SPECIFICATION NO. e- 610000543/HPC&HP/APGENCO/2019

(THIS IS A TWO PART BID)

“Design, engineering, manufacture, assembly, stage testing inspection and testing before supply and delivery at site and erection, testing and commissioning of 1 No. 5/7.5MVA, 132/11KV, 3-Phase, ONAN/ONAF Cooling Power Transformer complete with all fittings, accessories, associated equipment and Remote transformer control panel along with mandatory spares at Srisailam Right Bank Power House (7X110MW) located at Srisailam Dam East, Kurnool District of Andhra Pradesh State”

Summary sheet, Instructions to bidders, General, Financial Terms and Conditions, Technical Specification and schedules

Phone No : 0866-2526801
Email : se-hpc1@apgenco.gov.in

Sd/-
SUPERINTENDING ENGINEER
HYDEL-I/APGENCO
VIDYUT SOUDHA
VIJAYAWADA
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| 6. | Delivery Period | a) **Material:** The materials shall be delivered within **FOUR Months** from the date of issue of LOI/Purchase Order including a period of 15 days for approval of drawings by APGENCO reckoned from the date of receipt of hard copies of drawings. However, the delivery period shall include delivery and acceptance of the material in good condition at site.  
   b) **Erection, Testing & Commissioning:** Erection, testing & commissioning of transformer shall be done within **ONE Month** from the date of intimation of readiness of site. |
| 7. | Tender Type | Open |
| 8. | Tender Category | Common Products/Service |
| 9. | Bid Security (EMD) | Rs.45,000 (Rupees Forty Thousand Only)  
The EMD shall be paid in any of the following forms  
i) Non-PEMD Holders: Rs.45,000 in the form of DD/BC from any Govt. Banks/ Nationalized Banks/ Public Sector Banks/ Scheduled banks.  
ii) PEMD Holders: Permanent EMD holders shall upload the copy of PEMD approval issued by the competent authority along with bid.  
iii) SSI/NSIC units: The SSI units registered with either the NSIC or the Department of Industries/Govt. of AP, are eligible for exemption from payment of EMD. However, they should apply in advance by enclosing a valid SSI/ NSIC certificate and furnishing the details/ information and obtain exemption from the Chief Engineer (HPC & Hydel Projects), Vijayawada well in advance before submitting the tender. For details please refer Clause No 1.4. |
| 10. | Bid Security Payable to | For DD’s: Pay Officer, APGENCO, Vidyut Soudha payable at Vijayawada.  
For BG’s: As per Annexure-1 |
<p>| 11. | Process Fee | Not Applicable |</p>
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| 19. | Eligibility Criteria | A) The Bidder shall be Original equipment Manufacturer (OEM) having manufacturing unit in India and shall have an experience of at least 5 (FIVE) years in the manufacture, supply and commissioning of 132 KV or higher voltage rating Power/Generator Transformers for at least two organizations in india and which are working satisfactorily for at least ONE year as on the date of bid submission. Satisfactory performance certificates issued by the end users along with purchase order copies shall be uploaded.  
B) The bidder should have an annual turnover of not less than Rs.1.35 Crores for at least ONE year during the last ‘3’ years. The bidder should enclose copies of the audited financial statements of the last ‘3’ years so as to prove the financial capacity of the bidder to execute the order. |
| 21. | Contact Details | Phone : 0866 – 2526801/2526318  
Email: se-hpc1@apgenco.gov.in |
| 22. | Procedure for bid submission | Through APGENCO e-procurement platform, i.e., www.apgenco.gov.in OR https://etender.apgenco.gov.in  
Help Desk Ph. No. 08662526979. |
| 23. | Evaluation of Bids | Overall Lowest bidder (L1) excluding the cost of recommended spares. |

**Note:**

i) *Ensure that all the documents uploaded as per the CHECK LIST.*
CHECK LIST

I. The following documents pertaining to Pre-Qualification & Technical bid should be uploaded in “C-FOLDER ATTACHMENTS” only:

1. **EMD**: DD/BG/Pemd as per item no.9 of NIT.
2. **Proof of Experience** – Minimum Two **Performance certificates issued by the END USERs** along with Purchase order copies.
3. **Proof of Financial capacity** – Annual Turnover Certificates (with authentication of Chartered Accountant) along with Balance Sheets (Financial statements) for last three financial years.
4. **Proof of Technical Capability** – The Guarantee Technical particulars along with full Technical details and other relevant documents of the equipment previously supplied shall be furnished.
5. **Registration Certificates**: Copies of documents relating to the Registration of the firm, Registration as Electrical Licensed Contractor, Partnership deed, Articles of Association.
6. **Guaranteed Technical Particulars**: sheet (Schedule-09) along with full Technical details of the materials/equipment to be supplied
7. **Income Tax Registration**: Copy of PAN.
8. **GST Registration**: Copy of GST registration.
9. **Schedules**: Filled in Schedules 1 to 9
10. **Miscellaneous documents**: Any other documents/issues related to PQ/Technical matters, like Type Test reports etc.,

I. **Copies of the following Price Bid documents shall be uploaded in “ATTACHMENTS FOLDER” which will be visible after Price bid opening only:**

1) Price Summary Proposal sheet duly indicating GST, Packing & Forwarding, freight, Transit Insurance charges as per Schedule-A.
2) Any other items/issues related to Price bid/Price of items which could not be quoted in the Price Bid can also be uploaded.

**NOTE:**

1) Uploading of Documents in the respective folder of APGENCO e-platform will only be considered. Any wrong attachments will lead to disqualify of the bid.

2) Hard copies shall be submitted by the successful bidder (L1) for verification, only if asked by the Competent Authority.
SECTION-I

IMPORTANT INSTRUCTIONS TO BIDDERS

The instructions given below must be read very carefully, as failure in compliance with any of these may render the offer liable for rejection. If a bidder has any doubt about the meaning of any stipulation therein, General Purchase Conditions, specification of materials or any other enclosed document, he should immediately obtain the clarification/information in writing from the executive who has issued these documents.

1.1 Procedure for submission of bids in APGENCO e-procurement website:

1. The bidders need to register on the electronic procurement market place of APGENCO, i.e. www.apgenco.gov.in. On registration in the APGENCO e-procurement website market place the bidder will be provided with a user ID and password by the system using which the bidder can submit their bids on line. For any queries on registration and online bid submission, in APGENCO e-procurement Website, the bidders may contact HELP DESK of Service provider on https://etender.apgenco.gov.in

2. The guidelines for the bidders participating in APGENCO e-procurement tender are detailed in the website www.apgenco.gov.in.

3. The Bids/Schedules should be in the prescribed form that can be downloaded free of cost from the website https://etender.apgenco.gov.in.

4. The dates stipulated in the Bid notice are firm and under any circumstances they will not be relaxed unless officially extended.

5. Digital Certificate Authentication:
   a. The bidder shall authenticate the bid with his Digital Certificate for submitting the bid electronically on APGENCO e-procurement website. Bids not authenticated by Digital Certificate of the bidder will not be accepted on the APGENCO e-procurement website.
   b. For obtaining Digital Signature Certificate, all the bidders are requested to go through Guidelines to bidders for participating in APGENCO e-procurements tenders which is available in the APGENCO e-procurement website.

6. The tenderer should read and understand clearly the general instructions and terms and conditions of the tender document before uploading of documents and submission of the tender. The Bidder is also requested to download the training Kit, along with above tender document and use the same to acquaint with the procedure. Any offline submission of the bid will be rejected and action will be taken against the bidder according to the norms of APGENCO e-procurement website.

7. The bids shall be submitted online. All the documents to be submitted as soft copies shall be signed & stamped, scanned and uploaded in Zip format. Those documents which shall be submitted as hard copies shall be signed, stamped and sent to reach the tender inviting authority after written request from the tender inviting authority. **List of the documents** to be submitted in hard copies/soft copies is given in **Check List**.

8. Any downloading soft copy of the tender documents from the web site is at the sole risk and responsibility of the bidder. APGENCO will not be responsible for any delay/difficulty/inaccessibility of the downloading facility for any reason whatsoever.
9. Amendments/Addendum, if any will also be posted on website for downloading. APGENCO will not hold any responsibility of amendments being or not being kept tracked from time to time by the bidders.

10. The dates stipulated in the Bid notice are firm and under any circumstances they will not be relaxed unless officially extended.

11. The Bid Opening Authority will not consider any documents uploaded after opening date and time.

1.2 EVALUATION OF BIDS:

a) Bids will be processed in two stages (two part bid). In the first stage, the "Bid" under e-procurement package will be opened to assess whether the Bidder qualifies and whether his offer is technically acceptable and substantially responsive. The Purchaser will examine the Bids to determine whether they are complete, whether required sureties have been furnished, whether the documents have been properly signed, whether relevant hard copies have been furnished and whether the Bids are generally in order. The bids of only such Bidders whose bids are technically and commercially in accordance with the specification will be considered for second stage of Price Bid opening/evaluation. The on-line system will not open the price-bids of tenderers who are not qualified in Technical/PQ.

b) A responsive Bid is the one which accepts and fulfils all the terms and conditions of this specifications and documents, supported by the necessary sureties, and are complete in respect of details as requested in the Bid document.

   i) The responsive Bids received will be evaluated by the Purchaser to ascertain the lowest evaluated Bid for complete works covered under these specifications and documents.

   ii) The purchaser is the final authority in deciding the above and his decision cannot be contended

c) If the due date for opening of the tenders happens to be a Public holiday, the opening of the tenders will be done on the next working day at the same time and venue as specified originally for opening. APGENCO reserves the right to amend or modify the tender and its conditions.

d) The Bids will be opened at the time and date specified in the tender notice by the Superintending Engineer or his authorized assistant in the presence of the bidders or their authorized representatives with valid authorization, who may desire to be present.

e) The tenders which contain the full information and which comply with the requirements regarding technical and financial qualifications, experience and equipment will be considered.

f) The APGENCO e-procurement website market place provides an online self-service registration facility to such of the Bidders who are already registered with the respective participating departments for supply of specified goods and services.

g) Intending bidders can contact the O/o. the Superintending Engineer, Hydel-I, APGENCO, 4th Floor, Vidyut Soudha, Vijayawada - 520004 for any clarification /information on any working day during working hours. Phone: 0866 – 2526801.

h) APGENCO reserves the right to respond to any e-mail received by it through their website. APGENCO does not warrant the privacy and/or security of e-mails during internet transmission.

i) APGENCO reserves the right, without prejudice to other rights under terms and conditions of the NIT and tender documents or other remedies available to cancel tenders without assigning any reasons and will not entertain any correspondence in the matter. APGENCO accepts no liability whatsoever and will not be liable for any
loss or damage arising directly or indirectly (including special, incidental or consequential loss or damage) from use of APGENCO e-procurement website or from cancellation of tenders.

1.3 Earnest Money Deposit (EMD): Offers must accompany EMD as per summary sheet, S.No.9 of NIT.

1.4 The EMD shall be forfeited, if

i) Bidder withdraws the bid before expiry of its validity.

ii) Successful bidder does not accept the order/LOI or fails to enter in to a contract within validity period of offer.

iii) Successful bidder fails to furnish Security Deposit within 30 days from the date of issue of P.O/ LOI.

iv) The offer is disqualified for the reasons outlined in clause 1.7.

Waiver in respect of SSI Units:

SSI Units registered with either the NSIC or the Dept of Industries/Govt. of AP, are eligible for exemption from submission of EMD, subject to the following conditions.

(a) The Bidder shall submit a copy of the valid certificate of Registration either with NSIC or Govt. of A.P indicating details such as Monetary limit, details of items covered in the registration, validity period of certificate.

(b) The Items offered must be in the list of Items, for which the Firm is registered.

(c) The quoted price shall be less than the monetary limit stipulated in the Registration Certificate.

The BIDDERS who fulfill the above conditions shall apply for EMD exemption, in advance and they shall obtain approval before Offer submission itself. However, please note that exemption will be issued purely at APGENCO’s discretion.

All the bidders shall invariably upload the scanned copies of DD towards EMD or PEMD approval letter/ EMD exemption letter (if applicable), along with the Bid, in e-procurement platform, failing which their offer shall be liable for rejection.

1.5 Permanent/ Standing EMD Holders:

The bidder may deposit with APGENCO, the permanent fixed deposit of Rs.5,00,000/- (Rupees Five Lakhs only) as EMD in the form of DD/Pay order/ Banker’s cheque. In case of BG, it shall be valid for a period of three years constituting the said sum as security for the compliance with the obligation undertaken in the offer submitted by the bidder. No interest will be payable on such amount. Such bidder shall be entitled to have them considered without payment of EMD upto 5 Lakhs with each tender separately. They need to furnish the Registration Certificate Number and shall also furnish a copy of certificate along with the offer.

1.6 The fact of having enclosed the EMD, in requisite forms as indicated (1.3), or bidder holding permanent EMD (1.5), shall be clearly mentioned in their offer, failing which their offer will not be considered for evaluation whatsoever.

1.7 Post tender rebates or deviation in quoted prices and/or conditions or any other such offers which will give a benefit to the bidder will not only be rejected outright but also the original offer will itself get disqualified on this account, and bidders EMD shall be forfeited.
1.8 Bidders may note that due date and time of opening the bids shall be adhered to and accordingly, if they wish to witness the bid opening, they should bring necessary authorization letter from the organization.

1.9 Standard printed conditions of the bidder if uploaded with their offer will not be accepted.

1.10 **Validity of offers:** The offer shall be valid for period of **180 days** from the date of opening of bids. The period of validity cannot be counted from any other date other than the date of opening the bids. During this period bidder shall not be permitted to withdraw or vary their offers, once made and if they do so, the EMD shall be forfeited.

1.11 **Income Tax Certificate:** The bidder shall submit along with their offers, the latest valid Income Tax returns for at least two years during the last three years.

1.12 **Past Experience:** The list of consumers, to whom the bidder had supplied, erected and commissioned identical materials in the past along with P.O details and performance report, if any, shall be furnished.

1.13 **Acceptance of APGENCO Payment Terms:** The bidders will be loaded in price evaluation @ 1.25% of landed cost per month for deviation in payment terms.

1.14 **Price Basis:** Kindly quote FIRM & F.O.R. destination prices. Otherwise, if the quoted rates are Ex-works, Loading @ 2% towards packing and forwarding and 3% towards freight charges will be done.

1.15 **Transit Insurance:** Bidder shall quote FOR Destination prices inclusive of transit insurance charge till such time material is unloaded at Project site including 30 days’ storage period. All the damaged parts during transit or otherwise, if any, are to be made good or replaced with good ones by the bidder/supplier irrespective of the settlement of claims with insurance company.

1.16 **Goods & Services Tax:** Kindly indicate clearly as to whether the offered prices are inclusive or exclusive of GST. The rate applicable shall be shown separately. GST will be paid to the seller at the rate which it is liable to be assessed/actually assessed on the date of supply. In case the bidder stipulates GST extra as applicable at the time of dispatch and specifies the present rate of GST (in numeric percentage or NIL), the offer shall be evaluated considering rate of GST for the product as per rate of Govt. of India or as evident from bids received from other bidder. However, liability of APGENCO shall be restricted to actual GST paid at the time of dispatch subject to production of Tax Invoice.

1.17 **Cost Compensation for Deviation:** Deviations specifically declared by the bidders in respective deviation schedules of bid proposal sheets only will be taken into account for the purpose of evaluation. The bidders are required to declare the prices for the withdrawal of the deviations declared by them in the deviation schedules. Such prices declared by bidders for the withdrawal of the deviations in the deviation schedule shall be added to the bid prices to compensate for these deviations. In case prices for the withdrawal of deviations not furnished by the bidder, the APGENCO shall convert such deviations into Rupee value and add to the bid price to compensate for these. In determining the Rupee value of the deviations, the APGENCO will use parameters consistent with those specified in the specification and documents and / or other information as necessary and available with APGENCO. In case the bidder refuses to withdraw the EMD of bidder shall be forfeited. Bidder may note that deviation variations and additional condition etc. found elsewhere in the bid other than those stated in the Deviation schedules, save those pertaining to any rebates, shall not be given effect to in evaluation and it will be assumed that the bidder compiles with all the conditions of bidding documents. In case bidder refuses to withdraw, without any cost to APGENCO, those
deviations, which the bidder did not state in the deviation schedules, the EMD of the bidder may be forfeited.

1.18 Offer should strictly be in conformity with technical specifications/ drawings/ samples as stipulated in this tender. In case no deviations are indicated, it shall be taken for granted that item(s) has/have been offered strictly as per the requirements.

1.19 Delivery Period:

a) **Material:** The materials shall be delivered within **FOUR Months** from the date of issue of LOI/Purchase Order including a period of 15 days for approval of drawings by APGENCO reckoned from the date of receipt of hard copies of drawings. However, the delivery period shall include delivery and acceptance of the material in good condition at site. The equipment/materials shall be dispatched only after issuance of MDCC from the Quality control Department of APGENCO.

b) **Erection, Testing & Commissioning:** Erection, testing & commissioning of transformer shall be done within **ONE Month** from the date of intimation of readiness of site.

