U.P. JAL VIDYUT NIGAM LIMITED

(A U.P. Govt. Enterprise)

TENDER SPECIFICATION NO. 01/EE(DESIGN)/2021-22
FOR PROCUREMENT OF
1 NO. 5 MVA, 132/11 KV TRANSFORMER
AND
1 NO. 132 KV, 2000 AMP.
SF6 CIRCUIT BREAKER ALONGWITH
ERECTION, TESTING & COMMISSIONING OF ABOVE
INCLUDING
DISMANTLING & SHIFTING OF EXISTING OLD TRANSFORMER AND BREAKER
AT
OBRA HOPS
(SONEBHADRA, U.P.)

To be Submitted to :
Executive Engineer (Design)
U.P. JAL VIDYUT NIGAM LTD.
Shakti Bhawan Extn., 12th Floor,
Ashok Marg, Lucknow-226001
Website : www.upjvn.org

Tender Notice No. : 01/EE(Design)/2021-22
Last date of submission e-bids online : 10.05.2021 (14:00 Hrs.)
Last date of submission of bid hardcopy : 12.05.2021 (12.00 Hrs.)
Date of Opening (Part-I) of Tender : 12.05.2021 (14:30 Hrs.)
Pre bid meeting Date : 23.04.2021 (15:00Hrs)

U.P. JAL VIDYUT NIGAM LTD.

(A Govt. of Uttar Pradesh Enterprise)

Shakti Bhawan Extn., 12th Floor, Ashok Marg, Lucknow-226001

e-Tender Notice No. 01/EE(Design)/2021-22

Online e-Tenders in two parts are invited from manufacturers or accredited representatives for Supply, Erection, Testing & Commissioning of 01 No. 5MVA Transformers & 132 KV Sf6 Breaker at Obra Hydro-electric Project, Obra, 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)
01 No. 5MVA 132/11KV Transformer & 132 KV, 2000 Ampere Sf6 Breaker for Outdoor Service for Obra HEP	3,000 + 540 = 3,540/-	Rs.50,000.00	12.05.2021

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. Part-II shall contain price bid. Tender can be downloaded from and uploaded on e-procurement website: **www.etender.up.nic.in**. Tender (Part-I) shall be opened on 12.05.2021 (at 14.30 hrs). Last date for submission of e-bids online and hardcopy of techno-commercial bids shall be 10.05.2021 (upto 14.00 hrs.) and 12.05.2021 (upto 12:00 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

Trans.C.B./Obra/T.N.01/21-22

U.P. JAL VIDYUT NIGAM LTD.

(A Govt. of Uttar Pradesh Enterprise)

12th Floor, Shakti Bhawan Extn., 14-Ashok Marg, Lucknow-226001

Website: www.upjvn.org

E-TENDER INVITING NOTICE NO. 01/EE(DESIGN)/2021-22

1.	Name of Work	Supply, Erection, Testing & Commissioning of 01 No. 5MVA 132/11KV Transformer & 132 KV, 2000 Ampere Sf6 Breaker for Outdoor Service at Obra HEP (U.P.)
2.	Period of Supply & Work	05 months for complete supply 01 month for work of Erection, Testing & Commissining of both i.e transformer & Breaker
3.	Tender No.	01/EE(DESIGN)/2021-22
4.	Last date and time for submission of E-bids (Technical and Financial) at E-procurement Website http://etender.up.nic.in	10.05.2021 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, 12th Floor, Shakti Bhawan, Lucknow	12.05.2021 upto 12:00 hrs
6.	Date and time of opening of e-bid Part-I (Technical bid)	12.05.2021 at 14:30 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., 12th Floor, Shakti Bhawan, Lucknow
9.	Address for communication	Executive Engineer (Design) U.P. Jal Vidyut Nigam Ltd., 12th Floor, Shakti Bhawan, Lucknow
10.	E-mail address	eedesignenm@upjvn.org
11.	Bid Document Cost	Rs. 3,540.00 including GST through RTGS in **U.P. Jal Vidyut Nigam Ltd., United Bank of India, Station Road Branch, Lucknow A/c No. 1499010100375. (IFSC Code UTBI0LSR563).**
12.	Earnest Money	Rs. 50,000.00 RTGS in U.P. Jal Vidyut Nigam Ltd., **United Bank of India, Station Road Branch, Lucknow A/c No. 1499010100375. (IFSC Code UTBI0LSR563) OR** Bank Gaurantee of any Nationalised Bank in the favour of **"U.P. Jal Vidyut Nigam Ltd.". Please refer Page I-9 Clause 1.4**

Note: (1) Bidders are requested to visit e-procurement website of U.P. Government 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 23.04.2021 (15:00 hrs) at UPJVNL Office, 12th Floor, Shakti Bhawan (Extn.), 14-Ashok Marg, Lucknow.

Executive Engineer (Design)

Trans.C.B./Obra/T.N.01/21-22

I N D E X

I - INSTRUCTIONS TO TENDERERS

I- INSTRUCTIONS TO e-TENDERERS

1.0 GENERAL :

e-Tenders are invited from manufacturers or accredited representatives for supply of 01 No. 5 MVA, 132/11 KV Transformer and 1 No. 132 KV, 2000 Amp. SF6 Circuit Breaker (equipped with SCADA compatible features) including work of Erection, Testing & Commissioning; dismantling & shifting of existing equipments at Obra HOPS (Pipri, Distt.-Sonebhadra) as per specifications and schedule of Quantities & Prices (B.O.Q.) from manufacturers of these equipments or their accredited representatives.

1.1 PREPARATION OF TENDER :

1.1.1 Before submission of the tender, bidders 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 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 along with undertaking of the manufacturer. If these documents are not furnished along with the tenders, the offer will be liable to be rejected summarily.

1.2.2 (a) **OPERATIONAL EXPERIENCE :**

(i) Offered (5 MVA, 132/11 KV transformer) or higher capacity transformer (132/11 KV or higher voltage class and 132 KV, 2000 Amp. SF6 Circuit Breaker or higher voltage/current 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) 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 1 No. of 5 MVA transformer or higher capacity (132/11 KV or higher voltage class) and at least 1 No. 132 KV, 2000 Amp. SF6 Circuit Breaker (or higher voltage/current class). The manufacturer must have experience of manufacturing & supply of such equipments to various State Electricity Board/Central or State PSUs/ Government Departments or other renowned power utilities.

Manufacturer must submit evidence in form of successfully executed copies of P.O. to corroborate manufacturing experience of at least 1 such equipments each. 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)

The offered (5 MVA, 132/11 KV) or higher capacity (11/132 KV or higher voltage class) and 132 KV, 2000 Amp. SF6 Circuit Breaker (or higher voltage/current 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. <u>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</u>.

(B)

(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 5-10 years trouble free operational service of Transformer and SF6 Circuit Breakers.

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. 75.00 Lakhs.

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 has 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 up loading 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. 3540.00 (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).

1.5 **Exemptions :** For EMD & tender Fees

In case of the MSME bidder following benefits will be given to bidder to promote "Micro, Small and Medium Enterprises" (MSMEs) Sector :-

1. Free of cost tender documents
2. Exemption from payment of EMD

The bidder will submit the relevant document/certificate as an evidence towards being MSME entrepreneur/supplier.

Note – Eligible MSME bidders desirous to avail above cited benefit shall have to necessarily upload valid documentary evidence for being MSME entrepreneur/supplier, against covers of EMD/Tender fee online in e-tender submission site. The copy of same shall be submitted along with hardcopy of tender as well. In absence of documentary evidence/certificate the bid shall be liable to be rejected summarily.

1.6 **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.

1.6.1 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.

1.6.2 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 **debarring the tenderer from participation in purchases by the NIGAM for one year in the first instance**.

1.7 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.

1.8 PRICE AND PRICE STRUCTURE :

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

1.8.2 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.

1.9 EVALUATION OF TENDER :

1.9.1 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.

1.9.2 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.

1.9.3 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.

1.9.4 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.

1.9.5 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.

1.9.6 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.

1.9.7 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.

1.9.8 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.

1.9.9 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.

1.9.10 The prices shall be computed inclusive of GST for comparison purpose.

1.9.11 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.

1.10 PRICE VARIATION :

1.10.1 The Tenderers are required to quote FIRM price only.

1.10.2 The component of packing and forwarding, freight and insurance charges shall also remain FIRM in all respects throughout the currency of the contract.

1.10.3 Tenderer shall also quote FIRM prices only for the spare parts, type tests, and charges for Erection, Testing and Commissioning of the equipments.

1.10.4 No price variation shall be claimed against documents to be negotiated through bank.

1.10.5 Bank charges, if any, for documents to be negotiated through bank, shall be borne by the tenderer.

1.10.6 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.

1.11 SPLITTING OF ORDER :

The Nigam reserves the right to split the order among various tenderers in any manner Nigam chooses without assigning any reasons what-so-ever.

1.12 AWARD OF CONTRACT :

1.12.1 The Nigam is not bound to accept the lowest or any tender and may reject any or all the tenders without assigning any reason.

1.12.2 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.

1.12.3 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.

1.12.4 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.

1.13 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.

1.14 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.

1.15 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.

1.16 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.

1.17 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.

1.18 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.

1.19 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.

1.20 DELIVERY : 05 months for complete supplies
01 months for work of Erection, Testing & Commissioning of both equipments

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

1.21 FOREIGN EXCHANGE :

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

1.22 PRE-BID CONFERENCE :

The firm is requested to visit Obra Hydro Power Station (3x33 MW) before Tender (Part-I) opening date so as to inspect the existing 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 e-Tenders are invited for supply of 1 No. 5 MVA, 132/11 KV Transformer and 1 No. 132 KV, 2000 Amp. SF6 Circuit Breaker (equipped with SCADA compatible features) including work of Erection, Testing & Commissioning; dismantling & shifting of existing equipments at Obra HOPS (Pipri, Distt.-Sonebhadra) as per specifications and schedule of Quantities & Prices (B.O.Q.) from manufacturers of these equipments or their accredited representatives.

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 :

	Location		OBRA HEP, Distt.-Sonebhadra
	Altitude		Not exceeding 1000 Meters
	Climatic Conditions		Hot and humid tropical climate conductive to rust and fungus growth
	(a)	Design Maximum ambient Air Temperature	50^0C
	(b)	Maximum daily average ambient Temperature	32^0C
		In Shade	47.2^0C
		In Sun	65.5^0C
	(c)	Minimum ambient Air Temperature in shade	0^0C
	(d)	Relative Humidity	100% Max. 10% Min.
	(e)	Wind Load	195 kg./sq.m.
	(f)	Seismic Level	0.3 g.
	(g)	Isocraunic Level	50
	(h)	Average annual rainfall	1200 mm

2.4 SYSTEM PARTICULARS :

(A) SWITCHYARD :

(i)	Rated system voltage	132 KV
(ii)	System frequency	50 Hz. (±5%)
(iii)	Number of phases	Three
(iv)	Neutral	Effectively Earthed

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 50 Hz effectively earthed A.C. system
(b)	Lighting fixtures space heaters and fractional horse power motors and control devices	230 V, 2 wire, 50 Hz AC supply with one point grounded
(c)	DC alarm, Control and protective devices	2 wire grounded DC supplies from station 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.
Each of the foregoing supplies will be made available by Purchaser at one terminal point for each equipment for operation of accessory and auxiliary equipment.

2.5 ERECTION, TESTING & COMMISSIONING :

The contractor shall Erect, Test & Commission the supplied 05 MVA Transformer & 132 KV SF6 Circuit Breaker at site after dismantling & shifting of existing old transformer & breaker.

2.6 DRAWINGS AND MANUALS :

2.6.1 The Contractor shall submit the following drawings & GTPs pertaining to transformer & breaker :

(a) General Arrangement drawings of the Transformers & Breakers.
(b) OIP condenser type H.V. bushing.
(c) Oil communicating type porcelain LV bushing.
(d) Basic Electrical diagram.
(e) Detailed drawing, general arrangement and schematic of marshalling box.
(f) Detailed schematic of cooling arrangement.
(g) Foundation plan
(h) Detailed dimensional drawings & descriptive literature of all the components supplied.
(i) Guaranteed Technical Particulars (GTPs).
(j) Bimetallic terminal connector for HV bushing
(k) Rating & diagram plate

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.

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 prereceipted 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. E -way bill in this regard shall be arranged by the contractor.

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: P**ayment against supplies shall be made item wise through running payment. 80% payment against supply value of each i.e. Transformer & breaker complete in all respects shall be made after receipt of the same in good condition and checking of the same at the destination site. Remaining 10% payment of the supply portion for each item i.e. transformer & Breaker shall be made on satisfactory completion of erection, testing & commissioning of the supplied item. Balance 10% payment will be made after expiry of 24 months from the date of commissioning of the transformer & breaker or 36 months from the date of receipt of the materials respectively at site.

OR

100% payment of supply portion for each item i.e Transformer & breaker against supply of each complete in all respects 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.

2.14.2 **Work Portion:**

90% payment of work portion for each i.e Transformer & breaker will be made after completion of satisfactory work for each item through running payment and balance 10% payment will be made after expiry of 24 months from the date of commissioning.

OR

100% payment of work portion for each i.e. Transformer & breaker shall be made after completion of satisfactory work for each item through running payment against submission of 10% Performance Bank Guarantee, which shall only be released after expiry of 24 months from the date of commissioning.

