractor, jointly, as far as possible, before such variations are carried out. Provided that the Nigam shall not become liable for the payment of any charge in respect of any such variations, unless the instructions for the performance of the same shall have been given in writing by the Engineer.

In the event of the Engineer requiring any variations, such reasonable and proper notice shall be given to the Contractor as will enable him to make his arrangements accordingly, and in cases where goods or material have already been prepared or any designs, drawings or patterns have been made or work done that required to be altered, the Engineer shall allow such compensation in respect thereof as he shall consider reasonable.

Provided that no such variations shall, except with the consent in writing of the Contractor, be such as will involve in increase or decrease of the total price payable under the Contract by more than 10 percent thereof.

In every case in which the Contractor shall receive instructions from the Engineer for carrying out any work which either then or later will, in the opinion of the Contractor, involve a claim for additional payment, the Contractor shall, as soon as reasonably possible, after the receipt of such instructions, inform the Engineer of such claim for additional payment.

**13. Negligence:**

If the Contractor shall neglect to execute the work with due diligence and expedition, or shall refuse or neglect to comply with any reasonable orders given him in writing by the Engineer in connection with work, or shall contravene any provision of Contract the Nigam may give seven day's notice in writing to the Contractor, to make good the failure, neglect or contravention complained of and if the Contractor shall fail to comply with the notice within a reasonable time from date of service thereof in the case of a failure, neglect, or contravention capable of being made good within that time, then and in such case the Nigam shall be at liberty to employ other workmen and forth with perform such work as the Contractor may have neglected to do, or if the Nigam shall think fit, it shall be lawful for him to take the work wholly, or in part out of the Contractor's hands and give it to another person on contract at a reasonable price or provide any other materials, tools, tackle, or labour for the purpose of completing the work, or any part thereof, and in that event the Nigam shall, without being responsible to the Contractor for fair wear and tear of the same, have the free use of all the materials, tools, tackles, or other things which may be on the site, for use at any time in connection with the work to the exclusion of any right of the Contractor over the same, and the Nigam shall be entitled to retain and apply any balance which may be otherwise due on the Contract by him to the Contractor or such part thereof as may be necessary, to the payment of the cost of executing such work as aforesaid.

If the cost of executing the work as aforesaid shall exceed the balance due to the Contractor, and the Contractor fails to make good the deficiency the Nigam may recover it from the Contractor in any lawful manner of the Nigam may sell the said materials tools, tackle or other things belonging to the Contractor, and the proceeds of such sale shall be applied towards the payment of such deficiency and the costs of and incidental to such sale and any balance remaining after crediting the same shall be paid to the Contractor on the certificate of the Engineer, provided that when all expenses, cost and charges incurred in the completion of the work are paid by the Contractor, all such materials, tools, tackle or other things remaining unsold shall be removed by the Contractor.

**14. Death, Bankruptcy, etc.:**

If the Contractor shall die or commit any act of bankruptcy, or being a corporation commence to be wound up except for reconstruction purposes or carry on its business under a Receiver, the executors, successors or the representatives in law of the estate of the Contractor or any such Receiver, Liquidator, or any person in whom the Contract may become vested shall forthwith give notice thereof in writing to the Nigam and shall for one month during which he shall take all reasonable steps to prevent stoppage of the works, have the option of carrying out the Contract subject to his or their providing such guarantee as may be required by the Nigam but not exceeding the value of the work for the time being remaining unexecuted. In the event of stoppage of the works the period of the option under this clause shall be fourteen days only: Provided that should the above option not be exercised, the Contract may be determined by the Nigam by notice in writing to the Contractor and the Nigam may exercise the same power which he could exercise and will have the same rights which he could have under the proceeding clause if the work had been taken out of the Contractor's hands under the clause.

## **15. Inspection and testing :**

The Engineer and his duly authorized representatives shall have at all reasonable times access to the Contractor's premises, and shall have power at all reasonable times to inspect and examine the materials and workmanship of the plant during its manufacture there and if part of the plant is being manufactured on other premises the Contractor shall obtain for the Engineer and for his duly authorized representatives permission to inspect it as if the plant was manufactured on the Contractor's own premises.

The Engineer shall, on giving seven day's notice in writing to the Contractor setting out any grounds of objections which he may have in respect of the work, be at liberty to reject all or any plant or workmanship connected with such work which in his opinion are not in accordance with the Contract or are in his opinion defective for any reason whatsoever : Provided that, if such notice be not sent to the Contractor within reasonable time after the grounds upon which such notice is based have come to the knowledge of the Engineer he shall not be entitled to reject the said plant or workmanship on such grounds. Unless specifically provided otherwise all tests shall be made at Contractor's work before shipment.

The Contractor shall, if required, give the Engineer notice of any material being ready for testing, and the Engineer or his said representative if so desired shall, on giving twenty-four hours' previous notice in writing to the Contractor attend at the Contractor's premises within seven days of the date on which the material is notified as being ready, failing which visit the Contractor may proceed with the tests, which shall be deemed to have been made in Engineer's presence, and he shall forthwith forward to the Engineer duly certified copies of the tests in duplicate.

### **Test at Site:**

In all cases where the Contract provides for tests whether at the premises of the Contractor or of any Sub-Contractor, the Contractor, except where otherwise specified, shall provide free of charges such labour, materials, electricity, fuel, water, stores apparatus and instruments as may reasonably be demanded to carry out efficiently such tests of the plant in accordance with the Contract and shall give facilities to the Engineer or to his authorised representative to accomplish such testing.

If special tests other than those specified in the Contract are required they shall be paid for by the Nigam as "Variations" under clause 12.

When the tests have been satisfactorily completed at the Contractor's works the Engineer shall issue a certificate to the effect.

### **Tension site:**

In all cases where the Contract provides for tests on the site the Nigam, except where otherwise specified, shall provide, free of charges, such labour, materials, electricity, fuel, water, stores, apparatus and instruments as may be required from time to time and as may reasonably be demanded efficiently to carry out such tests of the plant or workmanship in accordance with the Contract. In the case of the Contractor requiring electricity for tests on site such electricity shall be supplied to the Contractor in the most convenient form available.

**16. Delivery of plant:**

No plant shall be forwarded until shipping instruction shall have been given to the Contractor.

Notification of delivery or dispatch in regard to each and every consignment shall be made to the Nigam immediately after dispatch or delivery. The Contractor shall further supply to the consignee a priced invoice and packing account of all stores delivered or dispatched by him. All packages, containers, bundles and loose materials forming part of each and every consignment shall be described fully in the packing account, and full details of the contents of packages and quantity of materials shall be given to enable the consignee to check the stores on arrival at destination.

**17. Access to site and work on site:**

Suitable access to and possession of the site shall be afforded to the Contractor by the Nigam in reasonable time, and the Nigam shall have any foundations to be provided by him ready when required by the Contractor. Where a crane is available, its safe lifting capacity shall be stated in the Specification, and it shall be available for free use of the Contractor until the plant is taken over.

**Only applicable to complete erection:**

The work, so far as it is carried out on the Nigam's premises, shall be carried out at such time as the Nigam may approve and so as not to interfere unnecessarily with the conduct of the Nigam's business, but the Nigam shall give the Contractor all reasonable facilities for carrying out the work.

No person other than the Contractor, Sub-Contractors, and workmen and the Contractor's duly authorized agents shall, except with the special permission in writing of the Engineer or his representative, be allowed to do any work on the site in connection with the erection of the work, but access to the work shall at all times be accorded to the Engineer and his representatives and other authorized officials or representatives of the Nigam.

The Contractor shall permit the execution of work by other Contractors or tradesmen whose names shall have been previously communicated in writing to the Contractor by the Engineer, and afford them every facility for the execution of their several works simultaneously with his own.

The Nigam shall provide all the unskilled labour and facilities necessary for the execution of work included in the contract unless otherwise specified.

**18. Engineer's supervision:**

All the work shall be carried out under the direction and to the reasonable satisfaction of the Engineer. If supervision of erection or complete erection is included in the Contract, the Contractor shall be responsible for the correctness of the positions, levels and dimensions of the works according to the drawings, notwithstanding that he may have been assisted by the Engineer in setting out the same.

**19. Engineer's decision:**

In respect of all matters which are left to the decision of the Engineer, including the granting or withholding of certificates, the Engineer shall, if required so to do by the Contractor, give in writing a decision thereon and his reasons for such decision. If the decision is not accepted by the Contractor the matter will, at the request of the Contractor, be referred to arbitration under the provision for arbitration hereinafter contained but subject to the right of reference to arbitration such decision shall be final and binding on the Contractor.

**20. Contractor's representative and workmen:**

If the supervision of erection or complete erection is also included in the Contract, the Contractor shall employ at least one competent representative, whose name or names shall have previously been communicated in writing to the Engineer by the Contractor to superintend the erection of the plant and the carrying out of the works. The said representative, or if more than one shall be employed then one of such representatives, shall be present on the site during working hours, and any written orders or instructions which the Engineer or his duly authorized representative whose name shall have been previously communicated in writing to the contractor may give to the said representative of the Contractor shall be deemed to have been given to the Contractor.

The Engineer shall be at liberty to object to any representative or person employed by the contractor in the execution of or otherwise about the works who shall in his opinion misconduct himself or be incompetent or negligent and the Contractor shall remove the person so objected to upon receipt from the Engineer of notice in writing requiring him so to do and shall provide in his place a competent representative at the Contractor's expense.

The Nigam shall provide suitable living accommodation on the site for the use of Contractor's representative unless the contractor exempts him from this liability.

**21. Liability for accident and damage:**

The Contractor shall be responsible for loss, damage or depreciation of the plant until the same is taken over under clause 35 or is deemed under that clause to have been taken over : Provided always that the Contractor shall not be responsible for any such loss, damage and depreciation occurring during such period that the plant is operated by the Nigam's staff prior to being taken over in accordance with clause 35.

Until the plant is taken over or is deemed to have been taken over as aforesaid, the Contractor shall also be liable for and shall indemnify the Nigam in respect of all injury to person or damage to property resulting from the negligence of the Contractor or his workmen or sub-contractors or from defective design, or work, but not from other cause:

Provided that the Contractor shall not be liable for any loss of profit or loss of Contract or any other claim made against the Nigam not already provided for in the Contract, nor for any injury or damage caused by or arising from the acts of the Nigam or of any other person or due to circumstances over which the Contractor has no control, nor shall his total liability for loss, damage or injury under this clause exceed the total value of the Contract.

The Contractor will indemnify and save harmless the Nigam against all actions, suits, claims, demands, costs, or expenses arising in connection with injuries (other than such as may be attributable to the Nigam or his employees) suffered prior to the date when the plant shall have been taken over under clause 35 hereof by persons employed by the Contractor or his sub-contractor on the work, whether at Common Law or under the Workmen's Compensation Act, 1923 or any other statute in force at the date of contract relating to the question of the liability of employers for injuries suffered by employees, and will if called upon to do so take out the necessary policy or policies of insurance to cover such indemnity.

Only applicable to complete erection contract:

In the event of any claim being made, or action brought against the Nigam involving the Contractor and arising out of the matters referred to and in respect of which the Contractor is liable under this clause, the Contractor shall be immediately notified thereof and he shall with the assistance, if he so requires, of the Nigam but at the sole expense of the Contractor conduct all negotiations for the settlement of the same or any litigation that may arise therefrom. In such case, the Nigam shall, at the request and expense of the Contractor, afford all reasonable and available assistance for any such purpose.

**22. Insurance:**

The Contractor shall insure the plant and shall keep it insured against loss by theft, destruction or damage by fire, flood, undue exposure to the weather, or through riot, civil commotion, war or rebellion, for the full value of the plant from the time of delivery f.o.b. British Port until the plant is taken over under clause 35. This insurance shall also cover loss by theft on site in the case of Contracts where the Contractor is responsible for complete erection, but not in other cases.

**23. Replacement of defective work or materials:**

If during the progress of the work the Engineer shall decide and notify in writing to the Contractor that the Contractor has executed any unsound or imperfect work or has supplied any plant inferior in quality to that specified the contractor on receiving details of such defects or deficiency shall, at his own expense, within such time that may be reasonably necessary for the making it good, proceed to alter, reconstruct or remove such work, or supply fresh materials up to the standard of the specification and in case the Contractor shall fail so to do, the Nigam may, on giving the Contractor seven day's notice in writing of his intention so to do, proceed to remove the work complained of, and, at the cost of the Contractor, perform all such work or supply all such material, provided that nothing in this clause shall be deemed to deprive the Nigam of or affect any right under the Contract, which he may otherwise have in respect of such defects or deficiencies.

**24. Deductions from contract price:**

All costs, damages or expenses which the Nigam may have paid, for which under the Contract the Contractor is liable, may be deducted by the Nigam from any moneys due or which may become due by him to the Contractor under the Contract, or may be recovered by suit on otherwise from the Contractor.



