

**ASSAM ELECTRICITY GRID CORPORATION LIMITED**

**Regd. Office:1st floor, Bijulee Bhawan,Paltanbazar,Guwahati-781001**

**CIN:U40101 AS2003SGC007238**

**Phone:0361-2739520/ web:www.aegcl.co.in**



**Bidding Document**

**For**

**Supply, Erection, Testing and commissioning of one(1) no. of 250kVA Station transformer at Ghoramari GSS, AEGCL**

**DEPUTY GENERAL MANAGER**

**TEZPUR T&T CIRCLE**

**AEGCL, TEZPUR-784001**

**Tender Cost: ₹1000.00**

**EMD: ₹20,000.00**

For & on behalf of the **Managing Director, AEGCL, the Deputy General Manager, Tezpur T&T Circle, AEGCL, Dhanuwa Nagar, Tezpur,** invites tenders in prescribed form, from reputed Firms/Contractors/Manufacturers with sound technical and financial capabilities for the following work. A single stage two envelope procedure (**Techno-Commercial and Price Bid**) will be adopted for this tender.

<b>Sl. No.</b>	<b>Name of work</b>	<b>Estimated Cost In INR</b>	<b>Time of completion In Days</b>	<b>Consignee address</b>
1	<b>Supply, Erection, Testing and commissioning of one(1) no. of 250kVA Station transformer at Ghoramari GSS, AEGCL</b>	<b>Rs.9,78,119.00</b>	<b>90 days from the date of issue of work order</b>	<b>132/33kVGhoramari Grid SubStation, AEGCL</b>

**1.0 Cost of Bidding Document:**

Bidder has to pay Non-Refundable tender document cost of **Rs.1000.00 (Rupees One Thousand) only in the form of A/C payee Demand draft (Non-refundable) pledged in favour of AEGCL, BijuleeBhawan, Paltanbazar, Guwahati-1, payable at Guwahati.**

**2.0 Bidding Address:**

2.1 Tender papers can be purchased on application in plain paper from the **Deputy General Manager, Tezpur T&T Circle, AEGCL, Tezpur.**

**Key Dates:-**

- a) Bid Document available date: 10:00hrs of 11-01-2023
- b) Bid Submission Start Time & date: 11:00hrs of 11-01-2023
- c) Bid Submission end time & date: 12:00hrs of 31-01-2023
- d) Techno-Commercial Bid Opening time: 14:00hrs of 31-01-2023

### **3.0 Validity of Bids and Bids Prices:**

- 3.1 Bids shall remain valid for a period of 180 days after the bid submission deadline date prescribed by AEGCL. In exceptional circumstances, prior to the expiration of the bid validity period, AEGCL may request Bidders to extend the period of validity of their bids. The request and the responses shall be made in writing. If a bid security shall also be extended for a corresponding period.
- 3.2 Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request shall not be required or permitted to modify its bid.
- 3.3 Bidders shall quote for the entire scope of supply and services on a “single responsibility” basis such that the total bid price covers all the Supplier’s obligations mentioned in or to be reasonably inferred from the bidding document in respect of the design, manufacture, including procurement, delivery, and completion of the entire scope.
- 3.4 Bidders shall give a breakdown of the prices in the manner and detail called for in the Price Schedules.

### **4.0 Bid Security:**

- 4.1 All bids must be accompanied by a bid security amounting to **Rs. 20,000.00** only in the form of Bank Guarantee/Demand Draft from any Nationalised Bank payable at Guwahati in favour of **AEGCL, BijuleeBhawan, Paltanbazar, Guwahati-01.**
- 4.2 If a bid security is specified, any bid not complying then his bid shall be rejected by the Employer as non-responsive.
- 4.3 The bid security of the successful Bidder shall be returned as promptly as possible once the successful Bidder has signed the Contract and furnished the required performance security.
- 4.4 The bid security of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder’s furnishing of the performance security.
- 4.5 The bid security may be forfeited:
- a) if a Bidder withdraws its bid during the period of bid validity specified by the Bidder.
  - b) if the successful Bidder fails to:
    - (i) sign the Contract with in the specified period.
    - (ii) furnish a performance security within 15 (fifteen) days’ time.
- 4.6 The Bid Security of a JV shall be in the name of the JV that submits the bid. If the JV has not been legally constituted at the time of bidding, the Bid Security shall be in the names of all future partners as named in the letter of intent.
- 4.7 If a bid securing declaration is not executed in accordance with the above, AEGCL will declare the Bidder ineligible to be awarded a contract by the AEGCL for the period of time stated in the Form of Bid Securing Declaration.

### **5.0 Format and Signing of Bid:**

- 5.1 The Bidder shall prepare one original of the Technical Bid and one original of the Price Bid

comprising the Bid and clearly mark it —ORIGINAL - TECHNICAL BID and —ORIGINAL - PRICE BID.

In addition, the Bidder shall submit three copies of the bid, in the number specified and clearly mark each of them —COPY. In the event of any discrepancy between the original and the copies, the original shall prevail.

5.2 The original and all copies of the Bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as specified in the Bid Document and shall be attached to the bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the bid where entries or amendments have been made shall be signed or initialled by the person signing the bid.

5.3 A bid submitted by a JV shall be signed so as to be legally binding on all partners.

5.4 Any interlineations, erasures, or overwriting shall be valid only if they are signed or initialled by the person signing the bid.

## **6.0 Submission and Opening of Bids:**

### **6.1 Submission, Sealing and Marking of Bids:**

6.1.1 Bidders may submit their bids by mail or by hand. When so specified in the Bid Document, bidders shall have the option of submitting their bids electronically. Procedures for submission, sealing and marking are as follows:

Bidders submitting bids by mail or by hand shall enclose the original and each copy of the Bid, including alternative bids, if permitted in accordance with above, in separate sealed envelopes, duly marking the envelopes as —ORIGINAL and —COPY. These envelopes containing the original and the copies shall then be enclosed in one single envelope.

6.1.2 The inner and outer envelopes shall:

- (a) bear the name and address of the Bidder;
- (b) be addressed to the Bidding Authority.
- (c) bear the specific identification of this bidding process indicated in the Bid Document

6.1.3 The outer envelopes and the inner envelopes containing the Technical Bid shall bear a warning not to open before the time and date for the opening of Technical Bid.

6.1.4 The inner envelopes containing the Price Bid shall bear a warning not to open until advised by the AEGCL.

6.1.5 If all envelopes are not sealed and marked as required, the Employer will assume no responsibility for the misplacement or premature opening of the bid.

6.2 AEGCL may, at its discretion, extend the deadline for the submission of bids by amending the Bidding Document, in which case all rights and obligations of the AEGCL and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.

## **7.0 Eligible Bidders:**

7.1 A Bidder may be a private entity or a government-owned entity or any combination of such entities

with the intent to enter into an agreement supported by a letter of intent or under an existing agreement in the form of a joint venture, consortium, or association (JV). In the case of a JV:

- a) all partners shall be jointly and severally liable, and
- b) the JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the partners of the JV during the bidding process and, in the event the JV is awarded the Contract, during contract execution.

7.2 A Bidder, and all partners constituting the Bidder, shall have Indian nationality. A Bidder shall be deemed to have the nationality of a country if the Bidder is a national or is constituted, incorporated, or registered and operates in conformity with the provisions of the laws of Republic Of India. This criterion shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the Contract including related services.

7.3 AEGCL considers a **conflict of interest** to be a situation in which a party has interests that could improperly influence that party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations, and that such conflict of interest may contribute to or constitute a prohibited practice under Anticorruption Policy of Government of India and Government Of Assam. In pursuance Anticorruption Policy's requirement that Employer as well as bidders, suppliers, and contractors observe the highest standard of ethics. AEGCL will take appropriate actions if it determines that a conflict of interest has flawed the integrity of any procurement process.

Consequently all Bidders found to have a conflict of interest shall be disqualified. A Bidder may be considered to be in a conflict of interest with one or more parties in this bidding process if, including but not limited to:

- (a). they have controlling partners in common; or
- (b). they receive or have received any direct or indirect subsidy from any of them; or
- (c). they have the same legal representative for purposes of this bid; or
- (d). they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or
- (e). a Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all Bids in which it is involved. However, this does not limit the inclusion of the same subcontractor, not otherwise participating as a Bidder, in more than one bid; or
- (f). a Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the plant and services that are the subject of the bid.