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 : Both items ie Transformer & Breaker shall be delivered at site within 05 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 both items i.e. transformer & breaker, 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, Hydel Obra Power Station, U.P. Jal Vidyut Nigam Ltd., Obra, Distt.: Sonebhadra (U.P.), shall be the consignee.

2.16.2 Material shall be despatched from manufacturer's works to destination i.e. Executive Engineer, Hydel Obra Power Station, Obra, 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 explicity 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 Transformer & breaker shall be 01 each 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 troubleshooting 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.: 01/EE(Design)/2021-22

From :

To

The Executive Engineer (Design)
U.P. Jal Vidyut Nigam Ltd.
12th 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 'A', 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

SCHEDULE 'B'

Tender Specification No.: 01/EE(Design)/2021-22

PREQUALIFICATION DETAILS OF THE TENDER

1. Manufacturer or accredited representative
   (a) For Manufacturer, registration with Industries Deptt. permitting manufacture is to be enclosed.*
   (b) For accredited representative, letter of authorisation from manufacturer of being accredited representative to be enclosed. *

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**
			2016-2017
			2017-2018
			2018-2019
			2019-2020
			2020-2021

* 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 quality 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.: 01/EE(Design)/2021-22

(To be executed on non-judicial stamp paper of Rs. 100/- with a revenue stamp of Rs. 1/- affixed)

Tender invited by

Executive Engineer (Design)
U.P. Jal Vidyut Nigam Limited
12th 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

SCHEDULE 'D'

Tender Specification No.: 01/EE(Design)/2021-22

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.
12th 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.: 01/EE(Design)/2021-22

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.	2016-2017 2017-2018 2018-2019 2019-2020 2020-2021	Rs._____ Rs._____ Rs._____ Rs._____ 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.	2016-2017 2017-2018 2018-2019 2019-2020 2020-2021	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.	Whether quoted Ex-works prices for Transformer are firm	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)	 ---------- ---------- ---------- ---------- ----------
27.	Bank A/c details for refund of EMD, if deposited through RTGS (electronically) in offline mode a) Bank Name b) Branch Name c) IFSC Code d) Beneficiary Name e) Beneficiary A/c No. (Scanned copy of cancelled Cheque to be enclosed)	 ---------- ---------- ---------- ---------- ----------

Full Signature

Name

Designation

Seal of the Company

Date

SCHEDULE 'F'

Tender Specification No.: 01/EE(Design)/2021-22

LIST OF DRAWING AND LITERATURE ENCLOSED WITH THE TENDER

Sl.No.	Drawing/Literature No.	Title

Signature

Name

Designation

Seal of Company Date

SCHEDULE 'G'

Tender Specification No.: 01/EE(Design)/2021-22

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.: 01/EE(Design)/2021-22

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.: 01/EE(Design)/2021-22

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

SCHEDULE 'J'

Tender Specification No.: 01/EE(Design)/2021-22

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.: 01/EE(Design)/2021-22

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.: 01/EE(Design)/2021-22

LIST OF RECOMMENDED SPECIAL TOOLS & TACKLES AND THEIR PRICES

(Tenderer shall give below a list of recommended special tools land 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.: 01/EE(Design)/2021-22

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

SCHEDULE 'N'

Tender Specification No.: 01/EE(Design)/2021-22

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 :

Date :

Signature of Bidder

Name

Designation/Status in the firm

Company Seal

SCHEDULE 'O'

Tender Specification No.: 01/EE(Design)/2021-22

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	
			Delivery Time	Erection, Testing & Commissioning Time
1.	Supply of 3 Phase 50 c/s Star/ Star 5 MVA 132/11 KV Oil immersed transformer for station supply at Hydel Obra Power Station, Obra as per technical specification complete in all respect with all accessories as specified including first filling of oil, OFF-LOAD tap changer, 10% reserve oil, set of bimetallic terminal connector for HV side ACSR Panther Conductor etc. The rates are inclusive of impulse voltage withstand and temperature rise tests as per ISS and tender specification.	1 Nos.	……..	……
2.	Supply of 132KV, 2000Amp SF6 circuit breaker for station supply at Hydel Obra Power Station, Obra as per specification complete in all respect	1 Nos.	……	…….

Note: 1) Nigam intends to procure both items i.e transformer & breaker in **5 months** time.
2) Nigam intends to Erect, Test & Commission both items i.e transformer & breaker: **01 month**

To be mandatorily filled by bidder:

1	State whether Total Time taken for supply of both items is less than or equal to 05 months ***** **:**	**Yes / No**
2	State whether Total Time taken for erection, testing & commissioning for both items is less than or equal to 01 month ***** **:**	**Yes / No**

*****_Tick whichever is applicable_

Note: Firm should submit Bar Chart depicting as to how it intends to complete the said activities

Seal of Company

Full Signature

Name

Designation

Date

SCHEDULE 'P'

Tender Specification No.: 01/EE(Design)/2021-22

CERTIFICATE OF PAST PERFORMANCE CONSISTENCY

We hereby confirm that performance of Transformers and Breakers 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

SCHEDULE 'Q'

Tender Specification No.: 01/EE(Design)/2021-22

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 :

Particular	**Financial Year ……**
Networth	Rs. ……..……

Seal of Company

Full Signature

Name

Designation

Date

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.

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 fore bearance, 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.

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.

F-4

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 form 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.

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.

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 ferrogalic 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, on 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 Contact 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 Contract form 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 occupies 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 form date of service thereof in the case of a failure, neglect, or contravention capable of being make 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 thinks 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 form 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 be 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 with holding 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, no shall his total liability for loss, damage or injury under this clause exceed the total value of the Contract.

The Contractor will indemnity 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 there-form. 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 of 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 be 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
5.0 MVA, 132/11 KV
STATION SUPPLY-TRANSFORMER
FOR
HYDEL OBRA POWER STATION
(3x33 MW)

TECHNICAL SPECIFICATION

1.0 GENERAL :

The equipment required is 132/11 KV, 5 MVA Power Transformer to be commissioned at the 132 KV switchyard of Hydel Obra Power House located at HOPS Obra (3x33 MW), Distt.-Sonebhadra (U.P.).

2.0 SCOPE :

a) The scope of the specification covers the design, manufacturing, testing and assembly at manufacturer's works before despatch, supply, delivery FOR destination of Power Transformer along with all allied equipment and erection, testing & commissioning of the transformer.

b) i) The transformer to be offered shall be complete in all respects including fixtures if any, to be embedded in the concrete at site for holding the equipment in correct position and compatible foundation/platform is to be constructed for installation of the transformer.

ii) Any item/and/or work (modifications as per site requirement) not specifically stated in these specifications, but considered necessary for trouble free operation of the transformer or accessories thereof shall be deemed to be covered in the bid prices.

3.0 CODES & STANDARDS :

All Standards, specifications and codes of practice referred to herein shall be the latest editions including all applicable official amendments & revisions as on date of opening of bid. The following standards & codes and also those mentioned elsewhere in these specifications shall be applicable :-

IS : 5	Colour for ready mix paints
IS : 335 BS-148 & IEC-296	New insulating oils for transformer (Test Procedure)
IS : 13155 (1991)	Method of Test for Carbon Type (PNA) Analysis of Mineral oils by infra Red Spectrophotometer
IS : 375	Marking & arrangement of switchgear Bus bars main connections and auxiliary wiring
IS : 1367	Hot dip galvanized coatings on threaded fasteners
IS : 2026 & IEC-76	Specification for Power Transformers
IS : 2099	Bushing for alternating voltage above 1000 V
IS : 2147	Degree of protection provided by enclosures for low voltage switchgear & control gear
IS : 2705	Current transformer
IS : 1271	Thermal evaluation and classification of electrical insulation

IS : 3347	Dimensions of porcelain transformer bushings for use in lightly polluted atmosphere
IS : 3637	Gas operated relays
IS : 3639	Fittings & accessories for power transformers
IS : 6600 & IEC-354	Guide for loading of oil immersed transformers
IS : 8603	Dimensions for porcelain transformer bushings for use in heavily polluted atmosphere (36 KV class). Dimensions for oil filled porcelain transformer bushings for use in medium polluted atmospheres
IS : 3024	Grain oriented, Electrical Steel sheet & strip
IS : 649	Methods for testing steel sheets for magnetic circuits of Power Electrical Apparatus
IS : 9434	Guide for sampling and analysis of free and dissolved gas in oil filled equipment
IS : 10028	Code of practice for selection installation & maintenance of transformers
IS : 10594	Method for evaluating the Analysis of gas
IS : 12676	Dimensions for OIP insulated condenser bushings
IEEE : 32	IEEE standard requirement terminology and test procedure for neutral grounding device
CBIP	Manual on transformers

4.0 PROJECT DETAILS :

(i)	Location		Obra HEP, Distt.-Sonebhadra
(ii)	Altitude		Not exceeding 1000 Meters
(iii)	Climatic Conditions		Hot and humid tropical climate conductive to rust and fungus growth
	(a)	Design Maximum ambient Air Temperature	50^0C
	(b)	Maximum daily average ambient Temperature	32^0C
		In Shade	47.2^0C
		In Sun	65.5^0C
	(c)	Minimum ambient Air Temperature in shade	0^0C
	(d)	Relative Humidity	100% Max. 10% Min.
	(e)	Wind Load	195 kg./sq.m.
	(f)	Seismic Level	0.3 g.
	(g)	Isocraunic Level	50
	(h)	Average annual rainfall	1200 mm

5.0 LIMITS OF TEMPERATURE RISE :

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

i)	Winding	Temperature rise 55^0C by resistance measurement.
ii)	Oil (hottest layer)	50^0C by the thermometer measurement.

5.2 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 5.1 above.

6.0 OVERLOAD CAPACITY & CONTINUOUS RATING :

a) The safe over load capacity of the transformer and the duration of overload for each type of cooling (ONAN) under maximum temperature conditions (project details) without any damage to the winding or harmful effects on the insulation shall be clearly stated in the tender, which must be as per IEC-354. (Guide for Loading of Oil Immersed Transformers).

b) The transformer shall be suitable for operation without exceeding temperature rise, winding gradient and hot spot injurious heating at any particular tapping at the rated MVA provided that the voltage does not vary by more than ±10% of the voltage corresponding to that tapping.

7.0 FREQUENCY :

The transformer shall be suitable for operation with a frequency variation of ±5% from normal 50 cycles per second without exceeding the specified temperature rise.

8.0 SUPRESSION OF HARMONICS :

The transformer shall be designed with particular attention to suppression of harmonic voltages especially the 3^{rd} and 5^{th}, Percentage of harmonics at normal voltage and at maximum system voltage shall be stated in the tender.

9.0 CAPITALIZATION OF TRANSFORMER LOSSES :

9.1 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 75^0C 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. 57,515.00 per KW of guaranteed no load loss.

ii) Rs. 47,622.00 per KW of guaranteed copper losses.

9.2 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. 57,515.00 per KW (ii) the excess of the test values of copper loss, over the corresponding guaranteed values @ Rs. 47,622.00 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.

10.0 DESIGN AND CONSTRUCTION :

(a) The transformer shall be 3-phase oil immersed type, with core type of construction, type of cooling as per 'Schedule of Requirements', with external heat exchangers as Radiators/cooler banks, shall be suitable for out door service, with adequate Ceramic Ball/spacers provided in the core/windings for circulation of oil so as to ensure proper cooling. All apparatus shall be designed to ensure satisfactory operation under such sudden variation of load and voltage as may be met with under working conditions on the system including those due to short circuits. To minimize the eddy current losses in the windings, continuous transposing of Conductor shall be used wherever required similarly for minimizing the stray losses, magnetic shield in the yoke, magnetic shunt in tank walls, bushing turrets, clamps, flitch plates etc. shall be provided wherever required. Manufacturer shall indicate the design value of eddy current losses, stray losses as a %age of load losses in the design.

(b) All materials used in the manufacture of the transformer shall be of the best quality of their respective kind, obtainable in the market and shall conform to relevant Indian Standards. The design of transformer and properties of the material used should be such as to reduce to the minimum, the risk of development of acidity in oil.

(c) Corresponding parts, liable for replacement shall be interchangeable.

(d) All outdoor apparatus, including bushing insulators with their mountings shall be designed so as to avoid pockets, in which water can collect. Means shall be provided for easy lubrication of all bearings and wherever necessary, if any mechanism or moving part that is not oil immersed.