Any sum of money due and payable, to the Contractor (including security deposit returnable to him) under this contract may be appropriated by the Purchase and set off against any claim of the Nigam for the payment of a sum of money arising out of or under any other contract made by the Contractor with the Nigam.

**25. Terms of payment:**

(1) Subject to any deduction which the Nigam may be authorized to make under the contract, to any additions or deductions provided for under clause 12, the Contractor shall be entitled to payment as follows:

(a) Eighty percent of the F.O.R. contract value of the plant in rupees on receipt by the Nigam of the Contractor's invoice giving the number and date of railway receipt covering the dispatch of the plant from the Indian Port and of the advice note giving case number and contents, together with a certificate by the Contractor to the effect that the plant detailed in the said advice note has actually been dispatched under the said railway receipt and that the Contract value of the said plant so dispatched is not less than the amount entered in the invoice.

(b) Ten percent of the F.O.R. contract value of the plant on satisfactory completion of test and taking over of the plant.

(c) Ten percent of the F.O.R. Contract value of the plant at the end of twelve months from the date of taking over.

(d) For the erection of the plant, in proportion of the progress of the work on the receipt by the Nigam of monthly invoices submitted by the Contractor supported by the certificates of the Engineer.

(2) If the time at which either of the installments due under sub-clauses (b) and (c) of clause (1) hereof become payable there are minor defects in the plant which are not of such importance as to affect to full commercial use of the plant, then the Nigam shall be entitled to retain only such part of the installment then retained shall, subject to the provisions of clause 36 become due upon such minor defects being made good.

(3) If the Nigam desires that the plant or any portion thereof should not be dispatched by the Contractor when it is due for dispatch by the Contractor shall store such plant or portion at his works and be responsible for all risk. For such storage the Nigam shall pay to the Contractor at a rate to be mutually agreed upon between the parties but not exceeding 5.S (five shilling) per ton per week, payable quarterly plus interest at one per cent per annum above the current rate of the State Bank of India on 80 percent of the Contract value of the plant or portion thereof so stored, for the period from the date on which the said plant or portion become due and is ready for shipment up to the date on which it is actually shipped.

25.(A) In the event of the supplier/contractor/company/not being able to supply the materials or to carry out works in accordance with the terms of this contract, the Government/Nigam/Owner shall have the right to recover any sums advanced in accordance with the clause 25 from the supplier/contractor/company and from his/its assets.

**26. Provisional sums:**

In any case where the contract price includes a provisional sum to be provided by the Contractor for meeting the expense of extra work or for work to be done or material to be supplied by a sub-Contractor, such sum shall be expended or used, either wholly or in part, or be not used, at the discretion of the Engineer and entirely as he may decide and direct. If no part or only a part thereof be used then the whole or the part not used as the case may be, shall be deducted from the Contract price. If the sum used is more than such provisional sum the Contractor shall pay the excess. In the case of materials supplied or work done by a Sub-Contractor, the total of the net sums paid to the Sub-Contractor on account of such materials or works and a sum equal to 10 percent of such net sum allowed as Contractor's profit shall be deemed to be the sum used. None of the works or articles to which such sum of money refers shall be done or purchased without the written order of the Engineer. The Contractors shall allow the Sub-Contractors every facility for the supply of materials or execution of their several works simultaneously with his own and shall within fourteen days after the Engineer has requested him in writing to do, pay the dues of such Sub-Contractors on account of such materials or works. PROVIDED ALWAYS that the Contractor shall have no responsibility with regard to such works or articles unless he shall have previously approved the Sub-Contractor and/or the material or plant to be supplied.

**27. Certificate of Engineer:**

Every application to the Engineer for a certificate must be accompanied by a detailed invoice (in duplicate) setting forth in the order of the Schedule of Prices, particulars of the work executed, and the certificate as to such plant or work as is in the reasonable opinion of the Engineer in accordance with the Contract shall be issued within fourteen days if possible or for other than the first payment within such time of application for the same as is reasonably necessary for communication with the site.

The Engineer may by any certificate make any correction or modification in any previous certificate which shall have been issued by him and payments shall be regulated and adjusted accordingly.

**28. Due dates of payment:**

Payment shall be due and payable by the Nigam in accordance with the provisions of clause 25 hereof at the end of the month following that in which invoices for the amounts due together with necessary documents are received by the Nigam, provided that the Nigam shall not be bound to make any payment under sub-clause (a) of clause 25 unless the amount of such payment represents at least 8 per cent of the total contract value of the plant.

**29. Certificate not to affect rights of the Nigam or Contractor:**

(1) No certificate of the Engineer on account nor any sum paid on account by the Nigam, nor any extension of time granted under clause 31 shall effect or prejudice the rights of the Nigam against the Contractor either under this Agreement or under the law or relieve the Contractor of his obligations for the due Performance of the contract, or be interpreted as approval of the work done or of the materials supplied.

(2) No certificate of the Engineer shall create liability in the Nigam to pay for any alteration, amendments, variations or additional work not ordered in writing by the Engineer or absolve the Contractor or his liability for the payment of damages whether due, ascertained or certified or not of any such sum against the payment of which he is bound to indemnify the Nigam nor shall any such certificate nor the acceptance by him of any sum paid on account or otherwise affect or prejudice the rights of the Contractor against the Nigam under this Agreements or under the law.

**30. Suspension of Works:**

The Nigam shall pay to the Contractor all reasonable expenses incurred by the Contractor by reason of suspension of the works of delay in shipment by order in writing of the Nigam or the Engineer unless such suspension shall be due to some default on the part of the Contractor or Sub-Contractor.

**31. Extension of time for completion:**

The time given to the Contractor for dispatch, delivery, erection or completion, as the case may be, shall be reckoned from the date of receipt by the Contractor of the order, together with all necessary information and drawings to enable the work to be put in hand.

In all cases in which progress shall be delayed by strikes, lockouts, fire, accident, defective materials, delay in approval of drawing or any cause whatsoever beyond the reasonable Control of the Contractor, and whether such delay or impediment shall occur before or after the time or extended time; for dispatch, erection or completion, a reasonable extension of time shall be granted.

**32. Damages for delay in completion:**

If the Contractor shall fail in the due performance of his Contract within the time fixed by the Contract or any extension thereof, the Contractor agrees to accept a reduction of the Contract price by ½ (half) percent per week reckoned on the contract value of such portion only of the plant as cannot in consequence of the delay be used commercially and efficiently during each week between the appointed or extended times as the case may be and the actual time of acceptance under clause 35, and such reduction shall be in full satisfaction of the Contractor's Liability for delay but shall not in any case exceed 10 (ten) percent of the Contract value of such portion of the plant.

**I. Tests on Completion:**

Whenever possible all tests shall be carried out before shipment, "Should, however, it be necessary for the final tests as to performance and guarantees to be held over until the plant is erected at site they shall be carried out in the presence of the Contractor's representative within one month of the completion of erection. If the result of these tests shall not come within the margin specified, the tests shall, if require be repeated within one month from the date the plant is ready for re-test, and the Contractor shall repay to the Nigam all reasonable expenses to which he may be put by such tests.

## **II. Rejection of defective plants :**

If the completed plant, or any portion thereof, before it is taken over under clause 35, be found to be defective, or fail to fulfill the requirements of the Contract, the Engineer shall give the Contractor notice setting forth particulars of such defects or failure, and the Contractor shall forthwith make the defect good or alter the same to make it, comply with the requirements of Contract. If the Contractor fails to do so with a reasonable time, the Nigam may reject and place, at the cost of the Contractor, the whole or any portion of the plant, as the case may be which is defective or fails to fulfill the requirements of the Contract. Such replacement shall be carried out by the Nigam within in a reasonable time and at a reasonable price, and where reasonably possible to the same specification and under competitive conditions. In case of such replacement by the Nigam, the Contractor shall be liable to pay to the Nigam the extra cost, if any, of such replacement delivered and/or erected as provided for in the original Contract, such extra cost being the ascertained difference between the price paid by the Nigam under the provisions above mentioned, for such replacement and the Contract price for the plant so replaced, and also to repay any sum paid by the Nigam to the Contractor in respect of such defective plant. If the Nigam does not so replace the rejected plant within a reasonable time, the Contractor shall be liable only to repay to the Nigam all moneys paid by the Nigam to him in respect of such plant.

In the event of such rejection, the Nigam shall be entitled to the use of the plant in a responsible and proper manner for a time reasonably sufficient to enable him to obtain other replacement plant. During the period the rejected plant is used commercially the Contractor shall be entitled to a reasonable sum as payment for such use.

## **III. Taking over :**

Where the specification calls for performance tests before shipment and these have been successfully carried out, the plant shall be accepted and taken over when it has been satisfactorily put into operation on site, or within one month of its being ready to be put into operation, whichever shall be the earlier and the Engineer shall forthwith issue a taking over certificate.

In the event of final or any outstanding tests being held over until the plant is erected, such taking-over Certificate shall be issued subject to the results of such or outstanding tests shall be carried out in accordance with clause-33.

When the specification calls for tests on site the plant shall be taken over and the Taking over Certificate issued immediately after such tests have been satisfactorily carried out.

If for any reason other than the default of the Contractor such last mentioned test on site shall not be carried out within one month of notice by the Contractor to the Nigam of the plant being ready for test the plant shall be deemed to have been taken over as on the last day of such period and payments due to the Contractor on taking over shall be made, but nevertheless the Contractor shall if called upon so to do by the Nigam, but at the Nigam's expense, make the said tests during the maintenance period and accept as aforesaid under the same obligations as specified in clause 33.

The Engineer shall not delay the issue of any taking-over Certificate contemplated by this clause on account of minor deficiencies of material or defects in the plant which do not materially affect the commercial use thereof provided that the Contractor shall undertake to make good the same in due course.

**33.** Tests on Completion: Whenever possible all tests shall be carried out before shipment, “Should, however, it be necessary for the final tests as to performance and guarantees to be held over until the plant is erected at site they shall be carried out in the presence of the Contractor’s representative within one month of the completion of erection. If the result of these tests shall not come within the margin specified, the tests shall, if require be repeated within one month from the date the plant is ready for re-test, and the Contractor shall repay to the Nigam all reasonable expenses to which he may be put by such tests.

**34.** Rejection of defective plants: If the completed plant, or any portion thereof, before it is taken over under clause 35, be found to be defective, or fail to fulfill the requirements of the Contract, the Engineer shall give the Contractor notice setting forth particulars of such defects or failure, and the Contractor shall forthwith make the defect good or alter the same to make it, comply with the requirements of Contract. If the Contractor fails to do so with a reasonable time, the Nigam may reject and place, at the cost of the Contractor, the whole or any portion of the plant, as the case may be which is defective or fails to fulfill the requirements of the Contract. Such replacement shall be carried out by the Nigam within in a reasonable time and at a reasonable price, and where reasonably possible to the same specification and under competitive conditions. In case of such replacement by the Nigam, the Contractor shall be liable to pay to the Nigam the extra cost, if any, of such replacement delivered and/or erected as provided for in the original Contract, such extra cost being the ascertained difference between the price paid by the Nigam under the provisions above mentioned, for such replacement and the Contract price for the plant so replaced, and also to repay any sum paid by the Nigam to the Contractor in respect of such defective plant. If the Nigam does not so replace the rejected plant within a reasonable time, the Contractor shall be liable only to repay to the Nigam all moneys paid by the Nigam to him in respect of such plant.

In the event of such rejection, the Nigam shall be entitled to the use of the plant in a responsible and proper manner for a time reasonably sufficient to enable him to obtain other replacement plant. During the period the rejected plant is used commercially the Contractor shall be entitled to a reasonable sum as payment for such use.

**35.** Taking over: Where the specification calls for performance tests before shipment and these have been successfully carried out, the plant shall be accepted and taken over when it has been satisfactorily put into operation on site, or within one month of its being ready to be put into operation, whichever shall be the earlier and the Engineer shall forthwith issue a taking over certificate.

In the event of final or any outstanding tests being held over until the plant is erected, such taking-over Certificate shall be issued subject to the results of such or outstanding tests shall be carried out in accordance with clause-33.

When the specification calls for tests on site the plant shall be taken over and the Taking over Certificate issued immediately after such tests have been satisfactorily carried out.

If for any reason other than the default of the Contractor such last mentioned test on site shall not be carried out within one month of notice by the Contractor to the Nigam of the plant being ready for test the plant shall be deemed to have been taken over as on the last day of such period and payments due to the Contractor on taking over shall be made, but nevertheless the Contractor shall if called upon so to do by the Nigam, but at the Nigam's expense, make the said tests during the maintenance period and accept as aforesaid under the same obligations as specified in clause 33.

The Engineer shall not delay the issue of any taking-over Certificate contemplated by this clause on account of minor deficiencies of material or defects in the plant which do not materially affect the commercial use thereof provided that the Contractor shall undertake to make good the same in due course.