7.4 A firm that is under a declaration of ineligibility by the AEGCL or any Government Entity or PSU at the date of the deadline for bid submission or thereafter i.e. on or before contract signing date shall be disqualified.

7.5 Bidders shall provide such evidence of their continued eligibility satisfactory to the AEGCL, as the Employer shall reasonably request.

7.6 In case a prequalification process has been conducted prior to the bidding process, this bidding is open only to prequalified Bidders.

## 8.0 Financial Capability:

8.1 Bidder will require to submit along with the bid the audited balance sheets and other legal financial statements acceptable to AEGCL, for the last 3 (three) years to demonstrate the current soundness of the Bidders financial position and its prospective long term profitability. As a minimum, an Applicant's net worth calculated as the difference between total assets and total liabilities should be positive.

8.2 **Average Annual Turnover** : Minimum average annual turnover **INR 2,94,000.00** calculated as total certified payments received for contracts in progress or completed, within the last 3 (Three) Years.

8.3 **Financial Resources**: Bidder need to demonstrate access to, or availability of, financial resources such as liquid assets, unencumbered real assets, lines of credit, and other financial means, other than any contractual advance payments to meet:

(1) the following cash-flow requirement, **INR 2,94,000.00 and**

(2) the overall cash flow requirements for this contract and its current works commitment.

## 9.0 Experience:

9.1 Experience on similar nature of works under contracts in the role of manufacturers, contractor, subcontractor, or management contractor for at least the last 7(Seven) years prior to the bid submission deadline.

9.2 Participation as manufacturer, contractor Experience having successfully completed similar works during last 7 years ending last day of the month previous to the one in which applications are invited should be either of the following:

(a) Three (3) similar completed works costing not less thanRs. **3,92,000.00**

(b) Two (2) similar completed works costing not less than Rs. **4,90,000.00**

(c) One (1) similar completed works costing not less than**Rs.7,83,000.00**

9.3 The Bidder must have experience of executing work of similar nature previously. The bidder must submit experience and completion certificate for scrutiny by AEGCL. Each of such project/ works should consist of completion certificate as per Clause 9.1.

## 10.0 Evaluation Criteria:

10.1 Evaluation will be done on the basis of *Bid Clause* No. **7.0**, Eligible Bidders, Cl. No. **8.0**, Financial Capability, Cl. No. **9.0.**, Experience and in accordance with the **Annexure I** to be duly filled in, signed and submitted by the bidder.

10.2 Price Bid of only **Responsive Techno-Commercial Bidders** will be opened.

10.3 **Arithmetical Error**, if observed while in Price Bid evaluation, same will only be corrected.

10.4 **Any post bid correction request will NOT BE ENTERTAINED.**

10.5 **Price Bid Envelope of the Non-responsive Techno Commercial Bidders will be returned** to the respective bidders against submission of a written request by the bidder.

10.6 The following methodology will be practised for identification and treatmentof the Abnormally Low Bids (ALB) in this tender process of AEGCL:

(i) Absolute Approach is to be considered when there is fewer than fivesubstantially responsive

bidders and if the bid price is 20% or more below AEGCL's cost estimate then AEGCL's tender evaluation committee should clarify the Bid price with the bidder to determine whether the Bid is Abnormally low.

(ii) Relative approach is to be considered when there are at least 5 (five) nos. of substantially responsive bids and the lowest bid price is 20% or more below AEGCL's cost estimate. In this approach, first the Average bid price is determined and then by deducting the standard deviation from the Average bid price, potentially ALB may be determined.

(iii) In case of an ALB, the tender evaluation committee/appropriate authority of the respective tenders shall undertake the following three stage review process which is as below:

- To identify ALB as per the steps mentioned in SI no. 10.6.(i) and 10.6.(ii), whichever is applicable.
- To seek and analyse the clarifications from the abnormally low Bidder in terms of resource inputs and pricing, including overheads, contingencies and profit margins. In that respect, the committee may refer to guideline of World Bank, AIIB, ADB etc. prescribed for ALB.
- To decide whether to accept or reject the bid.
- On acceptance of the bid, whether Additional Performance Security is to be imposed on the bidder supplemented by adequate justification.

(iv) In case of acceptance of ALB with Additional Performance Security:

- If any abnormally low bid is accepted with additional performance security, it is to be noted that the total performance security should not exceed 20% of the total contract value.
- The additional performance security shall be treated as part of the original performance security and shall be valid for a period similar to that applicable for defect liability period of the contract.
- Non submission of the additional performance security shall constitute sufficient ground for rejection of the bid and similar assessment shall then be initiated for next ranked bidder if that bidder is also identified as ALB.

## **11.0 Late Bid:**

11.1 Any bid submitted ***after the due date and time*** will be rejected without any prejudice.

11.2 AEGCL will not be responsible for any Postal and/or Courier Delay in delivering the bid. The same received after the scheduled closing date and time will be rejected without any prejudice.

11.3 Bidding through EMAIL WILL NOT BE ACCEPTED.

## **12.0 Clarification:**

12.1 A prospective Bidder requiring any clarification of the Bidding Document shall contact the AEGCL in writing at the AEGCL's address indicated in the BDS or raise his enquiries prior to 7 (seven) days of closing of the bid. The Employer will respond to any request for clarification, provided that such request is received no later than seven (7) days prior to the deadline for submission of bids. The AEGCL's response shall be in writing with copies to all Bidders who have acquired the Bidding Document including a description of the inquiry but without identifying its source. Should AEGCL deem it necessary to amend the Bidding Document as a result of a request for clarification, it shall do so.

12.2 The Bidder is advised to visit and examine the site where the work is to be Carried out and its surroundings and obtain for itself on its own responsibility all information that may be

necessary for preparing the bid and entering into a contract for the provision of plant and services. The costs of visiting the site shall be at the Bidder's own expense.

12.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.

12.4 The Bidder's designated representative is invited to attend a pre-bid meeting, if provided for in the BDS. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

12.5 The Bidder is requested, as far as possible, to submit any questions in writing, to reach the AEGCL not later than one week before the pre-bid meeting if there is provision of Pre Bid Meeting.

12.6 Minutes of the pre-bid meeting, including the text of the questions raised, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders who have acquired the Bidding. Any modification to the Bidding Document that may become necessary as a result of the pre-bid meeting shall be made by AEGCL exclusively through the issue of an Addendum but not through the minutes of the pre-bid meeting.

12.7 Non-attendance at the pre-bid meeting will not be a cause for disqualification of a Bidder.

### **13.0 Amendment of Bidding Document:**

13.1 At any time prior to the deadline for submission of bids, the Employer may amend the Bidding Document by issuing addenda.

13.2 Any addendum issued shall be part of the Bidding Document and shall be communicated in writing to all who have obtained the Bidding Document from AEGCL.

13.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their bids, AEGCL may, at its discretion, extend the deadline for the submission of bids.

### **14.0 Preparation of Bids by the Bidders:**

14.1 **Cost of bidding:** The Bidder shall bear all costs associated with the preparation and submission of its Bid, and AEGCL shall not be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

14.2 **Language of Bid:** The Bid, as well as all correspondence and documents relating to the bid exchanged by the Bidder and AEGCL, shall be written in the English language.

### **14.3 Bid Prices and Discounts:**

14.3.1 Unless otherwise specified in the Bid Document and/or AEGCL's Requirements, bidders shall quote for the entire plant and services on a —single responsibility basis such that the total bid



price covers all the Contractor's obligations mentioned in or to be reasonably inferred from the bidding document in respect of the including procurement and subcontracting (if any), delivery, construction, installation and completion of the Work. This includes all requirements under the Contractor's responsibilities for completing the work and where so required by the bidding document, the acquisition of all permits, approvals and licenses, etc.; the operation, maintenance and training services and such other items and services as may be specified in the Bidding Document, all in accordance with the requirements of the General Conditions. Items against which no price is entered by the Bidder will not be paid for by the Employer when executed and shall be deemed to be covered by the prices for other items.