10.1 CORE AND FLUX DENSITY :

i) The transformer should be so designed that the working flux density in any part of the core and yoke of the transformer at normal voltage and frequency shall be such that the flux density in over voltage condition (considering voltage and frequency variation not exceeding the rated v/f ratio by 10%) shall not exceed 1.5 Tesla. For consideration of overfluxing, the transformer shall be

suitable for continuous operation for overfluxing factor upto 1.1, this factor being v/v_m x f_n/f, where v & f are the system voltage & frequency respectively, v_m is mean system voltage and f_n is rated system frequency. Tenders with higher flux density than specified shall not be considered.

ii) 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

iii) The core shall be built up with thin laminations of high grade, non-ageing, PRIME GRADE low loss, high permeability, cold rolled super grain oriented silicon steel, known as HIB Grade CRGO or superior grade CRGO steels of maximum 0.27 mm or low lamination thickness especially suitable for transformer core. The tenderer should specify which grade of HIB is being used.

iv) After being sheared, the laminations shall be treated to remove all burns. They shall be coated with a baked enamel/carlite insulation coating. The insulation shall be inert to the action of hot transformer oil and shall be perfectly adhesive. Paper and varnish insulation shall not be accepted. Particulars of proposed insulation shall be stated in the tender. Laminations shall be checked for burns during stage inspection.

v) The core shall be rigidly clamped and/or bolted to ensure adequate mechanical strength and to prevent vibrations during operation. The bolts used in the assembly of the core shall be suitably insulated and the clamping structure shall be so constructed that the eddy currents will be minimum.

vi) Construction of the core shall be such that number of steps in the limb and yoke shall be matching and dimensionally identical to minimize the effect of cross fluxing and better mechanical strength.

vii) The core shall be provided with lugs suitable for lifting the complete core and coil assembly of transformer. The core and coils shall be so fixed in the tank that its shifting will not occur when the transformer is moved or when a short circuit occurs.

viii) The design of magnetic circuit shall be such as to avoid static discharges, development of short circuit paths within itself or to the earthing clamping structure and the production of flux components at right angles to the plane of the lamination which may cause local heating.

ix) Every care shall be exercised in the selection, treatment and handling of core steel to ensure that the laminations are flat and that finally assembled core is free from distortions.

x) The supporting framework of the core shall be so designed as to avoid the presence of pockets, which would prevent complete emptying of the tank through the drain valve or cause trapping of air during filling.

xi) Oil ducts, where necessary should be formed across/along the plane of the lamination and be given a suitable slope to assist oil circulation. The overall design of core and winding should be such that free flow of oil is not obstructed.

xii) The framework and clamping arrangement shall be earthed by connecting to the tank body through a copper strip. Yoke bolt area should be compensated if bolts are used for fastening of the core. Also fitch area will not be counted in core area.

xiii) The insulation of core to bolts and core to clamp plates wherever provided shall be able to withstand a voltage of 2KV (RMS) for one minute.

xiv) Core and windings shall be capable of withstanding shocks during transport, installation, service and adequate provision shall be made to prevent movement of core and winding relative to tank during these conditions.

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

xvi) The name of the core material must be mentioned in the tender. The successful tenderer shall be required to furnish magnetization curves of the core material/design calculations and such other data/documents deemed fit by the Purchaser for being satisfied that flux density is as desired.

xvii) Purchaser shall inspect the built-up core for verification of flux density for which all facilities shall be provided. The purchaser shall inspect/test the core material for various tests as per relevant IEC/IS to ensure quality. Core may also be inspected during horizontal assembly, built-up assembly.

NOTES

i) Yoke bolt area and fitch plate areas shall not be counted in the net core area if these are provided for fastening of core.

ii) The design of limb and yoke shall so co-ordinate that there is no cross fluxing at the joints.

10.2 WINDING :

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.

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.

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.

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.

10.3 REINFORCED INSULATION :

At each end of HV winding an electrostatic shield and/or cap and ring shall be provided so as to increase the ratio of the electrostatic capacity between turns as compared with the electrostatic capacity of the high voltage winding to earth and to the low voltage winding. The HV winding shall be preferably be interleaved.

10.4 CURRENT DENSITY :

The current density of HV winding & LV winding shall be specified by the bidder in the GTP.

10.5 INSULATION LEVELS :

10.5.1 The insulating material to be used, shall be of Class-“A” as specified in the latest edition of IS: 1271.

10.5.2 The dielectric strength of windings insulation and of the bushings shall conform to values given in IS: 2026/1981 Part-III amended up to date except for the changes made in this specification.

10.5.3 The impulse test and power frequency test voltage for 132/11kV class Power transformer would be as under:-

Rated system voltage (KV)	Highest system voltage (KV)	1.2/50 us positive impulse withstand voltage of line end (KV peak)	One minute PF withstand voltage	
			Line end (KV)	Neutral end (KV)
11	12	95	38	38
132	145	650	280	38

The provision of note under clause 5 of IS: 2026 (Part-III)-1981 should be kept in view while offering this parameter. The star connected windings of the transformer may have graded insulation category for HV winding.

10.6 SHORT CIRCUIT WITHSTAND CAPABILITY :

Transformer shall be designed and constructed to withstand without damage the thermal effects on external short circuits for 2 seconds under conditions specified in IS:2026 (Part-I) – 1977 and Dynamic withstand ability for 0.25 seconds as per Clause 4.2.5 of IEC 60076-5.

The transformers shall be provided with separate tapping coil to limit the short circuit forces. The position of the tapping coil shall be so arranged that at extreme negative tap, the percentage regulation is less than that at normal tap.

10.7 TANK (CONVENTIONAL TYPE)

The transformer tank and cover shall be air tight and shall be fabricated from good commercial grade low carbon steel suitable for welding (IS:1977/IS:2062) and of adequate thickness. The transformer tank shall be of welded construction & stiffeners provided where necessary. All seams shall be welded and where practicable they shall be double welded. Transformer with cooling pressure (normal pressure plus 35 KN/ Sq.m measured at the base of tank) and at room temperature. The tank cover shall be bolted to the tank and the transformer design shall be such that it shall be possible to move the complete transformer unit by skidding in any direction without injury when using plates or rails.

Man holes with welded flange and bolted covers shall be provided on the tank cover. The man holes shall be of sufficient size to afford easy access to the lower ends of bushings, terminals, etc.

All bolted connections to the tank and connections between sections of the tank shall be provided with suitable flanges, with properly spaced bolts and suitable oil tight gaskets which shall give satisfactory service under operating conditions.

The thickness of M.S. plate for bottom, sides and top of the tank shall be adequate in conformance to the latest CBIP recommendations.

The transformer tank alongwith radiators and other accessories shall be tested for vacuum and pressure test as per CBIP recommendations.

Special attention shall be given to the methods of making the hot oil tight joints between the tank and cover as well as between the cover and the bushings and 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, means shall be provided to prevent over compression.

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

Lifting eyes or lugs shall be provided on all parts of the transformer requiring independent handling during assembly or dismantlement. 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 by using hydraulic or screw jacks.

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 and damages or distortion.

All bolts and nuts used in connection with tank and fittings shall be galvanized/zinc plated.

The tank shall be provided with suitable lugs for the purpose of grounding with a mild steel flat.

The main body, radiators/coolers shall be capable of withstanding vacuum test as per CBIP manual when empty of oil.

In addition, the design of tank, its shape, proportions, weight of material and construction shall be such as to best facilitate oil circulation and to ensure against transmission or magnification of noise or vibration which might be injurious or objectionable.

As far as possible, the transformer tank and its accessories shall be designed without pockets wherein gasses may collect. Where pockets cannot be avoided, pipes shall be provided to vent the gas in to the main Buchholz relay pipe. The vent pipes shall have a minimum inside diameter of 15mm except for short branch pipes which may have 6mm minimum inside diameter.

The tank cover shall be provided with three pockets for mercury in glass thermometers and two pockets for the bulbs of oil and winding temperature indicators. Protection shall be provided where necessary, for each capillary tube. The thermometer pockets shall be fitted with captive screwed top covers to prevent ingress of water. The pockets shall be located in the position of maximum oil temperature at CMR and it shall be possible to remove the instrument bulbs without lowering the oil in the transformer tank. Lugs on top cover shall be so positioned that tank cover remains horizontal while lifting.

The transformer tank shall be fitted with the following valves/plugs/gauge with standard screw connections for external piping :

i. One filter cum oil drain valve with plug or blanking flange and so placed as to connections for external piping.

ii. One no. top filter valve, near the top of the tank diagonally opposite to filter cum drain valve.

iii. Three robust sampling valves with spouts suitable for taking samples of top, middle and bottom oil. The top and middle sampling valves shall be brought down by internal pipe connections. Suitable name plates shall be affixed to the sampling valves. The sampling device shall not be fitted on the filter valve.

iv. At least two Nos. air release plugs on top of cover, suitably located.

v. One pressure relief valve to operate at a pressure below the test pressure for the tank.

vi. Suitable no. of jacking bolts shall be provided on tank cover, inspection covers to facilitate moving of the transformer and they shall be suitably braced in the vertical direction so that bending does not occur when the pull has a vertical component.

The transformer tank should be provided with prismatic oil level gauge duly protected from external injury to show the transformer oil level.

10.8 COOLING :

The transformer shall be provided with ONAN cooling. The ONAN cooling of the transformer shall be by natural circulation of air while the circulation of oil shall be affected by natural convection, the maximum oil flow assumed by a method whereby the return flow of cooled oil is made to enter the tank on a level with the bottom of the hot columns of oil thus, avoiding center heads of cold oil at the bottom of the tank. Out flow shall be arranged to coincide as nearly as possible with the hot oil level at the top of the tank so that the total available difference will be fully employed in circulation of the oil round the shortest possible paths.

Winding of the transformer shall be designed to deliver continuously rated MVA with ONAN cooling. The transformer shall be provided with minimum two completely independent groups of radiators/cooler banks (each of 60% capacity). The bidder must submit Outline General Arrangement Drawing of offered transformer with Part-I of the tender.

The transformer shall be capable of delivering the rated output continuously with groups of coolers/radiators mentioned above in service without exceeding the specified temperature rise.

The supply, controls & piping of each group of coolers shall be completely independent of those of other group so that either group of coolers can be taken out of the service for maintenance, with the transformer & other group of coolers being in service.

The coolers shall be designed to withstand the pressure conditions specified for the tank and shall be designed so as to be accessible for cleaning and painting to prevent accumulation of water on the outer surfaces.

The connection pipe between tank and the cooler units shall be connected by machined steel flanges welded to the cooler units and the tank and provided with gaskets to ensure no leakage what so ever. At each cooler unit connection, there shall be provision on the tank, an indicating shut off valve, which can be fastened in either open or close positions. Separate oil tight blank flange shall be provided for each tank connection for use when the cooler unit is detached.

In addition to above, each cooler shall be provided with the following :-

i) A drain valve at lowest point.

ii) A thermometer pocket fitted with a captive screwed cap on the inlet and outlet oil branches.

iii) A filter valve at the top and bottom.

iv) Air release plug at the top.

v) Inlet/outlet pipe for transformer tank for radiator shall be tapped from opposite side of the tank for better circulation.

vi) Pipes and circular bends/elbows shall only be used.

A suitable expansion piece shall be provided in each oil pipe connection between the transformer and the tank mounted oil coolers/if required.

Provision shall be made in each cooler/radiators bank header for installing 1 No. radiators on each side, if required.

The power supply available shall be 415V, 3 phase, 4 wire & all the mechanism should be designed accordingly.

10.9 OIL CONSERVATOR (AIR CELL TYPE)

i) An oil conservator tank complete with sump, filling hole and drain valve shall be mouted above the radiators and located so as not to obstruct bare connections taken off from the transformer terminals.

ii) The capacity of the conservator tank shall be adequate to meet the requirements of expansion of the total cold oil volume in the transformer and cooling equipment from minimum ambient temperature of minus 5 deg. C. to 115 deg. C.

iii) The minimum indicated oil level shall be with the feed pipe from main tank cover, under not less than 15mm depth of oil and the indicated range of oil level shall be from minimum to maximum.

iv) One magnetic type oil level gauge with alarm contacts shall be mounted at a convenient height to be read from ground level. Prismatic type oil level gauge shall also be provided.

v) Oil level at 30 deg. C. shall be marked on the gauge.

vi) The conservator tank shall have one oil filling hole with cap at the top and drain valve of appropriate size at the bottom. A shut of valve shall be provided at the conservator to cut off oil supply to the transformer.

vii) The conservator tank will be designed in such a way that the same can withstand strong wind pressures by adding adequate stiffeners if necessary.

viii) Each conservator shall be fitted with a double compartment breather with oil seal in which silicagel is the dehydrating agent and designed so that:-

a) The passage of air is through the silicagel.

b) The external atmosphere is not continually in contact with the silicagel.

c) The moisture absorption is indicated by a change in colour of the tinned crystals and can be daily observed from distance.

d) All breathers shall be mounted at approximately 1400mm above ground level.

e) The breather should be made of superior quality see through material and should consist of two compartments placed in series. (Capacity 2x100%)

f) In addition to M.O.G., prismatic type oil gauge shall also be provided.

g) The conservator shall be of air cell type having provision for the rubberized air cell so that air does not come in contact with oil in the conservator.

h) One end plate of the conservator shall be bolted so that it can be removed for cleaning purposes.

10.10 INSULATING OIL :

(i) Sufficient insulating oil of Nepthenic type (made from Nepthenic crude) conforming to IS:335 shall be supplied for first filling of the transformer at site.

(ii) 10% extra oil of the total quantity of oil shall also be supplied along with the transformer.

(iii) In case the transformer is to be supplied gas filled, particular attention shall be paid to deliver the oil at site free from moisture and of uniform quality through out in non-returnable epoxy coated steel drums.

(iv) The quantity of oil for first filling of transformer shall be stated in tender, along with trademark of the oil to be supplied.

(v) Use of inhibitors in oil shall not be resorted to.