1.19.1 Delivery Schedule

The material shall be offered for inspection at least 10 days in advance to depute APGENCO representative and the material shall be delivered after issue of dispatch clearance. The offered delivery period shall be based on delivery schedule indicated in the tender. In case of any deviation, the bidder shall offer his best, realistic and firm delivery, which shall be specific and guaranteed. For delivery beyond contractual delivery period, provisions of ‘General Purchase Conditions’ shall apply.

1.20 It is not binding on APGENCO to accept the lowest or any bid. The corporation reserves the right to revise the quantities at the time of placing order. The quoted rates, terms and conditions shall apply. APGENCO further reserves the right to accept or reject any/all bids without assigning any reasons thereof.

1.21 Bidders are requested to fill in the enclosed proforma **(Schedule-6)** for Terms and conditions and submit the same along with their offer.

1.22 Make/Brand of items offered shall be specified. It shall be appreciated if one copy of detailed descriptive literature/pamphlets shall be enclosed along with the offer which may help technical evaluation.

1.23 Amendment of Bidding Documents:

a) At any time prior to the due date & time for submission of bids, the Purchaser may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by amendment through e-platform.

b) In order to allow prospective Bidders reasonable time to make the amendment into account in preparing their bids, the Purchaser may, at his discretion, extend the due date & time for the submission of bids.

1.24 Language of Bids: The Bid prepared by the Bidder and all correspondence and documents relating to the bid exchanged by the Bidder and the Purchaser, shall be written in English language only.

1.25 Documents Comprising Online Bid:

List of all documents which shall be submitted as softcopies/ hardcopies are given in the **Check List.** The documents which shall be submitted as softcopies shall be signed, stamped and scanned and uploaded during bid submission. The documents which shall be furnished as hardcopies shall be signed, stamped and sent only when requested by the tender inviting Authority by the successful bidder.
1.26 Articles of Association:

a) All Bids must be accompanied by duly authenticated copies of the documents defining the constitution of the company, power of attorney and other relevant documents, and any bid submitted by a partnership firm must be accompanied by duly authenticated extracts from the partnership deed or other documents, so as to show by which person and in what manner contracts may be entered into by or on behalf of the company, partnership for the due execution of such contracts and responsibilities.

b) The said documents must be legalized by the local authorities at the place of issue. Such documents should indicate current address of the firm and full name and current address of all partners of the firm.

c) Any Bid not containing these documents, or if such documents are incomplete, or do not confirm to the aforesaid forms, may at the discretion of the Purchaser be excluded from the judicature.

1.27 The Purchaser may, at his discretion, extend the due date & time for the submission of bids through online corrigendum. However, all rights and obligations of the Purchaser and Bidders previously subject to the due date & time will thereafter be subject to the due date & time as extended.

1.28 Date of Commencement of Contract:

The date of issue of LOI/PO is the date of commencement of contract. The contractor will have to complete all the formalities like submission of Security Deposit etc. within 30 days of issue of LOI/PO. Any delays in complying with the above formalities will be to the account of the contractor.

1.29 Authentication of Bidding:

a) If the tender is made by an individual, it shall be signed by the individual above his full name and current address.

b) If the tender is made by a proprietary firm it shall be signed by the proprietor above, his full name and the full name of his firm with its current address.

c) If the tender is made by a firm in partnership, it shall be signed by all the partners of the firm above their full names and current address, or by a partner holding the power of attorney for signing the tender in which case a certified copy of the power of attorney shall accompany the tender. A certified copy of the partnership deed, current address of the firm and the full names and the current addresses of all the partners of the firm shall also accompany the tender.

d) If the tender is made by limited company or a limited corporation, it shall be signed by a duly authorized person holding the power of attorney for signing the tender in which case a certified copy of the power of attorney shall accompany the tender. Such limited company or corporation may be required to furnish satisfactory evidence of its existence before Contract is awarded.

e) If the tender is made by group of firms, the sponsoring firm shall submit complete information pertaining to each firm in the group and state along with the bid as to which of the firms shall have the responsibility for tendering and for completion of the Contract document and furnish evidence admissible in law in respect of the authority assigned to such firm on behalf of the group of firms for tendering and for completion of the Contract document. The full information and satisfactory evidence pertaining to the participation of each member of the group of firms in the tender shall be furnished along with the tender.

f) The documents or information as required by paras “(a) to (e)” herein above must be uploaded by the tenderer.

g) All witnesses and sureties shall be persons of status and probity and their full names, occupations and addresses’ shall be stated below their signatures.

h) All signatures in the tender documents uploaded shall be dated.
SECTION-II
GENERAL PURCHASE CONDITIONS

2.1 The following terms and expressions herein used shall have the meaning as indicated therein:

**Supplier/ Vendors:** Shall mean the individual; firm or company whether incorporated or otherwise in whose name this purchase order is addressed and shall include its permitted assigns and successors.


2.2 **Reference:** This purchase order number must appear on all the correspondence, packing slips, invoices, drawings or any other document or paper connected with this purchase order.

2.3 **Specifications and drawings:** Any information or details which are included in the specification but not indicated in the drawings and vice-versa shall have the same effect and meaning as if included for and shown both in the specifications and drawings. In case of any dispute between the specifications and drawings, the decision of the Corporation or its authorized representative shall be final and binding.

2.4 **Additions/ Alteration/ Modifications:** The Corporation reserves the right to make additions/ alterations/ modifications to the quantity of items in the purchase order. The supplier shall supply such quantities also at the same rate as originally agreed to and incorporated in the purchase order. The variation shall, however, be limited to +/- 20% of the quantity ordered.

2.5 **Waiver:** Any waiver by the authority or any breach of the conditions of the purchase order shall not constitute any right for subsequent waiver of any other terms and conditions.

2.6 **Subletting and Assignment:** The supplier shall not, except with prior consent in writing of the Corporation, sublet, transfer or assign this order or any part thereof or interest therein or benefit or advantage thereof in any manner, whatsoever. Provided nevertheless that any such consent shall not relieve the supplier from any obligation, duty or responsibilities under the contract.

2.7 **Information Provided by the Corporation:** All drawings, Data and documentation that are given to the suppliers by the Corporation for the execution of the order are the property of the Corporation and shall be returned when demanded. Except for the purpose of executing the order of the Corporation, supplier shall ensure that the above documents are not used for any other purpose. The supplier shall further ensure that the information given by the Corporation is not disclosed to any person, firm, body, corporate and/or authority and every effort that the above information is kept confidential. All such information shall remain the absolute property of the Corporation.

2.8 **Name Plate:** Equipment should be provided with name plate giving full details of manufacture, capacity and other details as specified in the relevant IS or other specification stipulated. The purchase order number, date and year of supply and the words “APGENCO” must be etched on the name plate.

2.9 **Interchangeability:** All similar materials and removable parts of similar equipment shall be interchangeable with each other. A specific confirmation of this should be furnished along with the invoices for the supplies.
2.10 **Materials & Workmanship:** Supplier shall fully warrant that the stores, equipment and component supplied against the purchase order shall be new and first quality, according to the specifications and shall be free from defects (even concealed faults, deficiency in design, materials and workmanship).

2.11 **Spare Parts, Oil & Lubricants:** Whenever applicable, the supplier shall furnish to the Corporation, item-wise price list of spares required for five-year operation & Maintenance of the equipment. The supplier shall also furnish necessary instructions and drawings to identify the spare part numbers and their locations as well as on interchangeability chart. The supplier shall recommend the quality of oils & lubricants required to be used for un-interrupted operation (at least for one year) of the equipment supplied against this order.

2.12 **Supplier’s liability:** Supplier hereby accepts full responsibility and indemnifies the Corporation and shall hold the Corporation harmless from all acts of omission and commission on the part of the supplier, his agents, his subcontractors and employees in execution of the purchase order. The supplier also agrees to defend and hereby undertakes to indemnify the Corporation and also hold it harmless from any and all claims for injury to or death of any and all persons including but not limited to employees and for damage to the property arising out of or in connection with the performance of the work under the purchase order.

2.13 **Access to supplier’s Premises:** The Corporation and /or its authorized representative shall be provided access to suppliers and / or his sub-contractor’s premises, at any time during the pendency of the purchase order, for expediting the supplies, inspection, checking etc.

2.14 **Modifications:** This purchase order constitute an entire agreement between the parties hereto. Any modification to this order shall become binding only upon the same being confirmed in writing duly signed by both the parties.

2.15 **Inspection/checking/testing:**

All materials/ equipment to be supplied against this purchase order shall be subject to inspection/checking/testing by the Site engineers/ authorized Quality control department representative/Engineer from Head Quarters at all stages and places, before, during and after the manufacture. All these tests shall be carried out in presence of Site engineers/ authorized Quality control department representative/Engineer from Head Quarters of the Corporation. Supplier shall notify the corporation for the inspection of materials/ equipment when they are ready, giving at least 10 days notice. If upon receipt at our stores, the materials / equipment do not meet the specifications, they shall be rejected and returned to the supplier for repair/ modification etc., or for replacement. In such cases all expenses including to and fro freight, repacking charges, transit insurance etc., shall be to the account of supplier.

Inspection by the authorized representative of the Corporation or failure of the Corporation to inspect the material/ equipment shall not relieve the supplier of any responsibility or liability under this purchase order in respect of such materials /equipment not be interpreted in any way to imply acceptance thereof by the Corporation. Whenever specifically asked for by the Corporation, the supplier shall arrange for inspection/ testing by institutional Agencies such as Lloyd’s Register of Industrial services, Boiler Inspectorate, RITES etc. In such cases vendor shall adhere to the inspection / testing procedures laid down by such agencies. All expenses including inspection fees shall be to the suppliers account unless agreed to the contrary and specified in the purchase order.

*Accommodation and local conveyance shall be provided by the suppliers for the APGENCO/Third party representatives during inspection.*
2.16 **Packing and Marking:** All materials/equipment shall be securely packed to the requirement of transportation by Rail/Road/Sea transport. All exposed services/connections/protrusions shall be properly protected. All unexposed part shall be packed with due care and the packages should bear the words 'Handle with Care'. The packing requirements of Rail/ Road transport shall be complied with so as to obtain clear Railway/ Lorry Receipt i.e. without any qualifying remarks.

All packages and unpacked materials shall be marked with the name of the Consignor, Consignee, Purchase Order No., gross and net weight, sign of handling, if any, with indelible paint in English at least at two places. In case of bundles, metallic plates marked with the above details shall be tagged with such bundles.

2.17 **Dispatch of materials:** The equipment & material shall be dispatched only after issuance of MDCC from the corporate Quality Department. The supplier is responsible for the safe delivery of the goods in good condition at destination stores. The supplier should acquaint himself of the conditions obtaining for handling and transport of the goods to destination and shall include and provide for security and protective packing of the goods so as to avoid damage in transit. After packing the materials/ equipment those shall be dispatched strictly as per the provision of purchase order. In case any changes in the mode of transportation and / or transporter has to be done, the same shall be done only after obtaining prior approval in writing. Normally the goods shall be dispatched through our approved transporter only. All formalities related to allotment of wagons, loading permission from railways shall be completed by the supplier. The supplier shall communicate immediately the dispatch details to the consignee as specified in the purchase order. The original despatch documents shall be forwarded immediately, failing which the supplier shall be responsible for any delay in payment and consequential payments of demurrages and wharfages to the transporter, if any.

2.18 **Demurrage/wharfage:**

i. Dispatch of materials not through authorized transporter

ii. Late receipt of invoice or due to violation of any other clause(s) of the purchase order will be to supplier’s account. Supplier shall also be responsible for all such payments due to late receipt of RR/LR and other documents.

2.19 **Acceptance of order:** The Purchase orders shall be sent to supplier in duplicate and he shall return one copy along with enclosures, duly signed and stamped, within 7 days in token of having received and accepted the order.

2.20 **Jurisdiction:** All and any dispute or difference arising out of or touching this order shall be decided only by the courts or Tribunals situated in Vijayawada.

For the purpose of any legal obstruction, the material, spares etc. should be deemed to pass into company’s owner ship only at the destination stores where they are delivered and accepted.

2.21 **Guarantee Period:** The equipment shall be guaranteed for satisfactory operation for a period of 36 months from the date of receipt at stores in good condition or 30 months from the date of commissioning which is earlier. If during the period of guarantee any of the material found defective and / or fail in test or operation, such materials shall be repaired or replaced by the supplier free of cost to APGENCO irrespective of their reimbursements from the insurance company within reasonable time which shall in no circumstances be more than 15 days or such other reasonable time as APGENCO may deem proper to afford, failing which the cost of the failed units will be deducted from subsequent bills/ Bank Guarantees.
2.22 **Drawings:** The detailed drawings and bill of materials of the Transformer shall be furnished within 15 days from the date of acceptance of PO and got approved by APGENCO before manufacturing.

*Sd/-*

Superintending Engineer
(Hydel -I)/APGENCO
SECTION-III
FINANCIAL

3.1 Prices: Price(s) mentioned in the purchase order shall be firm and not subject to escalation on any account, till the order is executed in full and its subsequent amendments accepted by the supplier even though the completion/ execution of order may take longer time than delivery period incorporated and accepted in purchase order.

3.2 Taxes and Levies: Taxes and other levies payable shall be shown separately in the invoice. These shall be to the account of Corporation, unless otherwise mentioned in the purchase order.

3.3 Variations in Statutory Levies: Any variation, upward or downward, in statutory levies or new levy is introduced after opening of the bids/ placement of order under this purchase order shall be to the account of the Corporation, unless otherwise mentioned in the P.O. provided that the delivery is completed within the contractual delivery schedule. In cases where delivery schedule is not adhered to by the supplier and there are upward variation/revision after the agreed delivery date, the bidder/supplier shall bear the impact of such increased levies and if there is downward variation/revision, the corporation shall be given advantage to that extent.

All royalties for patent or charges for the use or infringement thereof that may be involved in the construction or use of any equipment shall be included in the bid price. The bidder /supplier shall protect the Corporation against any and all claims arising on account of the use thereof the Corporation agreeing to furnish the supplier any appropriate information or assistance.

3.4 Security Deposit (SD)

a) The successful bidder shall furnish within 30 days from the date of issue of LOI/PO (if the value of order is above Rs.2,00,000/-) security deposit equal to 2.5% of value of purchase order for full execution of supplies thereof.

b) Security deposit may be furnished in the shape of Demand Draft/BC/Pay order drawn on any nationalized/Scheduled/Public Sector Banks payable to APGENCO or bank guarantee in lieu of cash from any Nationalized/Scheduled/Public Sector bank’s in prescribed proforma as per Annexure-3 (Bank Guarantee shall be accepted only if amount of SD is above Rs.10,000/-) or Government Securities duly endorsed in favour of APGENCO. However, the Bank guarantee shall be valid till the guarantee period with a claim period of 6 months over and above the guarantee period and the validity of the bank guarantee shall be extended suitably in case of delay in supply of material.

c) Security Deposit payment is exempted for SSI/NSIC units.

d) The security deposit amount shall be forfeited to the extent of financial loss suffered by the Corporation, if supplier fails to execute the order and fulfill its terms and conditions.

e) The Security deposit shall be returned promptly to the supplier as soon as order is fully executed and there is nothing outstanding either against this purchase order or any other purchase order placed by the corporation on the supplier.

3.5 Terms of payment:

3.5.1 The standard payment terms shall be:

A) MATERIAL PORTION:

i) Within the Contractual delivery period: 90% of the all inclusive price of the materials will be paid within 30 days against contractor’s principle invoices and
other relevant documents on receipt and acceptance of the material in good condition at site against furnishing of Performance Bank Guarantee for 10% value of the contract covering the guarantee period and the Balance 10% payment shall be paid after successful completion of erection, testing and commissioning of the entire equipment.

ii) Beyond the contractual delivery period: 85% of the all inclusive price of the materials will be paid within 30 days against contractor’s principle invoices and other relevant documents on receipt and acceptance of the material in good condition at site against furnishing of Performance Bank Guarantee for 10% value of the contract covering the Guarantee period and Balance 15% payment shall be paid after completion of erection and commissioning of entire equipment thereafter subject to effective performance of the contract and settlement of liquidated damages etc.

B) ERECTION, TESTING & COMMISSIONING:

i) Within the Contractual delivery period: 100% payment of the all inclusive price of erection, testing & commissioning charges of equipment shall be paid within 30 days after successful completion of commissioning of the equipment in full shape on presentation of the contractor’s commercial invoice.

ii) Beyond the contractual delivery period: 100% payment of the all inclusive price of erection, testing & commissioning charges of equipment shall be paid within 30 days after successful completion of commissioning of the equipment in full shape on presentation of the contractor’s commercial invoice subject to settlement of liquidated damages etc.

3.5.2 Payments shall be made through account Payee CHEQUES ONLY. No interest charges shall be paid in case the payment is delayed for any reason.

3.5.3 If the supplier has received any over payments by mistake or if any amounts are due to the Corporation due to any other reasons, when it is not possible to recover such amount under the contract resulting out of this purchase order, the Corporation reserves the right to collect the same from any other amounts and/or Bank Guarantee given by the supplier due to or with the Corporation.