- 14.3.2 Bidders are required to quote the price for the commercial, contractual and technical obligations outlined in the bidding document. If a Bidder wishes to make a deviation, such deviation shall be listed. The Bidder shall also provide the additional price if any, for withdrawal of the deviation.
- 14.3.3 Bidders shall give a breakdown of the prices in the manner and detail called for in the Price Schedules. Where no different Price Schedules are included in the Bidding Document, bidders shall present their prices in the following manner:  
(a) Separate numbered Schedules shall be used for each of the following elements.  
(i) The total amount from each Schedule shall be summarized in a Grand Summary giving the total bid price(s) to be considered.
- 14.3.4 The price of the work shall be quoted as the Base Price or EXW Price
- 14.3.5 Sales Tax, GST and all other taxes (as applicable) payable on the work should be indicated separately. In case of failure to indicate so AEGCL will consider such taxes are included in the Offered Price.
- 14.3.6 Whenever forest produces like sand, stone, timbers etc are used in the work the contractor have to furnish documentary proof that requisite royalty on such produces has been paid to the concerned Department.
- 14.3.7 When the work being "work contract" which is one and individual and which involves no separate contract for the sale of materials, the contractor shall have not be entitled to get any VAT and or any other taxes, levies reimbursed from the AEGCL for the supply of the materials.
- 14.3.8 Taxes like work contract, income tax etc. which need to be deducted at source as per the prevailing law of the land, will be deducted at source.
- 14.3.9 **The Prices shall be FIXED and FIRM:** The Bided Price should on Fixed Price basis, prices quoted by the Bidder shall be fixed during the Bidder's performance of the contract and not subject to variation on any account. A bid submitted with an adjustable price quotation will be treated as non-responsive and rejected.

**15.0 Additional Requirements:**

- 15.3.1 Bidders(s) knowledge from actual personal investigation of the resources of the region or District (S) in which he/they offers the work.
- 15.3.2 The Bidder shall furnish copy of their PAN Card. The card must be in the name of firm, in case the bidder is a partnership Firm.

15.3.3 In case the bidder is a partnership Firm, the work experience, solvency and turn over shall be in the name of partnership Firm only.

15.3.4	GST registration No.
15.3.5	Registered Power of attorney, if any.
15.3.6	I T Return for last three Years
15.3.7	Audited Balance Sheet for last three years
15.3.8	Labour License (Valid).
15.3.9	Electrical License/supervisory license of/above 33kV Voltage level in case of electrical work
15.3.10	The Bidder must be a transformer manufacturer of voltage level upto 33kV and manufacturing transformers of 5.0 MVA rating. If not, the Bidder shall provide Manufacturer's authorisation
15.3.11	GTP as per SCHEDULE-A,B and C attached

## 16.0 Negotiation with successful bidder:

The AEGCL reserve the right to hold negotiations with lowest who should be lowest, valid, eligible and technically acceptable bidder considered for award of contract directly if the rates were not unreasonably high.

## 17.0 TECHNICAL REQUIREMENTS

### 17.1 Intent of specification

This section of the specification deals with the technical information & criteria for **“Supply, Erection, Testing and commissioning of one(1) no. of 250kVA Station transformer at Ghoramari GSS, AEGCL”**.The Contractor's proposal shall be based on the use of materials complying fully with the requirements specified herein.

### 18.0 Scope:

The major scopes of work are as follows:-

- Design, Supply, delivery of 250kVA, 33/0.433 kV Station transformer along with other equipments.
- Erection, Testing and commissioning of 250kVA Station transformer at Ghoramari GSS, AEGCL
- Transportation and movement of supplied materials including unloading at the site and arrangements of any permits required for transportation of supplied materials. However, AEGCL shall assist as far as practicable in the process.
- Transit insurance and insurance during storage at site till commissioning shall be in the scope of the contractor.
- Construction of 250KVA, 33/0.433 kV Station transformer pad

The works to be executed shall be as per the items mentioned in the Price bid and as per the directions of the site engineer.

### 19.0 Contractor to inform himself fully

19.1 The Contractor should ensure that he has examined the General Conditions, qualifying criteria, Specifications and Schedules and has satisfied himself as to all the conditions and circumstances affecting the contract price and fixed his price according to his own views on these matters and acknowledge that no additional allowances except as otherwise provided therein will be levied.

19.2 AEGCL shall not be responsible for any misunderstanding or incorrect information obtained by the Contractor other than information given to the Contractor in writing by AEGCL.

**20.0 Conformity with Indian Electricity rules & other local regulations wherever applicable:**

20.1 The Contractor shall note that all substation works shall comply with the latest provisions of Indian Electricity Rules and with any other regulations. Local authorities concerned in the administration of the rules and regulation relating to such works shall be consulted, if necessary, in regard to the rules and regulations that may be applicable.

20.2 The materials covered by this specification shall, unless otherwise stated be designed, constructed and tested in accordance with the latest revisions of relevant Indian Standards and shall conform to the regulations of local statutory authorities.

20.3 The Contractor shall also comply with the Minimum Wages Act 1948 and the payment of Wages Act (both. Of the Government of India and State of Assam) and the rules made there under in respect of any employee or workman employed or engaged by him or his Sub-Contractor.

20.4 All registration and statutory inspection fees, if any, in respect of his work pursuant to this Contract shall be to the account of the Contractor. However, any registration, statutory inspection fees lawfully payable under the provisions of the statutory laws and its amendments from time to time during erection in respect of the Substation Works, ultimately to be owned by the Employer, shall be to the account of the Employer. Should any such inspection or registration need to be re-arranged due to the fault of the Contractor or his Sub-Contractor, the additional fees to such inspection and/or registration shall be borne by the Contractor.

20.5 In case of any conflict between the standards and this specification, this specification shall govern.

**21.0 Drawing and Documents**

21.1 All drawings shall be provided by AEGCL during execution, wherever applicable.

**22.0 Employer Supervision**

22.1 The scope of the duties of the Employer, pursuant to the contract, will include but not be limited to the following.

- a) Inspect, accept or reject any material and work under the Contract.
- b) Issue certificate of acceptance and/or progressive payment and final payment certificate.

**23.0 Packing:**

All the materials shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling and storage at Site till the time of erection. The Supplier shall be responsible for any loss or damage during transportation, handling and storage due to improper packing.

The Supplier shall include and provide for securely protecting and packing the materials so as to avoid loss or damage during transport by air, sea, rail and road.

All packing shall allow for easy removal and checking at site. Wherever necessary, proper arrangement for attaching slings for lifting shall be provided. All packages shall be clearly marked for with signs showing 'up' and 'down' on the sides of boxes, and handling and unpacking instructions as considered necessary. Special precaution shall be taken to prevent rusting of steel and iron parts

during transit by sea.

The cases containing easily damageable material shall be very carefully packed and marked with appropriate caution symbols, i.e. fragile, handle with care, use no hook etc. wherever applicable.

Each package shall be legibly marked by the-Supplier at his expenses showing the details such as description and quantity of contents, the name of the consignee and address, the gross and net weights of the package, the name of the Supplier etc.

#### **24.0 Materials handling and storage:**

(a) All the supplies under the Contract as well as Employer supplied items (if any) arriving at site shall be promptly received, unloaded and transported and stored in the stores by the Contractor.

(b) Contractor shall be responsible for examining all the shipment and notify the Employer immediately of any damage, shortage, discrepancy etc. for the purpose of Employer's information only. The Contractor shall submit to the Employer every week a report detailing all the receipts during the week. However, the Contractor shall be solely responsible for any shortages or damages in transit, handling and/or in storage and erection at site. Any demurrage, and other such charges claimed by the transporters, railways etc., shall be to the account of the Contractor.

(c) The Contractor shall maintain an accurate and exhaustive record-detailing out the list of all items received by him for the purpose of erection and keep such record open for the inspection of the Employer.

(d) All items shall be handled very carefully to prevent any damage or loss. The materials stored shall be properly protected to prevent damage.

(e) All the materials stored in the open or dusty location must be covered with suitable weatherproof and flameproof covering material wherever applicable.

(f) The Employer will verify the storage facilities arranged by the contractor and dispatch clearance will be provided only after Employer is satisfied.