10.11 BUSHINGS, INSULATORS AND TERMINALS :

Transformer shall be fitted with bushing insulators as follows :-

132/11 KV 5 MVA Transformer shall be fitted with bushing insulators as follows:-

a)	LV-N bushing	**:**	36 KV Class, oil communicating Type porcelain bushing of 630 A rating
b)	LV bushing	**:**	36 KV Class, oil communicating Type porcelain bushing of 630 A rating
c)	HV bushing	**:**	145 KV class, 800A, OIL condenser bushing
d)	HV-N bushing	**:**	36KV Class, oil communicating type Porcelain bushing of 630A rating

i) An oil gauge, preferably of prismatic type shall be provided in the bushing to indicate that correct level is maintained.

ii) The electrical characteristics of bushings shall be in accordance with IS: 3347 and IS: 2099.

iii) 132KV side bushings shall be suitable for single ACSR Panther conductor. All bushings shall be equipped with suitable terminals of approved type and size and all external current carrying surfaces shall be adequately silver plated. All ends as well as all tapings on the windings shall be brought to terminals. In case of connection required outside the tank these shall be brought out to their respective terminals through well insulated bushings which shall be detachable and replaceable without disturbing the internal connections. Bushings which pass through the cover shall be removable without disturbing the transformer cover. Any change, if required shall be intimated to successful bidder.

iv) The bushings shall have high factor of safety against leakage to ground and shall be so located as to provide adequate electrical clearances between bushings of various voltages and between bushings and grounded parts.

v) Bushings of identical voltage shall be interchangeable. The insulating class of the high voltage neutral bushing shall be properly coordinated with the insulation class of neutral of the high voltage winding.

vi) Clamps and fittings made of steel or malleable iron shall be galvanized.

vii) Each bushing shall be so coordinated with the transformer insulation that all flash-over will occur outside the tank. All bushings shall have puncture strength greater than dry flash over value.

viii) Any stress shied shall be considered as integral part of bushing assembly.

ix) Short time current withstand capacity of Bushing shall be 25 time of rated current for 2 seconds.

x) Oil conservator tanks for main transformer, transformer bushing shall be capable to take care of expansion up to 115 deg C.

xi) Provision of BCT having variable tap is required for compensation to arrive at correct hot spot temperature to be indicated through WTI.

xii) Provision of suitable test point in the condenser bushing for measurement of tan delta and capacitance may be made.

10.12 FILTER ARRANGEMENT :

Suitable provision shall be provided on the transformer for connecting the filter arrangement. Two number shut-off valves shall also be provided at the bottom.

11.0 TAPPING :

The power transformers should be provided with the OFF Load Tap Changers having Manual control. The tapings may be provided on HV winding for variation from -10% to +10% in equal steps of 2.5% to keep LV side voltage constant.

11.1 TAPPING & OFF CIRCUIT TAP :

11.1.1 The transformer shall be fitted with Off Circuit Tap Changer with HV variations from -10% to +10% equal in 8 steps of 2.5% each.

11.1.2 The transformer shall be provided with rotary type Off Circuit Tap Changing switch with off circuit links for carrying its effective ratio of transformation while the transformer is de-energized, without producing phase displacement.

11.1.3 The off circuit switch handle shall be provided with a locking arrangement along with tap position indicator, thus enabling the switch to be locked in position and its operation can be done by a man standing at ground level.

11.1.4 A warning plate, indicating that the switch shall be operated only when the transformer is de-energized, shall be fitted. The taps shall be so designed that the transformer gives full load output on all taps without exceeding the limits of guaranteed temperature rise in oil, winding and hot spot temperature.

11.1.5 The current rating of the tap changer contacts shall be one step higher than the maximum current, which shall be passing through them at the lowest tap. A permanent legible diagram plate, showing position and designation of each terminal to achieve voltage steps shall be fitted.

11.1.6 The tap changing mechanism shall be of strong construction and shall be provided with low resistance contacts under condition of external short circuit. Tap changing equipment should be capable of carrying the same current as the transformer windings.

12.0 ELECTRICAL CLEARANCES :

The electrical clearances in air between live conductive parts to each structure shall be as under :

Nominal System Voltage (KV)	Testing Voltage Impulse (KVP)	Clearances	
		Phase to Phase (mm)	Phase to Earth (mm)
132	650	*	*
11	95	*	*

*** As per BS : 162**

13.0 TOLERANCES :

Various tolerances on technical parameter shall be as under :

i. **Impedance :**

Maximum tolerances allowed on impedances at all taps shall be as per IS:2026 (Latest Edition).

ii) **Losses :**

No positive tolerance shall be allowed on guaranteed no load losses and load losses individually at rated voltage, frequency, current, principal tap and 75^0C temp.

iii) **Temperature Rise Test :**

No positive tolerance shall be allowed on temperature rise of oil, winding, winding temperature gradient and hot spot temperature than the guaranteed values.

iv) **Weights :**

No negative tolerance shall be allowed on weight of copper, weight of CRGO & weight of oil etc.

v) Transformer shall be tested for overload conditions as specified in IEC: 354/1993, which shall be read with IEC: 76/1993.

14.0 ANTI EARTH QUAKE CLAMPING DEVICE :

To prevent transformer movement during earthquake, a clamping, device shall be provided for fixing the transformer to the foundations. The supplier shall supply necessary bolts for embedding in the concrete. The arrangement shall be such that the transformer can be fixed to or unfastened from these bolts as desired. The fixing of the transformer to the foundation shall be designed to withstand seismic events to the extends that a static coefficient of 0.3g applied in the direction of least resistance to that of loading will not cause the transformer or clamping device as well as bolts to be overstressed.

15.0 EARTHING TERMINALS :

Two earthing pads suitable for connecting 50x8 mm mild steel flat shall be provided at positions close to the two diagonally opposite bottom corners of tank. These grounding terminals shall be suitable for bolted connection. Two earthing terminals shall also be provided each on marshalling box and any other equipment mounted separately.

16.0 UNDER CARRIAGE :

The transformer shall be supported on a strong structural steel base equipped with forged steel or cast steel, single flanged, bi-directional wheels suitable for moving the transformer completely filled with oil. Jacking pads shall be provided to make it possible to change the direction of wheel through 90 degree when the transformer is lifted on jacks and permit movement of the transformer both in the longitudinal and transverse direction. Means shall be provided for locking the swivel movement in position parallel to and at right angles to longitudinal axis of the tank.

17.0 CENTRE OF GRAVITY :

The center of gravity of the assembled transformer shall be low and as near the vertical center line as possible. The transformer shall be stable with or without oil. If the center of gravity is eccentric relative to track either with or without oil its location shall be shown on the G.A. drawing.

18.0 JOINTS, GASKETS AND VALVES :

All gaskets used for making oil tight joints shall be of proven material such as granulated cork bonded with synthetic rubber. The material used should not deteriorate under the action of hot oil.

All valves shall be of gun metal or of cast steel. They shall be of full way type with internal screw and shall open when turned counter clockwise when facing the hand wheel. Means shall be provided for padlocking the valves in the open and closed position. Every valve shall be provided with flanges having machined faces. The drilling of valves flanges shall comply with the requirement of IS: 2026/IS: 3639.

19.0 BOLTS AND NUTS :

Steel bolts and nuts exposed to atmosphere shall have suitable finish like cadmium plating or zinc coating.

All nuts, bolts and pins shall be locked in position with exception of those which may require frequent operation. All bolts, nuts and washers in contact with non-ferrous parts, which carry current, shall be phosphors bronze where the transfer of current is through bolts.

If bolts and nuts are placed in such a way that they are inaccessible by means of ordinary spanners, suitable special spanners shall be provided by the supplier.

20.0 CLEANING AND PAINTING :

While in service, the equipment will be subjected to extremely severe exposure to atmosphere, pressure, high humidity and to long periods of high ambient temperature. All corrodible parts and surfaces shall be of such material and shall be provided with such protective finish that no part of the installed equipment is injuriously effected by atmospheric conditions.

The whole of the exposed portion except bright parts shall be thoroughly cleaned by sand blasting and painted with two primary and two secondary coats of approved rust resisting paint in light grey colour (shade 631 of IS:5). Inside surface of tank shall be clean, smooth, free from void and of best construction. The nature of coatings provided inside shall be specified and it shall be ensured that it does not react with transformer oil or deteriorates its electrical / chemical properties.

21.0 MARSHALLING BOX :

A sheet steel of at least 3 mm thick, vermin & weather proof (for outdoor installation), marshalling box confirming to IP-58 protection (minimum) with water tight, hinged and padlocked door of suitable construction shall be supplied. The box shall have sloping roof.

The marshalling box shall accommodate the following equipment:-

a) Temperature indicators for WTI & OTI.

b) Terminal blocks and gland plates for incoming and outgoing cables and control/ protection equipment.

All the above equipment except (b) shall be mounted on panels and back of panel wiring shall be used for inter-connection. The temperature indicators shall be so mounted that the dials are not more than 1600 mm from the ground level and the door(s) of the compartment(s) shall be provided with glazed window of adequate size.

To prevent internal condensation, an approved type of metal clad heater with thermostat controlled by water tight single pole iron clad rotary switch mounted on outside of the box shall be provided. The ventilation louvers, suitably padded with felt, shall also be provided. The louvers shall be provided with suitable felt pads to prevent ingress of dust. Suitable number of 4-20 mA contacts shall be provided for SCADA interface.

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

22.0 CONTROL CONNECTION, INSTRUMENT WIRING, TERMINAL BOARDS & FUSES :

All wiring connections, terminal blocks, fuses and links shall be suitable for tropical atmosphere. Any wiring liable to be in contact with oil shall have oil resisting insulation. There shall be no possibility of oil entering connection boxes used for cables and wiring. When 415 volts connections are taken through junction boxes or marshalling boxes, they shall be adequately screened and 415 volts danger notice must be affixed to the outside of junction boxes or marshalling boxes. All wiring shall be in accordance with relevant ISS. All wiring shall be with stranded copper of 1100 volts grade and size not less than 4.0 Sq.mm for CT leads and not less than 2.5 Sq.mm for other connections. All wiring cables shall carry ISI marking / certified.

All wires on panels and all multicore cables shall have ferrules which bear the same number at both ends. The same ferrule number shall not be used on wires in different circuits, on the same panel. Ferrules shall be of white insulating material and shall be provided with glossy finish to prevent adhesion of dirt. They shall be clearly and durably marked in black and shall not be affected by dampness or oil. Wiring shall in general be accommodated on sides of the box and wires for each circuit shall be separately grounded. Back of panel wiring shall be arranged so that access to the connecting stems of relays and other apparatus is not impeded. All the cables and capillary tubes of OTI & WTI etc. are to be wired properly on cable trays with the help of suitable cleats upto the marshalling box. The cables trays shall be kept minimum 100 mm from the tank body to avoid excessive heating of cables/wires.

Wires shall not be jointed or tied between terminal points. Wherever possible all circuits in which the voltage exceeds 125 volts, shall be kept physically separated from the remaining wiring. The function of each circuit/equipment shall be marked on the associated circuit/equipment.

Where apparatus is mounted on panels, all metal cases shall be separately earthed by means of copper wire.

No live metal part shall be exposed at the back of terminal boards.

All fuses shall be of HRC cartridge type and fuses and links shall be labeled.

All wiring diagrams for control panels shall preferably be drawn as viewed from the back.

The overall design of wiring shall be such that various wires and ends of the same wire can be traced easily and there is convenience to access the terminations and ferrule number shall be readable with convenience. Terminal blocks shall have 20% spare terminals.

23.0 DRYING OUT AND ERECTION :

The transformer shall be dried out by an appropriate method at the manufacturer's works and so arranged for transportation and storage that it may be put into service without further drying out at site. For any subsequent drying which may be necessary at site the manufacturer shall give details of the method recommended for using the same.

The transformer shall be designed to withstand pressure and vacuum tests as specified by CBIP specification for power and distribution transformer.

i) Vacuum of 760mm of mercury as per CBIP manual applied to tank and cooling equipment when empty of oil.

ii) Pressure of 1 Kg/cm2 of mercury applied to tank and cooling equipment when empty of oil.

iii) Pressure of 0.357 Kg/cm2 to be applied at conservator on fully assembled transformer when full of oil.

Clear instructions shall be given in the maintenance manual regarding special precautionary measures which must be taken before applying the specified vacuum treatments. The maximum vacuum which the complete transformer filled with oil, can safely withstand without any special precautionary measures being taken shall also be stated in the maintenance manual. The bushing shall be capable of withstanding vacuum operation when drying the transformer.

24.0 APPROVAL OF DESIGNS (GTPs /DRAWINGS) :

The successful bidder shall finalize the design and furnish to the purchaser the following data complete with calculations for approval before starting the manufacturing:-

24.1 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.

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

24.3 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.

24.4 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.

24.5 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.

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

24.6.1 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 ONAN 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.

24.6.2 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.
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) 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.

25.0 PLACE OF MANUFACTURE, TESTING AND INSPECTION :

The Tenderer shall state in his tender, the place(s) of manufacture, testing and inspection of various portions of the work included in the tender.

The Purchaser or his duly authorized representative or Third Party Inspector (authorised by Purchaser) shall have access to the manufacturer's works at any time during working hours for the purpose of inspecting the manufacture & testing of materials, equipment and competed plant and the supplier shall provide necessary facilities for inspection.

26.0 INSPECTION AND TESTING :

A) STAGE INSPECTION :

The supplier shall serve advance intimation regarding date when the manufacture of the material is about to start to enable the purchaser to depute his representative(s) for carrying out inspection of raw material, manufacturing process etc. Inspection shall be carried out at various stages such as transformer tank construction, verification of important parameters like copper weight, winding size, core material/dimensions etc.