### **36. Maintenance:**

For a period of 12 (twelve) calendar months commencing from the date on which the plant is taken over or is deemed to have been taken over under clause 35 (called "the maintenance period") the Contractor shall remain liable to replace any defective parts that may develop in plant of his own manufacture or those of his sub-Contractors approved under clause 6 under conditions provided for by the contract under proper use and arising solely from faulty design, materials or workmanship provided always that such defective parts as are not repairable at site and are not essential in the mean-time to the maintenance in commercial use of the plant are promptly returned to the Contractor's works at the expense of the Contractor unless otherwise arranged.

If it becomes necessary for the Contractor to replace or renew any defective parts of the plant under this clause, the provisions of the first paragraph of this clause shall apply to the parts of the plant so replaced or renewed until the expiration of six months from the date of such replacement or renewal or until the end of the above mentioned period of twelve months, whichever may be the later.

If any defects be not remedied within a reasonable time the Nigam may proceed to do the work at the Contractor's risk and expense, but without prejudice to other rights which the Nigam may have against the Contractor in respect of such defects.

The repaired or new parts will be delivered in accordance with clause 10. The Contractor shall bear reasonable cost of minor repairs carried out on his behalf at site.

At the end of the maintenance period the Contractor's liability shall cease. In respect of goods not covered by the first paragraph of this clause, the Nigam shall be entitled to the benefit of any guarantee given to the Contractor by the original supplier or manufacturer of such goods.

### **37. Regulations of local authorities:**

The Nigam shall, throughout the continuance of the Contract and in respect of all matters arising in the performance thereof, serve all notices and obtain all consents, way-leaves, approvals, and permission required in connection with the regulations and by-laws of any local or other authority which shall be applicable to the works.

All work shall be executed in accordance with the Indian Electricity Rules 1956, and any statutory modifications thereof, wherever are applicable, unless otherwise agreed to in writing by the Engineer.

**38. Arbitration:**

If any dispute, difference or controversy shall at any time arise between the Contractor on the one hand and the U.P. JAL VIDYUT NIGAM LTD. and the Engineer of the Contract on the other touching the contract, or as to the true construction meaning and intent of any part or condition of the same, or as to the manner of execution, or as to the quality or description of, or payment for the same, or as to the true intent, meaning, interpretation, construction or effect of the clauses of the contract, specifications or drawings or any of them, or as to anything to be done, committed or suffered in pursuance of the contract of specifications, or as to the mode of carrying the contract into effect, or as to the breach of alleged breach of the contract, or as to any claims on account of such breach or alleged breach, or as to obviating or compensating for the commission of any such breach, or as to any other matter or thing whatsoever connected with or arising out of the contract, and whether before or during the progress or after the completion of the contract, such question, difference or dispute shall be referred for adjudication to the Chairman, U.P. Jal Vidyut Nigam Ltd. or to any other person nominated by him in this behalf and his decision in writing shall be final, binding and conclusive. This submission shall be deemed to be a submission to arbitration within the meaning of the Indian Arbitration Act, 1940 or any statutory modification thereof. The arbitrator may from time to time with consent of the parties enlarge the time for making and publishing the award.

**Upon every or any such reference, the costs of an incidental to the reference and award respectively shall be in the discretion of the arbitrator, who shall be competent to determine the amount thereof or direct the same to be taxed as between solicitor and client or as between party and to direct by whom and to whom and in what manner the same shall be borne and paid.**

Work under the contract shall, if reasonably possible, continue during the arbitration proceedings and no payments due or payable by the Nigam shall be withheld on account of such proceedings.

**38.(A) Court of competent jurisdiction :**

Any action taken or proceedings initiated on any of the terms of this agreement shall be only in the court of competent jurisdiction under the High Court of Judicature at Allahabad.

Work under the Contract shall if reasonably possible, continue during the Arbitration proceedings, and no payments due or payable by the Nigam shall be withheld on account of such proceedings.

**39. Construction of contract:**

The Contract shall in all respects be construed and operated as a Contract as defined in the Indian Contract Act, 1872, and all the payments there-under shall be made in rupees unless otherwise specified.

**40. Marginal notes:**

The marginal note to any clause of this Contract shall not affect or control the construction of such clause.

**TECHNICAL SPECIFICATION OF  
67.5 MVA, 11/132 KV (OFWF)  
GENERATOR-TRANSFORMERS  
FOR  
RIHAND HYDRO ELECTRIC PROJECT**



## **TECHNICAL SPECIFICATION OF 67.5 MVA, 11/132 KV GENERATOR-TRANSFORMER**

### **1.0 SCOPE**

This specification covers the design, manufacture, assembly, shop testing, delivery of 3 No. 67.5 MVA, 11/132 KV Generator-Transformers (equipped with SCADA compatible features) complete with all accessories and auxiliary equipments required for its satisfactory operation at Rihand Hydro Electric Project of UPJVNL. The scope includes Erection, Testing & Commissioning of all three Generator-Transformers alongwith dismantling & shifting of existing 3 Nos., 60 MVA Generator-Transformer at Rihand HEP. Details of existing Generator-Transformers at Rihand HEP is enclosed as Annexure-I.

### **2.0 STANDARDS**

The transformers shall conform in all respects to IS-2026-1977 or latest amendment thereof; and CBIP specification as detailed below. Equipment meeting any other authoritative standard which ensure an equal or better quality than the standard mentioned above could also be considered.

<b>Sl. No.</b>	<b>Indian Standard No.</b>	<b>Title</b>	<b>International and Internationally Recognised Standard</b>
1.	IS-2026	Power transformer	IEC-76
2.	IS-3639	Fitting & accessories for power transformer	
3.	IS-335	Insulating oils for power transformers & switchgear	IEC-296, BS-148
4.	IS-2099	Bushings for alternating Voltage above 1000 V	IEC-137, BS-223
5.	IS-325	Three phase Induction motors	IEC-34
6.	IS-732	Electrical Systems	Indian Electricity Rules 1956
7.	IS 3347/1972	Dimension of Porcelain Bushing for Generator Transformer	
8.	IS-375	Marking & arrangements for switchgear, bus bars, main connections and auxiliary wiring	
9.	IS-3737	Gas operated relays	
10.	IS-1886	Code of practice for installation and maintenance of transformers	
11.	IS-2147	Degrees of protn. Provided by enclosures for low voltage switch gear and control	
12.	IS-5	Colours for ready mix paints	
13.	IS-6600	Guide for loading of oil immersed transformers	
14.	IS-11353	Industrial water cooler	
15.	IS:1271	Thermal evaluation and Classification of electrical insulation	
16.	CBIP manual	Manual of Transformers	ISBN 81-7336-283-1 or its latest revision thereof

Reference Abbreviation	Name and Address
IEC	International Electro Technical Commission, Bureau Central de la Commission, Electro Technique International, 1, Rue de Vereimbe Geneva, Switzerland.
IS	Indian Standard, Bureau of Indian Standards, Manak Bhavan, 9, Bahadur Shah Zafar Marg, New Delhi-110 002, INDIA.
BS	British Standards, British Standards Institution, 101, Pentonville Road, N – 19 – ND – UK.
NEMA	National Electric Manufacture Associate, 115, East 44 <sup>th</sup> Street New York, NY 10017, USA.

### 3.0 CLIMATIC CONDITIONS

The transformer shall be suitable for operation under climatic conditions given in “General Requirement of Specifications”.

### 4.0 TYPE, RATING AND QUANTITY

The Generator Transformers shall have core type construction, OFWF (oil immersed, water-cooled with forced oil circulation) cooled and shall be suitable for outdoor service.

### 5.0 DESIRED PARTICULARS

1.	Type	Generator Transformers
2.	Continuous capacity	67.5 MVA
3.	Rated HT voltage	132 KV
4.	Rated LT voltage	11 KV
5.	Frequency	50 Hz
6.	No. of Phases	Three
7.	Percentage impedance	10% (guaranteed)
8.	Efficiency (full load)	Not less than 99.6%
9.	Connections	
	a) HV winding	Star
	b) LV winding	Delta
10.	Vector Group	YnD11
11.	OCTC (off circuit tap changer)	5 taps (-5% to +5%)
12.	Type of cooling	OFWF
13.	Quantity	3 Nos.
14.	Earthing	Effectively earthed.
15.	System Fault Level	6000 MVA
16.	Overall weight of one GT	Not more than 87,500 kg

5.1 All the transformers shall be oil immersed, weather proof atmo-seal type and suitable for outdoor installation in lightning areas.

5.2 The transformers shall be capable of withstanding thermal and mechanical effects of a short circuit on the terminals of any winding with full voltage maintained on all other windings for a duration of 2 seconds as per IS:2026-1977.

5.3 Technical and guaranteed particulars of the transformers offered shall be furnished as per ‘SCHEDULE-R’ enclosed.

## 6.0 INSULATION

6.1 The dielectric strength of the winding insulation of the bushings shall conform to the values given in IS:2026.

6.2 For rated system voltage of 132 KV and 11 KV following minimum impulse test voltages (as per clause 5 of IS 2026-Part-III) of 1.2/50 micro second full wave will be offered :-

<u>System voltage</u>	<u>Impulse test voltage</u>
132 KV	550 KVP
11 KV	75 KVP

6.3 The HV Winding shall have graded insulation, the neutral end insulation being of 95 KVP (Impulse) and 38 KV (Power Frequency) withstand value. The LV windings of the transformer shall have uniform insulation.

6.4 The bidder shall ensure use of thermally upgraded kraft paper in place of normal kraft paper as recommended by IEEE transformer committee task force [See Annexure A(1) & A(2)].

6.5 As the transformers will be directly connected to the Generators and may be subjected to load rejection conditions, it shall be able to withstand 1.4 times the rated voltage for 5 seconds (as per Clause-10.2 of IS 2026 Part-I) at the transformer terminals to which the generator is to be connected.

## 7.0 TEMPERATURE RISE

Each transformer shall be capable of operating continuously at their normal rating without exceeding temperature rise limits (as per Clause-3 of IS 2026 Part-II) as specified below :-

i)	Winding	Temperature rise (at 30 <sup>0</sup> C water temp.) 65 <sup>0</sup> C by resistance measurement.
ii)	Oil (hottest layer)	45 <sup>0</sup> C by the thermometer measurement.

## 7.1 CLASS OF INSULATION

Each transformer shall be designed bearing state-of-the art insulating material capable of withstanding the temperature rise as cited in clause 7.0 above.

## 8.0 FREQUENCY

The transformer shall be suitable for continuous operation with a frequency variation of plus-minus 5% from normal of 50 Hz without exceeding the specified temperature rise.

## 9.0 PARALLEL OPERATION

The transformers shall operate satisfactorily in parallel with other three Generator-Transformer as elucidated below :

Unit No.	Make & Rating	Remarks
1	M/s ASEA Sweden make (11/132 KV, 60 MVA)	Replacement under ambit of this tender
2	M/s ASEA Sweden make (11/132 KV, 60 MVA)	To be replaced with M/s T&R make 11/132 KV, 67.5 MVA GT
3	M/s EMCO make (11/132 KV, 60 MVA)	-
4	M/s ASEA Sweden make (11/132 KV, 60 MVA)	To be replaced with M/s T&R make 11/132 KV, 67.5 MVA GT
5	M/s ASEA Sweden make (11/132 KV, 60 MVA)	Replacement under ambit of this tender
6	M/s ASEA Sweden make (11/132 KV, 60 MVA)	Replacement under ambit of this tender

#### 10.0 IMPEDANCES

The guaranteed impedance with tolerances shall be [as per clause 5.0 (7)] as required for parallel operation. Impedances shall include positive and zero sequence and shall be expressed in terms of the branches of the star connected equivalent diagrams, all on the same MVA basis. Impedance percentage volts at normal tap and 75<sup>0</sup>C winding temp. shall be subject to I.S. tolerances.

#### 11.0 MAXIMUM FLUX DENSITY

The maximum flux density in any part of the core and yoke at normal voltage and frequency on normal tap, shall not exceed 1.5 Tesla (15,000 lines per sq.cm).

#### 12.0 TRANSFORMER LOSSES

- 12.1 The no load loss in kilowatt at rated voltage and rated frequency and the copper losses in kilowatts at rated output, rated voltage, rated frequency and at 75<sup>0</sup>C shall be guaranteed under penalty for each transformer. If losses are guaranteed with tolerance as per I.S.S., these shall be increased by 10% for computation and for working out penalty. The Nigam reserve the right to reject the transformer, if the tested losses are more than 10% of the quoted figures.

The rates of computation shall be :-

- i) Rs. 73,500.00 per KW of guaranteed no load loss.
- ii) Rs. 49,500.00 per KW of guaranteed copper losses.
- iii) Rs. 73,500.00 per KW of guaranteed auxiliary losses.

- 12.2 The penalties shall be separately evaluated from (i) the excess of the test figures of the no load loss over the corresponding guaranteed values @ Rs. 73,500.00 per KW (ii) the excess of the test values of copper loss, over the corresponding guaranteed values @ Rs. 49,500.00 per KW (iii) the excess of test value of guaranteed auxiliary loss @ Rs. 73,500.00 per KW.