#### **25.0 TECHNICAL SPECIFICATIONS OF 250KVA, 33/0.433 KV STATION TRANSFORMER**

A brief description of scope of work covered under this Bidding Document is furnished below:

- a) Design, Supply, delivery of 250kVA, 33/0.433 kV Station transformer along with other equipments.
- b) Erection, Testing and commissioning of 250kVA Station transformer at Ghoramari GSS, AEGCL
- c) Transportation and movement of supplied materials including unloading at the site and arrangements of any permits required for transportation of supplied materials. However, AEGCL shall assist as far as practicable in the process.
- d) Transit insurance and insurance during storage at site till commissioning shall be in the scope of the contractor.
- e) Construction of 250KVA, 33/0.433 kV Station transformer pad

#### **25.1 SERVICE CONDITIONS**

The plant and materials supplied shall be suitable for operation under the following climatic and other conditions:

- a) Peak ambient day temperature in still air :45°C
- b) Minimum night temperatures :0°C
- c) Reference ambient day temperature :45°C

d) Relative Humidity	a) Maximum	:100 %
	b) Minimum	:10%
e) Altitude		: Below 1000M above MSL
f) Maximum wind pressure		:As per IS: 802 latest code.
g) Seismic Intensity		:ZONE-V as per IS 1893.

25.2

### TYPE TEST REPORTS

- (1) Equipment, which have never been type tested, shall not be accepted. In such cases, a promise or agreement by a bidder to have the equipment tested after award of a contract is not acceptable.
- (2) All Bids must be accompanied by the full Type Test Certificates of equipment offered. Such type test certificates shall be acceptable only if,
  - (a) Tests are conducted in an independent and well known testing laboratory, or
  - (b) Tests are conducted in manufacturer's own laboratory. In this case, (i) the laboratory must have ISO 9000 (or its equivalent) series certification; and (ii) tests have been witnessed by technically qualified representatives of earlier clients or purchaser.
- (3) Test reports to be acceptable must be related directly to the equipment offered. The Bidder shall furnish type test reports with the technical bid such as relevant drawings and specification so that test reports can be linked to the offered equipment. Test reports for a similar or higher class of equipment are acceptable with a commitment to perform the type test on the particular equipment after the contract is awarded, free of any charges.
- (4) The above said test reports submitted with the offer shall not be older than five years, prior to the date of opening of bid. ***Type Test Reports older than five (5) years on the date of Technical bid opening shall not be accepted.***

25.3

### GUARANTEED TECHNICAL PARTICULARS

#### STANDARD

25.3.1

The equipment covered by this specification shall, unless otherwise stated be designed, constructed and tested in accordance with the latest revisions of relevant Indian Standards indicated below or equivalent IEC and shall conform to the regulations of local statutory authorities except to the extent explicitly modified in this specification.

25.3.1.2

In case of any conflict between the Standards and this specification, this specification shall govern. The transformer shall comply with the latest issue of the following Indian standard.

- (i). IS: 2026 Specification of Power Transformers
- (ii). IS: 1180 (Part-1):2014 Outdoor type Oil Immersed Distribution Transformers upto and including 2500 KVA, 33 kV – Specification.
- (iii). IS: 335 Specification for Transformer Oil.
- (iv). IS: 12444 Specification for Copper Wire Rod

- (v). IS:3347 Specification for Porcelain Transformer Bushing.
- (vi). IS: 2099 Specification for High Voltage Porcelain Bushings.
- (vii). IS: 7421 Specification for Low Voltage Bushings.
- (viii). IS: 9335 Specification for Insulating Kraft Paper.
- (ix). IS: 1576 Specification for Insulating Press Board
- (x). IS: 6600 Guide for Loading of Oil Immersed Transformers.

## **25.3.2 TECHNICAL REQUIREMENTS**

### **General**

#### **25.3.2.1**

- i. The Transformers shall be of outdoor, three phase, 50 Hz, oil immersed, self-cooled and suitable for use in the geographic and meteorological conditions as given in Clause 25.1. The Transformers shall be suitable for mounting on RCC Pedestal.
- ii. The transformer shall be suitable for continuous operation with a frequency variation of (+/-) 3% from normal 50 Hz. Combined voltage and frequency variation should not exceed the rated V/f ratio by 10%.

#### **25.3.2.2**

### **Core**

- i. The core shall be stacked type of high grade cold rolled grain annealed steel lamination having low loss and good grain properties, coated with hot oil proof insulation, bolted together and to the frames firmly to prevent vibration or noise. The complete design of core must ensure permanency of the core losses with continuous working of the transformers.
- ii. MS channel or plate shall be used on top and bottom. Channel frames on LV side to be reinforced at equidistance, if holes / cutting are done for LT lead in order to avoid bending of channel. MS channels/plate frames shall be painted with hot oil-resistant varnish or paint.
- iii. The maximum flux density in any part of the core and yokes, of each transformer at normal voltage and frequency shall be such that the flux density with (+)12.5% combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla (19,000 lines per cm<sup>2</sup>).
- iv. The transformers core shall be suitable for over fluxing (due to combined effect of voltage and frequency) up to 12.5% without injurious heating at full load conditions and shall not get saturated.
- v. No load current shall not exceed 2% of full load current. Increase in secondary voltage of 433 volts by 12.5% shall not increase the no load current beyond 5%.

### 25.3.2.3

#### **Winding**

- i. The HV winding shall be of electrolytic, super enamel covered/Double paper covered (DPC) Copper round/strip conductor, free from scales and burrs.
- ii. LV winding shall be of strip type copper conductor/copper foil type. The neutral of the winding shall be brought out to a separate insulated terminal.
- iii. HV coil is wound over LV coil as crossover coils or continuous disc coils.
- iv. Inter layer insulation shall be Kraft paper/Epoxy dotted paper. Proper bonding of inner layer insulation with the conductor shall be ensured.

### 25.3.2.4

#### **Terminal Arrangement**

- i. Bushing terminals shall be provided with suitable terminal connectors of approved type and size for overhead conductor termination of HV side and cable termination on LV side.
- ii. The neutral terminals of 433V winding shall be brought out on a bushing along with the 433 volt phase terminals to form a 4 wire system for the 433 volt. Additional neutral bushing shall also be provided for earthing.

### 25.3.2.5

#### **Cable Boxes**

For LV side cable boxes shall be provided and shall be air insulated. They shall be of sufficient size to accommodate Purchaser's cables and shall have suitable removable side/top cover to facilitate cable termination and inspection. Cable boxes shall be dust & vermin proof.

### 25.3.2.6

#### **Off Circuit Tap Changing Equipment**

All transformers shall be provided with a Off Load Tap Changing Equipment. The tap change switch shall be of three phase, hand operated for simultaneous switching of similar taps on the three phases by operating an external hand wheel.

### 25.3.2.7

#### **Transformer Oil**

The insulating oil shall comply with the requirements of relevant standards IS 335. No inhibitors shall be used in oil.

### 25.3.2.8

#### **Transformer Tank**

- i. The transformer tank shall be of robust construction, rectangular plain tank type and shall be built up of tested MS sheet.
- ii. The internal clearance of tank shall be such that it shall facilitate easy lifting of core with coils from the tank without dismantling LV & HV bushings.
- iii. All joints of tank and fittings shall be oil tight and no bulging should occur during service. The tank design shall be such that the core and windings can be lifted freely. The tank plate shall be of such strength that the complete transformers when filled with oil may be lifted bodily by means of lifting lugs. Inside of tank shall be painted with varnish / hot oil resistant paint. The four walls of the tank shall be made of two "L" shaped sheets (without joints) full welded at the corners from inside and outside of the tank for withstanding a pressure of 0.8 kg/cm<sup>2</sup> for 10 minutes.
- iv. The tank shall be reinforced by welded angle on all the outside walls on the edge of the tank to form two equal compartments. Permanent deflection when the tank without oil is subject to a vacuum of 525 mm of mercury for rectangular tank and 760 mm of mercury for round tank shall not be more than 5 mm upto 750 mm length and 6 mm upto 1250 mm length. The tank shall

further be capable of withstanding a pressure of 0.8 kg/sq cm (g) and a vacuum of 0.3 kg/sq cm (g) without any deformation.