All major raw material items should be bought from manufacturers or through their accredited marketing organization and not through any agent/secondary market. Supplier should furnish documentary proof of their original source during stage inspection along with test certificates. Stage inspection of built up core (in horizontal/vertical position), windings, tank and radiators may be carried out by the representative of purchaser at the works of the contractor.

B) ROUTINE TESTING :

The transformer shall be completely assembled and all routine tests conducted at the factory in the presence of purchase's representative(s), as per IS: 2026. In addition the following tests on transformer oil shall be carried out before filling the same in transformer to ensure the quality of oil:-

(i) BDV

(ii) PPM

(iii) Resistivity at 90deg C

(iv) Tan delta

C) TYPE TESTING :

Following type tests and overload with stand capacity as per IEC-354 shall be carried out as per IEC-76/IEC-354 & IS: 2026 on transformer.

i) Temp. Rise Test with 2x50% coolers only on the transformer.

ii) Impulse Voltage Withstand Test with chopped impulse on any one phase (HV & LV winding).

Supplier shall submit in house test certificates at least 15 days in advance for final testing of transformer. For testing of transformer, all measuring instruments shall be of highest efficiency and best quality. These shall be got calibrated from NABL/Govt. accredited Agency.

All tests shall be carried out in the presence of the purchaser and/or Third Party Inspector (s) before dispatching the material. Test certificates in triplicate will be submitted to the purchaser for approval. No material shall be dispatched without prior inspection and approval of test certificates unless otherwise agreed to. Type and routine test certificates of all bought out items from recognized testing agency shall be submitted for approval before commencing supplies. Only fully assembled transformer including mounting of radiators shall be put up for final inspection.

27.0 FOUNDATION & FIXINGS :

All plant and equipment shall be provided with a complete set of foundation bolts, washers, nuts, plates and other fixtures as may be required and these shall be supplied by the supplier. These fittings shall be fixed by the purchaser in the foundations, unless otherwise specified. All foundations bolts, fixtures etc. shall be supplied as soon as possible after the contract drawings have been approved. Civil works related to construction f foundation shall be in the scope of contractor.

28.0 PACKING, DESPATCH AND DELIVERY :

The supplier shall be responsible for suitable packing of all equipment and marking of the consignments so as to avoid any damage during transit, storage and to ensure correct despatch to the destination. The LV bushings if mounted on the transformer during transportation should be suitably protected with Steel Plate Cover. Damages to the equipment due to improper packing shall be to supplier’s account. All parts requiring protection from moisture shall be especially packed to prevent ingress of moisture. No parts of any kind shall be packed inside other larger parts. Heavy parts shall be so mounted that there is no difficulty in attaching slings etc. for unloading at destination.

All parts shall be adequately marked to facilitate field erection. Boxes and crates shall be marked with contract number and shall have a packing list enclosed, showing the parts contained therein.

The weight and dimensions of the heaviest package of transformer shall be so arranged by tenderer that the transformer can be transported upto site in Indian Railways of by Road. It will be the entire responsibility of the supplier to obtain clearance from Indian Railways on all matters connected with despatch of transformer and its accessories and their receipt if the transformer is dispatched by rail.

If the transformer is supplied oil filled then the escort should be provided to avoid theft/pilferage of oil/any other item. It is the responsibility of the supplier that transformer along with all the accessories are received safe up to the site of destination. In case the transformer is dispatched gas filled and oil for the first filling is dispatched separately sufficient quantity of gas in cylinders shall be supplied to maintain the pressure of the gas in the tank at site before, it is filled with oil.

The supplier will depute his representative along with the trailers for maintaining the gas pressure in case of gas filled transformer.

29.0 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.

30.0 FITTING AND ACCESSORIES :

Transformer shall be complete with following fitting and accessories :-

i) One dial type indicating thermometer (OTI) of robust pattern mounted on the side of the transformer at a convenient height to read the temperature in the hottest part of oil and fitted with alarm and trip contacts.

ii) 2 Nos. dial type winding hot spot temperature indicators (WTI) placed in HV/LV winding, as described below:

iii) One pressure relief valve/device (PRV) for main tank with trip contacts.

iv) One explosion vent on transformer tank cover should be provided on opposite side of PRV.

v) Inspection covers with jacking bolts in the top cover plate of the tank.

vi) One filter cum oil drain valve with plug or blanking flange.

vii) One filter valve of size 50mm at top of transformer tank.

viii) Three oil sampling valves for taking samples of top middle and bottom oil.

ix) Set of lifting lugs/jacking lugs and eye bolts on all parts for ease of handling.

x) One double float gas/oil surge detecting (Buchholz) relay in the pipe connecting the conservator with tank, complete with alarm and tripping contacts to detect accumulation of gas and sudden changes of oil pressure, complete with two shut off valves on conservator side as well as tank side and coupling to permit easy removal without lowering flanges/oil level in the main tank.

xi) Two grounding terminals on diagonally opposite bottom corners of tank. However, if provided on the length side of tank then these grounding terminals shall be outside the rail gauge.

xii) One ONAN cooling equipment comprising suitable 2x60% radiators with shut off valves, air release, drain plug and fans.

xiii) Skids and pulling eyes on both sides.

xiv) One Marshalling box housing dial type thermometers for winding and oil temperature indicators, heater, complete wiring and local/auto selector switch, and supply isolating switches with H.R.C. fuses. The MB shall have automatic control equipment for controlling fan motors. MCBs & Ammeter for indicating current auxiliary equipment.

xv) Two thermometer pockets for mercury in glass thermometer of minimum 10" depth from top level.

xvi) A set of universal type bi-metallic multi-bolt double grooved conductor clamps for HV&LV bushing.

xvii) Suitable bi-metallic flexible connectors for neutral terminals.

xviii) 1 set of terminal bushings each for HV & LV winding.

xix) 1 set of Neutral bushing (s).

xx) 1 No. filling valve.

xxi) 2 Nos. valves between cooler & main tank.

xxii) Two Nos. header valves on diagonally opposite corners of each cooler.

xxiii) Suitable size bi-directional wheels in both directions- 4 Nos. along with locking & bolting devices.

xxiv) One Off circuit tap changer with rotary handle and provision of padlocking in any direction.

xxv) The following plates in English shall be fixed to the transformer tank at a suitable height above ground level:-

a. Rating plate bearing data as specified in IS: 2026/1977, it must contain insulation levels of various windings, impedance at normal & extreme taps short circuit duration, WTI ratio besides other information.

b. Terminal marking plate showing the internal connections & voltage vector relationship of various windings in accordance with IS: 2026/1977 (Latest Edition).

c. Diagram plate showing the location and function of all valves and air release cocks or plugs.

xxvi) A plate showing the rated no load voltage at various taps shall be affixed on the control panel in order to facilitate the operator in deciding the tap position on which the transformer is to be operated corresponding to the incoming voltage.

xxvii) Oil conservator (for main tank) complete with magnetic type oil level gauge, prismatic oil level gauge, filling hole and cap drain valve, shut off valve, inter connecting pipes etc. Magnetic type oil level gauge shall be provided with low oil level alarm contacts and a dial showing minimum, maximum and normal oil level. The gauge shall be readable from the transformer base level. Silica gel breather with oil seal shall be fitted as already prescribed. Breather should be made of see through material and should consist of two compartments placed in parallel with 2X100% capacity. One drainpipe up to floor level with one valve may be provided.

xxviii) One No. Spare pocket on tank cover for thermometer.

xxix) Any other item, which is not included above but is essential for the satisfactory operation of the equipment.

31.0 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.

32.0 DEVIATIONS FROM SPECIFICATIONS

Deviations from these specifications should be clearly listed and brought out separately in various schedules attached with tender.

33.0 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 transformer 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.

34.0 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.

35.0 <u>NOTE</u> :

35.1 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 (not below 5 MVA, 132KV or higher) conducted at a reputed laboratory like CPRI.

35.2 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.

35.3 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.

SCHEDULE OF GUARANTEED

TECHNICAL PARTICULARS

OF

TRANSFORMER

SCHEDULE-R

SCHEDULE OF GUARANTEED TECHNICAL PARTICULARS

1.	Name of manufacturer		:	
2.	Normal continuous rating		:	5.0 MVA
3.	Normal ratio of transformation		:	132/11 KV
4.	Phase connections			
	a)	H.V. Winding	:	STAR
	b)	L.V. Winding	:	STAR
	c)	Vector group reference No. & Symbol	:	YNyno
5.	Maximum temperature rise (at 30^0C 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		:	ONAN/ONAF
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 75^0C 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 & 75^0C average winding temperature for the outputs of :
    - i) Full load :
    - ii) ¾ full load :
    - iii) ½ full load :
    - iv) ¼ full load :

20. Resistance per phase of
    - a) H.V. winding at 75^0C :
    - b) L.V. winding at 75^0C :

21. Reactance per phase of
    - a) H.V. winding at 75^0C :
    - b) L.V. winding at 75^0C :

22. Resistance-voltage drop at 75^0C average winding temperature expressed as percent of rated voltage :

23. Reactance-voltage drop expressed as percent of rated voltage at 75^0C average winding temperature :

24. Impedance-voltage at 75^0C average winding temperature expressed as percentage of rated voltage between H.V. & L.V. winding :
    - a) Tap No. 1 :
    - b) Tap No. 2 :
    - c) Tap No. 3 :
    - d) Tap No. 4 :
    - e) Tap No. 5 :
    - f) Tap No. 6 :
    - g) Tap No. 7 :
    - i) Tap No. 8 :

25. Regulation at full load at 75^0C
    - 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 µs full wave withstand :

v) Impulse test on low voltage winding 1.2/50 µs 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 & Top cover	:
	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 :		
	Type & make of coolers		:
39.	Calculated time constants :		
	i)	Natural cooling (ONAN)	:
	ii)	Oil natural air forced (ONAF)	:
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/ range of voltage variation	:
	iv)	Whether having separate diverter switch and tap 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.	Details of Heat Exchanger		
	i)	No. of radiators	:
	ii)	No. of fins in each radiator	:
	iii)	Fan bank details	:
42.	Weight of copper required to complete the transformer		:
43.	Weight of CRGO stud required to complete the transformer		:
44.	Weight of fittings and parts despatched for transport		:
45.	Weight of CORE		:
46.	Weight of core and windings		:
47.	Weight of the complete transformer with all fittings and oil		:
48.	Weight of the heaviest package		:
49.	Volume of oil in the transformer, complete with conservator and all accessories		:
50.	Un-tanking height		:
51.	Over all dimensions of the transformer in metres :		
	a)	Max. height to top of bushings	:
	b)	Overall length	:
	c)	Overall breadth	:
52.	Dimensions of heaviest package (LxBxH)		:
53.	Lightening Arrestors (HV side)		:
54.	Reference standards		:

SCHEDULE R-1

(Additional particulars to be furnished by the Tenderers)

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

Schedule R-2

Details of associated items of Transformer

S.N.	Description	Specification	Make	Qty.
1	HV Bushing			
2	HV Connector			
3	LV Bushing			
4	HV Neutral Bushing			
5	Marshalling Box			
6	Double float type Buccholz relay			
7	Magnetic oil gauge (main cons.)			
8	Prismatic oil gauge on main conservator			
9	Tank oil gauge			
10	Winding temperature indicator			
11	Oil temperature indicator			
12	Oil flow indicator			
13	Silicagel breather for conservator and explosion vent			
14	Air release plug on various fittings			
15	Roller assly. (flanged BI-DIR)			
16	Flexible expansion joint			
17	Gate type drain valve with locking arrangement & position indicator			
18	Filter valve top & bottom			
19	Terminal marking plate			
20	Gate type top & bottom sampling valve with locking arrangement & position indicator on tank			

21	Sampling valve middle			
22	Gun metal gate type shut-off valve for oil inlet to tank at bottom			
23	Main conservator shut off valve			
24	Spring loaded type pressure relief valve with trip contact			
25	Non return valve			
26	Gun metal gate type valve			
27	Gun metal, gate type shut-off valve for oil outlet from tank at top			
28	Gun metal, gate type drain valve on main conservator			
29	Off circuit tap switch			
30	Radiator / Cooler			

Schedule R-3

Facilities available at Bidder's works

Sl.No.	Shop Floor Facilities	Declaration by the Bidder
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

TECHNICAL SPECIFICATION

OF

132 KV SF_6 CIRCUIT BREAKER

GENERAL TECHNICAL REQUIREMENTS FOR AND 145 KV SF6 CIRCUIT BREAKER

1.1 SCOPE :

1.1.1 The scope covers design, engineering, manufacture, assembly, inspection and testing at manufacture's works, supply and delivery of 01 no. SF6 circuit breaker complete with structures, accessories, auxiliary equipment and mandatory spares specified herein for their satisfactory operation at 132 KV station supply bay of Obra HEP (3x33 MW). The scope also includes erection, testing & commissioning of same in 132 KV switchyard of Hydel Obra Power Station, Obra, complete in all respect.

1.1.2 It is not the intent to specify completely here all the details of design and construction of the circuit breaker's, however, the breaker's shall conform in all respects to the high standard of engineering design and workmanship and shall be SCADA compatible and capable of performing in continuous commercial operation up to the guarantee in manner acceptable to the UPJVNL who will interpret the meanings of drawings and specifications and shall have power to reject any work or material which in its judgment is not in accordance therewith. The circuit breaker offered shall be complete with all components necessary for their effective and trouble-free operation. Such components shall be deemed to be within the scope of the Bidder irrespective of whether they are specifically brought out in this specification and / or in the commercial order or not. It should also be type tested and supposed to pass all accepted tests as per IEC/IS.