It shall be at the discretion of purchaser to reject the transformers having losses more than 10% in excess of guaranteed quoted value or accept them after having penalty at the above.

### 13.0 COOLING SYSTEM

- 13.1 Each transformer shall also be equipped with a water/oil cooling system (OFWF) complete with adequate heat exchanger, oil circulating pump having driving motor and associated starter with O/L device control gear, pipes, valves, flow recorder cum indicators, flow failure device, differential pressure device etc. designed to be connected to the common cooling water system.
- 13.2 The cooler shall be designed taking in account the temperature of water as 30<sup>0</sup>C maximum and availability of cooling water as 15 litres per second. Minimum capacity of each Heat Exchanger shall be 400 KW.
- 13.3 The water supply for cooling purposes shall be made available to the Contractor to a point near each transformer at a pressure of approximately 3-4 kg/cm<sup>2</sup>. The Contractor shall provide connection to water supply point with necessary reducer piping and/or open funnel system and valves, up to discharge point.
- 13.4 Two complete set of cooler units of 100% capacity each (one shall be standby) with necessary pipe, fittings and valves shall be furnished with each generator-transformer. Necessary piping shall be done between cooler and transformer by the contractor. Cooler tube shall be made of Cu-Ni alloy.
- 13.5 The cooling system shall be so designed that in no case the water pressure may become more than the oil pressure at any point of the cooler tubes even when the oil pumps are not running. The oil pressure reference may be taken as working oil head on the cooler tubes with oil pumps not running.
- 13.6 Pressure reducing valves and/or open funnel system and other accessories for cooling water system as necessary are included in the scope.
- Heat exchangers shall be designed for pressure and vacuum conditions specified for the tank and also keeping in view their relative location with respect to tank.
- 13.7 The heat exchanger shall be designed so as to prevent condensation of water on the outer surfaces. Oil return into tank will be designed to ensure non-formation of gas pocket when the tank is filled. Proper clearance shall be maintained between all pipe works and live parts. Pipe work is to be earthed.
- 13.8 Cooler units shall be connected to the tank by machined steel flanges welded to the cooler units and to the tank provided with gaskets. Each cooler connection at the tank shall be provided with two indicating shut-off valve which can be locked in either open or closed position. A separate oil tight blank flange shall be provided for each tank connection for use when cooler unit is detached.
- 13.9 The capacity and arrangement of the heat exchangers and oil circulating pumps of each main and standby cooling units shall be such that the capacity of the transformer shall be at least 70% of rated capacity without exceeding the allowable temperature rise with one half of the heat exchanger tubes being clogged.

13.10 An oil flow indicator with alarm and trip contacts shall be furnished with each assembly to indicate normal operation and direction of oil flow. The location of flow indicator shall be shown in the schematic diagram. In addition, following are to be provided with coolers:

- a. Pressure gauges at oil and water inlet and outlet branches.
- b. A suitable differential pressure gauge or equivalent suitable device fitted with electrical contacts to give an alarm when cooler outlet oil & water differential pressure falls to pre-determined value. The pre-determined values shall be higher than inlet water pressure.
- c. Suitable thermometers screwed into pockets for inlet oil and outlet water branches of coolers.
- d. Each pump shall be provided with a non-return valve on cooler circuit side.
- e. A water flow meter cum indicator with alarm and trip contacts shall be installed in the discharge pipe of the heat exchanger.

13.11 **Oil Circulation Pumps**

The forced oil cooler shall be provided with a 3 $\phi$  a.c. motor driven oil-pump of adequate capacity alongwith a standby pump. The oil pump shall be dealing with the maximum output of transformer and total head, which may occur in service, and with the varying head due to changes in the viscosity of the oil. Each pump assembly shall be furnished with oil flow indicators with alarm contacts to indicate normal pump operation and oil flow. The driving motor shall be suitable for direct starting and for continuous running from 415 Volt  $\pm$  10%, 3 phase, 50 Hz Supply.

Contractor shall provide provision to select the pump/automation switching over to standby pump in case of failure of running pump as well as scheme should accommodate running of both pumps at the same time whenever required.

13.12 **Cooler Control**

Control equipment for oil circulating pump with motor to be mounted in a weather proof marshalling box (Protection class : IP-68) shall include the necessary contactors with auto motor control. Provision for automatic/manual control equipment will be made in accordance with the following:

- a. Locally from the control cabinet through operation of local control switch.
- b. From remote centralised control room after selecting the remote operation and through operation of control switch.
- c. Automatically through the auxiliary contact of starting relay. For this purpose the selector switch shall be put on auto and the cooler shall start working when the starting relay is energised.
- d. Contractor shall provide provision to select the pump/automation switching over to standby pump in case of failure of running pump.

13.12.1 Auxiliary contacts shall be provided to indicate the running of all the pumps.

- 13.12.2 A single metal enclosed main MCCB shall be provided for the cooling plant contactor group. Overload protection of all motors shall be provided.
- 13.12.3 The Contractor shall specify the loading capacity of the transformer in case of lesser quantity of cooling water being available or in case of cooling water being available at reduced pressure.
- 14.0 **CORE**
- 14.1 The core shall be built up with cold rolled non-ageing, **prime grade** low loss and high permeability grain oriented (CRGO) silicon steel laminations (HI-B grade steel of ZDKH class of material having thickness less than or equal to 0.23 mm) or any superior quality material, specially suitable for GT (Generator-Transformer) cores.
- 14.2 After being sheared, the lamination shall be treated to remove all burrs and shall be reannealed to remove all residual stresses. Atleast one side of each lamination shall be coated with a insulation coating as may be approved by the ISS and as per the modern manufacturing practice which shall be inert to the action of hot transformer oil. The nature of insulation on core should be specified.
- 14.3 The core shall be rigidly clamped or bolted to ensure adequate mechanical strength and to prevent vibration during operation. The bolts used in the assembly of core shall be suitably insulated and clamping structure shall be so constructed that eddy currents will be minimum.
- 14.4 **The tenderer will offer the core for inspection and approval by the purchaser during the manufacturing stage. Tenderer's notice for this purpose shall be accompanied with the following documents as applicable proof towards use of 'Prime Core':**
- (a) Invoice of the supplier
  - (b) Mill's test certificates
  - (c) Packing List
  - (d) Bill of Loading
  - (e) Bill of Entry certificate of custom
  - (f) Country of origin
- Following documents are to be made available for scrutiny during inspection :
- (a) Purchase Order No. & date
  - (b) Number of packed coils with package nos.
  - (c) Gross weight & Net weight
  - (d) Port of Loading & Port of discharge
  - (e) Grade & Thickness of core material
- 14.5 The core material shall be directly procured either from the manufacturers or through their accredited representative and not through any agent.
- 14.6 Tenderer should possess an in-house core cutting facility for proper monitoring and control on quality and also to avoid any possibility of mixing prime material with either defective or second grade material.
- 14.7 The Tenderer shall submit 'Saturation Curves' of the core material proposed to be used and calculations to demonstrate that the core is not over-fluxed under stringent condition of operation.

- 14.8 The core shall be provided with lugs suitable for lifting the complete core and coil assembly of the transformer.
- 14.9 The core and the coil shall be so fixed in the tank that shifting does not occur when the transformer is moved or during a short circuit.
- 15.0 **WINDING**
- 15.1 The winding shall be so designed that all coil assemblies of identical voltage ratings shall be interchangeable, and field repairs to the windings can be made readily without special equipment. The coil shall be supported between adjacent sections by insulating spacers and the barriers, bracings etc. Insulation used in the assembly of the windings shall be arranged to ensure a free circulation of the oil and to reduce hot spot in the windings.
- 15.2 The coils shall be dried under vacuum and submerged in dried insulating oil to develop the full electrical strength of the windings. All materials used in the insulation and assembly of the windings shall be insoluble, non catalytic, and chemically inactive in the hot transformer oil and shall not soften or otherwise be adversely affected under the operating conditions.
- 15.3 All threaded connections shall be provided with locking facilities. All leads from the winding to the terminal board and bushings shall be rigidly supported to prevent injury from vibration. Guide tubes shall be used where practicable.
- 15.4 The winding shall be clamped securely in place so that they will not be displaced or deformed during short circuits. The copper conductor used in the construction shall be best suited to the requirements and all permanent currents carrying joints in the windings and the leads, shall be brazed precisely.
- 16.0 **INSULATION OIL**
- 16.1 Oil for first filling together with ten percent extra oil shall be supplied with each transformer. The oil shall comply in all respects with the insulations of IS:335. Particular attention shall be paid to deliver the oil free from moisture having uniform quality throughout in non-returnable steel drums.
- 16.2 The quantity of oil for first filling of each transformer shall be stated in the tender. The cost of the oil shall also be given separately.
- 16.3 Following tests will be required to be performed on a sample of oil from each transformer and the test certificates shall be furnished with the routine test reports of the transformer. The test certificates of oil SUPPLIERS will not be accepted in this respect :-
- a) Density at 29.5<sup>0</sup>C
  - b) Kinematic Viscosity at 27<sup>0</sup>C
  - c) Interfacial tension
  - d) Flash point
  - e) Neutralization value (total Acidity)
  - f) Dielectric strength (Break down voltage)
  - g) Dielectric dissipation factor (Tan Delta)
  - h) Specific resistance Ohm-cm
  - i) Water content, PPM (Karl Fisher Method)



- 16.4 Dissolved gas analysis of the oil for the transformer in respect of the gases named below.
1. Hydrogen ( $H_2$ )
  2. Carbon di-oxide ( $CO_2$ )
  3. Carbon Mono-oxide ( $CO$ )
  4. Methane ( $CH_4$ )
  5. Ethylene ( $C_2H_4$ )
  6. Acetylene ( $C_2H_2$ )
  7. Ethane ( $C_2H_6$ )
- 17.0 **TANK**
- 17.1 The transformer tank and cover shall be fabricated from good commercial grade low carbon steel suitable for welding and of adequate thickness. Thickness of bottom tank plate shall be at least 16 mm. The tank and the cover shall be of welded construction. All seams shall be welded and where practicable they shall be double welded. The tank shall have sufficient strength to withstand without permanent distortion (i) filling by vacuum and (ii) continuous internal gas pressure of 0.7 atmospheres with oil at operating level. The tank cover shall be bolted to the tank and the transformer design shall be such that the tank will not be splitted between the lower and upper cooler connection for untanking.
- 17.2 A manhole with a welded flange and a bolted cover shall be provided on the tank cover. The manhole shall be of sufficient size to afford easy access to the lower ends of the bushings terminals etc.
- 17.3 All bolted connection to the tank shall be fitted with suitable oil tight gaskets which shall give satisfactory service under the operating conditions. Special attention shall be given to the methods of making the hot oil tight joints between the tank and the cover as also between the cover and the bushings. All other outlets to ensure that the joints can be remade satisfactorily and with ease, with the help of semi-skilled labour. Where compressible gaskets are used, stoppers shall be provided to prevent over compression.
- 17.4 Suitable guides shall be provided positioning the various parts during assembly or dismantling. Adequate space shall be provided between the core and winding and the bottom of tank for collection of any sediment or sludge.
- 17.5 Lifting eyes or lugs shall be provided on all parts of the transformer, requiring independent handling during assembly or dismantling. In addition, the transformer tank shall be provided with lifting lugs and bosses properly secured to the sides of the tank, for lifting the transformer either by crane or by jacks.
- 17.6 The design of the tank, the lifting lugs and bosses shall be such that the complete transformer assembly filled with oil can be lifted with the use of these lugs without any damage or distortions.
- 17.7 The tank shall be provided with two suitable copper alloy pads for the purpose of grounding, where the G.I. earthing strip of suitable size shall be clamped either in horizontal direction or in vertical direction with 4 no. studs without drilling any hole in the G.I. earthing strip.

17.8 Each tank shall be equipped with the following valves with standard flange connection for external piping :-

- i) One drain and lower filter valve placed to completely drain the tank. At the opinion of the contractor a large valve may be furnished with an eccentric reducer. This valve shall be equipped with a small sampling cock.
- ii) One upper filter valve located at the top of the tank. The opening of this valve shall be baffled to prevent aeration of the oil. Alternatively, this valve can be located at any convenient position to suit connection, to the filter machine but may be connected to upper part of the tank by means of internal piping. The upper filter valve shall be on the side opposite to the side of lower filter valve.
- iii) One pressure relief valve or device to operate at a pressure below the test pressure for the tank. This device shall be mounted so that oil from the device should fall on the ground.
- iv) One oil filling cum filter valve in the oil conservator.

18.0 **RADIO INTERFERENCE**

- i) The transformers shall be designed with particular attention to suppression of maximum harmonic voltage. Especially the third and fifth so as to eliminate wave form distortion and minimize interference with communication circuits.
- ii) The noise level, when energized at normal voltage and frequency with pumps running shall not exceed, when measured under standard conditions, the values specified in NEMA, TR-I.