- v. Pressed steel radiators shall be used for cooling. The transformer shall be capable of giving continuous rated output without exceeding the specified temperature rise. 4 Nos. welded heavy duty lifting lugs of MS plate 8 mm thick (min) suitably reinforced by vertical supporting flat welded edgewise below the lug shall be provided on the side wall.
- vi. Top cover fixing shall be with Stainless Steel bolts and 6 mm Neoprene bonded cork gasket conforming to IS 4253 part-II shall be placed between tank and cover. The bolts outside tank shall have 2 flat washers & one spring washer. All bolts/nuts/washers exposed to atmosphere shall be as follows: a) Size 12 mm or below - Stainless Steel b) Above 12 mm Steel with suitable finish like electro galvanized with passivation or hot dip galvanized.

#### **25.3.2.9 Conservator**

Oil gauge and the plain or dehydrating breathing devise(dehydrating agent Silica Gel) shall be fixed to the conservator, which shall also be provided with a drain plug and a filling hole (M30 normal size thread) with cover. The capacity of a conservator tank shall be designed keeping in view the total quantity of oil and its contraction and expansion due to temperature variations. In addition, the cover of main tank shall be provided with an air release plug to enable air trapped within to be released, unless the conservator is so located as to eliminate the possibility of air being trapped within the main tank. The inside diameter of the pipe, connecting the conservator to the main tank, should be within 20 to 50 mm and it should be projected into the conservator so that its end is approximately 20 mm above the bottom of the conservator so as to create a sump for collection of impurities. The minimum oil level (corresponding to -5 deg.C.) should be above the sump level.

#### **25.3.3 Surface Preparation and Painting**

Before painting or filling with oil or compound, all ungalvanised parts shall be completely clean and free from rust, scale and grease, and all external surface cavities on castings shall be filled by metal deposition. All blast cleaned surfaces (except machined faces that have to be protected) must be cleaned in accordance with ISO specification no. ISO 8501 Part 1, to a minimum standard of 'ASa2½' or 'BSa2½' prior to paint application.

External and internal surfaces of all transformer tanks and chambers and other fabricated steel items shall be cleaned of scale, rust and surface dirt by blast cleaning or other suitable approved method. After cleaning, these surfaces should be immediately covered with paint. Hot oil resistant varnish on white synthetic enamel/epoxy paint is to be used for painting the inside of all oil filled chambers, including transformer tanks. Only one thin layer ( $\approx$  25 microns) of this is to be applied. Except for hardware, which may have to be removed at site, all external surfaces shall receive at least four coats of paint.; two coats of epoxy zinc phosphate or zinc chromate primer topped with two coats of aliphatic polyurethane glossy finish paint. The total dry film thickness shall be 100 microns minimum. Any scratch, bruise or paint damage incurred during transportation and unloading at site should be made good by the Supplier as soon as the damage is detected. This is to be done by thoroughly cleaning the damaged area and applying the full number of coats as was applied originally. One coat of additional paint shall be given at site over all external surfaces, including hardware, after erection by the Supplier. The make and grade of the recoat shall be same as the original coat.

#### **25.3.3.1 Fittings and Accessories**

**Following fittings and accessories shall be provided with each transformer:**



- (a) Rating and terminal marking plates shall be as per Fig-1 & Fig-3 of .IS: 1180 (Part-1) -2014.
- (b) Two earthing terminals (studs and bolts should be properly galvanized and conform to IS:1363 and IS:1367.
- (c) Two lifting lugs to lift core assembly.
- (d) Two lifting lugs to lift complete transformer.
- (e) Lifting lugs for tank cover.
- (f) Thermometer pocket in accordance with IS: 3580.
- (g) Air release plug on the transformer tank to release air trapped inside the tank when filling oil through conservator.
- (h) Conservator tank shall have inter-connection pipe projection, 20 mm above bottom of the conservator so as to create a sump for collection of impurities. It shall have 30 mm dia drain valve, oil filling hole with cap on the top of the conservator.
- (i) Oil level gauge with toughened glass with "minimum" and 'maximum' marking.
- (j) De-hydrating breather.
- (k) Pressure Relief device or explosion vent.
- (l) One drain cum sampling valve.
- (m) One filter valve on the upper side of the tank.
- (n) Unidirectional flat rollers.
- (o) Inspection hole.
- (p) Terminal connectors for HV & LV.
- (q) Surge counter
- (r) LA holder clamp with provision of earthing in HV side bushings, 3 numbers.
- (s) Grounding material & accessories for earthing of transformer neutral, transformer tank and LA.

### 25.3.3.2 TESTING AND INSPECTION

#### i. Inspection

- (a) Physical and dimensional check of transformer tank and accessories
- (b) Tank crack detection of major strength weld seams by dye penetration test.
- (c) Physical inspection and check of quality of varnish, if used in core.
- (d) Check on completed core for measurement of iron loss and check for any hot spot by exciting the core so as to induce the designed value of flux density in the core.
- (e) Sample checks for physical properties of the insulating material.
- (f) Check for dielectric strength of insulating materials.
- (g) Sample check on winding conductor for mechanical properties and electrical conductivity and on installation covering.
- (h) Sample check on insulation paper used for windings for pH value, Bursting strength, Electric strength.
- (i) Check complete transformer against approved outline drawing provision for all fittings, finish etc.

#### ii. Factory Tests

All standard routine tests in accordance with IS: 1180 (Part-1), 2014 and latest issue of IS: 2026 shall be carried out on each transformer at Manufacturer's Works.  
In addition to above standard Routine tests, following tests shall also be carried out as Routine Tests for one number transformer of each category of each Package:

- (a) Temperature-rise test as per IS 2026.
- (b) No load current at 112.5% of rated voltage.
- (c) Pressure and Oil Leakage test. (on each transformer).
- (d) Routine Tests on Transformer Tank as per CBIP Manual on Transformer (CBIP Publication No. 317).

**iii. Pre-Commissioning Tests (Field Tests)**

- (a) Winding resistance measurement.
- (b) Verification of vector group and polarity.
- (c) Measurement of voltage ratio test.
- (d) Measurement of magnetizing current.
- (e) Magnetic balance test
- (f) Magnetic circuit (isolation) test.
- (g) Measurement of short circuit impedance at low voltage.
- (h) Insulation resistance measurement.
- (i) Tests on oil filled in transformer as per IS 1866

**iv. REJECTION**

The Purchaser may reject any transformer if during tests or service any of the following conditions arise:

- a. The permissible total loss (No load loss + Load Losses at 75 0 C) at 50% of rated load and 100% load loss exceeds the guaranteed value by 7½%.
- b. The difference in impedance values of any two phases during single phase short circuit impedance test exceeds 2% of the average value guaranteed by the vendor.
- c. Oil or winding temperature rise exceeds the specified value.
- d. Transformer fails on power frequency voltage withstand test.
- e. Transformer is proved to have been manufactured not in accordance with the agreed specification.

**25.3.3.3 TECHNICAL DATA SHEET FOR TRANSFORMERS**

No.	DESCRIPTION	PARAMETER
1	Rated capacity, KVA	250, Continuous
2	Rated Voltage	
	(a) HV, kV	33
	(b) LV, kV	0.433
3	Type of Winding	Two Winding Transformer
4	Service	Outdoor
5	No of Phases	Three
6	Frequency, Hz	50
7	Type of Cooling	ONAN
8	Impedance at 75 degree C, %	4.5
9	Max. Temp. Rise over an ambient of 50 degree C	
	(a) Oil (Temperature rise measurement by thermometer)	40

	, degree celsius	
	(b) Winding (Temperature rise measurement by resistance method)	<b>45</b>
<b>10</b>	Losses	
	(a) Maximum No Load Loss without any positive tolerance, Watts	1050
	b) Maximum Copper Loss without any positive tolerance, Watts	3150
<b>11</b>	System Apparent Short circuit level (kA)	As per IS 2026-Part 1
<b>12</b>	Winding Connection	
	a) HV	Delta
	b) LV	Star
<b>13</b>	Winding Insulation	Uniform
<b>14</b>	Insulation Level	
<b>i.</b>	Power Frequency Test Level	
	(a) HV, kV (rms)	70
	(b) LV, kV (rms)	3
<b>ii.</b>	Basic Impulse Level	
	(a) HV, kV (peak)	<b>170</b>
	(b) LV, kV (peak)	-
<b>15</b>	Method of earthing	Solidly Earthed
<b>16</b>	Tap changer	
	(a) Type	OFF LOAD on HV side
	(b) Range	LV variation: $\pm 5\%$
	(c) No. of steps	4 steps, 5 positions
<b>17</b>	HV Bushing	
	(a) Rated Voltage, kV	36
	(b) Rated Current, Ampere	400
	(c) Basic Impulse Level, kVp	170
	(d) Wet & Dry Power frequency Withstand Voltage, kV (rms)	70
	(e) Min. Total Creepage Distance, mm	900
<b>18</b>	LV Neutral Bushing	
	(a) Rated Voltage, kV	<b>1.1</b>
	(b) Rated Current, Ampere	<b>1000</b>
	(c) Wet & Dry Power frequency Withstand Voltage, kV (rms)	<b>2.0</b>
<b>19</b>	Min. Clearance in Air	
	(a) Ph-Ph (HV/LV), mm	<b>350/25</b>
	(b) Ph-Earth (HV/LV), mm	<b>350/25</b>