1.2 STANDARDS :

1.2.1 The circuit breakers shall conform to the latest revisions with amendments available at the time of testing of relevant standards, rules and codes, some of which are listed herein for ready reference. Equipment meeting with the requirements of any other authoritative standards, which ensures equals or better quality than the standards mentioned herein may also be offered. In that case, salient points of difference between the standards adopted and the specified standards shall be clearly brought out in the bid and shall be considered acceptable, if found justified after due technical evaluation.

SR.NO.	STANDARD	TITLE
1	IEC-62271-100	Specification for alternating current circuit breakers
2	IEC-376	Specification and acceptance of new supply of sulfur hexafluoride
3	IS-2147	Degree of protection provided for enclosures for low voltage switch gear and control gear
4	IS-325	Specification for three phase induction motors
5	IS-13118	Specification for high voltage alternating current circuit breakers
6	IS-2629	Recommended practice for hot dip galvanizing of iron and steel
7	IS-2099	High voltage porcelain bushing
8	IS -2486	Specifications for clamp connectors
9	IS-2062/2016	Specifications for GI /SS nut, bolt & washer

1.3 DOCUMENTATION :

1.3.1 All drawings shall conform to the International standards Organization (ISO) Drawing sheet/Indian Standards Specification IS : 11065 shall be applicable. All drawings shall be reproducible and clearly legible. All dimensions and data shall be in S.I. Units.

1.3.2 List of Drawings and Documents

The bidder shall furnish a set of relevant descriptive and illustrative published literature, pamphlets and the following drawings for preliminary study along with offer.

a. General outline drawings showing dimensions and shipping weights, quantity of insulating media etc.
b. Sectional views showing the general constructional features of the circuit breaker including operating mechanism, arcing chambers, contacts with lifting dimensions for maintenance.
c. Drawings showing control cabinets and circuit diagrams for operating mechanism.
d. Schematic diagrams for all the control, SCADA compatibility supervision circuitries and auto reclosing (single phase and three phases).
e. Structural drawings and loading data for support structures.
f. Foundation plan and loading data and foundation design.
g. Drawings showing the complete operation cycle of the circuit breaker with description.
h. Drawings showing the details of complete opening and closing operation.

1.3.3 The successful Bidder shall within 2 weeks of placement of order submit two sets of final version of all the above drawings for purchaser's approval. The UPJVNL shall communicate comments / approval on the drawings to the supplier within reasonable period. The supplier shall, if necessary, modify the drawings and resubmit two copies of the modified drawings for purchaser's approval within a week from the date of comments.

1.3.4 The manufacturing of the equipment shall be strictly in accordance with the approved drawings and no deviation shall be permitted without the written approval of the purchaser. All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawing shall be at the supplier's risk.

1.3.5 Approval of drawings/ work by the UPJVNL shall not relieve the supplier of any responsibility and liability for ensuring correctness and correct interpretation of the drawings for meeting the requirements of the latest revision of the applicable standards rules and codes of practices. The equipment shall conform in all respects to high standards of engineering, design, workmanship and latest revisions of relevant standards at the time of supply and UPJVNL shall have the power to reject any work or materials which, in its judgment, is not in full accordance therewith.

a) The precise procedure to be adopted by maintenance personnel for handling equipment which are exposed to the products of arcing in SF6 gas so as to ensure that they are not affected by possible irritants of the skin and respiratory system. Recommendations shall be submitted for suitable protective clothing, methods of disposal of circuit breaker cleaning utensils and other relevant matters.

b) A complete catalogue on operation analyzer satisfying all the requirements stipulated in this specification should be provided.

c) The Bidder shall furnish along with the bid, curves supported by test data indicating the opening time under close & open operation with combined variation of trip coil voltage.

d) All duty requirements shall be provide with the support of adequate test report to be furnished along with the bid failing which the bid likely to be rejected.

1.3.6 The bidder may submit any other drawing found necessary in addition to the drawings stated above.

1.4 TEMPERATURE RISES :

The temperature rise and the maximum temperature on any part of the equipment when in service at site under continuous full load conditions and exposed continuously to the direct rays of the sun shall not exceed the permissible limits as per IEC latest publication. The temperature shall not be exceed when corrected for the difference between ambient temperature at site and the ambient temperature specified in the relevant specification. The correction proposed shall be stated in the bid and shall be subject to approval of the purchaser.

1.5 The circuit breaker shall have the following operating capabilities;

(a) SHUNT CAPACITOR SWITCHING CAPACITY ,

(b) BREAKING CAPACITY FOR KILOMETERIC FAULT :

(c) TRANSFORMER CHARGING CURRENT BREAKING CAPACITY:

(d) RESTRIKING VOLTAGE BREAKING CAPACITY:

(e) RECOVERY VOLTAGE AND POWER FACTOR BREAKING CAPACITY:

(f) AUTOMATIC RAPID RECLOSING (Three Phase) :

1.6 TRIP FREE OPERATION :

The circuit breakers shall be trip-free as per IS-13118.

1.7 TYPE AND CONSTRUCTION :

The circuit breakers offered may be suitable for operation under the climatic conditions specified in general conditions.

1.8 GENERAL TECHNICAL REQUIREMENTS :

a. Any part of the breaker, especially the removable ones, shall be freely interchangeable without the necessity of any modification at site.

b. Breaker assemblies with bases, support structure for circuit breaker well as for control cabinet, central control cabinet and foundation bolts for main structure as well as control cabinet and central terminals and operating mechanisms are included in the scope of supply.

c. Compressed SF6 gas, spring operating system in all respects, also included in scope of supply.

d. All necessary parts to be provided for a complete and opera table circuit breaker installation such as main equipment, terminal, control parts, connectors and other devices, whether specifically called for herein or not.

e. The circuit breaker shall be designed for three phase reclosing for mechanically gang operated breaker.

f. All other parts like control cabinet, mechanism, housing shall be epoxy painted as per shade 697 IS-5. Bolts, nuts etc shall be hot dip galvanized/steel.

g. Circuit breaker shall be suitable for hot line washing.

h. The terminal pads shall be of aluminium alloy/copper. In case if terminal pads are of copper, then they will be silver plated with at least 50 microns thickness.

i. The current density adopted for the design of the terminal pads shall, in no case exceed the following values :

   For copper pads : 1.6 A/sq. mm and others : 1.0 A/sq. mm.

j. All gasketed surfaces shall be smooth, straight and reinforced, if necessary to minimize distortion and to make a tight seal. The operating rod connecting the operating mechanism to the arc chamber (SF6 media) shall have adequate seals. The manufacturer shall guarantee that the gas leakage rate should not exceed 1% p.a. failing which total cost of refilling the gas including service charges shall be borne by the supplier.

k. In the interrupter assembly, there shall be an absorbing product box to eliminate SF6 decomposition products and moisture. The material used in the construction of the circuit breakers shall be fully compatible with SF6 gas.

l. SF6 density of circuit breaker shall be monitored and regulated by density monitor and pressure switches respectively in each pole. The SF6 gas density monitor shall be adequately temperature compensated. It will meet the following requirements:

   I. It shall be possible to dismantle the density monitor for checking/replacement without draining the SF6 gas by using suitable interlocked non-return couplings.

   II. It shall damp the pressure pulsation while filling the gas service so that the flickering of the pressure switch contacts does not take place.

   III. A gas pressure indicator shall also be supplied.

m. Facility shall also be provided to reduce the gas pressure within the breaker to a value not exceeding 8 millibars within 4 hours or less. Each circuit breaker shall be capable of withstanding- this degree of vacuum without distortion or failure of any part.

n. Sufficient SF6 gas shall be provided to fill the circuit breaker.

o. Provisions shall be made for attaching an operation analyzer after installation at site to record contact travel, speed and making measurement of operation timings, pre insertion timing of closing resister, synchronization of contacts in one pole.

1.8.1 The bidder shall furnish complete literature regarding assembly, maintenance and charging procedures as applicable to SF6 breakers.

1.8.2 The supply shall cover necessary remote control switches., temperature compensated gas pressure switches which shall give an alarm or lockout operation of the breakers in case density of SF6 fall below a predetermined value or when the air pressure falls below the present values.

1.8.3 **Tests :**

Besides the tests on SF6 circuit breakers as per the latest IS/IEC, the certificate of following tests shall be submitted for the SF6 gas:

a) Toxicity test
b) Moisture Test
c) Tests to determine the quantities of air, CF4 and free acid in the gas.

1.9 INSULATION OF THE CIRCUIT BREAKER :

The insulation to ground, the insulation between open contacts, and the insulation between phases of the completely assembled circuit breaker shall be capable of withstanding satisfactorily dielectric test voltages corresponding to basic insulation level.

The minimum clearances in open air shall be as per relevant IS/BS, unless the apparatus is impulse tested after complete assembly as type tested (drawing of type tested breaker shall be submitted duly stamped by testing authority).

1.10 BUSHINGS AND INSULATORS :

The basic insulation level of the bushings and insulating porcelain shall be as specified and shall be suitable for installation in climatic conditions specified in of this specification. The hollow insulators shall confirm to the latest edition of IS:5621 or IEC publication no: 815 and 233. The porcelain used shall be homogeneous and free from cavities and other flaws. They shall be designed to have ample insulation, mechanical strength and rigidity for satisfactory operation. All bushing of identical ratings shall be interchangeable. The puncture strengths of the bushing shall be greater than their flashover values. The bushing shall be entirely free from radio disturbances when operating at a voltage up to the maximum system voltage and shall also be free from external and internal corona.

1.11 CONTACTS :

1.11.1 All making and breaking contacts shall be sealed free from atmospheric effects. Contacts shall be designed to have adequate thermal and current carrying capacity for the duty specified and to have a life expectancy so that frequent replacements due to excessive burning will not be necessary. Provision shall be made for rapid dissipation of heat generated by the arc on opening.

Main contacts shall be first to open and last to close so that there will be little contact burning and wear. If arcing contacts are used, they shall be first to close and last to open. They shall be easily accessible for inspection and replacement. If there are no separately mounted arcing contacts, the main contacts shall be easily accessible for inspection and replacements. Tips of arcing contacts shall be made of Tungsten alloy/Graphite and main contacts shall be silver plated or have tungsten alloy tipping.

1.11.2 Breaker shall be so designed that when operated within their specified rating, the temperature of each part will be limited to values consistent with a long life of the material used. The temperature shall not exceed that indicated in IEC under specified ambient conditions.

1.11.3 Contacts shall be kept permanently under pressure of SF6 gas. The gap between the open contacts shall be such that it can withstand at least the rated phase to ground voltage continuously at zero gauge pressure of SF6 gas due to its leakage.

1.11.4 If multi break interrupters are used these shall be so designed and augmented, that a uniform voltage distribution is developed across then. Calculations/test reports in support of the same shall be furnished along with the bid. The thermal and voltage with stands of the grading elements shall be adequate for the service conditions and duty specified.

1.12 OPERATING MECHANISM :

1.12.1 The circuit breakers shall be designed to operate from the control room and for local control ON/OFF switch.

1.12.2 The circuit breakers shall have a mechanical open/closed indicator in addition to facilities for remote electrical indicator.

1.12.3 The operating mechanism shall be of spring charging type by electric control. The mechanism will be trip free electrically. The mechanism shall perform satisfactorily the specified duty cycles.

1.12.4 All the working parts in the mechanism shall be of corrosion resistance materials and all bearings which require greasing, shall be equipped with pressure grease fittings, mechanism shall be strong, quick in action and shall be removable without disturbing other parts of the circuit breakers.

1.12.5 The operating mechanism (spring operated) along with accessories shall be mounted in a weatherproof cabinet with hinged doors located near the breakers. The local control switch and the breaker position indicator shall be provided in this cabinet. The control circuit shall be designed to operate on 220 Volts D.C. It shall be possible to adopt it to work on either of the voltage by changing the operating coils, necessary contactors and relay. The control circuit shall be designed to operate at the D.C. voltages specified in this specification. The closing and opening coils shall be designed to operate satisfactorily at any control voltage from 85% to 110% of the normal voltage. A heater shall be provided in the cabinet to prevent moisture condensation.

1.2.6 Necessary cable glands for the cables of the operating mechanism shall be provided.

1.13 AUXILIARY SWITCHES :

A minimum twelve (12) number of auxiliary switches contact both of the normally open and normally closed type shall be provided on each circuit breaker for use in remote indication and control scheme of the circuit breakers and for providing safety interlocking and SCADA compatibility. If required, special contacts for use with trip coils and auto-re-closing operation shall also be provided. All auxiliary switches shall be placed in a weatherproof galvanized casing/epoxy painted casing and current rating of the switches shall be mentioned in the bid. Arrangement proposed for connecting control cables to the auxiliary switches should be clearly stated.

1.14 INTERLOCKS :

Necessary interlocks to prevent the closing or opening of the circuit breakers under low pressure and devices for initiating alarm shall be provided. Provision shall also be made to enable electrical interlocking of the isolator associated with the circuit breakers to prevent incorrect isolator operations, when the breaker is closed.

1.15 TERMINAL CONNECTORS AND EARTHING TERMINALS :

Terminal connectors suitable for ACSR Panther conductor shall be supplied. The terminal connector shall be suitable for both vertical and horizontal connections of the line conductor or station bus bar. . The required bolts / nuts must be stainless steel with suitable check nut. Suitable terminal earth connector for earthing connections shall also be supplied.