19.0 **PRESSURE RELIEF DEVICE**

Adequate number of pressure relief devices shall be provided (with 1 set of alarm contacts) at suitable locations which shall be of sufficient size for rapid release of any pressure that may be generated in the tank and which may result in damage to the equipment. The device shall operate at a static pressure of less than the hydraulic test pressure of transformer tank. It shall be mounted direct on the tank. One set of electrically insulated contacts shall be provided for alarm/tripping along with the recommendations.

20.0 **BUCHHOLZ RELAY**

A double float type Buchholz relay shall be provided. All the gases evolved in the transformer shall collect in this relay. The relay shall be provided with a test cock suitable for a flexible pipe connection for checking its operation and taking gas sample. A copper or stainless steel tube, shall be connected from the gas collector to a valve located about 1200 mm above ground level to facilitate sampling, with the transformer in service. The device shall be provided with two electrically independent ungrounded contacts, one for alarm on gas accumulation and the other for tripping on sudden rise of pressure. The contracts of relay shall be properly housed, sealed and gasketed to make the arrangements water proof.

## 21.0 VALVE

A valve of other suitable means shall be providing to fix the on line dissolved Gas monitoring system to facilitate continuous dissolved gas analysis.

## 22.0 AIR CELL

The Air Cell (Flexible Separator) shall be fitted inside a conservator tank to isolate the insulating oil from the atmosphere such that it inflates or deflates to accommodate oil volume displacements due to changes in the Generator-Transformer temperature. The bag is vented to the transformer through flange type mounting [See Annexure A (3)].

## 23.0 ANNUNCIATION

The following flag indications are required to be passed on to the purchaser's transformer control panel. The required terminal blocks for them shall be provided on the transformer, including all other necessary features and terminals required for operation & monitoring through SCADA :

### a) TRIP ALARM

- i. Buchholz Trip
- ii. WTI Trip
- iii. OTI Trip
- iv. Pressure Release device Trip

### b) NON TRIP ALARM

- i. Buchholz alarm
- ii. WTI temperature high alarm
- iii. OTI temperature high alarm
- iv. Conservator oil level low alarm
- v. Conservator oil level high alarm
- vi. Oil flow failure alarm
- vii. Water flow failure alarm
- viii. Oil pumps trip alarm (separate flag for each pump)
- ix. MCB for pump trip alarm
- x. Heat Exchanger (cooler) differential pressure high alarm

## 24.0 TRANSFORMER OIL

The Bidder shall warrant that oil furnished is in accordance with the following specification :

S.N.	Characteristics	Requirement	Method of Test
1)	Appearance	The oil shall be clear and transparent and free from suspended matter or sediment.	A representative sample of oil shall be examined in a 100 min thick layer at ambient temperature.
2)	Density, max.	0.89 gm/cm <sup>3</sup> at 29.5 <sup>0</sup> C	IS :1448
3)	Dynaminic Viscosity CST at 27 <sup>0</sup> C	27 cSt (Max.)	IS : 1448
4)	Interfacial tension at 27 <sup>0</sup> C min Newton/M.	0.04 N/m	IS : 6104
5)	Flash point Penskey Marten (closed) min.	140 <sup>0</sup> C	IS : 1448
6)	Pour point max.	-15 <sup>0</sup> C (Max.)	IS : 1448
7)	Neutralization value a) (Total acidity) mg. max. b) In organic activity/alkalinity	0.03 mg. KOH/gm Max. Nil	IS : 1335 Appendix 'A'
8)	Corrosive Sulphur (in terms of classification of copper strip) 48 Hrs. @ 150 <sup>0</sup> C	Non-corrosive	ASTM D1275 subjecting oil 150 <sup>0</sup> C for 48 Hrs.
9)	Electric strength (breakdown voltage) min. a) New untreated oil b) After treatment	30 kV (rms) (if the above value is not attained, the oil shall be treated) 60 kV Min. (rms)	IS : 6792
10)	Dielectric dissipation factor (tan delta) at 90 deg.C max.	0.002	IS : 6262
11)	Specific Resistance (resistively) a) at 90 <sup>0</sup> C b) at 27 <sup>0</sup> C	resistance a) 35 x 10 <sup>12</sup> ohm-cm (Min.) b) 1500 x 10 <sup>12</sup> ohm-cm (Min.)	IS : 6103
12)	Oxidation stability a) Neutralization value after oxidation, for 164 Hrs. @ 100 <sup>0</sup> C b) Total sludge, after oxidation, for 164 Hrs. @ 100 <sup>0</sup> C	a) 0.40 mg/KOHp gm Max. b) 0.10% by weight Max.	IEC 61125 (method C)
13)	Presence of oxidation inhibition	Absent	IS : 335 Appendix 'D'
14)	Aging characteristics after 96 Hrs. accelerated ageing (open Breaker method with copper catalyst) a) Specific Resistance (Resistivity) 1. @27 <sup>0</sup> C 2. @90 <sup>0</sup> C b) Dielectric Dissipation Factor (Tan delta) @90 <sup>0</sup> C c) Total acidity d) Total Sludge Value	2.5 x 10 <sup>12</sup> ohm-cm-Min. 0.2 x 10 <sup>12</sup> ohm-cm-Min. 0.20 Max. 0.05 mg KOH/gm (Max.) 0.05% by weight Max.	ASTM-ID 1934/IS : 12177
15)	Water content PPM (Max.) New untreated oil After treatment	50 PPM Max. 05 PPM Max.	IS : 2362 IS : 1866
16)	Poly Chlorinated Biphenyls(PCB) Content	NIL	IEC 61619 Double Spec
17)	Gassing tendency at 50 hZ, after 120 minutes	+5mm <sup>3</sup> per minute (Max.)	Doble Spec

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## 25.0 ON LINE MOISTURE MONITORING SYSTEM

Necessary provision, supply & installation of on line moisture monitoring system (with 2 sets of potential free contacts) shall be made for satisfactory performance throughout the life of transformer.

## 26.0 UNDERCARRIAGE

26.1 The transformer tank shall be supported on a structural steel base equipment with forged steel or cast steel single flanged wheels suitable for moving the transformer completely filled with oil.

26.2 Jacking steps shall be provided. It shall be possible to change the direction of the wheels through  $90^0$  when transformer is lifted on jacks to permit movement of the transformer both in longitudinal and transverse directions as per details furnished in the enclosed layout drawing (Annexure-II). **The contractor shall design the transformer keeping in view the transportation and space limitations at site (Refer Annexure-II).**

26.3 Suitable jacks for lifting and turning the fully assembled transformer filled with oil shall be supplied as integral part of transformer with fittings & accessories.

26.4 Pulling eyes shall be provided to facilitate moving the transformer and they shall be suitably braced in a vertical direction so that bending does not occur when the pull has a vertical component.

## 27.0 TAP CHANGING MECHANISM (OCTC)

27.1 The transformer shall be provided with full capacity OFF load pattern taps on HV neutral end to vary voltage on HV side from -5% to + 5% in equal step of 2.5% each i.e. 5 taps including one normal tap position. The tested ratios shall not have more than error specified in the relevant IS from rated ratios on any of the 5 no. of taps. The rated current of the tap changes shall not be less than 300 Amps.

27.2 Tap changing mechanism shall be suitable for local/manual operation and shall be equipped with local tap changer position indicator. Necessary terminations shall be made available so as to make it SCADA compatible.

27.3 The tap changer shall be capable of permitting parallel operation with other transformers of the same type covered by this specification.

27.4 The transformer shall give full load output on all taps. The manual operating device shall be so located on the transformer that it can be operated by a man standing at the level of the transformer track, it shall be strong and robust in construction, and all rotating parts & shafts shall be covered by protective caging or covering.

## 28.0 BUSHINGS

28.1 The following type of bushing shall be provided on the transformers :-

- (a) HV Oil Impregnated Paper (OIP) anti fog type condenser bushing
- (b) LV oil communicating anti fog type solid porcelain bushing (at least 24 KV rating)

28.2 The bushings shall be suitable for heavily polluted atmosphere (anti fog type) and shall have high factors of safety against leakage to ground and shall be so located as to provide adequate electrical clearances between bushings as well as the bushings and grounded parts. Bushings of identical voltage shall be inter-changeable. All bushings shall be equipped with suitable terminals of approved type and size and all external current carrying contact surface shall be silver plated adequately. The insulation class of the neutral bushing shall be properly coordinated with insulation class of the neutral end of the winding.

- i) Each bushing shall be so coordinated with the transformer insulation that all flashovers will occur outside the tank.
- ii) All porcelain used in bushings shall be of the wet process homogeneous and free from cavities or other flaws. The glazing shall be uniform in colour and free from blisters, burs and other defects.
- iii) All bushings shall have puncture strength greater than the dry flashover value. Special adjustable arcing horns are also to be provided for all bushings. All bushings shall comply with I.S. 2099 and IS : 3347.
- iv) The tenderers are required to give the guaranteed withstand voltages for the above bushings and also furnish a calibration curve with different settings of the coordination, gap to the purchaser to decide the actual gap setting. Tenderers recommendations are also invited in this respect.
- v) The 145KV bushings shall be oil filled condenser anti-fog type and the 12KV bushings shall be of oil communicating anti-fog type solid porcelain-bushing. Bushings shall be hermetically sealed and equipped with oil level gauge.
- vi) The minimum creepage distance of all the bushings shall not be less than 25 mm per KV of the max. system voltage.
- vii) The HV&LV bushings should be placed coinciding with the centre line of the transformer rollers.
- viii) Tap for capacitance/tan delta test shall be provided.

## 29.0 **CENTRE OF GRAVITY**

The centre of gravity of the transformer shall be low and as near to the vertical central line as possible. The transformer shall be stable with or without oil. If the centre of gravity is eccentric relative to track either with or without oil, its location shall be shown separately on the layout drawing.

## 30.0 **ACCESSORIES**

30.1 Each transformer shall be provided with the following main accessories :-

Tenders shall submit the technical details of below mentioned accessories and associated items as enclosed under Schedule R-2.

- i) A dial type indicating thermometer of robust pattern mounted inside the marshalling kiosk at a convenient height to read the temperature in the hottest part of the oil and fitted with the alarm and trip contacts with a repeater to give oil temp.
- ii) A winding temperature indicator with repeater and alarm/trip.

- iii) Two magnetic type oil level gauge with low level alarm contact on a dial showing minimum; maxm. and normal oil level. The gauge shall be readable from the transformer base level.
  - iv) One oil filling valve (inlet) for main conservator tank.
  - v) One oil drain valve from main conservator tank.
  - vi) One filter valve located at the top of the tank on one side.
  - vii) One filter valve located near the bottom of the tank on the other side of transformer.
  - viii) Oil sampling valves for top, middle and bottom oil sample.
  - ix) Pressure release device of a safety valve of the chimney type with an equalizer pipe interconnecting the top of the conservator and upper most part of the safety valve should be provided to permit rise of oil in the pipe. A stop cock should also be provided in the interconnecting pipe. An air release cock shall also be fitted in a convenient position.
- The safety valve pipe shall preferably take off from the side of the transformer tank near to the tank cover and not from the top of tank cover. In case if the pipe is taking off from the top cover, arrangements shall be made to prevent the gases forming in the tank from rising into the safety valve pipe and thereby by-passing the buchholz relay.
- x) 01 set of oil/water heat exchangers with oil pumps, valves, oil/water piping, water pressure reducer, valves, pipe headers, mounting plates, hangars, hardware etc.
  - xi) Neutral formation set alongwith support insulator, neutral CT's etc. as required.
  - xii) One double float gas detector relay (Buchholz relay) with alarm and tripping contacts to detect accumulation of gas and sudden change of pressure, complete with shut off valves on both the ends and flange couplings to permit easy removal without lowering oil level in the main tank or conservator, a bleed valve for gas venting and a test valve.
  - xiii) Heat exchangers with shut off valves at top and bottom. These will have lifting lugs and oil filling and drain plugs.
  - xiv) An atmoseal type oil conservator for main tank.
  - xv) Eye bolts and lugs on all parts for ease of handling.
  - xvi) Two suitable grounding pads as G.I. flat with four studs.
  - xvii) Complete OFWF cooling fittings & accessories.
  - xviii) One set of Lightning Arrestors.

30.2 Diagram and rating plate (For ease of identification at site and stores). It is desired that in addition to diagram and rating plate as per Clause No. 15.2 of IS 2026 (Part-I), all equipments shall carry a metallic plate giving following information got marked by the manufacturers itself :

- i) Name of equipment with specification No.
- ii) Sl. No. as per the bill of material
- iii) Sl. No. of transformer
- iv) Year of order
- v) Year of manufacturing

Guaranteed as well as measured values of no load/load losses/and auxiliary losses without any plus tolerance at 75<sup>0</sup>C shall also be inscribed on the diagram and rating plate.