#### 25.3.3.4

#### TECHNICAL SPECIFICATION FOR DROP OUT FUSE

The 33KV D.O Fuses shall be suitable for outdoor operation in horizontal/vertical configuration under the climatic conditions specified. It shall be of the following ratings:

1	Number of Poles	3
2	Nominal system Voltage	33 KV
3	Highest System of Voltage	36 KV
4	Rated frequency	50 Hz

The post insulator used in the D.O Fuse set shall have the following ratings: -

- |  |  |
|--|--|
| 1. Power frequency withstand voltage (dry) | 95 KV (RMS)  |
| 2. Power frequency withstand voltage (wet) | 75 KV (RMS)  |
| 3. Impulse withstand voltage (dry)         | 170 KV (Peak)  |
| 4. Power frequency withstand voltage       | 1.3 times the actual dry flashover voltage of the units. |

### 25.3.3.5

**CLIMATIC CONDITIONS:** - The D.O fuse set shall be suitable for Operation under the following climatic conditions. -

Maximum ambient air temperature	45 <sup>0</sup> C
Maximum daily average air temperature	35 <sup>0</sup> C
Maximum yearly average ambient air temperature	30 <sup>0</sup>
Maximum temperature attainable by a body	50 <sup>0</sup> C
Minimum ambient air temperature	0 <sup>0</sup> C
Maximum relative humidity	100%
Average number of thunderstorm days per annum	70 days
Average number of rainy days per annum	120
Average annual rain falls.	150CM
Number of months of tropical monsoon conditions	4
Maximum wind pressure	260 Kg/mm
Degree of exposure to atmospheric pollution.	Normally polluted

### 25.3.3.6

#### **TECHNICAL SPECIFICATION OF LIGHTNING ARRESTERS**

##### **STANDARDS**

The design, manufacture and performance of Lightning Arresters shall comply with IS: 3070 Part-3, unless otherwise specifically specified in this Specification.

##### **GENERAL REQUIREMENTS**

The lightning arrester shall draw negligible current at operating voltage and at the same time offer least resistance during the flow of surge current.

The lightning arrester shall consist of non-linear resistor elements placed in series and housed in electrical grade porcelain housing/silicon polymeric of specified creepage distance.

The non-linear blocks shall be of sintered metal oxide material. These shall be provided in such away as to obtain robust construction, with excellent mechanical and electrical properties even after repeated

operations.

The assembly shall be hermetically sealed with suitable rubber gaskets with effective sealing system arrangement to prevent ingress of moisture.

The lightning arrester shall be provided with line and earth terminals of suitable size. The ground side terminal of lightning arrester shall be connected with 25x6mm galvanized strip, one end connected to the surge arrester and second end to a separate ground electrode.

The lightning arrester shall not operate under power frequency and temporary over voltage conditions but under surge conditions, the lightning arrester shall change over to the conducting mode.

The lightning arrester shall be suitable for circuit breaker performing 0-0.3sec.-CO-3min-CO- duty in the system.

Lightning arresters shall have a suitable pressure relief system to avoid damage to the porcelain/silicon polymeric housing and providing path for flow of rated fault currents in the event of arrester failure.

The reference current of the arrester shall be high enough to eliminate the influence of grading and stray capacitance on the measured reference voltage.

The arrester shall be capable of handling terminal energy for high surges, external pollution and transient over voltage and have low losses at operating voltages.

The Surge Arrester shall be thermally stable and the bidder shall furnish a copy of thermal stability test with the bid.

#### **25.3.3.7**

##### ***ARRESTER HOUSING***

The arrester housing shall be made up of **porcelain/polymer** and shall be homogenous, free from laminations, cavities and other flaws of imperfections that might affect the mechanical and dielectric quality. The housing shall be of uniform brown colour, free from blisters, burrs and other similar defects.

Arresters shall be complete with insulating bases, fasteners for stacking units together, surge counters with leakage current meters and terminal connectors.

**The housing shall be so coordinated that external flashover shall not occur due to application of any impulse or switching surge voltage up to the maximum design value for arrester.** The arresters shall not fail due to contamination. The arrester housings shall be designed for pressure relief class as given in Technical Parameters of the specification. Sealed housings shall exhibit no measurable leakage.

#### **25.3.3.8**

##### ***FITTINGS& ACCESSORIES***

The surge arrester shall be complete with insulating bases, fasteners for stacking units together, surge counters with leakage current meters and terminal connectors.

The terminals shall be non-magnetic, corrosion proof, robust and of adequate size and shall be so located that incoming and outgoing connections are made with minimum possible bends. The top metal cap and base of surge arrester shall be galvanized. The line terminal shall have a built in clamping device which can be adjusted for both horizontal and vertical take-off.

### 25.3.3.9

#### **SURGE MONITOR**

A self-contained discharge counter suitably enclosed for outdoor use and requiring no auxiliary or battery supply for operation shall be provided for each single pole unit. Leakage current meter with suitable scale range to measure leakage current of lightning arrester shall also be supplied within the same enclosure. The number of operations performed by the arrester shall be recorded by a suitable cyclometric counter and surge monitor shall be provided with an inspection window.

Surge monitor shall be mounted on the support structure at a suitable height so that the reading can be taken from ground level through the inspection window and length of connecting leads upto grounding point and bends are minimum.

### 25.3.3.10

#### **TESTS**

##### **Test on Lightning Arresters**

The Lightning Arresters **offered shall be type tested and shall be subjected to routine and acceptance tests in accordance with IS: 3070 (Part-3)**. In addition, the suitability of the lightning Arresters shall also be established for the following:

- Residual voltage test
- Reference voltage test
- Leakage current at M.C.O.V
- P.D. test
- Sealing test
- Thermal stability test
- Aging and Energy capability test
- Watt loss test

Each metal oxide block shall be tested for guaranteed specific energy capability in addition to routine/acceptance test as per IEC/IS.

The lightning arrester housing shall also be type tested and shall be subjected to routine and acceptance tests in accordance with IS:2071.

### 25.3.3.11

#### **Galvanization Test**

All Ferrous parts exposed to atmospheric condition shall have passed the type tests and be subjected to routine and acceptance tests in accordance with IS:2633 & IS:6745.

### 25.3.3.12

#### **NAMEPLATES**

The name plate attached to the arrester shall carry the following information:

Rated Voltage

Continuous Operation Voltage Normal discharge current

Pressure relief rated current

Manufacturers Trade Mark

Name of Sub-station

Year of Manufacture  
 Name of the manufacturer  
 Purchase Order Number along with da

**25.3.3.13**

**TYPE AND RATING**

SL No	Particulars	Voltage Class 33kV
1	Rated voltage of arrester, kV	30
2	Rated frequency, Hz	50
3	Nominal discharge current of arrester, kA	10
4	Maximum residual voltage at nominal discharge current, kV(peak)	108
5	Maximum steep current impulse residual voltage at kV(kVP)	120
6	One minute power frequency withstand voltage of arrester insulation, kV(rms)	70
7	1.2/50 $\mu$ second impulse withstand voltage of arrester insulation, kV(peak)	170
8	Line discharge class	2
9	<b>InsulatorHousing</b>	
	a)Power frequency withstand test voltage (wet) (kVrms)	70
	b)Lightning impulse withstand tests voltage(KVp)	170
	c)Pressure Relief Class	40
	d)Creepage distance not less than(mm)	900

**25.3.4**

**ERECTION, TESTING AND COMMISSIONING**

- i. Bidders should note that, transformers shall be installed at new location identified by the site engineer, at the existing Ghoramari substations. Transformers shall be erected on a new RCC pedestal, to be constructed by the Purchaser. The RCC work shall comply with Indian Standard IS 456:2000.
- ii. It is also responsibility of the supplier to lay the power cable on LV side to connect the transformer to existing LTAC Panel of the Purchaser.
- iii. Bidder shall carry out the required earthing system for the commissioning of the transformer like two numbers neutral earth, two numbers transformer body earth & LA earth. The bidder shall load the price in items of price schedule.