3.5.4 When the supplier does not at any time fulfill his obligations in replacing/rectifying etc., of the damages/defective materials in part or whole, promptly to the satisfaction of the corporation’s officers, the corporation reserves the right not to accept the bills against subsequent dispatches made by the supplier and under these circumstance only the supplier will be responsible for any demurrage, wharfage or damages occurring to the consignments so dispatched.

3.6 Liquidated damages/ failure and termination:

3.6.1 In the event of any delay in the supplies of ordered materials/ delay in erection, testing and commissioning beyond the stipulated date of delivery/ delivery schedule including any extension permitted in writing, the Corporation reserves the right to recover from the supplier a sum equivalent to 0.5% of the delayed material/Erection, testing and commissioning for each week of delay and part thereof subject to a maximum of 5% of the total value of the order.

3.6.2 Alternatively, the Corporation may resort to purchase the materials/ equipment from elsewhere at the risk and cost of the supplier and recover all such extra cost incurred by the Corporation in procuring the materials by above procedure.

3.6.3 Alternatively, the Corporation may cancel the purchase Order completely or partly without prejudice to its right under the alternatives mentioned above.

3.6.4 In case of resource to alternative 3.6.2 and 3.6.3 above, the Corporation shall have the right to repurchase the materials which is readily available in the market to meet the urgency of requirements caused by supplier’s failure to comply with the scheduled delivery period irrespective of the fact whether the materials /equipment are similar not.

3.7 Performance Bank Guarantee: The supplier shall ensure that all materials/ equipment under this tender shall conform to Corporation’s requirements and specifications. An additional security in the form of Performance Bank Guarantee is essential for satisfactory performance of the equipment over a period of time. In
view of this, the suppliers of equipment/ instruments/ machinery shall be required to furnish a Bank Guarantee (10% of order Value) against any manufacturing defects/ poor workmanship/ poor performance valid till the guarantee period and with a claim period of 6 months over and above the guarantee period. In case any deficiencies are found during guarantee period, the same shall be repaired/rectified/replaced free of cost. BG shall be from any Nationalized/Public Sector/Schedule Bank in the prescribed proforma as per Annexure-4 and got approved by APGENCO. OR otherwise, 10% of order value shall be deducted from the bills, if the supplier fails to furnish the Performance bank guarantee. The deducted 10% performance guarantee amount shall be released after expiry of guarantee period.

3.7.1 The Corporation shall at its discretion have recourse to the said Bank Guarantee for recovery of any or all amount due from the supplier in connection with the purchase order including of the Guarantee obligations. Checking/approval of supplier’s drawings, inspection and acceptance of materials/equipment furnishing to effect shipment and/or work done by erection, testing and commissioning of the equipment by Corporation or any other agency on behalf of the Corporation shall not in any way relieve the supplier from the responsibility for proper performance during the Guarantee period.

3.8 Insurance: Supplier shall arrange suitable marine transport insurance cover at their risk and cost.

3.9 Removal of Rejected Goods and Replacement:

a) If upon delivery, the material/ equipment is found not in conformity with the specifications stipulated in the purchase order, whether inspected and approved earlier or otherwise, those shall be unacceptable to the Corporation or its authorized representative. A notification to this effect shall be issued to the supplier, normally within 30 days from the date of receipt of materials at our stores.

b) Supplier shall arrange suitable replacement supplies and remove the rejected goods within 30 days from the date of notification failing which, the goods shall be dispatched to vendor by road transport on ‘freight to pay basis’ at suppliers risk and cost.

c) External damages or shortages that are prima-facie the results of rough handling in transit or due to defective packing shall be intimated within a fortnight of the receipt of the materials, spares etc.. In case of internal defects, damage or shortages or any internal parts, which cannot ordinarily be detected on a superficial visual examination, though due to bad handling in transit or defective packing should be intimated within 3 months from the date of receipt of these articles. In either case the damaged or defective materials should be replaced by the supplier free of cost to the company.

d) If no steps are taken within 15 days of receipt of intimation of defects or such other reasonable time as corporation may deem proper to afford, the company may without prejudice to its other rights and remedies arrange for repairs/rectification of the defective materials or replace the same and recover the expenditure incurred from the deposits such as EMD, SD and performance guarantees or other monies available with the company or by resorting to legal action.

e) However, if any advance payment had been made by the Corporation for the goods so rejected on technical ground, rejected materials shall be returned to the supplier after receipt of suitable replacement supplies. If the supplier does not settle the rejection within a period of 60 days from the date of notification from stores, rejected goods shall be sent back to supplier at his risk and cost.

3.10 Force Majeure:

3.10.1 The supplier shall not be liable for any delay or failing to supply the materials/equipment for reasons of Force Majeure such as Acts of God, Acts of War, Act of Public Enemy, Natural calamities, Fires, Floods, Frost, Strikes, Lockouts etc. Only those causes which have duration of more than 7 days shall be considered for force
majeure.

3.10.2 The vendors shall within 10 days from the beginning of such delay notify to the Corporation in writing the cause of delay. The corporation shall verify the facts and grant such extension of time as facts justify.

3.10.3 No price variation shall be allowed during the period of force majeure and Liquidated damages would not be levied for this period.

3.10.4 At the option of the Corporation, the order may be cancelled. Such cancellation, would be without any liability whatsoever on the part of the Corporation. In event of such cancellation, supplier shall refund any amount advanced or paid to him by the Corporation and release the facilities, if any provided by the Corporation.

3.11 Cancellation of Order: The Corporation reserves the right to cancel the order in part or in full by giving two weeks’ notice there by if

- The supplier fails to comply with any of the terms of the order.
- The supplier becomes bankrupt or goes into liquidation.
- The supplier makes general assignment for the benefit of the creditors and
- Any Receiver is appointed for the property owned by the supplier.

Sd/-
SUPERINTENDING ENGINEER
(HYDEL -I)/APGENCO
SECTION-IV

TECHNICAL SPECIFICATION of 5/7.5 MVA, 132 / 11 KV POWER TRANSFORMER

4.0 SCOPE:

This specification covers design, engineering, manufacture, assembly, stage testing inspection and testing before supply and delivery at site and erection, testing and commissioning of 5/7.5MVA, 132/11KV, 3-Phase, ONAN/ONAF Cooling Power Transformer- 1 No. complete with all fittings, accessories, associated equipment and Remote transformer control panel along with mandatory spares which are required for efficient and trouble free operation as specified hereunder.

It is not the intention of the specification to specify completely herein all the details of the design and construction of equipment. However, the equipment shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation. The owner will interpret the meanings of drawings and specification and shall have the power to reject any work or material, which, in his judgment is not in accordance therewith. The offered equipment 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 bidder's supply irrespective of whether those are specifically brought out in this specification and / or the commercial order or not.

4.1 STANDARDS:

The transformer and associated accessories shall conform to the latest issues/amendments of standards as given below, except to the extent explicitly modified in the specifications.

<table>
<thead>
<tr>
<th>Indian No.</th>
<th>Title</th>
<th>International and Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS-2026</td>
<td>Power Transformers</td>
<td>IEC-76</td>
</tr>
<tr>
<td>IS-3639</td>
<td>Fittings and Accessories for power transformers</td>
<td></td>
</tr>
<tr>
<td>IS-335</td>
<td>Insulating oils for Transformers and switch gear</td>
<td>IEC-296, BS-148</td>
</tr>
<tr>
<td>IS-2099</td>
<td>Bushings for alternating Voltage above 1000 V</td>
<td>IEC-137, BS-223</td>
</tr>
<tr>
<td>IS-2705</td>
<td>Current Transformers</td>
<td>IEC-185</td>
</tr>
<tr>
<td>IS-325</td>
<td>Three phase Induction motors</td>
<td>IEC-34</td>
</tr>
<tr>
<td>IS-375</td>
<td>Marking &amp; arrangements for switch gear, bus bars, Main connections and auxiliary wiring</td>
<td></td>
</tr>
<tr>
<td>IS-3737</td>
<td>Gas operated relays</td>
<td></td>
</tr>
<tr>
<td>IS-1886</td>
<td>Code of practice for installation and maintenance of transformers</td>
<td></td>
</tr>
<tr>
<td>IS-2147</td>
<td>Degrees of protn. Provided by enclosures for low voltage switch gear and control</td>
<td></td>
</tr>
<tr>
<td>IS-5</td>
<td>Colours for ready mix paints</td>
<td></td>
</tr>
<tr>
<td>IS-6272</td>
<td>Industrial cooling fans</td>
<td></td>
</tr>
<tr>
<td>IS-6600</td>
<td>Guide for loading of oil immersed transformers</td>
<td></td>
</tr>
</tbody>
</table>
IS-3347 Dimensions for porcelain transformers bushings.
IS-2629 Recommended practice for Hot-dip galvanizing for Iron and steel.
IS-2633 Method of testing if coating of Zinc coated items.
IS-1271 Classification of insulating material for electrical machinery and apparatus in relation to their thermal stability in service.

CBIP Publication no 295 - Manual on transformers

Reference Abbreviation | Name and Address
------------------------|---------------------------------------------------------------
IS                      | Indian Standard, Bureau of Indian Standards, Manak Bhavan, 9, Bahadur Shah Zafar Marg, New Delhi - 110 002. INDIA.
BS                      | British Standards, British Standards Institution, 101, Pentonvilla Road, N - 19 - ND - UK.
NEMA                    | National Electric Manufacture Associate, 115, East 44 th Street New York, NY 10017, USA.

Equipment conforming to other internationally accepted standards, which ensure equal or higher quality than the standards mentioned above, would also be acceptable. Incase the bidders who wish to offer material confirming to the other standards, salient points of difference between the standards adopted and the specific standards shall be clearly bought out in relevant schedule, four copies of such standards with authentic English translations shall be furnished along with the offer. In case of conflict the order of precedence shall be (i) IS, (ii) IEC, (iii) Other standards. In case of any difference between provisions of these standards and provisions of this specification, the provisions contained in this specification shall prevail.

The electrical installation shall meet requirements of Indian Electricity Rules, 1956 and IS-1886, "Code of practice for installation & maintenance of Transformers" as amended till date.

4.2 SERVICE CONDITIONS:

4.2.1 SITE CONDITIONS:
a. Climate: December to January is the coldest period and there after temperature rises rapidly at first and steadily later till May which is the hottest month. The day temperature increases a little in September and October after which both day and night temperatures begin to drop.

b. Altitude: +72.500 M.
c. Type of soil: Rocky.
d. Ambient Temperature
   i) Daily Min. (Mean) : 17 Deg.C.
   ii) Daily Max. (Mean) : 29 Deg.C. (46 Deg.C in May)
   iii) Design ambient temp. for electrical equip. : 50 Deg.C.

e. Rainfall
   Average per annum : 673.3 mm.

f. Wind Velocity & Pressure :
   Max. Wind velocity : Assumed 120 km/hour.

4.2.2 SEISMIC FORCES:
The equipment shall be designed to withstand seismic forces corresponding to a seismic co-efficient 0.2g in the horizontal direction and 2/3rd of the above value in the vertical direction. Details of the calculations made for the design of the various equipment taking in to account the above seismic forces shall be furnished to the purchaser.

4.3 Auxiliary Power Supply:
Auxiliary electrical equipment shall be suitable for operation on the following supply system.
   a. Power Devices (like drive motors) 415 V, 3 phase 4 wire 50Hz. neutral grounded AC supply.
   b. DC Alarm, control and protective devices 220 V DC, ungrounded 2 wire
   c. Lighting 240 V, single phase 50 Hz. AC supply

Each of the foregoing supplies shall be made available by the Purchaser at the terminal point for transformer for operation of accessories and auxiliary equipment. Bidder's scope include supply of interconnecting cables, terminal boxes etc., The above supply voltage may vary as indicated below and all devices shall be suitable for continuous operation over the entire range of voltages.

   i) AC supply : Voltage + 10% / -15%; Frequency +/- 5%

   ii) DC supply : -15% to +10%.

4.4 PRINCIPAL PARAMETERS: The transformer shall conform to the following specific parameters:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Type of power transformer/</td>
<td>3 Phase Power transformer</td>
</tr>
<tr>
<td></td>
<td>installation</td>
<td>suitable for out-door installation</td>
</tr>
<tr>
<td></td>
<td>Voltage Rating(HV/LV)</td>
<td>132 / 11 kV</td>
</tr>
<tr>
<td>2.</td>
<td>Type of mounting</td>
<td>On wheels: mounted on rails</td>
</tr>
<tr>
<td>3.</td>
<td>Suitable for system frequency</td>
<td>50 Hz ±5%</td>
</tr>
<tr>
<td>4.</td>
<td>No. of phases</td>
<td>Three (3)</td>
</tr>
</tbody>
</table>
5. No. of windings: Two (2)
6. Type of cooling: ONAN /ONAF
7. MVA Rating corresponding to cooling system:
   a) ONAN Cooling: 5 MVA
   b) ONAF cooling: 7.5 MVA
8. Method of connection: HV winding is Star connected and LV winding is Star connected and HV neutral is separately earthed to the earth mat.
9. Connection Symbol (Vector group): Star/Star (YNyn0)
10. System earthing: Solidly grounded neutral system on 132kV side
11. Percentage Impedances, Voltage on normal tap and MVA base corresponding to HV/LV rating and applicable tolerances:

<table>
<thead>
<tr>
<th>% Impedance</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) LV-HV for 7.5 MVA</td>
<td>10.0</td>
</tr>
</tbody>
</table>
12. Anticipated continuous loading of windings:
    a) HV and LV: Not to exceed 110% of its rated capacity
13. Tap changing gear:
    i) Type: On load
    ii) Provided on Neutral end of 132 kV side
    iii) Tap range: ± 10 %
    iv) Tap step: 1.25%
14. Over voltage operating:
   125% rated voltage for 60 sec. duration
   And 140% rated voltage for 5 sec.
15. Minimum Air core reactance of HV windings: 20%
16. Minimum knee point voltage: 110% rated voltage
17. Max. flux density in any part of core and yoke at rated MVA, frequency and normal voltage (Tesla): 1.6
18. Insulation levels for windings:
    | HV | LV | Neutral |
    |----|----|---------|
    | a) 1.2/50 microsecond wave shape impulse withstand (kVp) | 650 | 75 | 170/95 |
    | b) Power frequency voltage withstand (kV rms.) | 275 | 28 | 70/38 |
    | c) Maximum continuous operating system voltage (kV rms.) | 145 | 12 |
19. Type of winding insulation:
a) HV/LV winding Segregated

20. System short circuit level and duration for which the transformer shall be capable to withstand thermal and dynamic stresses (kA rms/sec.): For 132kV System 40kA for 1 sec.

21. Noise level at rated voltage and frequency (Maximum): 75 dB

22. Permissible temperature rise over ambient temp. specified in Clause 3.1
   i) Of top oil measured by thermometer 50 deg. C
   ii) Of winding measured by resistance 55 deg. C

23. Minimum clearances in air (mm)
   |   | Phase to Phase | Phase to ground |
   |--|--|---|---|
   | HV | 1700 | 1020 |
   | LV | 460  | 310  |

24. Cooling Equipments Radiators with Fan cooling

25. Bushings
   |   | HV | LV | Neutral (HV/LV) |
   |--|--|---|---|---|
   | i) Voltage Rating (kV rms.) | 145 | 17.5 | 36/17.5 |
   | ii) Current Rating (Amps.) | As per requirement |
   | iii) Insulation level |
   | a) Lighting impulse Withstand (kVp) | 650 | 95 | 170/95 |
   | b) One minute power Frequency withstand voltage (kV rms.) | 275 | 38 | 70/38 |
   | c) Creepage distance (mm) | 3625 | 437.5 | 900/437.5 |

4.5 GENERAL TECHNICAL REQUIREMENTS

4.5.1 Duty Requirements

4.5.2. The Power transformer shall be capable for Bi-directional flow of rated power.

4.5.3. The transformer and all its accessories like CTs etc., shall be designed to withstand without injury, the thermal and mechanical effects of any external short circuit to earth and of short circuits at the terminals of any winding of values specified above for a period of 1 sec.

4.5.4. The transformer shall be capable of being loaded in accordance with IS:6600 upto loads of 150%. There shall be no limitation imposed by bushings, tap changer etc.

4.5.5. The transformer shall be capable of being operated without danger on any tapping at the rated kVA with voltage variation of plus or minus 10% corresponding to the voltage of that tapping with normal temperature rise. The design adopted to achieve this shall be indicated in detail in the tender.
4.5.6. Radio interference:
   
i) The transformers shall be designed with particular attention to suppression of maximum harmonic voltage. Especially the third and fifth so as to eliminate wave form distortion and minimise interference with communication circuits.

   
   ii) The noise level, when energized at normal voltage and frequency with fans running shall not exceed, when measured under standard conditions, the values specified in NEMA, TR-1

4.5.7. Transformer shall be capable of operating under the natural cooled condition upto the specified load. Cooling shall be so designed that during total failure of power supply to cooling fans the transformer shall be able to operate at full load for at least ten (10) minutes without the calculated winding hot spot temperature exceeding 140 deg.C. Transformers shall be fitted with adequate radiators capable of dissipating 100 per cent of the loss at continuous maximum rating and shall be capable of operating in the event of failure of cooling fans, without the calculated winding hot spot temperature exceeding 105 deg.C at continuous maximum rating.