1.16 TROPICALISATION :

All control wiring, electric motors and accessories shall by means of spray or dip coating, be protected against fungus growth and other harmful effects due to tropical environments.

1.17 GALVANISING :

All ferrous parts of breaker exposed to atmosphere shall be hot dip galvanized or epoxy painted. Bolts, nuts etc. hardware shall be hot dip galvanized or stainless steel.

1.18.1 TESTS :

1.18.1 Type Tests :

The Circuit Breaker offered shall be fully type tested for following, as per IEC-56 & IS 13118 latest edition at the Government approved laboratory :-

- Lightning impulse withstand test
- Power Frequency voltage dry withstand test after Lightning Impulse test
- Corona inception and extinction voltage test
- Temperature Rise and measurement of resistance test
- Short Time and peak current withstand test
- Short Circuit Test duties
- Out of phase closing test
- Line charging & switching current test
- Capacitor Current switching test
- Shunt reactor current switching test
- Mechanical Endurance test
- Tightness test
- Degree of protection for all cubicles
- Seismic test
- Tests on Controlled Switching scheme
- STC withstand test on terminal connector
- Temperature Rise & tightness test on terminal connector
- Tests on Auxiliary Switches

The Bidder shall furnish one set of the type test reports for the Circuit breakers of the type and Design offered by him along with the bid. The Type Test report shall not be older than 5 (Five) years from the date of tender publication.

1.18.2 ACCEPTANCE AND ROUTINE TESTS :

All acceptance and routine tests as stipulated in the relevant standards shall be carried out by the supplier in the presence of purchaser's representative.

Following additional tests shall also be performed.

Speed curves for each breaker shall be obtained with the help of a suitable operation analyzer to determine the breaker contact movement during opening, closing, auto-re-closing and trip free operations under normal as well as limiting operating conditions (control voltage etc) The tests shall show the speed of contacts directly at various stages of operation, travel of contacts, opening time, closing time, shortest time between separation and meeting of contacts at make-break operation etc. This test shall also be performed at site.

1.19 CONTROL :

1.19.1 The close and trip circuits shall be designed to permit use of momentary contact switches and push buttons.

1.19.2 Each breaker pole shall be provided with two (2) independent tripping circuits and coils each connected to a different set of protective relays with one set of pressure switch per pole and one number of density monitor per pole.

1.19.3 The breaker shall normally be operated by remote electrical control. Electrical tripping shall be performed by shunt trip coils. However, provisions shall be made for local electrical control. For this purpose a local/remote selector switch and close and trip push buttons/switch shall be provided in the breaker central control cabinet. Remote located push buttons and indicating lamps shall be provided by the purchaser.

1.19.4 The trip coils shall be suitable for trip circuit - supervision. The trip circuit supervision relay would be provided by the purchaser. Necessary terminals shall be provided in the central control cabinet of the circuit breaker by the supplier. Trip circuit supervision shall be operative in both close and open conditions of the breaker.

1.19.5 Closing coil shall operate correctly at all values of voltage between 85% and 110 % of the rated voltage. Shunt trip shall operate correctly under all operating conditions of the circuit breaker up to the rated breaking capacity of the circuit breaker and at all values of supply voltage between 70% and 110% of rated voltage. If additional elements are introduced in the trip coil circuit their successful operation and reliability for similar applications on outdoor circuit breakers shall be clearly brought out in the additional information schedules. In the absence of adequate details, the offer is likely to be rejected.

1.19.6 The pressure switches used for interlock purposes shall have adequate contact ratings to be directly used in the closing and tripping circuits. In case the contacts are not adequately rated and multiplying relays are used then the interlock for closing/opening operation of breaker shall be with no logic of the relay i.e. if dc supply to the interlock circuit falls then operation lockout shall take place.

1.19.7 For spring operated breaker mechanism box should be at a height such that one man can manually charge the spring from ground level/suitable platform shall be provided for easy operation.

1.19.8 The auxiliary switch of the breaker shall be preferably positively driven by the breaker operating rod and where due to construction features, same is not possible, a plug in device shall be provided to simulate the opening and closing operations of circuit breaker for the purpose of testing control circuits.

1.19.9 The circuit breaker should have a mechanical emergency trip device, to open the breaker, in case of failure of control supply.

1.20 OPERATING MECHANISM HOUSING :

The operating mechanism housing/control shall conform to the requirement specified.

1.21 INTERLOCKS :

It is proposed to electrically interlock the circuit breaker with UPJVNL associated air break isolators in accordance with switchyard safety interlocking scheme. All accessories required on breaker side for satisfactory operation of the scheme shall be deemed to be included in the scope of supply of this specification.

1.22 FITTINGS AND ACCESSORIES :

1.22.1 Following is a partial list of some of the major fittings and accessories to be furnished by supplier in the central control cabinet. Number and exact location of these parts shall be indicated in the bid :-

a) Central control cabinet 'in accordance with Clause 1.31.10 complete with:

i. Cable glands

ii. Local /remote changeover switch

iii. Operation counter

iv. Gas pressure gauges

v. Fuses/MCB as required

vi. The number of terminals provided shall be adequate enough to wire out all contacts and control circuits plus 12 terminals spare for owner's use.

b) Anti-pumping relay/Contactor. Rating and diagram plate in accordance with IEC incorporating year of manufacture.

1.22.2 All metal surfaces exposed to atmosphere shall be given two primer coats of zinc chromate and coats of epoxy paint with epoxy base thinner. All metal parts not accessible for painting shall be made of corrosion resisting material. All machine finished or bright surfaces shall be coated with a suitable preventive compound and suitably wrapped or otherwise protected. All paints shall be carefully selected to withstand tropical heat and extremes of weather within the limits specified. The paint shall not scale off or wrinkle or be removed by abrasion due to normal handling. All external paintings shall be as per shade no.697 of IS:5.

1.22.3 Galvanizing

All ferrous parts exposed to atmosphere of breaker shall be hot dip galvanized or epoxy painted. Bolts, nuts, etc. hardware shall be hot dip galvanized or stainless steel.

1.22.4 Earthing

The operating mechanism housing, control cabinets, dead tanks, support structure etc. shall be provided with two separate earthing terminals suitable for bolted connection to MS flat to be provided by the UPJVNL for connection to station earth mat.

1.22.5 Name and Rating Plates

Circuit breaker and its operating device shall be provided with a rating plate or plates marked with but not limited to following data:

a) Manufacturer's name or trade mark.

b) Serial number or type designation making it possible to get all the relevant information from the manufacturer.

c) Year of manufacture.

d) Rated voltage.

e) Rated insulation level.

f) Rated frequency.

g) Rated normal current.

h) Rated short circuit breaking current.

i) First pole to clear factor.

j) Rated duration of short circuit.

k) Rated DC supply voltage of closing and opening devices with operating range.

l) Rated gas pressure for operation, alarm and lockout

m) Rated out of phase breaking current.

n) Rated supply voltage of auxiliary circuits.

The coils of operating devices shall have a reference mark permitting the data to be obtained from the manufacturer. The rating plate shall be visible in position of normal service and installation. The rating plate shall be weather proof and corrosion proof.

1.22.6 Terminal Connectors

The terminal connectors shall meet the following requirements:

a) Terminal connectors shall be manufactured and tested as per IS:5561

b) All castings shall be free from blow holes, surface blisters, cracks and cavities. All sharp edges and corners shall be blurred and rounded off.

c) No part of a clamp shall be less than 10 mm thick.

d) All ferrous parts shall be hot dip galvanized confirming to IS:2633.

e) For bimetallic connectors, copper alloy liner of minimum thickness of 2 mm shall be cast integral with aluminium body.

f) Flexible connectors shall be made from tinned/copper/aluminium sheets.

g) All current carrying parts shall be designed and manufactured to have minimum contact resistance.

f) Connectors shall be designed to be corona free in accordance with the requirements stipulated in IS:5561.

g) The terminal connector shall be suitable for ACSR PANTHER conductor for 145 KV breaker.

h) The terminal connector shall be boltless type.

i) The required bolts and nuts must be stainless steel with suitable check nut.

1.22.7 Fuses

All Fuses shall be of the HRC cartridge type, conforming to IS:2208 and suitable for mounting on plug-in type of fuse bases. Fuses shall be provided with visible operation indicators to show that they have operated. All accessible live connections shall be adequately shrouded and it shall be possible to change fuses with the circuit alive, without danger or contact with live conductor. Insulated fuse pulling handle shall be supplied with each control cabinet.

1.22.8 Specification for Control Cabinets

1. Control cabinets shall be of the free standing floor-mounting type in case where control cabinet and operating mechanism are separate.

2. Control cabinets shall be sheet steel enclosed and shall be dust weather and vermin proof (IP58 or higher). Sheet steel shall be at least 3.0 mm thick as the control cabinets are intended for outdoor operation. Control cabinets shall be provided with a hinged door and padlocking arrangement. The door hinges shall be of union joint type to facilitate easy removal. Door shall be properly braced to prevent wobbling.

3. Equipment and devices shall be suitable for operation on 240 V, 1 phase at frequency from 90% to 105% of normal 50 Hz.

4. Fractional KW motors would be suitable for operation on a 240 V, I phase, 50 Hz supply system.

5. Fuses shall be HRC cartridge link type having prospective current rating of not less than 46 KA (rms). They shall be provided with visible operation indicators to show when they have operated. One fuse pulling handle shall be supplied for every ten fuses or a part thereof.

6. Push button shall be rated for not less than 6 Amps, 415 V A/C. Or 2 Amps, 220 V D.C. and shall be flush mounted on the cabinet door and provided with appropriate nameplates. Red, Green and Amber indicating lamps shall be flush mounted and provided with series resistors to eliminate the possibility of short-circuiting of control supply in the event of using of lamps.

7. For motors up to 5 KW, contactors shall be direct-on-line, air break, single throw type and shall be suitable for making and breaking the stalled current of the associated motor which shall be assumed equal to 6.5 time the full load current of the motor at 0.2 p.f. For motors above 5 KW, automatic star delta type starters shall be provided. 3 pole contractors shall be furnished for 3 phase motors and 2-pole contractors for single-phase motors. Reversing contractors shall be provide with electrical interlocks between forward and reverse contractors. If possible, mechanical interlocks shall also be provide. Contractors shall be suitable for uninterrupted duty and shall be of duty category class AC4 as defined in IS:2959. The main contacts of the contractors shall be silver plated and the insulation class for the coils shall be class E or better. The dropout voltage of the contactors shall not exceed 70% of the rated voltage.

8. Single phasing preventer relay shall be provided for 3 phase motors to positive protection against single phasing.
9. Purchaser's power cables will be of 1100/650 volts grade stranded aluminium/Copper conductor. PVC insulated PVC sheathed single steel wire armoured and PVC jacketed. All necessary cable terminating accessories such as glands, crimp type tinned copper lugs etc. for power as well as control cables shall be included in supplier's scope of supply. Suitable brass cable glands shall be provided for cable entry.
10. Wiring for all control circuits shall be carried out with 1100 volts grade PVC insulated tinned copper stranded conductors of sizes not smaller than 2.5 sq.mm. At least 10% spare terminal blocks for control wire terminations shall be provided on each panel. The terminal blocks shall be ELMEX type. All terminals shall be provided with ferrules indelibly marked or numbered and these identifications shall correspond to the' designations on the relevant wiring diagrams. The terminals shall be rated for adequate capacity, which shall not be less than 10 Amps.
11. Separate terminal blocks shall be provided for terminating circuits of various voltage classes. CT loads shall be terminated on a separate block and shall have provision for short-circuiting the CT secondary terminals. Stud type terminal connectors should be used for all CT circuits and main DC input.
12. Control cabinet shall be provided with 240 V, I-Phase 50 Hz, 2OW fluorescent light fixture an suitably rated 240 V, I phase, 5 amps, 3 pin socket for hand lamps.
13. Strip heaters shall be provided inside each cabinet complete with thermostat (preferably 30 to 80 $_0$C setting) to prevent moisture condensation. Heaters shall be controlled by suitably rated double pole miniature circuit breakers.
14. Signal lamps provided shall be of neon screw type with series resistors, enclosed in bakelite body. Each signal lamp shall be provided with a fuse integrally mounted in the lamp body.
15. All AC control equipment shall be suitable for operation on 240 V, I phase 50 Hz system.
16. All doors, panels, removable covers and breaker openings shall be gasketed all around. All louvers shall have screens and filters. Cabinets shall be dust, moisture and vermin proof.
17. Spare marshalling kiosk should be provided for wiring if breaker pole is individually operated and it should be provided at reasonable height from ground and it should be tested with IP 58 the thickness of MK box should not be less than 3mm with rain shed arrangement.

1.22.9 Motors

1.22.10 Motors shall be universal type of sufficient size capable of satisfactory operation for the application and duty as required for the driven equipment.

1.22.11 Sulphur Hexafluoride Gas (SF6 Gas)

a) The SF6 gas shall comply with IEC-376, 376A and 376B and be suitable in all respects for use in the switchgear under the worst operating conditions.

b) The high pressure cylinders in which the SF6 gas is shipped and stored at site shall comply with requirements of the following standards and regulations.

IS:4379 Identification of the contents of industrial gas cylinders. IS:7311 Seamless high carbon steel cylinders for per manet and high pressure liquifiable gases.