- iv. Before commissioning of the transformers, the Supplier shall carry out all the site tests specified and shall take approval of the same from the Purchaser.
- v. The civil works will be as per approved design and drawing alongwith the advice of the site engineers of AEGCL

## 26.0 DOCUMENTATION

The successful bidder shall submit drawings for AEGCL approval. The following drawing shall be supplied with the tender: -

- (i) Outline drawings of all apparatus showing sufficient details to enable the purchaser to determine whether the design proposed can be installed satisfactorily or not.
- (ii) Drawing of the transformer pad

## 26.1 Contract Agreement:

An agreement shall have to be drawn on non-judicial stamp of appropriate value with the Department by the selected Contractor in AEGCL's General Conditions of Supply and Erection 2009 of contract within 15 (fifteen) days from the date of issue of the LOI/Work Order.

Wherever there is any variation in between the conditions of the AEGCL's General Conditions of Supply and Erection 2009 and the above terms & conditions, this bid conditions will supersede the conditions of the AEGCL's General Conditions of Supply and Erection 2009.

## 27.0 Liquidated Damage:

The date of completion of work shall be deemed to be the essence of the contract and shall not be completed no later than the date specified in the contract. In case of failure to complete the work within the stipulated period AEGCL shall be entitled to:

27.1 Recover an amount at the rate of 1% (One percent) of the Contract Price per week or part thereof of delay, subject to maximum of 10% (Ten percent) of the contract price as liquidated damage to AEGCL. However, the payment of liquidated damages shall not in any way relieve the Contractor from any of its obligations to complete the works or from any other obligations and liabilities of the Contractor under the Contract.

27.2 To complete the balance work giving notice to the Contractor/Firm and to recover any extra expenditure incurred thereby for having to complete the work at a higher price at the risk and responsibility of the Contractor/Firm.

27.3 Contractual failure: - Refer clause No.27.1 of AEGCL's General Conditions of supply and erection 2009.

## 29.0 PERT Chart and/or BAR Chart:

The successful bidder within 10 (ten) days before the contract is awarded will make out a detailed PERT Chart covering all activities along with detailed program chart on accepted scheme indicating various stages of execution, method of execution and completion of work in different stages keeping the period of completion in view and submit the same to the Engineer for the consideration and approval.



**30.0 Insurance:**

The bidder shall arrange for any pay/cost of personnel accident insurance, medical treatment etc. in respect of their employees assigned to the works for all time and shall govern by Law of land.

**31.0 Warranty:**

31.1 The Supplier/Manufacturer warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract.

31.2 The Supplier/Manufacturer further warrants that the Goods shall be free from defects arising from any act or omission of the Supplier or arising from design, materials, and workmanship, under normal use in the conditions prevailing in the country of final destination. The supplier will provide warranty for the works executed by them.

31.3 If during the Period Warranty any defect is found, the Purchaser shall give Notice to the Supplier/Manufacture stating the nature of any such defects together with all available evidence thereof, promptly following the discovery thereof. The Purchaser shall afford all reasonable opportunity for the Supplier/Manufacturer to inspect such defects.

31.4 If having been notified, the Supplier/Manufacturer fails to remedy the defect within a period of 15 (fifteen) days, the Purchaser may, following notice to the Supplier/Manufacturer, proceed to do such work, and the reasonable costs incurred by the Purchaser in connection therewith shall be paid to the Purchaser by the Supplier or may be deducted by the Purchaser from any amount due the Supplier or claimed under the Performance Security.

31.5 The term period of warranty shall mean the period of **18 months from the date of completion of work**. The successful bidder should warrant the free replacement of any damaged/malfunctioning equipment and its accessories during the warranty period.

**32.0 Safety:**

32.1 Each and every safety measures for MAN and MACHINE will be the sole responsibility of the Contractor without any prejudice. Compensation claim if any will also be the responsibility of the contractor without any prejudice. As the contract is Turnkey in nature hence AEGCL will not bear any responsibility towards such claim.

32.2 **COVID-19 rules must be strictly followed during the working period.**

**33.0 Pollution:** Each and every measure should be taken to adhere to the standard norms to avert any occasion of Air Pollution, Water Pollution, Soil Pollution and Sound Pollution. In case of any deviation leading to any legal action the Contractor will be solely responsible without any prejudice.

<b>34.0</b>	<b>Payment terms:</b>
34.1	No advance/Mobilization advance shall be made in this contract.
34.2	<b>Progressive payments for erection works wherever applicable</b>
34.2.1	Within 60 (sixty) days from the date of submission of invoice against foundation, erection & civil

	works, not more than 80% (eighty percent) of the total verified invoice would be made. However, GST amount on Invoice would be paid 100% or as per Govt. Rules.
34.2.2	Maximum 4(four) Nos. of progressive erection Invoice/ Bill would be entertained during entire erection work.
34.2.3	The 1 <sup>st</sup> Progressive erection Invoice/Bill would be entertained on completion of 30% of total erection cost of the Project.
34.2.4	Minimum value of 2 <sup>nd</sup> and 3 <sup>rd</sup> invoice should be 20% of the total order value for the foundation, erection and civil works.
34.2.5	Remaining 20% of the erection value would be paid on successful completion of 100% erection, testing and commissioning activities of the project, which should be certified by the Project Manager.
34.3	<p>Payment will be made by DGM, Tezpur (T&amp;T) Circle, AEGCL, Dhanuwa Nagar, Tezpur. The Bidder / Firm will have to be submitted the following Net Banking details.</p> <p>(a) Banker's Name &amp; Branch  (b) Account No  (c) Banker's address  (d) Banker's IFSC Code  (e) Banker's RTGS Code</p>
<b>35</b>	<b>Performance security deposit:</b>
35.1	The successful bidder shall have to deposit through a <b>Bank Guarantee/Demand Draft</b> from a Nationalized or scheduled Bank of RBI in AEGCL's standard proforma on non-judicial stamp of appropriate value for an amount equivalent to 10% (ten percent) of the total value of the order as performance security, immediately within 10 (ten) days from the issue of the letter of intent/detailed orders (as the case may be), duly pledged in favour of <b>AEGCL, BijuleeBhawan, Paltanbazar, Guwahati-1</b> , and such security deposit shall be valid up to 30 days beyond the warranty period of 18 (Eighteen) months. The Bank Guarantee (BG) should be submitted to the <b>O/O the Deputy General Manager, Tezpur T&amp;T Circle, AEGCL, Tezpur-784001</b> by the issuing Bank under registered post AD.
35.2	Please note that, if the selected Bidder / Firm fail to furnish the requisite performance security as stated above and signs the contract within the stipulated period, 10 percent security money will be deducted from the total Bill value.
35.3	If the bidder / firm fails or neglects to observe and perform any of his obligations under the contract, Purchaser (AEGCL) shall have the right to forfeit either in full or in part at his absolute discretion, the security deposit furnished by the Contractor/Firm.
35.4	No interest shall be payable on such deposits.
<b>36</b>	<b>Retention Money:</b>
36.1	In addition to above performance security deposit, retention money @ 20%of the total value of the order will be retained by the Engineer/Purchaser as per Bid Clause 34.The amount will be held by the

	Purchaser (AEGCL) till the work under the contract is completed and the completion certificate is issued.
36.2	If the Firm/Bidder fails or neglects to observe and perform any of his obligations under the contract, the Purchaser (AEGCL) shall have the right to forfeit either in full or in part at his absolute discretion, the security deposit furnished by the supplier/contractor.
36.3	No interest shall be payable on such deposit.