### 31.0 **TERMINAL CLAMPS**

31.1 Bimetallic terminal connectors for High Voltage shall be suitable for ACSR PANTHER for 145 KV bushing. The low voltage (LV) side of transformer shall be connected to the respective Generators through 11 KV isolated phase bus ducts. LV bushings shall be mounted on turrets suitable for connection to busbars in isolated phase bus ducts. The contractor shall make the arrangement for termination of the bus duct. All connectors should be suitable for horizontal as well vertical take off.

Information shall be furnished by the tenderers for following items :

- i) Name of manufacturer
- ii) Drawings of clamp
- iii) Weight of clamp
- iv) Material of clamp
- v) Testing facility for terminal connectors available at manufacturer's work as per relevant I.S.
- vi) Make of bolts, nuts, check nuts and washers

31.2 The tenderers are requested to please note that :-

- i) 132KV clamps should have at least 2 pairs of bolts on conductor as well as terminal end.
- ii) The clamp should be designed with large factor of safety and should comply in all respects of temperature rise, resistance and short circuit current with stand capacity and other conditions specified in I.S. 5561-1970.
- iii) The bolts and nuts, washers and check nuts should be hot dip galvanized.
- iv) A check nut should be provided on each bolt to avoid loosening of nuts due to vibrations etc.
- v) Bolts and nuts should be manufactured by a reputed concern.



- 31.3 The transformers shall be complete with separate marshalling box or kiosk in which all the leads from Buchholz relays, oil/winding temp. indicators and magnetic oil level gauges shall be brought out to suitable terminals. This kiosk shall be weather proof (IP55 protection class) and vermin proof and shall be provided with a front door as well as a back door so that it will be possible to open both the doors during service.

The front side shall be used to mount all the fittings, fuses, switchgears and contactors etc. and the back side for the wiring. All the fixtures will be provided with a level plate in the front as well as in the back side for identification. The terminal blocks shall be provided atleast 20% extra.

- 31.4 Necessary cable glands shall also be provided at the base of this kiosk. It shall be complete with hinges and padlock arrangement, space heater, cubicle light, fuses etc. The necessary cables between transformer and the marshalling box shall also be provided by the tenderer.

- 31.5 The equipment and accessories required with the transformer shall be suitably mounted on the transformer for ease of operation, inspection and maintenance, and the mounting details shall be subject to the approval of the purchaser. All valves shall be provided either with blind companion flanges or with pipe lugs for protection.

- 31.6 Indication, alarm and relay equipment shall have contacts suitable for operation with 220 Volts D.C. supply.

- 31.7 Any fittings accessories of apparatus which might not have been mentioned in the specifications but which are usual and necessary in the equipment of similar design and required for satisfactory **SCADA compatible** operation are to be provided by the manufacturer without extra cost. All apparatus must be complete in all details whether mentioned in the specification or not.

## 32.0 **PAINTING**

Before despatch, all steel surfaces, not under oil, shall be painted with a primary coat of anti-corrosive paint of durable nature and final two coats of dark admiralty Grey paint of good quality. The interior surface shall be painted with oil resistant paint according to the contractor's standard practice.

## 33.0 **PACKING**

- 33.1 The packing may be in accordance with the tenderer's standard practice so as to ensure safe transit by road. Special arrangements should be made to facilitate handling and to protect the projecting parts against damage in transit.

- 33.2 The transformer shall be despatched filled with oil or if necessary with inert gas with a pressure gauge and a spare gas cylinder to replenish the gas pressure in transit or during its storage at the destination until it is filled up with oil.

- 33.3 All parts shall be adequately marked to facilitate identification and erection. Boxes and crates shall be marked with the Purchase Order No. and shall have a packing list enclosed showing the parts contained therein.

33.4 Bill of Material : The suppliers shall make available a consolidated bill of material for one transformer unit complete in all respects. The bill shall be made out on drawing of A-3 size giving a serial no. for each item of fitting and accessories required for one transformer, and this no. shall be mentioned in the packing list and the challan to facilitate the cross checking of all the items by the consignee and to ensure that all the components of the transformer unit have been received.

#### 34.0 **FACTORY ASSEMBLY AND TEST**

34.1 The Transformer shall be completely assembled and tested at the factory. If the purchaser selects to send a representative all tests shall be witnessed by him. Tests shall be performed in compliance with IS 2026-1977 or latest amendment thereof.

34.2 The following tests shall be made on Generator-Transformers :-

- i) All double welds shall be tested for leaks with dry nitrogen at a pressure not less than 7 kg./sq.cms. (atmospheres).
- ii) All tanks cooling tubes, valves and other parts necessary for complete transformer shall be tested for leak and strength by applying to the completed tank filled with oil at air pressure not less than 0.7 Atmosphere for a period of 24 hours or not less than 1.0. Atmospheres for a period of six hrs. If leaks occur, the tests shall be conducted again till all leaks have been stopped.
- iii) Routine tests as per IS-2026-1977 or its latest amendment.
- iv) Temperature rise test on one unit as per IS:2026-1977.
- v) Impulse test on all limbs of HV&LV windings of one unit as per Cl. 12 of IS-2026-1977.
- vi) Zero phase sequence impedance measurement on each GT.
- vii) Regulation at rated load at 1.0, 0.9, 0.8 lagging power factor (calculated).
- viii) Exciting current at 90%, 100%, 110% and 120% of rated voltage.
- ix) Excitation losses at 90%, 100%, 110% and 120% of rated voltage measured by the average voltmeter method.
- x) Magnetic balance test on HV/LV winding on all the transformer.
- xi) Exciting current measurement on both the HV/LV winding of on all the transformer at 440 volts.
- xii) Vacuum Test

The tank shall be designed for vacuum of 760mm of Hg and shall be tested at an internal pressure of 25mm of Hg or 3.35 KN/m<sup>2</sup> (absolute) for one hour. The permanent deflection of flat plates after the vacuum has been released shall not exceed the value specified below without affecting the performance of the transformer:

Horizontal length of flat Plate (in mm)	Permanent deflection (in mm)
Upto and including 750	5.0
750 to 1250	6.5
1251 to 1750	8.0
1751 to 2000	9.5
2001 to 2250	11.0
2251 to 2500	12.5
2501 to 3000	16.0
Above 3000	19.0

35.0     **TEST AT SITE**

After erection at site, the Nigam shall carryout the following tests on transformers:-

- i)           Insulation resistance test
- ii)          Ratio and polarity test
- iii)         Di-electric test on oil

36.0     **FURTHER TESTS**

The purchaser reserves the right of having other reasonable tests carried out at his own expense either before despatch or at site to ensure that the transformer complies with the requirements of this specification.

37.0     After all tests have been completed, three certified copies of each test report shall be furnished. Each report shall supply following information : -

- i)    Complete identification data including serial no. of the Transformers.
- ii)   Method of application, where applied, duration, and interpretation of results for each test.
- iii)  Losses/Impedances corrected to 75<sup>0</sup>C

38.0     **DRAWINGS AND INSTRUCTION BOOK**

38.1     On placement of the order, the manufacturer shall supply three copies of all the drawings, which will describe the equipments in detail as per the provisions of cl. 2.6 of the instructions to tenderers, for approval.

38.2     Drawings : All the drawings are required to be furnished in A-3 size only, for proper filing and making folders having card paper covers of the same size. In case, some of the drawings cannot be prepared directly in A-3 size, these could be prepared on larger sheets and submitted for approval. These large size drawings, after approval (made in ink) shall be photographically reduced and printed in A-3 size on a plastic film only to be used as a master copy. Additional prints or photo copies on white sheets of A-3 size shall be made out from the master copy.

38.3     The size of letters and the numerical figures on the reduced drawing, shall be of 2 mm, size or more.

38.4     The wiring drawings and the general arrangement drawing, if necessary, could be splitted into more than one A-3 sheet., so that these could be understood and read correctly.

38.5     After approval the contractor shall submit to the engineer and consignee within a reasonable time but before commencement of any despatches of equipment, the following : -

- a)    3 set of prints of each approved drawing to the consignee & 5 set for the engineer of the contract.
- b)    3 set of bound copies of approved manuals for each consignee and 5 set for the Engineer of contract.
- c)    3 set of detailed bill of material for each consignee and 5 set for Engineer of Contract.
- d)    One good quality direct reading reproducible of each approved drawing and also of bill of material to Engineer of Contract.

38.6     In the event of non-supply of aforesaid drawing & manuals in the quantity and in the manner as required above, the contractor shall deduct from his bill(s) an amount equal to two (2%) of ex-works price of the equipments. This amount can, however, be claimed by the contractor only after supplying the above.

38.7 The following drawing shall be required to be supplied by the successful tenderer, on placement of the order :-

38.7.1 General Arrangement Drawings

- 1) Outline general arrangement drg. of transformer.
- 2) Details of winding and core as per schedule of technical particulars with specific mention of size of conductor in L.V. & H.V. OD/ID (or strip cross-section) of HV, LV and tap windings, and their relative placement and position.
- 3) Outline dimensions of the core and winding alongwith the weight of the active parts to be lifted for over-hauling of the transformer, showing the minimum lift required to take out the core & windings out of the transformer tank.
- 4) General arrangement of Marshalling Kiosk.
- 5) General arrangement of OFWF cooling system.
- 6) General arrangement of H.V. bushing with their electrical and mechanical characteristics.
- 7) General arrangement of LV, HV and Neutral bushings with their electrical and mechanical characteristics.
- 8) L.V. bushing without current carrying parts with make and type (porcelain part).
- 9) Foundation plan of transformer, with required cable trench position.
- 10) Bimetallic terminal connector drawings for H.V. bushings.
- 11) Braded copper strip drawing with clamping arrangement for neutral bushing.
- 12) Winding temp. indicator, oil temp. indicator, bucholz relay, silicagel breather, M.O.L.G. and pressure release device drawings.
- 13) Transportation sketch of transformer super imposed on the loading diagram of the railway wagon/track (in two views).

38.7.2 Schematic and wiring diagrams

- 1) Diagram of alarm and annunciation scheme.
- 2) Schematic diagram of marshalling kiosk.
- 3) Wiring diagram of marshalling kiosk.
- 4) Interconnection and external cabling details between marshalling kiosk and Generator Transformers including CP&RP of that unit.
- 5) Cable routing drawing showing the routes of the cables and their clamping arrangement on the transformer tank.
- 6) Erection commissioning, operation and maintenance manual alongwith descriptive literature and data on transformer construction, windings, bushings, heat exchangers, and OCTC.
- 7) Details of Automation (SCADA compatibility) schematic.
- 8) Any additional drawing which the supplier may consider necessary.

**All the drawings, i.e. elevation, side view, plan, cross sectional view etc., in Auto CAD format and manuals in PDF format, for offered item shall be submitted. Also the hard copies as per specification shall be submitted.**

**39.0 SPARES**

The tenderer shall quote separately for the spares recommended for five years normal operations. The Nigam will decide on the actual spares to be ordered on the basis of the list and the itemwise prices of spare parts.

Oil sampling pot (2 Nos.) and gas sampling pot (2 No.) shall be supplied free of cost.

**40.0 REPLACEMENT OF PARTS**

In the event of an order being placed, the successful tenderer will be required to supply all damaged, short supplied parts within the period of one month from the date of notifying them the list of all damaged/shortages by the consignees. In case the firm is unable to supply the replacement within the above period, then they should agree to refund any payment that might have been paid for the entire equipment which cannot be used as a result of loss, damages or short supplies. If this is not done, the necessary amount would be deducted either from the security or bank guarantee or their other pending bills with the Board.

**41.0 DEVIATIONS FROM SPECIFICATIONS**

Deviations from these specifications should be clearly listed and brought out separately.

**42.0 SCHEDULE OF REQUIRED DELIVERY AND PRICES**

Tenderers are requested to offer F.O.R. station of despatch deliveries matching the desired deliveries as given in the Schedule 'O' i.e. Schedule of Quoted Guaranteed Delivery complete supply of 3 No. GTs shall deemed to have been done when all requisite accessories and spares (including supply of spare, HV & LV bushings as per BOQ) are affected. The schedule of prices should be given as per online format of B.O.Q.

**43.0 ERECTION, TESTING & COMMISSIONING CHARGES**

The tenderer shall quote separately in the schedule, charges for Erection and Commissioning of transformers including dismantling & shifting of existing Generator-Transformers alongwith their terms and conditions.

**44.0 TESTING AND INSPECTION CALL**

The call for final inspection shall be given by the supplier when the goods have actually become ready in all respects in the works of manufacturer and not on the basis of anticipated date of completion. Routine test report of the goods offered for inspection will have to be submitted with inspection call letter.

A period of 2 weeks shall be allowed for the Nigam to make travel arrangements for their inspecting officer to reach their works. This period of 2 weeks will be from the date when inspection call is received by the Nigam. In case the goods are not available for inspection at the time of the arrival of the inspecting officer, the firm shall pay to Nigam a sum of Rs. 1,000/- (Rs. One Thousand Only) per day from the date of departure to the date of arrival (both inclusive) of the tenderer concerned.