The cylinders shall also meet Indian Boiler regulations and certificate should be submitted.

c) Test: SF6 gas should have been tested for purity, dew point, break down voltage, water contents as per IEC:376, 376A and 376B and test certificates shall be furnished to GSECL indicating all the tests as per IEC:376 for each lot of SF6 gas.

Thermal conductivity at 30 $_0$C (Cal/Sec:cm $_0$C)	3.3x10$_{-5}$
Sp. Heat ration	1.07
Sp. Heat at constant I Atm.250C (cp cal/mol. $_0$C)	23.22
Solubility of H_2O (CCs per CC of H_2O)	0.001
Solubility in oil (CCs per CC of oil) 0.297	
Solubility of H_2O in SF6 (% weight at 30 $_0$C)	0.135 + 0.010

TABLE-11

COMPOSITION OF SF6 GAS

Permissible impurities by (wt.)

(i)	CF4	500 ppm
(ii)	O_2, N_2 (air)	500 ppm
(iii)	H_20	15 ppm
(iv)	Free acid	1.0 ppm
(v)	Hydrolyzable fluroides in HF	0.3 ppm

1.23 TECHNICAL AND GUARANTEED PARTICULARS :

The bidder shall furnish all guaranteed technical particulars as called for in Schedule 'A' of this specification.

SPECIFIC TECHNICAL REQUIREMENTS

1 SCOPE :

This section cover the specific technical particulars, climatic and isoceraunic conditions and system particulars suiting which the circuit breakers shall be offered as per the General Technical Requirements in this specification, and the Schedule of Requirements specified herein for the various sub-stations.

2 TYPE AND RATING :

The 132KV circuit breakers shall comply with the following technical requirements:

1.	Nominal system voltage (KV)		132
2.	Highest system voltage (KV)		145
3.	Rated frequency (Hz)		50
4.	Number of poles		3
5.	Type		Out door SF6
6.	Number of poles		3
7.	Type of operation		Gang operated single poles
8.	Basic insulation level		
	(a)	1.2 x 50 microsecond impulse withstand voltage (KVP) to earth	650
	(b)	One minute power frequency withstand voltage (KV rms)	275
9.	Rated normal current (Amp.)		2000
10.	Rated short circuit breaking current (KArms)		40
11.	Total break time for any current up to the rated breaking current (Cycle)		3
12.	Closing time (Cycle)		3
13.	Short time current carrying capacity for 3 Sec (KA rms)		40
14.	Rated duration of short circuit (Sec)		3
15.	Phase to phase spacing in the switchyard i.e. inter-pole spacing for breaker (mm)		1700
16.	Required ground clearance from the lowest line terminal (mm)		
	(a)	If both the terminals are not in the same horizontal plane	4324
	(b)	If both the terminals are in the same horizontal plane	4324
17.	Height of concrete plinth (to be provided by the contractor) (mm)		300
18.	Minimum height of the live part to ground level (mm)		4600
19.	Operating mechanism		Spring charge
20.	Rated transient recovery voltage for terminal fault		As per Clause of IS:13118
21.	Rated line charging current breaking capacity (Amp)		As per IEC
22.	Small inductive current breaking capacity		As per IEC

23.	First pole to clear factor	1.3
24.	Rated short circuit making current (KA rms)	100 KA
25.	Rated operating duty	O-0.3S CO-3-min-CO
26.	Automatic rapid reclosing	3 phase
27.	Maximum acceptable difference at the instance of closing/ operating of contacts	As per standard
28.	Total minimum creepage distance (mm) for support insulator	3625
29.	Control circuit voltage (Volt)	220 DC
30.	Type of breaker	SF6

3 EARTHQUAKE AND WIND DESIGN LOADS :

Each circuit breaker including its supporting structure shall be designed to withstand repeated earthquake acceleration of 0.38 and wind loads of 150 Kg/m_2 on the project area (non-simultaneous) without damage to component parts and without impairments operation. Necessary type test reports for Seismic test shall be submitted with the bid.

4 AUXILIARY POWER SUPPLY :

4.1 The bidder shall quote in his bid estimated requirements of AC and DC power for equipment covered by this specification.

4.2 Power supply for auxiliaries will be available at 240 Volts single phase and 425 volts, 3 phase AC 50 Hz. The frequency can vary between 90% and 105% of normal frequency of 50 Hz. And voltage would vary from 110% to 85% of the normal value.

DC supply 220 Volts DC 2 wire will be available from the Station Battery through the DC panels, DC supply is subject to variations of –15% to + 10%.

Guaranteed Technical Particulars for Circuit Breakers

Sl.No.	Particulars	Parameter
1.	Name of manufacturer	
2.	Manufacturer's type and designation	
3.	Governing standard	
4.	Rated Voltage (KV)	
5.	Maximum continuous rated service voltage (KV)	
6.	Frequency (Hz)	
7.	Class (indoor or outdoor)	
8.	Normal current rating (approx.)	
	Under standard conditions	
	Under site conditions	
	Derating factor, if any, for site conditions	
9.	Short-time current rating (KA) for 3 sec	
10.	Rated short circuit breaking current a) Rated short circuit current (A.C. component) -at- KV b) Percentage D.C. component -at- KV c) Asymmetrical breaking current (including -at- KV D.C. component) KA nns.	
11.	Making capacity (KA peak) – at – KV	
12.	Total break time (milliseconds) a) For interruption of 10% of the rated capacity b) For interruption of 30% of the rated capacity c) For interruption of 60% of the rated capacity d) For interruption of the full rated capacity	
13.	Arcing time (milliseconds)	
14.	Minimum reclosing rated interrupting capacity from the instant of the trip coil energisation (milliseconds)	
15.	Minimum dead time a) 3-phase reclosing (milliseconds) b) I-phase reclosing (milliseconds) c) Limit of adjustment of dead time for 3-phase reclosing d) Limit of adjustment of dead time for I-phase reclosing	

16.	Rate of re-striking voltage for 100%, 50% or 30% rated capacity a) Amplitude factor b) Phase factor c) Natural frequency (Hz) d) Rate of rise of re-striking voltage (KV/micro-sec.)	
17.	a) Recovery voltage when circuit breaker tested at 100% rated breaking capacity (KV inst.) b) Rate of rise of re-striking voltage at breaking I. For 30% breaking capacity, (KV/micro seconds) II. For 100% breaking capacity (KV/micro seconds) c) Maximum over voltage factor of the circuit breaker when switching off i. Unloaded transformer ii. Loaded transformer iii. Open circuited lines	
18.	When switching of synchronous systems a) Max. Current (KA) b) Max. Voltage of I pole (KV)	
19.	Maximum interrupting capacity under phase opposition condition (MVA)	
20.	Maximum line charging current breaking capacity without over-voltage exceeding 2.5 times the rated phase to neutral voltage (Amps.)	
21.	Maximum line charging current breaking capacity and corresponding over voltage recorded in test a) On supply side b) Online side	
22.	Maximum cable charging current breaking capacity and corresponding over voltage recorded in test a) On supply side b) Online side	
23.	----Nil----	
24.	Maximum breaking capacity on kilometric faults (MVA)	

25.	Dry 1-minute power frequency test with stand voltage, for complete circuit breaker a) Between line terminals and grounded parts (KV rms) b) Between terminal with breaker contacts open (KV rms)	
26.	Wet I minute power frequency test withstand voltage for complete circuit breaker a) Between line terminals and grounded parts (KV rms) b) Between terminal with breaker contacts open (KV rms)	
27.	a) i) R.I.V. level at specified ii) Corona inception voltage (KV) iii) Corona extinction voltage (KV) b) Whether the circuit breaker is fixed trip or trip free	
	SUPPORTING INSULATORS :	
28.	Make and Type	
29.	Weight	
30.	Transport dimensions	
31.	Height above pole required to remove porcelain (mm)	
32.	Insulation class	
33.	Visible corona discharge voltage	
34.	Dry 1minute power frequency flashover voltage (KV rms)	
35.	Wet 10 sec. power frequency flashover voltage (KV rms)	
36.	1.2/50 microsecond impulse flashover voltage (KV peak)	
37.	Nature of dielectric	
38.	Total minimum Cree page distance (mm)	
39.	Minimum clearance in air a) Between phases (mm) (Live parts) b) Live parts & earth (mm) c) Live parts to ground level (mm) d) Center to center distance between phase (mm)	
40.	Permissible safe cantilever loading on installed porcelain (Kg.m)	

	CONSTRUCTIONAL FEATURES :	
41.	No. of poles per circuit breaker	
42.	No. of break per pole	
43.	Length of contact travel (mm)	
44.	Total length of breaks per phase (mm)	
45.	Rate of contact travel a) At tripping (millimeters/sec) b) At closing (millimeters/sec.)	
46.	Type of devices if any used to obtain uniform voltage distribution between breakers	
47.	Type of main contacts	
48.	Material of main contacts	
49.	Whether main contacts Silver plated (Yes/No) ● Thickness of silver coating on main contracts (mm) ● Type of arcing contacts & material ● Contact pressure on arcing contacts (KG/m_2)	
50.	Type of auxiliary switches	
51.	Material of switch contacts	
52.	Whether contacts silver plated (Yes/No)	
53.	No. of auxiliary switch contacts operating with all the three poles of a breaker a) Which are closed when breaker is open (NC) b) Which are open when breaker is open (NO) c) Those adjustable with respect to the position of main contacts	
54.	No. of auxiliary switch contacts operating with individual pole of a breaker a) **Which are closed when breaker is open (NC)** b) Which are open when breaker is open (NO) c) Those adjustable with respect to the position of main contacts	
55.	No. of spare auxiliary switch contacts operating with all three poles of a breaker a) Which are closed when breaker is open (NC) b) Which are open when breaker is open (NO) c) Those adjustable with respect to the position of main contacts	

56.	No. of spare auxiliary switch contacts operative with individual pole of breaker a) Which are closed when breaker is open (NC) b) Which are open when breaker is open (NO) c) Which are adjustable with respect to the position of main contact	
57.	No. of operations possible without maintenance a) At full rated interrupting capacity b) At 50% of rated interrupting capacity c) At 100% of rated current d) At 50% of rated current	
58.	Mounting flange details (PCD & Diameter)	
59.	Method of closing a) Normal Electrical/Mechanical b) Emergency Electrical/Mechanical	
60.	Type of closing mechanism (spring)	
61.	a) Normal voltage of closing b) Pick up range (Volts)	
62.	a) Power at normal voltage of closing mechanism (Watts) b) Power at 85% normal voltage (Watts)	
63.	Type of tripping mechanism (spring)	
64.	Normal voltage of tripping coils (Volts)	
65.	a) Power at normal voltage for tripping coils (watts) b) Power at 70% normal voltage for tripping coils (watts)	
66.	Arc duration at 100% interruption capacity (ms) a) Power at Normal voltage for tripping coils (watts) b) Power at 70% normal voltage for tripping coils (watts)	
67.	Arc duration at 100% interruption capacity (ms) a) Opening	
68.	Total length of the arc (mm)	
69.	Max. length of the arc (in sec)	
70.	Total interrupting time measured from instant of trip coil opening of main contact	

71.	Closing time measured from instant of application of power to closing device up to closing of main contact	
72.	Critical current (current giving the longest are when a break takes place) (KA)	
73.	Contingencies for which alarm provided	
74.	Design data for supporting structure	
75.	Weight of supporting steel structure per breaker	
76.	a) Weight of complete circuit breaker (Kg.) b) Impact loading for foundation design, to include dead load plus impact value on opening at maximum interrupting ratings, in terms of equivalent static load (kg) c) Overall dimensions : Height (mm) Width (mm) Length (mm)	
77.	Descriptive leaflets enclosed	
78.	Rated pressure of SF6 gas in the circuit breaker (Kg./CM_2)	
79.	Rated pressure of SF6 gas in the gas cylinders (Kg/cm_2)	
80.	Quantity of SF6 gas required per single pole unit (Kg.)	
81.	Quantity of SF6 gas per cylinder (Kg.)	
82.	Weight of empty cylinder (Kg.)	
83.	Quantity of absorbent required per pole (Kg.)	
84.	Recommended interval for renewal of absorbent in case of outdoor circuit breakers operating in tropical conditions	
85.	Chemical composition of the absorbent	
86.	Quantity of absorbent covered in the scope of supply (including spare quantity) (Kg.)	
87.	Limits of gas pressure for proper operation of circuit breaker	
88.	Pressure and temperature at which the temperature compensated gas pressure switch will a) Give alarm (Kg/cm_2 $_0$C) b) Cutoff (Kg/cm_2 $_0$C)	
89.	Name of SF6 suppliers and country of origin	

90.	Quantity of SF6 gas supplied for a) Actual use in breakers (Kg.) b) As spare (Kg.) (free of cost)	
91.	Chemical composition of gas a) Qty. of air by weights (ppm) b) Qty. of H_2O by weight (ppm) c) Qty. of CF4 - by weight (ppm) d) Qty. of acid by weight (ppm)	
92.	Type of operating mechanism offered	
93.	Voltage and power supply system for which the temp. compensating gas pressure switch and other pressure switches are suitable	
94.	Recommended overhauling intervals for a) Circuit Breakers b) Spring operating system	
95.	Details of Control Cubicle a) Degree of Protection b) Type and thickness of gasket	
96.	Details of (counter)	
97.	Electrical (counter)	