4.5.8. Transformer shall be capable of withstanding thermal and mechanical stress caused by symmetrical or asymmetrical faults on any winding.

4.5.9. Transformer shall accept, without injurious heating, combined voltage and frequency fluctuation, which produces the following over fluxing conditions:
   
   i) 125% for 1 minute 140% for 5 seconds

   ii) Bidder shall also indicate 150% and 170% over voltage withstand time.

   iii) Over fluxing withstand characteristics upto 140% shall be submitted along with the bid.

4.6. Transformer losses
The bidder shall indicate values of no load losses at rated voltage and frequency at normal tap, load losses and auxiliary losses at rated output, voltage and frequency at normal tap. The bidder shall indicate maximum firm losses without tolerance. The no load and load loss values shall also be furnished for operation at rated frequency and +5%, -10% taps in addition to normal taps.

4.6.1. Losses formula for evaluation of bid:

The maximum losses at normal tap as mentioned below will be taken as base parameters. If the maximum losses as guaranteed by the bidder in the guaranteed technical particulars exceed these specified losses, the bid will be loaded at the rates given hereunder.

7.5MVA

a) Iron losses (Wi) 8 kW(Max.)

b) Copper losses (Wc)
   +Auxiliary losses (Wa) 50 kW(Max.)

Losses quoted less than the above losses will be treated as base parameters only. For total cost evaluation for comparisons capitalized cost of losses at normal tap shall be calculated at the following rates.

   Capitalization Factors:
   
   i) No load losses Rs. 1,39,922/-
   ii) Load losses Rs. 60,446/- Per Kilo Watt.
   iii) Auxiliary losses Rs. 60,446/-

25
For fraction of a kilo watt evaluation will be on prorata basis.

4.6.2. Penalty for excessive losses:

On testing, if it is found that actual losses are more than the values quoted, undisputed penalty shall be recovered from the bidder at double the cost of losses arrived at clause 4.6.1.

4.7. Clearances:

Minimum clearances of live parts to ground in outdoor sub-stations are as follows:

- 11 kV Adequate as per I.S
- 132 kV Adequate as per I.S

The bottom most portion of any insulator or bushing in service is at an absolute minimum height of 2500 mm above ground level.

The transformer bay width in the sub station for 132 kV will be 12200 mm and the height of boom will be 9300 mm.

The above aspects may be noted while designing the transformer size.

4.8. Construction Details:

The features and construction details of power transformer shall be in accordance with the requirements stated hereunder:

4.8.1. Tank and Tank Accessories

4.8.1.1 Tank

a) Tank shall be of welded construction and fabricated from tested quality low carbon steel of adequate thickness.

b) All seams and those joints not required to be opened at site shall be factory welded and wherever possible they shall be double welded.

After completion of tank construction and before painting, dye penetration test shall be carried out on welded parts of jacking bosses, lifting lugs and all load bearing members.

c) Tank stiffeners shall be provided for general rigidity and these shall be designed to prevent retention of water.

d) The tanks shall be designed to withstand:

- i) Mechanical shocks during transportation
- ii) Vacuum filling of oil at 10 torr.
- iii) Continuous internal pressure of 35 kN/m² over normal hydrostatic pressure of oil.
- iv) Short circuit forces.

e) Wherever possible the transformer tank and its accessories shall be designed without pockets wherein gas may collect. Where pockets can not be avoided, pipes shall be provided to vent the gas into the main expansion pipes.

f) Adequate space shall be provided at the bottom of the tank for collection of sediments.
g) The shields shall be such that no magnetic fields shall exist outside the tank. They shall be of magnetically permeable material. If required impermeable shields shall be provided at the coil ends. Tank shield shall not resonate when excited at the natural frequency of the equipment. Bidder shall confirm use of tank shields in the schedule of additional information.

h) Suitable guides shall be provided in the tank for positioning the core and coil assembly. Each tank shall be provided with

i) Lifting lugs suitable for lifting the equipment complete with oil.

ii) A minimum of four jacking pads in accessible position at 500 mm height to enable the transformer complete with oil, to be raised or lowered using hydraulic or screw jacks.

iii) Suitable haulage holes shall be provided.

4.8.1.2 Tank Cover:

a) The tank cover shall be sloped to prevent retention of rain water and shall not distort when lifted.

b) At least two adequately sized inspection openings, one at each end of the tank shall be provided for easy access to bushings and earth connections. The inspection covers shall not weigh more than 25 Kg.

c) The tank covers shall be fitted with pockets at the position of maximum oil. The inspection covers shall be provided with two handles. Temperature of MCR (Maximum Continuous Rating) for bulbs of oil and winding temperature indicators. It shall be possible to remove these bulbs without lowering the oil in the tank.

d) Bushings, turrets, covers of inspection openings, thermometer, pockets etc., shall be designed to prevent ingress of water into or leakages of oil from the tank.

e) All bolted connections shall be fitted with weather proof, hot oil resistant gasket in between, for complete oil tightness. If gasket is compressible, metallic stops shall be provided to prevent over-compression.

4.8.2. Axles and Wheels:

a) The transformers are to be provided with flanged bi-directional wheels and axles. These shall be so designed as not to deflect excessively to interfere with the movement of the transformer. Wheels shall be provided with suitable bearings which shall be rust and corrosion resistant. Fittings for lubrication shall also be provided.

b) Suitable locking arrangement along with foundation bolts shall be provided for the wheels to prevent accidental movement of transformer.

c) The wheels are required to swivel and they shall be arranged so that they can be turned through an angle of 90 deg. when the tank is jacked up to clear of rails. Means shall be provided for locking the swivel movements in positions parallel to and at right angles to the longitudinal axis of the tank.
d) The rail track gauge shall be 5'-6" (1676 mm) along longer axis as well as along shorter axis. There shall be one pair of rails in either axis, with the above gauge.

e) To facilitate uniform distribution of transformer weight two nos. props each on front & rear side along longer axis to be provided, if necessary.

f) The base of each tank shall be so designed that it shall be possible to move the complete unit by skidding in any direction without injury when using plates or rails.

4.8.3 Anti Earthquake Clamping Device:
To prevent transformer movement during earthquake, clamping device shall be provided for fixing transformer to the foundation. The Bidder shall supply necessary bolts for embedding in the concrete foundation. The arrangements shall be such that the transformer can be fixed to or unfastened from these bolts as desired. The fixing of the transformers to the foundations shall be designed to withstand seismic events to the extent that a static co-efficient of 0.2g. applied in the direction of least resistance to that loading will not cause the transformer or clamping devices as well as bolts to be over stressed.

The details of the device used and its adequacy shall be brought out in the additional information schedule.

4.8.4 Conservator Tank
a) The conservator tank shall have adequate capacity between highest and lowest visible levels to meet the requirement of expansion of the total cold oil volume in the transformer and cooling equipment from minimum ambient temperature to 90 deg.C

b) The conservator tank shall be bolted into position so that it can be removed for cleaning purposes.

c) The conservator shall be fitted with magnetic oil level gauge with low level electrically insulated alarm contact.

d) Conservator shall be provided in such a position as not to obstruct the electrical connections to the transformer.

4.8.5 Pressure Relief Device
Adequate No. of pressure relief devices may be provided at suitable locations which shall be of sufficient size for rapid release of any pressure that may be generated in the tank and which may result in damage to the equipment. The device shall operate at a static pressure of less than the hydraulic test pressure of transformer tank. It shall be mounted direct on the tank. One set of electrically insulated contacts shall be provided for alarm/tripping along with the recommendations.

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

a) Oil Temperature Indicator (OTI)
Transformers shall be provided with a 150 mm dial type thermometer for top oil temperature indication. The thermometer shall have adjustable, electrically independent ungrounded alarm and trip contacts, maximum reading pointer and resetting device mounted in the cooler control cabinet. A temperature sensing element suitably located in a pocket on top oil shall be furnished. This shall be connected to the OTI by means of capillary tubing. Accuracy class of OTI shall be plus or minus 1.0% or better.

b) Winding Temperature Indicator (WTI)
A device for measuring the hot spot temperature of each of the windings shall be provided (HV, LV). It shall comprise of the following:

i) Temperature sensing element.

ii) Image coil.

iii) Auxiliary CTs, if required to match the image coil, shall be furnished and mounted in the cooler control cabinet.

iv) 150 mm dia local indicating instrument with maximum reading pointer mounted in cooler control cabinet and with four adjustable electrically independent ungrounded contacts (besides that required for control of cooling equipment), one for high winding temperature alarm and one for trip.

v) Winding Temperature RTO’s (PT ISO) type shall be provided to extend the same to Customer Panels.

vi) Accuracy class of WTI shall be plus or minus 1.0% or better.

vii) All cables required for connection between the transformer equipment to the Transformer Marshaling box /control cabinet of suitable type (Armored) shall be in Bidder’s scope of work.

4.8.8 Earthing Terminals:

Two (2) earthing pads (each complete with two (2) Nos. tapped holes, M 10 bolts, plain and spring washers) suitable for connection to 50 x 8 galvanised steel flat shall be provided each at position close to the two (2) diagonally bottom corners of tank. Earthing strip upto the ground level shall be provided by the Bidder.

4.8.9 Core:

Bidder will offer the Core for inspection and approval by the Purchaser during the manufacturing stage. Bidder’s call notice for the purpose should be accompanied with the following documents as applicable as a proof towards use of prime core material.

a) Invoice of the supplier.
b) Mills test certificate.
c) Packing list.
d) Bill of loading
e) Bill of entry certificate to customs.
Core material shall be directly procured either from the manufacturer or through their accredited marketing organization of repute and not through any agent.

a) The core shall be constructed from high grade non-aging cold rolled super grain oriented silicon steel laminations, of H1-B grade steel or superior grades.

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

c) The insulation of core to bolts and core to clamps plates shall be able to withstand a voltage of 2 kV RMS for one minute.

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

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

f) Each core lamination shall be insulated with a material that will not deteriorate due to pressure and hot oil.

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

h) The maximum flux density in any part of the core and yoke at rated MVA voltage and frequency at any tap shall not exceed 1.6 tesla. A margin of 10 to 12.5% for over fluxing may be provided for the worst combination of voltage and frequency within the ranges specified. The bidder shall provide saturation curve of the core material proposed to be use and calculations.

4.8.10. Windings:

a) The Bidder shall ensure that windings of 145KV class transformer are made in dust proof, conditioned atmosphere. The Bidder shall furnish the facilities available at this work along with the Bid.

b) The conductors shall be of electrolytic grade copper.

c) The insulation of transformer windings and connections shall be free from insulating compounds which are liable to soften, ooze out, shrink or collapse or be catalytic and chemically active in transformer oil during service.

d) Coil assembly and insulating spacers shall be so arranged as to ensure free circulation of oil and to reduce the hot spot of the winding.

e) Better insulating material shall be used and compression of the windings after drying out shall be carried out at a pressure exceeding one and a half to twice the force which can occur in the transformer; to
impart greater mechanical strength to the windings against heavy short circuit stresses.

4.9 Insulating Oil:

a) The quality of the oil supplied with transformer shall conform to the oil parameters specified below. No inhibitors shall be used in the oil. The oil used shall be non-PCB (Poly Chlorinated Biphenyl) type. The oil samples will be drawn as follows:
   i) Prior to filling
   ii) Before and after heat run test
   iii) Before energizing

All tests as per IS:335 shall be conducted on all samples.

b) Sufficient quantity of oil necessary for first filling of all tanks, and radiator at the proper level along with 10% extra oil for topping up shall be supplied in non-returnable containers suitable for outdoor storage.

c) **The Bidder shall dispatch the 5/7.5MVA Transformer filled with oil.**

d) The Bidder shall warrant that oil furnished is in accordance with the following specification.

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Characteristics</th>
<th>Requirement</th>
<th>Method of Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Appearance</td>
<td>The oil shall be clear and transparent and free suspended matter or sediment</td>
<td>A representative sample or oil shall be examined in a 100mm thick layer at Ambient temperature.</td>
</tr>
<tr>
<td>2.</td>
<td>Density at 27 deg. C max.</td>
<td>0.89 g/cm³</td>
<td>IS: 1448</td>
</tr>
<tr>
<td>3.</td>
<td>Kinematics viscosity at 27 deg. C max.</td>
<td>27 CST</td>
<td>IS: 1448</td>
</tr>
<tr>
<td>4.</td>
<td>Interfacial tension at 27 deg. C min.</td>
<td>0.04 N/m</td>
<td>IS: 6104</td>
</tr>
<tr>
<td>5.</td>
<td>Flash point Penskey Marten (closed) min.</td>
<td>140 deg. C</td>
<td>IS: 1448</td>
</tr>
<tr>
<td>6.</td>
<td>Pour point max.</td>
<td>-10 deg. C</td>
<td>IS: 1448</td>
</tr>
<tr>
<td>7.</td>
<td>Neutralization value (Total acidity) max.</td>
<td>0.03 mg. KOH/g</td>
<td>IS: 335 Appendix 'A'</td>
</tr>
<tr>
<td>8.</td>
<td>Corrosive Sulphur (in terms of)</td>
<td>Non-corrosive</td>
<td>IS: 335 Appendix 'B'</td>
</tr>
</tbody>
</table>
9. Electric strength (breakdown voltage) min.
   a) New untreated oil 30 kV (rms) IS: 6792
      (if the above value is not attained, the oil shall be treated)
   b) After treatment 60 kV (rms)

10. Dielectric dissipation factor (tan delta) at 90 deg. C max.
    0.002 IS: 6262

11. Specific resistance (resistivity)
    a) at 90 deg. C min. 3.0 E+12 Ohm-cm IS: 6103
    b) at 27 deg. C min. 50.0 E+12 Ohm-cm

12. Oxidation stability
    a) Neutralization value after oxidation, max. 0.20 mg/KOH/g
    b) Total sludge, after oxidation, max. 0.02 per cent by weight

13. Presence of oxidation
    The oil shall not contain antioxidant inhibitors IS: 325 Appendix 'D'

14. Water content, max. 10 ppm IS: 2362

15. Aging characteristics after 96 hrs.
    with catalyst (copper)
    As per ASTM-D 1934
    a) Resistivity
       i) 27 deg. C Min.0.25 E+12 Ohm cm
       ii) 90 deg. C Min.0.02 E+12 Ohm cm
    b) Tan delta at 90 deg. C 0.1 (max.)
    c) Total acidity 0.05 mg/KOH/gm(max.)
    d) Sludge content by weight 0.03% (max.)

    e) Oil samples taken from the transformer after the completion of site processing and tested in the approved manner shall be shown to have the above values before commissioning of the transformer.
4.10 Radiators for cooling

Radiators and coolers shall be so designed as to avoid pockets in which moisture may collect and shall withstand the pressure tests. Radiators shall be detachable type mounted to the tank or as a bank with necessary valves and drain plugs. Adequate support and stiffeners required for mounting of radiators and to avoid cantilever loading shall also be considered and supplied. Blanking plates with gaskets shall be supplied in case of removal of any radiator and blocking the same. Air release plugs shall be provided for each radiator element. All valves shall be of stainless steel or suitable gun metal valves as per approval. In case of a separate banks are provided necessary piping with expansion bellows and valves shall be considered. All piping shall be with flanged gasket joints. Cast iron shall not be used.

Blower Fans

Air blowers for the use for cooling shall be of motor driven and suitable for continuous operation and outdoor purpose designed. The motor and bearings shall be of sealed type which does not require frequent lubrication. It shall be possible to dismantle the blower complete with motor without disturbing or dismantling the radiators. Suitable painted mesh grills shall be provided for the fans/blowers to avoid contact of personnel. Blower fan motors shall be of the squirrel cage totally enclosed weather proof type and shall comply with standards. They shall be capable of operating without undue vibration and with minimum noise. Blowers/fans shall be designed to run in two groups with selection of group as main and standby. Initially first group selected as main will run on raise in temperature and the other group shall also be switched on raise in temperature further on increase to full load. Controls shall be provided accordingly. Transformer shall be provided with suitable no of cooling fans for the radiators with 50% stand by.

Suitable expansion pieces will be provided in each oil pipe connection between the transformer and the separately mounted radiators/oil coolers.

Drain valves/plugs will be provided in order that each radiator / section of pipe work can be drained independently.

4.11 Terminal Arrangements

4.11.1 Bushings

a) The electrical and mechanical characteristics of bushings shall be in accordance with IS:2099 and IS:3347(Part III/Section I).

b) 145 kV bushings shall be oil impregnated paper condenser type.

17.5 KV neutral bushings shall be of porcelain.

36kv HV Neutral bushings shall be oil impregnated paper condenser type.

Bushing shall be as per technical particulars furnished.

c) Condenser type bushings shall be provided with

i) Oil level gauge

ii) Oil filling plug and drain valve if not hermetically sealed

iii) Tap for capacitance/tan delta test

d) When bushings have an under-oil end of reentrant form, the pull through lead shall be fitted with a gas bubble deflector.
e) Where current transformers are specified, the bushings shall be removable without disturbing the current transformers.

f) Bushings of identical rating shall be interchangeable.

g) Porcelain used in bushing manufacture shall be homogenous, free from laminations, cavities and other flaws or imperfections that might affect the mechanical or dielectric quality and shall be thoroughly vitrified tough and impervious to moisture.

h) Glazing of porcelain and bushing shall be of uniform brown colour free from blisters and burrs.

i) Special precaution shall be taken to exclude moisture from paper insulation during manufacture, assembly, transport and erection.