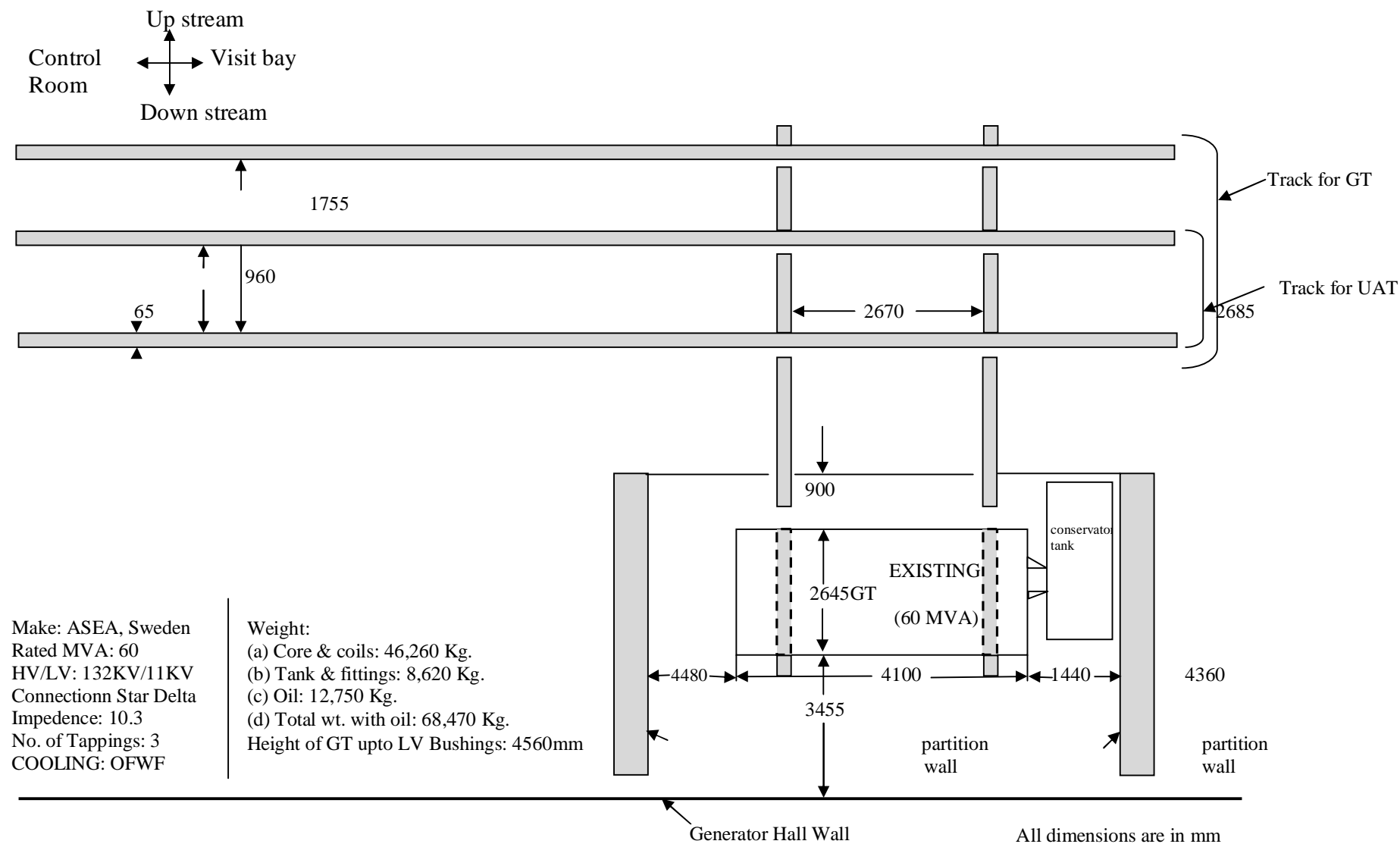
45.0 **NOTE :**

- 45.1 The tenderer is required to submit a copy of short circuit test report (not more than 5 year old) on a transformer of similar type and rating conducted at a reputed laboratory like CPRI.
- 45.2 The tenderer has to submit the calculation as per the method stipulated in IS:2026 or amendments thereof, to show the thermal short circuit capability of the transformer, due to external short circuit conditions.
- 45.3 The prevailing IEEMA price variation formula for Transformer and oil shall be applicable.
- 45.4 The supplier shall keep the purchaser informed in advance about various stages of manufacturing programme, so that arrangement can be made for stage inspection if so required.

**Details of existing Generating Transformers in Rihand Power Station, Pipri**

<b>Sl. No.</b>	<b>Desired information</b>	
1.	Technical Specifications	<p>Make : ASEA, Sweden  Rating : 60,000 KVA  HV : 132 + 2x2.5% KV, LV:11KV  Cooling : Oil immersed water cooled with forced oil circulation  Temperature rises (when max. 30<sup>0</sup>C Water temp.) :  (a) Winding by resistance : 65<sup>0</sup>C  (b) Oil by thermometer : 45<sup>0</sup>C  Impedances : 10.1% at 11/138.6 kV  10.2% at 11/135.3 kV  10.3% at 11/132.0 kV  Connection : 132 kV side-star, 11kV side-delta  Group : 42 Yd 11  Weights : (a) Core &amp; coils ..... 46,260 Kg.  (b) Tank &amp; fittings.... 8,620 Kg.  (c) Oil ..... 12,750 Kg.  Total ..... 68,470 Kg.  Quantity of circulating oil : 264 galls./min.  Quantity of circulating water : 200 galls./min.</p>
2.	General Physical Layout Diagram	<p>Overall Dimension :  Length with conservator tank and other accessories &amp; mountings: 5,800 mm  Width with accessories &amp; mountings excluding LA structure: 2,645 mm  Height from top of LV bushing to the bottom of the wheels of GT: 4,560 mm</p>
3.	Details of Tap Changer	3 Nos. off load
4.	Width of rail Spacing between the center of rails (a) on the road (b) on the GT site	<p>65 mm</p> <p>1,755 mm 2,685 mm</p>

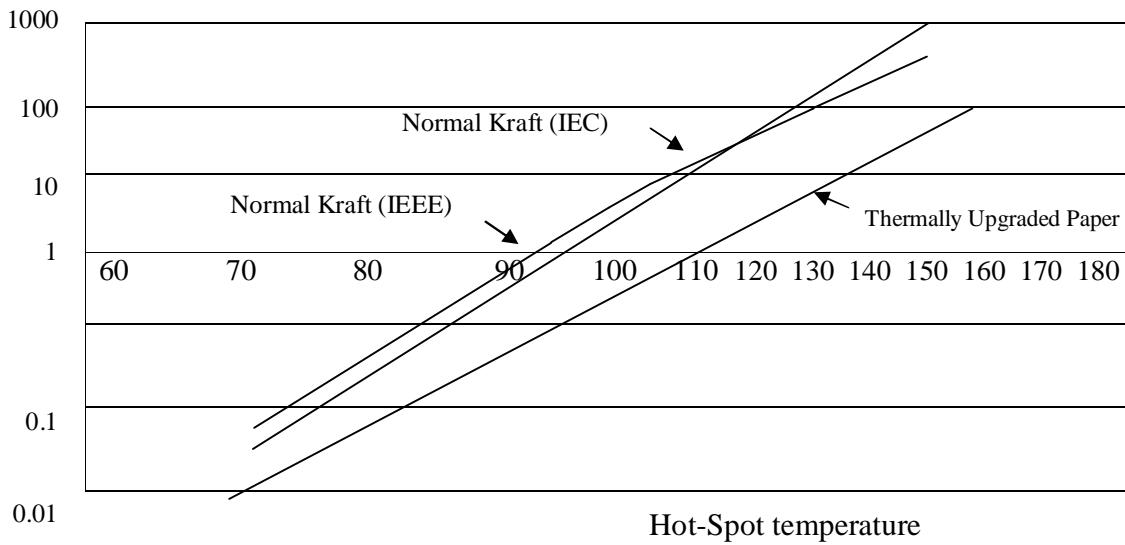
**Sketch showing approx. dimension of GT alongwith adjacent space and rails in R.P.S., Pipri**



Make: ASEA, Sweden  
Rated MVA: 60  
HV/LV: 132KV/11KV  
Connectionn Star Delta  
Impedence: 10.3  
No. of Tappings: 3  
COOLING: OFWF

Weight:  
(a) Core & coils: 46,260 Kg.  
(b) Tank & fittings: 8,620 Kg.  
(c) Oil: 12,750 Kg.  
(d) Total wt. with oil: 68,470 Kg.  
Height of GT upto LV Bushings: 4560mm





Effect of temperature on paper aging rate

### Recent development on winding temperature calculation methods

For several decades IEEE and IEC loading guides (1,2) have been providing guidelines for the calculation of the winding hottest spot temperature from data that can be conveniently measured and parameters derived from temperature rise test or manufacturer calculations. The basic calculation methods relies on the measurement of oil temperature at the top of the transformer tank (top-oil temperature) and a calculation of the temperature difference between the winding hottest spot and the top oil. This temperature rise is provided by the manufacturer, based on his modeling of oil flow and losses distribution in winding. Thereafter the hot-spot temperature can be computed for any load using the standard relation:

$$\Theta_{HS} = \Theta_{TO} \left[ \frac{I}{I_R} \right]^{2m} \quad 2m$$

Where :

$\Theta_{HS}$	=	Hot-spot temperature
$\Theta_{TO}$	=	Top-oil temperature
$\Delta\Theta_{HR}$	=	Rated hot-spot temperature rise above top oil
$I$	=	Load current
$I_R$	=	Rated current
$m$	=	Winding exponent

**International Electrotechnical Commission**  
**Glossary**

EN	thermally upgraded paper (TUP)
	<p>Cellulose-based paper which has been chemically modified to reduce the rate at which the paper decomposes. Ageing effects are reduced either by partial elimination of water forming agents (as in cyanoethylation) or by inhibiting the formation of water through the use of stabilizing agents (as in amine addition, dicyandiamide). A paper is considered as thermally upgraded if it meets the life criteria defined in ANS/IEEE C57.100; 50% retention in tensile strength after 65000 hours in a sealed tube at 110 C or any other time/temperature combination given by the equation:</p> $\text{Time (h)} = e^{\left( \frac{15000}{(\Theta_h + 273)} - 28,082 \right)} \approx 65000 \times e^{\left( \frac{15000}{(\Theta_h + 273)} - \frac{15000}{(110 + 273)} \right)}$ <p>Because the thermal upgrading chemicals used today contain nitrogen, which is not present in Kraft pulp, the degree of chemical modification is determined by testing for the amount of nitrogen present in the treated paper. Typical values for nitrogen content of thermally upgraded papers are between 1% and 4% when measured in accordance with ASTM D-982.</p> <p>NOTE This definition was approved by the IEEE Transformers Committee Task Force for the Definition of Thermally Upgraded Paper on 7 October 2003.</p>

TC/SC: 14  
Published in: IEC 60076-14, ed. 2.0 (2009-05)  
Reference number: 3.6  
Source: IEC 60076-7, 3.12

**DESCRIPTION & WORKING :**

An Aircell is a sealed envelope made out of highly resistant polyamide fabric coated with synthetic elastomers. The Aircell hangs in conservator. It is held in position by connecting flange and two straps on either side. Please see illustrative figures.

When oil level in conservator increases, Aircell gets deflated there by expelling air out and when oil level drops, Aircell inflates and allows air to come in. Thus Aircell breathes without allowing outside air to get in contact with transformer oil. There are many advantages due to introduction of Aircell in conservator.