   The surface of all paper insulation shall be finished with non-hygroscopic varnish which cannot be damaged easily.

j) Clamps and fittings shall be of hot dip galvanised steel.

k) Bushing turrets shall be provided with vent pipes which shall be connected to route any gas collection through the Buchholz relay.

4.11.2 Terminal Connectors

a) Terminal connectors for HV side and LV side shall be suitable for single Zebra ACSR (28.62mm) and suitable for horizontal or vertical take off. Confirmation shall be obtained regarding type of terminal connectors.

b) Bushing terminals shall be provided with terminal connectors of approved type and size for connection to external parts. Terminal connectors offered must have been successfully type tested as per IS 5561.

c) i) All castings shall be free from blow holes, surface blisters, cracks and cavities. All sharp edges and corners shall be blurred and rounded off. The aluminum alloy castings, if used, shall conform to designation A6 of IS 617.

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

   iii) All steel bolts & nuts shall be hot dip galvanized conforming to IS : 1867 part xiii and spring washers shall be Electro galvanized to IS : 1573.

   iv) For bimetallic clamp, copper alloy liner of minimum thickness of 2 mm shall be supplied which shall fix tightly.

   v) Flexible connectors shall be made from tinned copper sheets.

   vi) Size of terminal/conductor for which the clamp is suitable and rated current under site conditions shall be embossed/punched on each component of the clamp, except hardware.

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

   viii) Clamps shall be designed corona controlled.
ix) The short time rating of terminal connector shall correspond to the short time rating of respective bushing.

4.11.3 Bushing current transformers

a) Current transformers shall comply with IS: 2705. Current transformers of ratio 75/1 Amp with 3 cores class PS, Class 0.2-15 VA, Class 5P10-15 VA class type and burden on HV side shall be provided including on HV neutral. Current transformers of ratio 500/1 Amp with 3 cores class PS, Class 0.2-15 VA, Class 5P10-15 VA class type and burden on LV side shall be provided.

b) It shall be possible to remove turret mounted CTs from the transformer tank without removing the tank cover. Necessary precautions shall be taken to minimize the eddy currents and local heat generated in the turret.

c) All secondary leads shall be brought to a terminal box near each bushing. These terminals shall be wired out to Marshaling box / Control Cabinet using separate cables for each core.

d) The CT meant for supplying thermal image coil of winding temperature indicator shall be provided with suitable ratio and class CT.

4.11.4 Terminal Marking

The terminal marking and their physical position shall be in accordance with IS: 2026.

4.12 Neutral Earthing Arrangement

a) The neutral terminals of the star connected windings shall be brought to the ground level by a suitable copper flat-grounding bar which shall be supported from the tank by porcelain insulators.

b) The end of the grounding bar shall be brought to the ground level, at a convenient point, for connection to Purchaser's ground network through two (2) 50x8 mm galvanized steel flats. The connection shall be made by using two(s) bolted neutral grounding terminals with necessary accessories.

4.13 Auxiliary power supply for OLTC, cooling fan control and power circuit.

4.13.1 Auxiliary Power Supplies, 415 volt, three phase, four (4) wire shall be provided by the purchaser at Marshaling Box / control cabinet for cooling fans.

4.13.2 Auxiliary Power Supplies, 415 volt, three phase, four (4) wire shall be provided by the purchaser at OLTC control cabinet for Tap changer control.

4.13.3 Design features of the transformer cooling shall include the following:

i) Normally the transformer cooling shall be with radiators (ONAN).

ii) Upon increase in the temperature beyond 65 deg the cooling fans shall be switched on due to increase in the load by more than 5 MVA.

iii) Again on the temperature down to 55 deg the fans shall be switched off.

iv) Automatic switching of fans with the temperature switch settings shall be envisaged..
4.13.4 The Bidder shall derive AC power for control circuit from the AC feeder as mentioned above by using appropriately rated dry type transformers.

4.13.5 Necessary isolating switches / MCCB’s and HRC fuses etc. shall be provided at suitable points as per owner’s approved scheme.

4.14 Tap Changing Equipment

4.14.1 Tap Change Switch General Requirement:

a) The on load tap changer shall be provided in the neutral end of HV winding and shall permit variation of HV voltage over a range of +10% to -10% for constant voltage on LV side.

b) OLTC gear shall be motor operated for local as well as remote operation. An external hand wheel/handle shall be provided for local manual operation. This hand wheel/handle shall be easily operable by a man standing at ground level.

c) Arrangement shall be made for securing and padlocking the tap changer wheel in any of the working positions and it shall not be possible for setting or padlocking the wheel in any intermediate position. The arrangement shall be such that no padlock key can be inserted unless all contacts are correctly engaged and switch set in a position where no open or short circuit is possible. An indicating device shall be provided to show the tap in use.

4.14.2 On Load Tap Changing Gear (OLTC)

a) The details of the method of diversion of the load current during tap changing, the mechanical construction of the gear and the control features for OLTC gear along with detailed drawings on the inner view and the arrangement of connections, shall be submitted with the bid. Information regarding the service experience on the gear and a list of important users shall be furnished. The tap changer shall change the effective transformation ratio without producing phase displacement.

b) The current diverting contacts shall be housed in a separate oil chamber not communicating with the oil in main tank of the transformer.

c) The contacts shall be accessible for inspection without lowering oil level in the main tank and the contact tips shall be replaceable.

d) The Bidder shall indicate the safeguards in order to avoid harmful arcing at the current diverting contacts in the event of operation of the OLTC gear under over-load conditions of the transformer. Necessary tools and tackles shall be provided along with main supply for maintenance of OLTC gear.

e) The OLTC oil chamber shall have oil filling and drain plug, oil sampling valve, relief vent and level glass. It shall also be fitted with an oil surge relay the outlet to which shall be connected to a separate conservator tank.

f) The diverter switch or arcing switch shall be so designed as to ensure that its operation once commenced shall be completed independently of the control relays or switches, failure of auxiliary supplies etc. To meet any contingency which may result in incomplete operation of the diverter switch, adequate means shall be provided to safeguard the transformer and its ancillary equipment.

g) Drive mechanism chamber shall be mounted on the tank in accessible position. It should be adequately ventilated and provided with anti condensation metal clad
heaters. All contractors, relay coils and other parts shall be protected against corrosion, deterioration due to condensation, fungi etc.

h) The control feature shall provide the following:

i) **Local-remote selector switch mounted in the local control cubicle shall switch control of OLTC for lower/raise functions in local or remote mode as selected.**

ii) The LOCAL-REMOTE selector switch shall have at least two spare contacts per position which are closed in that position but open in the other position.

iii) A RAISE-LOWER CONTROL SWITCH shall be provided in the Local Control Cubicle. The switch shall be spring loaded to return to the Centre 'OFF' position and shall require movement to the RIGHT to raise the voltage of the transformer. Movement to the left shall lower the voltage. Alternatively push button type arrangement of standard design may be provided.

   This switch shall be operative only when 'local remote', selector switch is in 'local' position.

iv) An OFF-ON tap changer control switch shall be provided in the OLTC local control cabinet for transformer. The tap changer shall be inoperative in the OFF position. Also the OFF-ON switch shall have atleast one spare contact per position which is closed in that position but open in the other position.

v) Operating mechanism for on load tap changer shall be designed to go through one step or tap change per command. Subsequent tap changes shall be initiated only by a new or repeat command.

vi) On load tap changer shall be equipped with a time delay in complete STEP alarm consisting of a normally open contact which closes, if the tap changer fails to make a complete tap change. The alarm shall not operate for momentary loss of auxiliary power.

vii) The selsyn units or approved equivalents shall be installed in the local OLTC control cabinet to provide tap position indication for the transformer. Complete mounting details shall be included with approved diagram.

viii) Transformer load tap changer shall be equipped with a fixed resistor network capable of providing discrete voltage steps for input to the supervisory system.

i) Limit switches shall be provided to prevent overrunning of the mechanism and in addition a mechanical stop shall be provided to prevent over-running of the mechanism under any condition.

j) Limit switches may be connected in the control circuit of the operating motor provided that a mechanical-de-clutching mechanism is incorporated.

k) Thermal device or other means shall be provided to protect the motor and control circuit. All relays, switches, fuses etc. shall be mounted in the drive mechanism chamber and shall be clearly marked for the purpose of identification.
l) A permanently legible lubrication chart shall be fitted within the driving mechanism chamber.

m) Any 'DROP DOWN' tank associated with the tap changing apparatus shall be fitted with guide rod to control the movements during lifting or lowering.

n) A five digit counter shall be fitted to the tap changing equipment to indicate the number of operations completed.

o) All relays and operating devices shall operate correctly at any voltage between the limits specified.

p) It shall not be possible to operate the electric drive when the manual operating gear is in use.

q) It shall not be possible for any two controls to be in operation at the same time.

r) The equipment shall be suitable for supervisory control and indication with make before break multi-way switch, having one potential free contact for each tap position. This switch shall be provided in addition to any other switch/switches which may be required for remote tap position.

s) Operation from the local or remote control switch shall cause one tap movement only until the control switch is returned to the off position between successive operations.

t) All electrical control switches and the local operating gear shall be clearly labeled in a suitable manner to indicate the direction of tap changing.

u) Transfer of source failure of one AC supply shall not effect tap changing operation.

4.14.3 Manual Control

The cranking device for manual operation of the OLTC gear shall be removable and suitable for operation by a man standing on ground level. The mechanism shall be complete with the following:

i) Mechanical tap position indicator which shall be clearly visible to the person operating tap changer manually at the transformer.

ii) A mechanical operation counter.

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

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

4.14.4 Electrical Control

This includes the following:

i) Local Electrical control

ii) Electrical remote control from remote control panel.

The control circuits shall have the following features:
i) An interlock to cut off electrical control automatically upon recourse being taken to the manual control in emergency.

ii) Reinforcement of the initiating impulse for a tap change, ensuring a positive completion once initiated to the next (higher or lower) tap.

iii) Step-by-step Operation ensuring only one tap change from each tap changing impulse and a lock-out of the mechanism if the control switch (or push button) remains in the "operate" position.

iv) An interlock to cut-out electrical control when it tends to operate the gear beyond either of the extreme tap positions.

v) An electrical interlock to cut-off a counter impulse for reverse step change being initiated during a progressing tap change and until the mechanism comes to rest and resets circuits for a fresh position.

vi) Tap change in progress by means of an indicating lamp at the remote panel. Necessary contacts for this and for remote tap position indicator at remote panel shall be provided by the Bidder.

vii) Protection apparatus, considered essential by the Bidder according to specialties.

4.14.5 Local OLTC Control Cabinet

The auxiliary devices for electrical control of the OLTC shall be housed in a weather proof cabinet. It shall be complete with the following:

i) A circuit breaker / contactor with thermal overload devices for controlling the AC auxiliary supply to the OLTC motor.

ii) Cubicle light with door switch.

iii) Space heaters to prevent condensation of moisture.

a) Padlocking arrangement for hinged door of cabinet.

4.14.6 Local OLTC Control Cabinet, Cooler control cabinet & Remote Transformer control Panel

i) The three phase transformer unit shall be provided with Local OLTC control cabinet, cooler control cabinet and remote Transformer control Panel. The total height of Remote OLTC panel shall be 2250 mm to match with the height of other Control & Relay panels. Local OLTC and cooler control cabinets shall be mounted on the transformer.

ii) **Transformer Marshaling Box** - Control equipment for the cooling fans shall be mounted completely wired in a weatherproof local control panel complete with isolating switches, HRC fuses, Contractors, thermal overload relays, automatic control equipment, and auto/manual selector switch etc. The terminal blocks shall be of Type CATDM4 of Elemex make for C.Ts and CATM4 for other circuits. The control cabinet shall have all necessary devices meant for Fans control and local temp. indicators. All the contacts of various protective devices mounted on the transformer shall also be wired up to the terminal board in the control cabinet. All the secondary terminals of the
bushing CT's shall also be wired upto the terminal board at the control cabinet.

iii) The control cabinet shall have two sections. One section shall have the control equipment exclusively meant for fans control. The other section shall house the temperature indicators, aux. CT's and the terminal boards meant for termination of various alarm and trip contacts.

iv) The control cabinet, Local OLTC cabinet and remote Transformer control Panel shall be provided with non disconnecting stud type terminal blocks. Each of the terminal blocks in the above panels should have 20% spare terminals exclusively for owner's use. All the necessary terminals for remote connection to owner's panel shall be wired unto the control cabinet.

Necessary shorting of terminals shall be done at the control cabinet, local OLTC cabinet and remote OLTC panel. All the CT secondary terminals in the Cooler Control Cabinet shall have provision for short circuiting to avoid CT open circuit while it is not in use.

One potential free initiating contact for all the required indications shall be wired independently to the terminal blocks of Marshaling box / control cabinet exclusively for owner's use.

v) The Local OLTC control cabinet shall house all necessary devices meant for OLTC control and indication.

4.15 Remote Transformer Control panel

Remote Transformer Control panel to be supplied by the bidder shall consist of:
i) Actuating switch for electrical raise/lower control of transformer tap position
ii) Remote tap position indicator.
iii) Signal lamps for
   a) Tap changer in progress.
   b) Tap changer out of step.
   c) DC supply healthy
   d) Transformer 132 KV CB ON
   e) Transformer 132 KV CB OFF
   f) Transformer 11 KV CB ON
   g) Transformer 11 KV CB OFF

iv) Auxiliary devices for remote control and indication as required
   a) Transformer 132 KV CB On/Off contrl switch with 2 sets of contacts
   b) Transformer 11 KV CB On/Off contrl switch with 2 sets of contacts
   c) Multi function meter for HV(132 KV) side of transformer parameters.
   d) Multi function meter for LV(11 KV) side of transformer parameters

v) Annunciation scheme with the following
   a) cooling fan supply fail
   b) cooling fan group A/B ON
   c) OLTC control supply fail.
   d) OLTC at max / min tap position.
   e) Protn DC fail/Relay fault
   f) Transformer 132 KV CB fault
   g) Transformer O/C & E/F Protn operated
   h) Trip Circuit faulty
VI) Integrated Transformer protection Numerical relays for HV and LV of reputed make consisting of the following features.
  a. 3 phase over current of HV and LV
  b. Earth fault protection HV and LV
  c. REF protection of transformer
  d. Differential protection
  e. LBB protection
  f. Disturbance, event recording
  g. Metering
  h. CB supervision
  i. Programmable output relays for all type faults

Vii) Auxiliary relays, contact multiplier relays, trip circuit supervision relays as required for the Transformer control.

Provision for input of CT and PT circuits for metering and protection relays shall be provided as required for HV and LV.

One potential free initiating contact for all the required indications shall be wired independently to the terminal blocks exclusively for owner's use.

All the controls for Breakers and protection relays are envisaged for operation with 220 V DC from the station Battery source

Following cabling are specifically excluded from the scope of the Bidder. However, interconnection drawings for the same are to be submitted by the Bidder.

i) Cabling between Remote Transformer control Panel to Trf Marshaling box Control Cabinet.
ii) Cabling between Remote Transformer control panel to Local OLTC Cabinet.
iii) Cabling between Remote Transformer control panel to Purchaser's Panel.
iv) Cabling between Trf Marshaling box / Control Cabinet to Purchaser's Panel.
v) Cabling between Local OLTC Cabinet to Purchaser's Panel.
vi) The sheet steel used shall be at least 2.0 mm thick. The degree of protection shall be IP 55 in accordance with IS 2147.

vii) The temperature indicators shall be so mounted that the dials are not above 1600 mm from ground level. Glazed door of suitable size shall be provided for convenience of reading.

viii) A space heater, and cubicle lighting with ON-OFF switch shall be provided.

ix) Terminal Blocks

i) The terminal blocks to be provided shall be fully enclosed with removable covers and made of molded, non-inflammable plastic material with block and barriers molded integrally. Such block shall have washer and binding screws for external circuit wire connections, a white marking strip for circuit identification and molded plastic cover. All terminals shall be clearly marked with identification numbers or letters to facilitate connection to external wiring.

ii) All internal wiring to be connected to the external equipment shall terminate on terminal blocks, preferably vertically mounted on the side of each panel. The terminal blocks shall be 1100 V grade and have 10 amps continuous...
rating, molded piece, complete with insulated barriers, non-disconnecting stud type terminals, washers, nuts and lock nuts. Screw less, spring pressed cage clamp type terminal blocks also are acceptable. Terminal block design shall include a white fiber marking strip with clear plastic, slip-on/clip-on terminal cover. Markings on the terminal strips shall correspond to wire number and terminal numbers on the wiring diagrams.

iii) Terminal blocks for current transformer secondary leads shall be provided with test links and isolating facilities. Also current transformer secondary leads shall be provided with short circuiting and earthing facilities.

iv) Unless otherwise specified, terminal blocks shall be suitable for connecting the following conductors on each side.

a) For all circuits except current transformer circuits minimum of one no. 2.5 mm² copper.

b) For all CT circuits minimum of four nos. 2.5 mm² copper.

v) There shall be a minimum edge to edge clearance of 250 mm between the first row of terminal blocks and the associated cable gland plate. Also the clearance between two rows of terminal blocks shall be a minimum of 150 mm.

vi) Arrangement of the terminal block assemblies and the wiring channel within the enclosure shall be such that a row of terminal blocks is run parallel and in close proximity along each side of the wiring duct to provide for convenient attachment of internal panel wiring. The side of the terminal block opposite the wiring duct shall be reserved for the owner's external cable connection. All adjacent terminal blocks shall also share this field wiring corridor. A steel strip shall be connected between adjacent terminal block rows at 450 mm intervals for support of incoming cables.

vii) The number and sizes of the owner's multi core incoming cable will be furnished to the Bidder after placement of the order.

viii) The gaskets shall be of neoprene rubber.

4.16 Painting

The internal and external surfaces including oil filled chambers and structural steel work to be painted shall be shot or sand blasted to remove all rust and scale of foreign adhering matter or grease. All steel surfaces in contact with insulating oil shall be painted with two coats of heat resistant, oil insoluble, insulating varnish.

All steel surfaces exposed to weather shall be given a primary coat of zinc chromate, second coat of oil and weather resistant varnish of a colour distinct from primary and final two coats of glossy oil and Epoxy light gray paint in accordance with shade no.631 of IS-5.

All paints shall be carefully selected to withstand extremes of weather. The paint shall not scale off or crinkle or be removed by abrasion due to normal handling.

The minimum thickness of each coat of outside painting of tank shall be 20 microns and the total thickness shall be minimum 80 microns.
4.17 Bolts and nuts

All bolts and nuts exposed to weather shall be hot dip galvanised/cadmium plated.

4.18 Wiring and Cabling

a) All external cabling will be carried out by owner based on wiring diagram & interconnection schedule to be supplied by the Bidder.

Cable box/sealing end shall be suitable for following types of cables:

i) 415 Volt power: 1100 Volt grade PVC insulated stranded copper conductor cable with armour.

ii) Control: 1100 Volt grade PVC insulated stranded copper conductor cable with armour.

b) Compression type cable connector shall be provided for termination of power and control cables.

c) All controls, alarms, indicating and relaying devices provided with the transformer shall be wired upto the terminal blocks inside the Control Cabinet.

d) All devices and terminal blocks with the Control Cabinet shall be clearly identified by symbols corresponding to those used on applicable schematic or wiring diagrams.

e) not more than 2 wires shall be connected to one terminal. Each terminal shall be suitable for connecting two 7/0.737 mm stranded copper conductors from each side.

f) All internal wiring shall be securely supported, neatly arranged, readily accessible and connected to equipment terminals and terminal blocks.

g) Engraved code identification plastic ferrules marked to correspond with schematic diagrams shall be fitted at both ends of wires. Ferrules shall fit tightly on wires and shall not fall off when the wire is disconnected from terminal block.

4.19 Fittings

The following fittings shall be provided with each transformer covered in this specification.

a) Conservator for main tank, with oil filling hole and cap, isolating valves, drain valve, magnetic oil level gauge with low level alarm contacts, minimum, maximum, normal oil level indicator and dehydrating breather with oil seal.

b) Conservator for OLTC with drain valve, Surge relay, filling hole with cap, prismatic oil level gauge and silica gel breather. Containers for silica gel breathers shall be of metal.

c) Pressure relief device with alarm contact
d) Buchholz relay double float type with one shut off valve 80 mm size on conservator side bleeding pipe with pet cock at the end to collect gases and alarm and trip contacts.

e) Air release plug

f) Inspection openings and covers

g) Bushing with metal parts and gaskets to suit the termination arrangement.

h) Winding temperature indicators for local and remote mounting.

i) Oil temperature indicators.

j) Cover lifting eyes, transformer lifting lugs, jacking pads, towing holes and core and winding lifting lugs.

k) Protected type mercury or alcohol in glass thermometer.

l) Bottom and top filter valves with threaded adopters on diagonally opposite corners of size 50 mm, 2 Nos. sampling valves at top and bottom of main tank and drain valve with blanking flange size 80/100 mm.

m) Rating and diagram plates on transformers and auxiliary apparatus.

n) Earthing terminals.

o) Flanged bi-directional wheels.

p) Marshalling Box / Control Cabinet.

q) On load tap changing equipment and OLTC control cabinet.

r) Drain valves/plugs shall be provided inorder that each section of pipe work can be drained independently.

s) Bushing CTs for Metering, protection and winding temperature indicator

t) Insulating oil

u) Terminal marking plate

v) Jacking pads.

w) Lifting bollards

x) Haulage lugs

y) Cover Lifting lugs

z) Valve schedule plate

Note: The fittings listed above are only indicative and any other fittings which generally are required for satisfactory operation of the transformer are deemed to be included.
4.20 **MOTORS:**

Motors for fans, OLTC, shall conform to IS:325 shall be of self-ventilated type having totally enclosed fan-cooled enclosure along with its supports in complete. Motors shall be "Squirrel Cage" three phase induction motors of sufficient size capable of satisfactory operation for the application and duty as required for the driven equipment.

4.21 **Special Tools and Tackles**

The Bidder shall include in his proposal any special erection and maintenance tools required including hydraulic jacks and their capacities according to the specialties of the equipment. The list of such special tools shall be given in the bid and price of these shall be indicated separately.

4.22 **Spare parts and maintenance equipment**

Supplier shall indicate in its proposals optional spares required for the trouble-free operation of the equipment for five years. The prices of spares and gaskets shall be quoted separately.

   a. Engineering documents required by this specification.
   
   b. The Inspection of the materials and components on request.
   
   c. Reference to contractors work procedures appropriate to each activity.
   
   d. Inspection during fabrication/construction.
   
   e. Final inspection and test.

4.23 The guaranteed Technical particulars as given in the specification shall invariably be mentioned in the bids furnished. Those bids not containing the guaranteed Technical particulars will be treated as NON-RESPONSIVE.

4.24 **TESTS**

   a) All the offered equipment shall be fully type tested by the bidder as per the relevant standard. The type tests must have been conducted on the similar or higher capacity of HV voltage class of transformers not earlier than five years as on the date of bid opening. The bidder shall furnish two sets of the following type test reports as per relevant standards for each type of equipment offered along with the bid. The offers received without these test reports shall be treated as NON-RESPONSIVE.

   i) Impulse Test on one phase HV & LV limbs
   
   ii) Temperature rise test
   
   iii) Tank pressure and vacuum test.

b) Special tests other than type and routine tests, as agreed between Purchaser and Bidder shall also be carried out as per IS: 2026. with latest amendments.

c) The pre-shipment checks to be carried out by the Bidder are given under clause 7.0, of section II "Inspection".
d) The bidder shall include in his offer the costs for the following type/special tests. Cost for each type test/special test shall be indicated clearly. The type/special tests shall be conducted on first transformer of each lot.

i) Type Tests
a) Impulse test IS: 2026(Part-III) on one phase HV & IV limbs.
b) Temperature rise test as per IS-2026 (Part II).

The test shall be conducted at a tap for the worst combination of loading on the three windings of the transformer for both ONAN & ONAF ratings. DGA on oil shall be conducted on samples taken before and after the temperature rise test.

c) Tank pressure and vacuum test as per IS 2026 and latest amendments.

Special Tests:

a) Measurement of Zero sequence reactance.
b) Measurement of Acoustic noise level
c) Measurement of Power taken by auxiliaries.
d) Measurement of harmonic level in no load currents.

4.24.1 Routine tests

All standard routine test in accordance with IS:2026, with dielectric tests corresponding to Method 2 as per amendment No.1 issued in September,1980 to IS:2026 and latest amendments shall be carried out on each transformer.

Operation and dielectric testing of OLTC shall be carried out ZX as per IS: 2026 and latest amendments.

Following additional routine tests shall also be carried out on each transformer:

a) Magnetic Circuit Test

After assembly, each core shall be tested for 1 minute at 2000 Volts between all bolts, side plates, structural steel work.

b) Oil leakage test on transformer tank

c) Measurement of capacitance and tan delta to determine capacitance between winding & earth. This measurement shall be carried out before and after series of dielectric tests.

d) Relief Device Test :

The pressure relief device of each size shall be subjected to increase in oil pressure. It shall operate before reaching the test pressure specified in ‘Tank Tests' subsequently in this clause. The device shall seal off after the excess pressure has been relieved.

4.24.2 High voltage withstand test shall be performed on auxiliary equipment and wiring after complete assembly.
4.24.3 Tests on terminal connectors
Terminals connectors shall be tested as per IS: 5561. In addition, the Bidder shall carry out an additional test to demonstrate withstand capacity of wind load. The test procedure and acceptance norms shall be furnished for Purchaser's approval.

4.24.4 Test reports
a) Four (4) sets of certified test reports and oscillograms shall be submitted for approval prior to despatch of the equipment. The equipment shall be dispatched only when all the required type and routine tests have been carried out and test reports have been approved by the Purchaser.

b) Four (4) copies of the test reports for the tests carried out on the ancillary apparatus shall be furnished to the Purchaser for approval prior to despatch.

c) All auxiliary equipment shall be tested as per the relevant standard. Test certificate shall be submitted for bought out items.

4.25 INSPECTION

4.25.1 General
i) The owner shall have access at all times to the works and all other places of manufacture where the transformers are being manufactured and the Bidder shall provide all facilities for unrestricted inspection of the Bidder's works, raw materials, manufacture of all the accessories and for conducting necessary tests as detailed herein.

ii) The successful Bidder shall keep the Purchaser informed in advance of the time of starting and of the progress of manufacture of equipment in its various stages so that arrangements could be made for inspection.

iii) No material shall be dispatched from its point of manufacture unless the material has been satisfactorily inspected and tested.

iv) The acceptance of any quantity of equipment shall in no way relieve the successful Bidder of his responsibility for meeting all the requirement of this specification and shall not prevent subsequent rejection if such equipment are later found to be defective.

4.25.2 Inspection programme
a) The Bidder shall chalk out a detailed inspection and testing programme for manufacturing activities for the various components. An indicative programme of inspection as envisaged by the Purchaser is given in Annexure-III. This is not however intended to form a comprehensive programme as it is Bidder's responsibility to draw up and carry out such a programme duly approved by the Purchaser. The owner reserves the right to carry out any tests by a third party.

b) Cost of inspection/tests and third party inspection if any shall be borne by the Bidder.

c) Additional tests, if required, are deemed to be included in the scope of work.
d) Stages of inspection and Purchaser's participation would be defined and tied up at the time of award of contract.

4.27 DOCUMENTATION:

i) The Bidder shall furnish along with the bid the dimensional drawings of transformer, GA and all other accessories.

ii) These drawings shall include the following information.

a) Detailed internal drawings of transformer clearly indicating insulation, core assembly and windings duly incorporating all important dimensions.

b) Tolerances on dimensions.

c) Material designation used for different components with reference to standards.

d) Fabrication details such as welds, finishes and coatings.

e) Catalogue or part numbers for each component and the total assembly with bill of materials.

f) Identification marking.

g) Weight of individual components and total assembled weight.

iii) The assembly drawings shall include the following:

a) Brief installation instructions.

b) Design installation torque for the bolt or cap screw.

c) Withstand torque that can be applied to the bolt or cap screw without failure of components or parts thereof.

d) Compression die number with recommended compression pressure.

e) Relevant technical details of significance.

4.28 Test Reports

i) Four copies of type test reports shall be furnished to the Purchaser within one month of conducting the tests. One copy will be returned duly certified by Purchaser to the Bidder within three weeks thereafter and on receipt of the same Bidder shall commence with the commercial production of the concerned material.

ii) Four copies of acceptance test reports shall be furnished to the Purchaser. One copy will be returned duly certified by the Purchaser and only thereafter shall the materials be dispatched.

iii) All records of routine test reports shall be maintained by the Bidder at his works for periodic inspection by the Purchaser.
iv) All test reports for tests conducted during manufacture shall be maintained by the Bidder. These shall be produced for verification as and when requested for by the Purchaser.

4.29 All drawings shall conform to International Standards Organization (ISO) 'A' series of drawing sheet/Indian Standards Specification. All drawings shall be in ink and suitable for micro filming. All dimensions and data shall be in S.I. Units only.

4.30 The Bidder shall within 3 weeks of placement of order, submit four sets of final versions of all the above drawings for Purchaser's approval. The Purchaser shall communicate his comments/approval on the drawings to the Bidder within reasonable time. The Bidder shall, if necessary, modify the drawings and resubmit four copies of the modified drawings for Purchaser's approval within two weeks from the date of Purchaser's comments.

After receipt of Purchaser's approval, the Bidder shall within three weeks, submit 6 prints and two good quality reproducible of the approved drawings for Purchaser's use. The Bidder shall also submit the drawing in a Compact Disc for purchasers use.

4.31 Adequate copies of contract drawings, acceptance and routine test certificates, duly approved by the Purchaser shall accompany each of the dispatched consignment. A history card of the transformer giving the details indicated in the rating diagram shall also accompany the transformer.

4.32 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 Bidder's risk only.

4.33 Six copies of nicely printed and bound volumes of operation, maintenance and erection manuals in English language shall be supplied by the Bidder along with each Transformer to destination. The manual shall contain all the drawings and information required for erection, operation and maintenance of the transformers. The manual shall also contain a set of all the approved drawings, type, routine & acceptance Test reports etc.

4.34 Approval of drawings by the Purchaser shall not relieve the Bidder of his responsibility and liability for ensuring correctness and correct interpretation of the latest revision of 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 ordering and the Purchaser shall have the power to reject any material which in his judgement is not in full accordance therewith.

4.35 PACKING AND FORWARDING:

4.35.1 The equipment shall be packed in crates suitable for vertical/horizontal transport as the case may be and suitable to withstand handling during transport and outdoor storage during transit. The Bidder shall be responsible for any damage to the equipment during transit, due to improper and inadequate packing. The easily damageable material shall be carefully packed and marked with the appropriate caution symbol. Wherever necessary, proper arrangement for lifting, such as lifting hooks etc. shall be provided. Any material found short inside the packing cases shall be supplied by Bidder without any extra cost.
4.35.2 Each consignment shall be accompanied by a detailed packing list containing the following information:

   a) Name of the consignee
   b) Details of consignment
   c) Destination
   d) Total weight of consignment
   e) Handling and unpacking instructions.
   f) Bill of material indicating contents of each package.

The Bidder shall ensure that the packing and bill of material are approved by the Purchaser before despatch.

4.35.3 Weight of the transformer shall be designed, so that the transformer, can be transported by road. Heaviest single packet that can be transported is about 60 MTs by road.

4.36 QUANTITY AND DELIVERY REQUIREMENTS:

i) This is set out in Schedule of Requirements.

ii) The scope of supply shall include a supply of 2.5% extra quantity of bolts, nuts, washers, split pins, cotter pins and such other small loose items free of cost.

4.37 ERECTION, TESTING & COMMISSIONING:

The purchaser will arrange for unloading and transportation to site stores and erection of the equipment. The bidder has to provide services of qualified personnel for erection, testing and commissioning of the transformer & Control & Relay panel.

The bidder shall clearly indicate in his offer the charges for Erection, testing and commissioning of the transformer and Control & relay panel. The prices quoted for the above will be taken into consideration for evaluation.

4.38 TOOLS TO BE SUPPLIED: The renderer shall supply the following tools at free of cost

One SET of full outfit of tools (two nos. for each type), spanners (2 nos. for each size), jacks (4 Nos), special tools (two nos. for each type) for assembling and dismantling the transformer, with a rack for handling them. All spanners shall be suitably ended and case hardened.

4.39 Quality Assurance Plan:

The successful bidder shall within 30 days of placement of order, submit the following information to the Superintending Engineer/Quality control/APGENCO, Vidyut Soudha, Vijayawada.

   a) Manufacturing quality plan (MQP). As per Annexure-5
   b) Field quality plan (FQP). As per Annexure-6
   c) The names of sub-suppliers selected (sub supplier /sub contractor assessment & approval by quality department).
   d) Inspection and testing schedules.
e) Quality Assurance Plan (QAP) with customer hold points (CHP) for Quality department inspection. QAP’s and QA&I/purchaser customer hold points shall be discussed between the QA&I/purchaser and contractor and issuance /Clearance of CHP by quality department before the QAP’s is finalized. The Tenderer shall submit the routine test certificates / compliance certificates of bought out accessories for raw material at the time of routine testing if required by the quality department and ensure that the quality assurance requirements of specification are followed by the contractor/sub-contractor.

*The Equipments & Materials shall be dispatched only after issuance of MDCC from the corporate Quality Department of APGENCO.