**PACKING :** Each Aircell is suitably packed in corrugated paper box.

**MATERIAL CROSS SECTION :****SIDE EXPOSED TO OIL**

	← NITRILE RUBBER
	← TEXTILE
	← NEOPRENE AND HYPALON RUBBER

**SIDE EXPOSED TO AIR****CHARACTERISTICS OF THE MATERIAL OF CONSTRUCTION**

Characteristics	Requirement	Reference Standard
Mass of the Surface	1170 gms/m	IS 7016 (I)
Coating - Inside - Outside	Neoprene and Hypalon Nitrile	UNR – AC-03
Textile Reinforcement	Polyamide	UNR – AC-03
Resistance to perforation	400 N min	UNR – AC-03
Working temperature range	-20 <sup>0</sup> c, + 100 <sup>0</sup> c	UNR – AC-03
Resistance to Ozone for 96 hr at 40 <sup>0</sup> C with Ozone concentration 200 + 20pphm	No cracks	IS 3400 (20)
Wrap Breaking Strength	3 KN min/5cm	IS 7016 Pt 2
Wrap Breaking Strength	3 KN min/5cm	IS 7016 Pt 2
Wrap elongation at break	25% min.	IS 7016 Pt 2
Weft elongation at break	30% min.	IS 7016 Pt 2
Seam resistance	3 KN/50 x 50 mm overlap	Unirub Standard
Permeability to air at room temperature	5 x 10 cc/cm/cmhg.sec.	ASTMD 1434
Permeability to water vapour during the oil phase at 70 <sup>0</sup> C	Impermeable to water Vapour	UNR – AC – 03
Resistance of the rubber when in contact with the oil	Swelling rate % Test Values	
After immersion for 7 days at 100 <sup>0</sup> C of Tr. Oil	+ 10 max.	IS 3400 (6)
After immersion for 30 days at 100 <sup>0</sup> C of Tr. Oil	+ 12 max.	IS 3400 (6)
Variation of the shore hardness of the rubber when in contact with Tr. Oil at 100 <sup>0</sup> C,	Test Values –	
After immersion for 7 days	+ 3 max.	IS 3400 (2)
After immersion for 30 days	+ 5 max.	
Test on transformer oil		
Sludge content	0.05% max.	IS 1448 Pt 2
Acidity	0.10 max. Mg Koh/gm	IS 12177
Resistance of the metallic accessories	No discolouration	BS 903 pt A 37

**SCHEDULE OF GUARANTEED  
TECHNICAL PARTICULARS  
OF  
GENERATOR-TRANSFORMERS**

**SCHEDULE-R**  
**SCHEDULE OF GUARANTEED TECHNICAL PARTICULARS**

1.	Name of manufacturer	:	
2.	Normal continuous rating	:	67.5 MVA
3.	Normal ratio of transformation	:	11/132 KV
4.	Phase connections		
	a) H.V. Winding	:	STAR
	b) L.V. Winding	:	DELTA
	c) Vector group reference No. & Symbol	:	42 Yd11
5.	Maximum temperature rise (at 30 <sup>0</sup> C water temperature)		
	i) of oil by thermometer	:	
	ii) of winding by resistance	:	
	iii) by hot spot temperature indicator	:	
6.	Maximum permissible temperature rise	:	
7.	Limit for hot spot temperature for which the transformer is designed	:	
8.	Temperature gradient between windings	:	
9.	Voltage to earth for which the star point will be insulated	:	
10.	Type of cooling	:	OFWF
11.	Class of insulation	:	
12.	Maxm. flux density in iron at normal voltage, frequency and ratio :		
	a) Core	:	
	b) Yoke	:	
13.	Maximum current density in winding at GMR :		
	a) H.V. winding	:	
	b) L.V. winding	:	
14.	Magnetising current (H.V. side) at normal voltage	:	
15.	Power factor for magnetising current at normal voltage & frequency	:	
16.	Guaranteed maximum no load loss at normal ratio, rated frequency without any plus tolerance	:	
17.	Guaranteed maximum copper losses at normal ratio, rated output, rated voltage, rated frequency and at 75 <sup>0</sup> C average winding temperature without plus tolerance	:	

18. Auxiliary maximum consumption at rated load without any plus tolerance :
19. Efficiencies (upf) at normal ratio, rated voltage, rated frequency & 75<sup>0</sup>C average winding temperature for the outputs of :
  - i) Full load :
  - ii)  $\frac{3}{4}$  full load :
  - iii)  $\frac{1}{2}$  full load :
  - iv)  $\frac{1}{4}$  full load :
20. Resistance per phase of
  - a) H.V. winding at 75<sup>0</sup>C :
  - b) L.V. winding at 75<sup>0</sup>C :
21. Reactance per phase of
  - a) H.V. winding at 75<sup>0</sup>C :
  - b) L.V. winding at 75<sup>0</sup>C :
22. Resistance-voltage drop at 75<sup>0</sup>C average winding temperature expressed as percent of rated voltage :
23. Reactance-voltage drop expressed as percent of rated voltage at 75<sup>0</sup>C average winding temperature :
24. Impedance-voltage at 75<sup>0</sup>C average winding temperature expressed as percentage of rated voltage between H.V. & L.V. winding :
  - a) Tap No. 1 :
  - b) Tap No. 3 (normal tap) :
  - c) Tap No. 5 :
25. Regulation at full load at 75<sup>0</sup>C
  - a) Unity power factor :
  - b) 0.8 power factor (lagging) :
26. Type of transformer (core or shell) :
27. Core :
  - a) Material of core lamination and grade :
  - b) Thickness of core plates :
  - c) Whether core plates are grain oriented cold rolled :
  - d) Insulation of core lamination :
  - e) Whether insulation provided on both sides of laminated cores :
  - f) Insulation of core/bolts, washers :
  - g) Insulation of core and plates :

- h) Details of oil ducts in core :
    - i) Whether in the plane and at right angle to the plane of winding :
    - ii) Across the plane of lamination :
  - i) Details of Sub-contractor/concern where CORE cutting will be conducted :
28. Windings :
- a) Type of winding :
    - i) H.V. Winding :
    - ii) L.V. Winding :
  - b) Insulation of H.V. winding :
  - c) Insulation of L.V. winding :
  - d) Insulation between H.V. & L.V. winding :
  - e) Power frequency high-voltage tests :
    - i) Test voltage for induced over voltage withstand test on high-voltage winding :
    - ii) Test voltage for separate source voltage withstand test on low voltage windings :
    - iii) Test voltage for one minute withstand test on neutral end of :
      - i) High voltage winding :
      - ii) Low voltage winding :
    - iv) Impulse test on high voltage winding 1.2/50  $\mu$ s full wave withstand :
    - v) Impulse test on low voltage winding 1.2/50  $\mu$ s full wave withstand :
  - f) i) Number of turns in HV winding :
    - ii) Volts per turns in HV winding :
  - g) i) Number of turns in LV winding :
    - ii) Volts per turns in LV winding :
  - h) Type of axial coil supports :
    - i) High voltage winding :
    - ii) Low voltage winding :
  - i) Type of radial coil supports :
    - i) High voltage winding :
    - ii) Low voltage winding :
  - j) Whether HV windings are interleaved :

- k) Details of special arrangements (if any) made to improve stress conditions :
  - l) Size of cooling ducts :
- 29. Maximum out-of balance force in winding on short circuit at the terminals :
- 30. Dimensions of Tank (LxWxH) :
- 31. Thickness of transformer tank plate :
  - a) Sides :
  - b) Bottom :
  - c) Conservator for main tank :
- 32. Type and details of winding temperature indicator :
- 33. Buchholz relay description, range of settings, make and type :
- 34. Bushings :
  - i) Type & Make :
  - ii) Visible (Power frequency) voltage discharge test :
  - iii) Wet and dry power frequency withstand voltage :
  - iv) Dry standard lightning impulse withstand voltage :
  - v) Creepage distance in air :
  - vi) Recommended gap setting :
  - vii) Weight of assembled bushing :
  - viii) Quantity of oil :
- 35. Free volume of conservator :
- 36. Total volume of conservator :
- 37. Total volume of conservator between highest and lowest levels of oil :
- 38. Cooling System :
  - a) Type & make of pumps :
  - b) Type & make of flow-meter and indicating instruments :
- 39. Calculated time constants :
  - i) Natural cooling :
  - ii) Oil forced water forced cooling (OFWF) :



- |     |       |   |   |
|-----|-------|---|---|
| 40. | i)    | Make details of off circuit tap changing gear                                 | : |
|     | ii)   | Type and catalogue no.  | : |
|     | iii)  | Rating  |   |
|     |       | a) rated voltage  | : |
|     |       | b) rated current  | : |
|     |       | c) step voltage   | : |
|     |       | d) No. of steps/winding of which taps provided/<br>range of voltage variation | : |
|     | iv)   | Whether having separate diverter switch and tap<br>selector switch            | : |
|     | v)    | Auxiliary supply details  | : |
|     | vi)   | Parallel operation  | : |
|     | vii)  | Protective devices  | : |
|     | viii) | Approximate overall weight  | : |
|     | ix)   | Approximate overall dimensions  | : |
|     | x)    | Approximate overall quantity of oil   | : |
| 41. |       | Heat Exchanger  |   |
|     | a)    | Make  | : |
|     | b)    | Heat Exchanger Capacity   | : |
|     | c)    | No. of tubes  | : |
|     | d)    | ID & OD of tubes  | : |
|     | e)    | No. of Passes   | : |
|     | f)    | Operating Pressure (Shell Side)   | : |
|     | g)    | Operating Pressure (Tube Side)  | : |
|     | h)    | Design Temp.  | : |
|     | i)    | Oil Flow  | : |
|     | j)    | Material of Tube  | : |
|     | k)    | Connection Size   | : |
|     | l)    | Overall Dimensions  | : |
| 42. |       | Online Moisture Monitoring System   |   |
|     | (i)   | Make  | : |
|     | (ii)  | Type  | : |
|     | (iii) | Rating  | : |
| 43. |       | Weight of copper required to complete the transformer                         | : |
| 44. |       | Weight of CRGO stud required to complete the<br>transformer                   | : |
| 45. |       | Weight of fittings and parts despatched for transport                         | : |

46.	Weight of CORE	:
47.	Weight of core and windings	:
48.	Weight of the complete transformer with all fittings and oil	:
49.	Weight of the heaviest package	:
50.	Volume of oil in the transformer, complete with conservator and all accessories	:
51.	Un-tanking height	:
52.	Over all dimensions of the transformer in metres :	
	a) Max. height to top of bushings	:
	b) Overall length	:
	c) Overall breadth	:
53.	Dimensions of heaviest package (LxBxH)	:
54.	Lightening Arrestors (HV side)	:
55.	Reference standards	:

**T-33**

### **SCHEDULE R-1**

(Additional particulars to be furnished by the Tenderers)

- |    |   |   |    |
|----|---|---|----|
| 1. | Calculated copper loss in HV winding at 75 <sup>0</sup> C as calculated from winding resistance (give calculations) | : | KW |
| 2. | Calculated copper loss in LV winding at 75 <sup>0</sup> C   | : | KW |
| 3. | Total calculated copper loss at 75 <sup>0</sup> C (1+2)   | : | KW |
| 4. | Calculated stray loss at 75 <sup>0</sup> C (give calculation details)   | : | KW |
| 5. | Total calculated load loss at 75 <sup>0</sup> C (3+4)   | : | KW |
| 6. | i) Material of core   | : |    |
|    | ii) Grade of core   | : |    |
|    | iii) Thickness of core  | : |    |
|    | iv) Wt. of core (lamination)  | : |    |
|    | v) Cross sectional area of core   | : |    |
| 7. | Total calculated no load loss from core material details. Give detailed calculation                                 | : |    |

**Schedule R-2**  
**Details of associated items of Generator-Transformer**

S.N.	Description	Specification	Make	Qty.
1	HV Bushing			
2	HV Connector			
3	LV Bushing			
4	HV Neutral Bushing			
5	Lightning Arrestor HV			
6	Marshalling Box			
7	Double float type Buchholz relay			
8	Magnetic oil gauge (main cons.)			
9	Prismatic oil gauge on main conservator			
10	Tank oil gauge			
11	Diff. pressure gauge with box			
12	Winding temperature indicator			
13	Oil temperature indicator			
14	Oil flow indicator			
15	Water flow indicator			
16	Silicagel breather for conservator and explosion vent			
17	Water pressure gauge at cooler water inlet & outlet			
18	Oil pressure gauge at cooler water inlet			
19	Pump			
20	Air release plug on various fittings			
21	Roller assly. (flanged BI-DIR)			
22	Flexible expansion joint			

23	Gate type drain valve with locking arrangement & position indicator			
24	Filter valve top & bottom			
25	Terminal marking plate			
26	Gate type top & bottom sampling valve with locking arrangement & position indicator on tank			
27	Sampling valve middle			
28	Gun metal gate type shut-off valve for oil inlet to tank at bottom			
29	Valve for disconnecting oil pump & motor			
30	Main conservator shut off valve			
31	Spring loaded type pressure relief valve with trip contact			
32	Non return valve			
33	Gun metal gate type valve			
34	Gun metal, gate type shut-off valve for oil outlet from tank at top			
35	Gun metal, gate type drain valve on main cons'r			
36	Off circuit tap switch			
37	Hand operating handle for OCTC			
38	Heat exchanger			
39	By-pass valve for cooler-1&2			
40	Valve for disconnecting oil inlet to cooler			
41	Valve for disconnecting oil outlet from cooler			
42	Differential pressure gauge with trip contact between oil outlet & water inlet			
43	Dial type temperature indicator for oil & water inlet & oil outlet of cooler			
44	Pressure reducing valve in water inlet			
45	Gun metal gate type valve for water inlet			

**Schedule R-3**

**Facilities available at Bidder's works**

<b>SLNo.</b>	<b>Shop Floor Facilities</b>	<b>Declaration by the Bidder</b>
1.0	Whether Core Construction floor have de-humidifier plant	
2.0	Whether Vertical winding machine is available	
3.0	Whether winding construction area is under positive pressure	
4.0	Core lamination cutting facilities in-house or out source	
5.0	Whether Vapour Phase drying facilities are available	
6.0	Whether Testing Lab has NABL accreditation	
7.0	Whether testing laboratory is acoustically shielded	

\* Declaration shall be Specific