4.40 **Recommended Spares:** Bidders shall furnish the detailed list of recommended spares for five years along with prices for the same along with Pre Qualification bid. The validity of the prices for these spares shall be upto the completion period of contract. The bidder shall note that the cost of recommended spares will not be considered for evaluation and also note that it is the discretion of APGENCO whether the items are purchased or not.
**SCHEDULE – 1**

**CONTRACTOR’S EXPERIENCE**

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Particulars</th>
<th>Description</th>
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<tr>
<td>1.</td>
<td>Name of the Project</td>
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<td>2.</td>
<td>Name, designation and full Postal address of order placing Authority</td>
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<td>3.</td>
<td>Date of award of the contract and Detailed order No. of the project authority</td>
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<td>1. Contractual Date of completion</td>
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<td>2. Actual date of completion of work</td>
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<td>4.</td>
<td>(a) Reasons for delay in supply of material, if any</td>
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<td>(b) whether the equipment is in trouble free operation for a duration of at-least 12 months after commissioning.</td>
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<td>5.</td>
<td>Nature of arbitration with the project authority, if any</td>
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<td>6.</td>
<td>Approximate value of the contract</td>
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Seal of the Tenderer  
Signature, Designation  
And address of the Tenderer.

Note:  
1. The above information should be furnished contract wise  
1. Necessary performance certificate from the executing agency shall be furnished by the contractor.
From: 
To: The Superintending Engineer,
(Hydel-I), HPC & Hydel Projects wing,
APGENCO, Vidyut Soudha, Vijayawada.

Dear Sir,

i) Tender no.
ii) Specification no.
iii) Item of work.

1. Having examined the above specification, together with the accompanying general conditions therein referred to, we hereby offer to provide and carry out the work described in the said specification according to the said specification and general conditions at the rates entered in the contract schedule of prices attached to the price bid.

2. We hereby undertake to have the materials delivered within the time specified in the schedule.

3. We hereby guarantee the particulars entered in the schedules attached to the bid.

4. In accordance with clause 3.4 & 3.7 of section-III of this specification we propose to furnish securities to the extent of 2½ % & 10% of the value of the contract.

5. We hereby confirm that before submitting this tender, we have visited the Project site and fully acquainted ourselves with the system requirement, site conditions and local situation regarding material, labour and all other factors pertaining to the work under this tender.

6. We hereby agree to make the supplies as per the terms and conditions

Yours faithfully,

Signature: 
Date:
I ___________________________________________ certify that all the data and information to the subject tender specification are correct and are true representation of the equipment covered by our formal Bid No.__________________________, Dt.______________.

I hereby, certify that I am the duly authorized representative of the Bidder whose name appears above my signature.

Bidder’s Name: ____________________

Authorized Representative's Signature: ____________________

Authorized Representative's Name (Typed): ____________________

Authorized Representative's Designation: ____________________

Bidder's Seal

Bidder's Intent: The Bidder hereby agree to fully comply with the requirements and intents of the subject tender specification for the price(s) indicated in the price bid.

Authorised Representative's Signature : ____________________

Bidder's Seal.
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<tr>
<th>Item No.</th>
<th>Item or Equipment</th>
<th>Qty</th>
<th>Weight</th>
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Signature of Tenderer
PROFORMA OF GUARANTEE FOR EQUIPMENT PERFORMANCE
(to be enclosed in the Part-I Pre-qualification bid)

The tenderer hereby guarantees the requirements of this specification.

If any of the requirements of the guarantees given are not fulfilled, the purchaser has the right to reject the equipment, and if capacity, performance and efficiency obtained during acceptance tests falls short of that guaranteed by the tenderer, the tenderer hereby affirms that such deficiency will be made good by rectifying/replacing the defective parts. All the replaced parts shall be removed from the site. While the facility for making good the deficiency will be normally given once, the purchaser is entitled to reject the equipment in case of repeated failure to meet the guarantee as per the specification.

Name of the firm :
Signature of the bidder :
Designation :
Date :
Seal of the company
**SCHEDULE – 6**

**SCHEDULE OF GENERAL TERMS AND CONDITIONS**

(to be enclosed in the Part-I Pre-qualification bid)

Bidders are requested to fill in the blank space and upload the same along with offer otherwise their offer will be either treated as non-responsive or suitable cost compensated for deficiencies as deemed fit by the Corporation.

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<tr>
<td>1</td>
<td>Tender Specification No., date and due date</td>
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<td>2</td>
<td>Offer/quotation No. &amp; Date</td>
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<td>3</td>
<td>Name of the bidder</td>
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<td>4</td>
<td>GST Registration No</td>
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<td>5</td>
<td>DGS&amp;D’s Registration No., if any (Please enclose copy of rate contract, if any)</td>
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<td>6</td>
<td>NSIC/SSI/MSME Registration No., if any (Copies of certificates to be enclosed)</td>
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<td>Price Basis (F.O.R.)</td>
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<td>8</td>
<td>Discount, if any</td>
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<td>9</td>
<td>Packing and forwarding charges (If price basis ex-works)</td>
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<td>10</td>
<td>GST for material</td>
<td>Included/Excluded (Indicate rate)</td>
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<td>11</td>
<td>GST for services</td>
<td>Included/Excluded (Indicate rate)</td>
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<tr>
<td>12</td>
<td>Freight charges</td>
<td>Included/Excluded</td>
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<td>13</td>
<td>Transit Insurance</td>
<td>Included/Excluded</td>
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<tr>
<td>14</td>
<td>Bank charges</td>
<td>To be borne by seller.</td>
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<tr>
<td>15</td>
<td>a) Delivery Period</td>
<td>Within _________ days/weeks/Months from the date of issue of LOI/PO.</td>
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<td></td>
<td>b) Erection, Testing &amp; commissioning</td>
<td>Within ____ days of intimation</td>
</tr>
<tr>
<td>16</td>
<td>Whether phased delivery acceptable</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Mode of dispatch</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Confirmation of submission of Performance Bank Guarantee for 10% of order value for performance of Equipment.</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Earnest Money Deposit Details (APGENCO reserves the right to reject/consider offers without EMD)</td>
<td></td>
</tr>
</tbody>
</table>

**We Confirm acceptance towards the following:**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Payment Terms</td>
<td>APGENCO payment terms as per tender specification</td>
</tr>
<tr>
<td>21</td>
<td>Security Deposit</td>
<td>2.5% of order value (for full execution of order) by the way of DD/Pay order/Bank guarantee.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>22</td>
<td>Validity of offer</td>
<td><strong>180 days</strong> from the date of opening of pre-qualification &amp; Technical bids</td>
</tr>
<tr>
<td>23</td>
<td>Recovery of Liquidated Damages.</td>
<td>In case of delay in Execution of order beyond stipulated delivery period, APGENCO reserves the right to recover from the vendor Liquidated Damages equivalent to 0.5% of the value of delayed materials for each week or part thereof subject to maximum of 5% of total value of Purchase Order.</td>
</tr>
<tr>
<td>24</td>
<td>Part order</td>
<td>Acceptable</td>
</tr>
<tr>
<td>25</td>
<td>Price Variation</td>
<td>The prices quoted shall remain firm till execution of full order (in case of any specific price variation formula, the same shall be mentioned with ceiling limits. If the bidder quotes for variable prices, Non furnishing of Ceiling limit and the applicable formula may lead to disqualification of the tender.)</td>
</tr>
<tr>
<td>26</td>
<td>Rate Certificate</td>
<td>It is certified that prices quoted herein are the same as applicable to other Government Departments/ Public Sector Undertakings.</td>
</tr>
<tr>
<td>27</td>
<td>Guarantee Certificate</td>
<td>Materials quoted shall be guaranteed for a period of 36 months from the date of supply or 30 months from the date of Commissioning, whichever is earlier against any manufacturing defects or poor workmanship.</td>
</tr>
<tr>
<td>28</td>
<td>Interchangeability</td>
<td>It is certified that the quoted items are interchangeable with the items existing in APGENCO and if fails to interchange, the same shall be replaced free of cost.</td>
</tr>
</tbody>
</table>

*(Signature of Bidder with Name, Designation and Office Seal)*
SCHEDULE – 7
SCHEDULE OF TESTS
(to be enclosed in the Part-I Pre-qualification bid)

Tests as per this specification, IS and manufacturer's standard shall be performed. Detailed list of tests shall be indicated in this schedule.

Name of the firm: 

Signature of the bidder: 
Designation: 
Date: 
Seal of the company
SCHEDULE - 8

SCHEDULE OF DEVIATIONS FROM THE SPECIFICATION
(to be enclosed in the Part-I Pre-qualification bid)

Tenderer shall carefully state below all points not in accordance with enclosed specification.

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Section</th>
<th>Deviation</th>
</tr>
</thead>
</table>

The tenderer hereby certifies that the above mentioned are the only deviations from the specification No.

Signature of the tenderer.
SCHEDULE – 9

GUARANTEED TECHNICAL PARTICULARS FOR POWER TRANSFORMERS

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Name of the Manufacturer</td>
</tr>
<tr>
<td>2.</td>
<td>Normal continuous rating</td>
</tr>
<tr>
<td>3.</td>
<td>Normal ratio of transformation</td>
</tr>
<tr>
<td>4.</td>
<td>PHASE CONNECTIONS:</td>
</tr>
<tr>
<td></td>
<td>a) HV Winding</td>
</tr>
<tr>
<td></td>
<td>b) LV Winding</td>
</tr>
<tr>
<td></td>
<td>c) Vector group reference number and symbol</td>
</tr>
<tr>
<td>5.</td>
<td>MAXIMUM TEMPERATURE RISE:</td>
</tr>
<tr>
<td></td>
<td>a) Of oil by Thermometer</td>
</tr>
<tr>
<td></td>
<td>b) Of Winding by resistance</td>
</tr>
<tr>
<td></td>
<td>c) By Hot spot temperature Indicator</td>
</tr>
<tr>
<td></td>
<td>d) Ambient Temperature adopted</td>
</tr>
<tr>
<td>6.</td>
<td>Limit for Hot spot temperature for which the transformer is designed</td>
</tr>
<tr>
<td>7.</td>
<td>Temperature gradient between windings and oil</td>
</tr>
<tr>
<td>8.</td>
<td>Voltage to earth for which the star point will be insulated</td>
</tr>
<tr>
<td>9.</td>
<td>Type of cooling</td>
</tr>
<tr>
<td>10.</td>
<td>MAXIMUM FLUX DENSITY IN IRON AT NORMAL VOLTAGE, FREQUENCY AND RATIO</td>
</tr>
<tr>
<td></td>
<td>a) Core</td>
</tr>
<tr>
<td></td>
<td>b) Yoke</td>
</tr>
<tr>
<td>11.</td>
<td>MAXIMUM CURRENT DENSITY IN WINDING AT CMR</td>
</tr>
<tr>
<td></td>
<td>a) HV Winding Amps/sq.cm.</td>
</tr>
<tr>
<td></td>
<td>b) LV Winding -do-</td>
</tr>
<tr>
<td>12.</td>
<td>Magnetizing Current (HV) at normal voltage and ratio (Amps)</td>
</tr>
<tr>
<td>13.</td>
<td>Power Factor of Magnetizing current at normal voltage and frequency</td>
</tr>
<tr>
<td>14.</td>
<td>a) Guaranteed no load loss at normal ratio rated voltage and frequency(Max.)</td>
</tr>
</tbody>
</table>
b) Guaranteed load loss at normal ratio, rated output, rated voltage, rated frequency and 75 deg.C average winding temperature including auxiliary losses, if any (Max.)

15. Guaranteed total losses at At Normal At lowest At highest
    at rated output, tap tap tap
    rated voltage, rated
    frequency and 75 deg.C
    average winding temperature
    including auxiliary losses if any (Max.)

16. Total losses at rated output, rated voltage, rated frequency and maximum attainable temperature at site including auxiliary losses if any.(Max.)

17. Auxiliary losses, if any, at rated load
    
    18. Efficiencies at normal ratio, rated voltage, rated frequency and 75 deg.C average winding temperature for the outputs of.

    a) Full load
    b) 3/4 Full load
    c) 1/2 Full load
    d) 1/4 Full load

19. Resistance per phase of (at normal tap)
    
    a) HV Winding (Ohms) :
    b) LV Winding (Ohms) :

20. Reactance per phase of (at normal tap)
    
    a) HV Winding (Ohms) :
    b) LV Winding (Ohms) :

21. Resistance voltage drop at 75 deg.C average winding temperature expressed as percent of rated voltage.

22. Reactance voltage drop expressed as percent of rated voltage.

23. Impedance voltage at normal and 75 deg.C average winding at normal at lowest at highest
    tap tap tap

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temperature expressed as percent of rated voltage. (Indicate tap nos.)

a) Between HV and LV winding
b) Positive Sequence HV
c) Positive Sequence LV

24. Regulation at full load:
   a) Unity Power Factor
   b) 0.8 Power Factor (Lagging)

25. Type of transformer (Core or Shell)

27. Width of track gauge

27. Core:
   a) Material of Core lamination
   b) Thickness of Core Plates
   c) Whether Core Plates are grain oriented cold rolled
   d) Insulation of core lamination
   e) Insulation of core bolts:
   f) Insulation of core bolt washers
   g) Insulation of core and plates
   h) Details of oil ducts in cores
   i) Whether in the plane and at right angle to the plane of winding
   ii) Across the plane of laminations

28. Windings:
   a) Type of Winding
      i) HV Winding
      ii) LV Winding
   b) Insulation of HV winding
   c) Insulation of LV winding
   d) Insulation between HV & LV winding

29. Power frequency High Voltage Tests
   i) Test Voltage for 1 minute withstand test on High Voltage Windings (Induced)
   ii) Test Voltage for one minute withstand test
iii) Test Voltage for one minute withstand test on Neutral end of high voltage winding

iv) Impulse test on High Voltage Winding 1/50 full wave withstand

v) Impulse test on low voltage winding 1/50 full wave withstand

vi) Wave form for impulse test

Inter turn insulation HV/LV

i) Extent of extreme and turns reinforcement

ii) Extent of end turns reinforcement

iii) Extent of turns adjacent to tapping reinforced

iv) Test Voltage for ten seconds 50 cycles inter turn insulation test on (i).

v) Test Voltage for ten seconds 50 cycles inter turn insulation test on (ii).

vi) Test Voltage for ten seconds 50 cycles inter turn insulation test on (iii)

vii) Test Voltage for ten seconds 50 cycles inter turn insulation test on main body of the winding

30. Type of Axial coil supports:

i) High Voltage Winding

ii) Low Voltage winding

31. Type of radial coil supports

i) High Voltage Winding

ii) Low Voltage Winding
32. Whether HV windings are interleaved

33. Details of special if any, made to improve stress conditions

34. Size of cooling ducts

35. Drawings to scale indicating flow of oil in the radial and axial ducts of each limb and winding.

36. Maximum out of balance force in winding on short circuit at the terminals

37. Thickness of Transformer tank plate:
   a) Sides mm : 
   b) Bottom mm : 
   c) Radiator Plate mm :

38. Type and details of winding hot spot temperature detector

39. Power requirement of heater in conservator

40. Buchholz relay description, data, range of settings schematic diagram etc.

41. Bushings:
   a) Type : 
   b) Dry flash over voltage 
   c) Wet flash over voltage  
   d) Dry 60s withstand test voltage 
   e) Wet 60s withstand test voltage  
   f) Full wave withstand test voltage with 1.2/50 micro seconds wave 
      (+) Positive 
      (-) Negative 
   g) Creepage distance in air: 
   h) Recommended gap setting ( mm): 
   i) Weight of assembled bushing (Kgs): 
   j) Quantity of oil (ltrs.)

42. Free space required at top for:
   removal of bushings (mm)

43. Total volume of conservator liters

44. Volume of conservator between the Highest and lowest levels liters

45. Cooling system:
   a) Type and make of Fan motors for forced air cooling equipment.
b) Rating and speed of motors

c) Efficiency of motors at full load

d) Temperature rise of motors at full load

e) Number of fan motors

46. Period of continuous working at full load without fans.

47. Continuous kVA rating without fans

48. Calculated time constants
a) Natural cooling:
   b) Forced air cooling:

49. Details of on load tap changing gear
a) Make:
   b) Type:
   c) Rating:
      i) Rated voltage
      ii) Rated current
      iii) Step voltage
      iv) Number of steps
   d) Approximate overall weight:
   e) Approximate overall dimensions (HxWxD)
   f) Approximate overall quantity of oil - liters

50. Weight of copper required to complete the transformer (Kgs.)

51. Weight of steel required to complete the transformer (Kgs.)

52. Weight of fittings and parts detached for transport (Kgs.)

53. Weight of core and windings (Kgs):

54. Weight of complete transformer with all fittings and oil (Kgs.)

55. Weight of complete transformer arranged for transport of the heaviest package, if broken down (Kgs.)

56. Weight of oil in the transformer (Kgs.)

57. Dimensions of the transformers in meters
a) Maximum height to top of bushings
b) Overall length
c) Overall breadth
d) Heaviest package for transport

58. Taps
59. Fault levels for which the transformer is designed

60. List of accessories and fittings being provided for transformer

61. Whether the materials covered by this Bid have been fully type tested and if so, whether the copies of the type test certificates enclosed to the bid offer.

Yes/No

62. Whether oil temperature indicator provided.

Yes/No

63. Type and size of oil temperature indicator and whether supervisory alarm contacts provided

64. Type of oil level indicator and whether supervisory alarm contact for low oil level provided

65. Type and size of Gas operated relay and whether supervisory alarm and trip contacts provided and their sizes and Nos.

66. Whether winding temperature indicator with supervisory alarm indicator and trip contacts provided and their sizes and Nos.

67. Ratio and type of C.T. used for HV, LV side and for winding temperature indicator

68. Type and size of Thermostat used

69. No. of Breathers provided

70. Type of dehydrating agent used for Breathers

71. Capacity of Conservator vessel (liters)

72. Valve sizes and Numbers required/fitted

73. Size of Rail gauge for installation in yard

74. Wheel base

75. a. Type and make of pressure relief device

b. No. of each type of devices per transformer unit(Nos.)

c. Minimum pressure at which the device
76. Remote transformer control panel
   a. Dimensions (L x W x H)
   b. Protection relays Details (brochure to be enclosed)
   c. Operating voltage -- **220 V DC**
   d. Auxiliary relays
   e. Annunciator

**SIGNATURE OF THE TENDERER**
## Schedule-A
**Proforma of summary price proposal**
*(To be uploaded in the price bid through e-platform)*

<table>
<thead>
<tr>
<th>S.No.</th>
<th>DESCRIPTION OF THE MATERIAL</th>
<th>Qty.</th>
<th>Unit Price in Rs. (to be filled in by the tenderer)</th>
<th>Amount in Rs. (to be filled in by the tenderer)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. SUPPLY PORTION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>5/7.5 MVA, 132/11KV, 3-Phase, ONAN/ONAF Cooling Power Transformer- complete with all fittings, accessories</td>
<td>1 No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Remote transformer control &amp; Relay panel for 132/11 KV, 7.5 MVA, Transformer in redundant configuration and associated Equipment</td>
<td>1 No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3 Mandatory spares</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>HV Bushing with metal parts and gaskets for 5/7.5 MVA, 132/11KV, 3Phase Transformer</td>
<td>1 No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>LV Bushing with metal parts and gaskets for 5/7.5 MVA, 132/11KV, 3Phase Transformer</td>
<td>1 No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Neutral bushing with metal parts and gaskets for 5/7.5 MVA, 132/11KV, 3Phase Transformer</td>
<td>1 No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>HV Winding Temperature indicator for 5/7.5 MVA, 132/11KV 3Phase Transformer</td>
<td>1 No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>LV Winding Temperature indicator for 5/7.5 MVA, 132/11KV, 3Phase Transformer</td>
<td>1 No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Oil Temperature indicator for 5/7.5 MVA, 132/11KV, 3Phase Transformer</td>
<td>1 No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Pressure Relief Device for 5/7.5MVA, 132KV/11KV, 3Phase Transformer</td>
<td>1 No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Bucholtz Relay for 5/7.5 MVA, 132/11KV, 3Phase Transformer</td>
<td>1 No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Silica gel breather for 5/7.5 MVA, 132/11KV, 3Phase Transformer (1 No of each type)</td>
<td>1 Set</td>
<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>Gate Valves for breather for 5/7.5 MVA, 132/11KV, 3Phase Transformer (1 No of each type)</td>
<td>1 Set</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>BF Valves for Radiators for 5/7.5 MVA, 132/11KV 3Phase Transformer</td>
<td>3 Nos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total for Supply</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GST for material @ %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Packing &amp; Forwarding Charges</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Freight inclusive of GST</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Insurance inclusive of GST</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other taxes &amp; Levies if any</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total charges for Supply</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B. ERECTION, TESTING &amp; COMMISSIONING OF TRANSFORMER AND CONTROL &amp; RELAY PANEL</strong></td>
<td></td>
<td>LS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GST on Services @ %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total charges for Erection, Testing &amp; Commissioning</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL (Supply + Erection, Testing &amp; Commissioning)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Note:**

1) The Bidder shall compulsorily quote the Prices of all items in the price bid through APGENCO e-platform otherwise their offer will be treated as non-responsive and disqualified.

2) However, the bidder may upload this sheet in Attachments folder in the price bid.

<table>
<thead>
<tr>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place</td>
<td>Name</td>
</tr>
<tr>
<td></td>
<td>Designation</td>
</tr>
<tr>
<td></td>
<td>(Seal)</td>
</tr>
</tbody>
</table>

Superintending Engineer  
(Hydel - I)/APGENCO
ANDHRA PRADESH POWER GENERATION CORPORATION LIMITED

GUIDE-LINES FOR SUBMISSION OF BANK GUARANTEE

The Bank Guarantee shall fulfill the following conditions failing which it shall not be considered valid:

1. Bank Guarantee shall be executed on non-judicial stamp paper of applicable value purchased in the name of bank.

2. Non-judicial stamp paper shall be used within 6 months from the date of purchase. Bank Guarantee executed on the stamp paper of more than 6 months old shall be treated as invalid.

3. The contents of the Bank Guarantee shall be as per our proforma which will be enclosed along with the Purchase Order.

4. The Bank Guarantee should be executed by a nationalized bank’s/Scheduled bank’s/public sector bank’s.

5. The executor of Bank Guarantee (Bank Authority) should mention the Power of Attorney No. and date executed in his/her favour authorizing him/her to sign the document or produce the Photostat copy of Power of Attorney.

6. All conditions, corrections, deletion in the Bank Guarantee should be authenticated by signature of Bank Officials signing the Bank Guarantee.


8. Two persons should sign as witnesses mentioning their full name and address.

9. **Validity of Bank Guarantees:**

   a) The Bank Guarantee for EMD shall be valid for a period of 270 days from the date of opening of pre-qualification with a claim period of 3 months.

   b) The Bank Guarantee for PEMD shall be valid for a period of 3 years from the date of submission with a further claim period of 6 months.

   c) The Bank Guarantee for Security Deposit shall be valid for a period of 6 months over and above the Guarantee period.

   d) The Bank Guarantee for Performance Guarantee shall be valid up to the Guarantee period with a claim period of 6 months over and above the Guarantee period.
ANNEXURE - I
BANK GUARANTEE PROFORMA FOR PERMANENT EARNEST MONEY DEPOSIT

This Bank Guarantee has to be executed on a Non-Judicial stamped Paper worth Rs. 100/-

Whereas the Andhra Pradesh Power Generation Corporation Ltd. hereinafter called ‘The Corporation’ has afforded a facility to persons submitting tenders in response to notice of the corporation calling for tenders for supply of materials or rendering of services permitting tenderers who furnish a permanent E.M.D. of Rs.5,00,000/- (Five Lakhs only) in the shape of Cash/Govt. Securities or Bank guarantee in lieu of cash to have their tenders considered without separate payment of earnest monies with each tender. Whereas M/s ………………… has offered the guarantee of this Bank, towards the fixed Earnest Money Deposit and the Corporation has agreed to accept the same and the obligations of the tenderer have been incorporated in agreement dated………… which shall be read as part of this guarantee.

We……………… Bank Ltd., do hereby undertake to indemnify and keep indemnified the Andhra Pradesh Power Generation Corporation Ltd. against any loss or damage caused to or suffered by the Corporation by reason of any breach of the tenderer aforementioned of any terms and conditions of any of the tender quotations or the tenders submitted by the tenderer which are considered by the Corporation in accordance with the terms of the agreement dated………… of the contract entered into pursuant to such tenders.

We ………………………. Bank Ltd., further agree that the guarantee herein contained shall remain in full force and effect up to and inclusive of…………………..(date) and that it shall continue to be enforceable till all the terms and conditions of the Corporation under or by virtue of any of the said tender quotations or tenders or contracts have been fully compiled with and its claims satisfied, or discharged or till the Chief Engineer, certifies that the terms and conditions of the said tender quotation have been fully and properly carried out by the said M/s ……………………… and accordingly discharges the guarantee object, however that the Corporation shall have no right under this bond after the expiry of …………………….. (period) from the date of its execution. The guarantor bank undertake to pay the amount guaranteed here under or such part thereof as required within one week of the same being demanded by the corporation without reference to the supplier and without questioning the right of the Corporation to make such demand or propriety or legality of the demand.

We …………………. Bank Limited lastly undertakes not to revoke this guarantee during its currency except with the previous consent of the Corporation in writing.

Notwithstanding anything contained in the foregoing our liability under this guarantee is restricted to Rs.5,00,000/- (Rupees Five Lakhs only). Our guarantee shall remain in the force until…………. Unless a claim under the guarantee is made against us within 6 months from the date, all rights of the corporation under this guarantee shall be forfeited and we shall be relieved and discharged from all liability hereunder.

We…………….. Bank Ltd, further agree that this Bank Guarantee is

1) Unconditional and absolute.
2) Without any delay or demur if claim arises
3) Guarantee all the losses, claims, damages, and costs suffered by APGENCO.

Dated the…………………. day of………………..20__ for…………………………. Bank Ltd.,

Signature:
Designation:
Address:
Seal of the Bank:

Witness
1) 2)
ANNEXURE-2

PROFORMA FOR AGREEMENT FOR PERMANENT EARNEST MONEY DEPOSIT

This agreement has to be executed on a Non-Judicial stamped Paper worth Rs.100/-

Whereas the ANDHRA PRADESH Power Generation Corporation Ltd. (hereinafter called “THE CORPORATION”) has afforded a facility to persons submitted tenders in response to notices of the Corporation calling for tenders for supply of materials or rendering of services, permitting tenders who furnish a Permanent Earnest Money Deposit of Rs.5,00,000/- in the shape of Cash/Government Securities or Bank Guarantee in lieu of cash to have their tenders considered without separate payment of Earnest Monies with each tender.

Whereas we…………………………… hereinafter called the tenderer, indent to avail the said facility and do hereby furnish the fixed Earnest Money Deposit of Rs.5,00,000/- in the shape of Bank Guarantees of the …………………………….. Bank.

IT IS HEREBY AGREED AND DECLARED AS FOLLOWS:

1) The Bank guarantee furnished herewith shall in the first instance be valid for …………… years.

2) So long as the Bank guarantee is in force all tenders submitted by the tenderer in response to notices of the Corporation inviting tenders shall be considered by the Corporation without payment of Earnest Money for each tender.

3) If there is any default on the part of the tenderer, in respect of the tender or the contract resulting there from, the Corporation shall have the unilateral right to call upon the Bank to forthwith pay to the Corporation a sum equivalent to the loss sustained by the Corporation by reason of such default.

4) Where any such amounts have been claimed from and paid by Bank, the Corporation shall not be bound to consider any tender of that tenderer submitted thereafter unless the Bank guarantee has been restored to the level of Rs.5,00,000/-. However, in special cases the Corporation may consider any tender before the guarantee is restored to the full amount of Rs.5,00,000/- if a separate Earnest Money Deposit is given for the short fall and the tenderer undertakes in writing to make good the short fall in Bank Guarantee within two months of the opening the tender.

Dated the…………………….. 20__ for…………………………………………………

Signature of Tenderer
Name :
Designation :
Address :

Witness
(1)

(2)
This Bank Guarantee has to be executed on a Non-Judicial Stamped paper worth Rs.100/-

PROFORMA OF BANK GUARANTEE FOR SECURITY DEPOSIT
(Applicable to the State Bank of India and other Nationalized Banks approved in terms of
the Government of India, Ministry of Finance, Office Memorandum No. F(27)-F-1/54, dated
the 25th of February, 1965, for guarantee without deposit of the securities up to prescribed
limit.)

In consideration of the Andhra Pradesh Power Generation Corporation Limited
(herein after called 'the Corporation') having agreed to exempt
____________________ (herein after called the 'said contractors') from the demand, under the terms and conditions
of the P.O.No. _______________ dt ___________ made between the Corporation and
M/s _______________ for supply of _______________ (herein after called 'the said
agreement') of Security Deposit for the due fulfillment by the said contractors of the terms
and conditions contained in the said agreement, on production of a Bank Guarantee for Rs
_____________ (Rupees __________________________ only). we
____________________ Bank Ltd., do hereby undertake to indemnify and keep indemnified
the Corporation to the extent of Rs. ______________ against any loss or damage caused to
or suffered by the corporation by reason of any breach by the said contractors of any of the
terms and conditions contained in the said agreement.

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 agreement and that it shall continue to be enforceable till all the
dues of the Corporation under or by virtue of the said agreement have been fully paid and
its claims satisfied or discharged or till The Chief Engineer (HPC & Hydel Projects),
APGENCO, Vidyut Soudha, Vijayawada certifies that the terms and conditions of the said
agreement have been fully and properly carried out by the said contractors and accordingly
discharge the guarantee, subject to, however, that the corporation shall have no right
under this bond after expiry of __________ (period) from the date  of its execution.

We the guarantor Bank under take to pay the amount guaranteed here under or such part
their of as required within one week of the sum being demanded by the Corporation without
referring to the supplier and without questioning the right of the Corporation to make such
demand or the propriety or legality of the demand.

Notwithstanding anything contained in the foregoing our liability is restricted to Rs.
_____________ (Rupees __________________________ only). Our guarantee shall remain in force
until __________. Unless a claim under the guarantee is made against us within 6 months
from that date, all your rights under this guarantee shall be forfeited and we shall be relived
and discharged from all liabilities here under.

Furthermore, we________________ Bank limited accept that

i. This Bank Guarantee is unconditional and absolute
ii. Claim against this Bank Guarantee will be honored without any delay or demur;
and
iii. This Bank guarantee covers all the losses, claims, damages and costs suffered
by the Corporation against the said agreement.

We ______________ Bank Ltd., lastly undertake not to revoke this guarantee during its
currency except with the previous consent of the Corporation in writing.
Dated the ___________ day of __________ 20___ for ______________Bank Ltd.,

Signature
Designation Address & Seal of the Bank

Witness
(1)

(2)
ANNEXURE – 4
PROFORMA FOR PERFORMANCE BANK GUARANTEE

This guarantee has to be executed on Rs. 100/- Stamp paper

In consideration of The Andhra Pradesh Power Generation Corporation Limited, (herein after called ‘the Corporation’) having at our request agreed to accept this ________________ Bank Ltd., guarantee in lieu of cash deposit required from M/s __________________ for making 100% payment by APGENCO for due fulfillment by them of the terms and conditions of the P.O.No. ______________________ made between M/s __________________ and APGENCO for ________________ (herein called said agreement) during the period from ___________ to __________, or the extended period, if any, do hereby undertake to indemnify and keep indemnified the Corporation to the extent of Rs. ________________ (Rupees __________________ only) representing 10% of the value of the contract against any loss or damages caused to or suffered by the Corporation by reason of any breach by the said M/s __________________ or any terms and conditions of the said agreement.

We ________________ Bank Ltd., further agree that the guarantee herein contained shall remain in full force and effect up to and inclusive of ___________ (date) referred to above or the expiry of the extended period, if any, and that it shall continue to be enforceable till all the dues of the Corporation under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till the Chief Engineer (HPC & Hydel Projects), APGENCO, Vidyut Soudha, Vijayawada certifies that the terms and conditions of the said agreement have been fully and properly carried out by the said M/s __________________ and accordingly discharges the guarantee subject to, however, that the Corporation shall have no right under this bond after the expiry of ___________ (period)

We the guarantor Bank undertake to pay the amount guaranteed hereunder or such part there of as required within one week of the sum being demanded by the Corporation without reference to the supplier and without questioning the right of the Corporation to make such demand or the propriety or legality of the demand.

Notwithstanding anything contained in the foregoing, our liability under this guarantee is restricted to Rs. ________________ only. Our guarantee, shall remain in force until ___________. Unless a claim under the guarantee is made against us within 6 months from that date, all your rights under this guarantee shall be forfeited and we shall be relieved and discharged from all liabilities hereunder.

Furthermore, we ________________ Bank limited accept that

i. This Bank Guarantee is unconditional and absolute

ii. Claim against this Bank Guarantee will be honored without any delay or demur; and

iii. This Bank guarantee covers all the losses, claims, damages and costs suffered by the Corporation against the said agreement.

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

Dated the ___________ day of __________ 20__ for __________________ Bank Ltd.,

Signature

Designation Address & Seal of the bank

Witness

(1)
(2)
## ANNEXURE-5

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<th>TYPE OF CHECK</th>
<th>QUANTUM OF CHECK</th>
<th>REFERENCE DOCUMENT</th>
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### LEGEND:
- * RECORDS, IDENTIFIED WITH "TICK" ( ✓ ) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.
- ** M: MANUFACTURER/SUB-SUPPLIER
- **C: MAIN SUPPLIER, A: APGENCO, P: PERFORM W: WITNESS AND V: VERIFICATION. AS APPROPRIATE, CHP: APGENCO SHALL IDENTIFY 'W' IN COLUMN "A"
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LEGEND:  
A = CRITICAL, B=MAJOR, C=MINOR;  
'A' SHALL BE WITNESSED BY OWNER QUALITY DEPTT., 'B' SHALL BE WITNESSED BY OWNER ERECTION / CONSTRUCTION DEPTT. AND 'C' SHALL BE WITNESSED BY MAIN SUPPLIER (A & B CHECK SHALL BE OWNER CHP STAGES)

DOC. NO.: REV.....

MANUFACTURER/ SUB-SUPPLIER

MAIN-SUPPLIER

SIGNATURE

FOR APGENCO USE

REVIEWED BY

APPROVED BY

APPROVAL SEAL