**37.0 Force Majeure Condition:**

Force Majeure condition shall be considered as any circumstances beyond reasonable control of the party claiming relief, including but not limited to strikes, lockout, civil commotion, riot insurrection, hostilities, mobilization, war, fire, flood, earthquake, malicious damage or accidents could entitle contractor to extension time. Any such delay should intimated within 10 (ten) days from the beginning of such delay to consider/approved, any claim without prior information may not be considered under force Majeure.

**38.0 Settlement of Dispute and Arbitration:**

Any dispute arising out of the contract will be first settled bilaterally between AEGCL and Contractor. In case, dispute cannot be settled bilaterally, it will be referred to arbitration to be by an arbitrator appointed by AEGCL. The contractor shall not stop the work during settlement of any dispute. All disputes shall be subjected to the jurisdiction of District Court of Kamrup District.

**39.0 Right to Reject:**

AEGCL reserves the right to reject any or all the bids without assigning any reason thereof and the AEGCL further reserves the right to split up the work order in favour of more than one Contractor. The AEGCL also reserves the right to reject the lowest or any other price without assigning any reason.

**The clauses which are not appearing in this document (bid) will be as per The General Condition of Supply and Erection 2009 of AEGCL. The General Condition of Supply and Erection 2009 of AEGCL is available in the AEGCL's website [www.aegcl.co.in](http://www.aegcl.co.in) under Acts, Rules and Policies Tab.**

**Letter of Technical Bid**

[Bidder's Letterhead]

Date: \_\_\_\_\_

Tender No.: \_\_\_\_\_

Invitation for Bid No.: \_\_\_\_\_

To: \_\_\_\_\_

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Document, including Addenda No.: \_\_\_\_\_.
  
- (b) We offer to supply in conformity with the Bidding Document and in accordance with the completion/delivery schedule specified in the bid document, the following Goods and Related Services:  
\_\_\_\_\_
  
- (c) Our Bid shall be valid for a period of \_\_\_\_\_ days from the date fixed for the bid submission deadline in accordance with the Bidding Document, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
  
- (d) If our Bid is accepted, we commit to obtain a Performance Security in the amount of \_\_\_\_\_ percent of the Contract Price for the due performance of the Contract;
  
- (e) We are not participating, as Bidders, in more than one Bid in this bidding process;
- (f) We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal Contract is prepared and executed.
- (g) Our firm, its affiliates or subsidiaries, including any Subcontractors or Suppliers for any part of the contract, has not been declared ineligible by AEGCL, APDCL or APGCL under the Employer's country laws or official regulations
- (h) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.

Name \_\_\_\_\_

In the capacity of \_\_\_\_\_

Signed \_\_\_\_\_

Duly authorized to sign the Bid for and on behalf of \_\_\_\_\_

Date \_\_\_\_\_

**Price Proposal Submission Sheet**

Date: \_\_\_\_\_

Tender No.: \_\_\_\_\_

Invitation for Bid No.: \_\_\_\_\_

To: \_\_\_\_\_

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Document, including Addenda No.: \_\_\_\_\_
  
- (b) We offer to supply in conformity with the Bidding Document and in accordance with the completion/delivery schedule specified Schedule of Supply & Erection, the following Goods and Related Services: \_\_\_\_\_
  
- (c) The total price of our Bid, excluding any discounts offered in item (d) below is: \_\_\_\_\_
  
- (d) The discounts offered and the methodology for their application are: \_\_\_\_\_
  
- (e) The following commissions, gratuities, or fees have been paid or are to be paid with respect to the bidding process or execution of the Contract:

Name of Recipient	Address	Reason	Amount

(If none has been paid or is to be paid, indicate "none.")

Name \_\_\_\_\_

In the capacity of \_\_\_\_\_

Signed \_\_\_\_\_

Duly authorized to sign the Bid for and on behalf of \_\_\_\_\_

Date \_\_\_\_\_

**Bidding Forms:**

**Name of work:**

---

**Bid Identification No:**

---

**General**

- (i) Name of the Firm/Contractor:
- (ii) Full Address:
- (iii) Constitution of the Firm:
  - a) Whether Partnership or any type:

**A) Experience**

- (i) No of years the Firm/Contractor has been in operation under its present name.
- (ii) Details of work executed/being executed by the tenderer in the last three years.
- (iii) Testimonials from Clients Company on various works executed for the last three years.  
(Details of works executed/under execution in the last three years including other department)

Sl. No.	Name of work & W/O No.	Worked Done Under	Value of Work	Specified date of completion	Present status/completed on



**B) Financial Position**

(i) Financial Turnover during the last three years (copies of Audited Annual report, Accounts or a statement duly certified by a chartered accountant and Income Tax return.

Year	Turn over

Any other details that the tenderer may like to furnish to substantiate their financial and technical ability to undertake this work and complete the same within stipulated period of completion.

Name of the Bidder:-

Signature of the Bidder/Firm .....

Full Name .....

Postal Address .....

Phone/Mobile No. ....

**PRICE BID**

(To be submitted in the Part-II, 'Price bid' in sealed envelope in quadruplicate)

**Annexure-i: Supply :**

Item No	Item Description	Unit	Qty	Unit Price	Unit F&I (Rs.)	Total GST @18%	Total price (In Rs)
1	250KVA , 33/0.433kV Transformer (Energy Efficiency Level 3) including Clamp & connectors.	Nos	1				
2	33kV DO Fuse for Station Service Transformer	Nos	1				
3	30kV,10kA LA with pipe structures, Surge counter, hardware fittings, clamps & connectors as per specification	Nos	3				
4	T-clamp for Moose to Moose	Nos	6				
Grand total=							
Say=							

**Annexure-ii : Erection \_\_\_\_\_ :**

Item No	Item Description	Unit	Quantity	Unit Price	Total GST @18%	Total price (In Rs)
1	Erection , Testing and commissioning 250KVA , 33/0.433kV Transformer (Energy Efficiency Level 3) including Clamp & connectors and including laying of connected power and control cables	Nos	1			
2	Installation of DO Fuse for Station Service Transformer	Nos	1			
3	Erection , Testing and commissioning of 30kV,10kA, LA with surge counter,hardware fittings, clamps & connector.	Nos	3			
Grand total=						
Say=						

**Annexure—iii :Foundation**

Item No	Item Description	Unit	Quantity	Unit Price	Total unit price	GST @18%	Total price (In Rs)
1	Construction of 250KVA, 33/0.4KV Station Transformer pad	Nos	1				

**Annexure—iv- Summary :**

Sl. No.	Annexure	Amount(in Rs)
1	Annexure-1(Supply)	
2	Annexure-2(Erection Testing and Commissioning)	
3	Annexure-3(Foundation)	
	<b>Grand Total</b>	

In words \_\_\_\_\_

Name of the Bidder:-

Signature of the Bidder/Firm .....

Full Name .....

Postal Address .....

Phone/Mobile No. ....

**Form of Bid Security (Bank Guarantee)**

(To be stamped in accordance with Stamp Act)

(The non-Judicial Stamp Paper should be in the name of issuing Bank)

Date: \_\_\_\_\_

Bid Reference No.: \_\_\_\_\_

WHEREAS, \_\_\_\_\_ [*Name of Bidder*] (hereinafter called "the Bidder") has submitted his bid dated \_\_\_\_\_ [*Date*] for the supply of \_\_\_\_\_ [*Name of Contract*] (hereinafter called "the Bid").

KNOW ALL MEN by these presents that We \_\_\_\_\_ [*Name of Bank*] of \_\_\_\_\_ [*Name of Place*] having our registered office at \_\_\_\_\_ (hereinafter called "the Bank) are bound unto \_\_\_\_\_ [*Name of Purchaser*] (hereinafter called "the Purchaser ") in the sum of \_\_\_\_\_ 1 for which payment well and truly to be made to the said Purchaser the Bank binds himself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this \_\_\_ day of \_\_\_\_\_ 20\_\_.

**THE CONDITIONS of this obligation are:**

- 1) If the Bidder withdraws its Bid during the period of bid validity specified by the Bidder in the Bid Submission Sheet, except as provided in the relevant Bid **Clause**;  
Or
- 2) If the Bidder refuses to accept the correction of errors in his Bid;  
Or
- 3) if the Bidder, having been notified of the acceptance of his Bid by the Employer during the period of Bid validity;
  - a) fails or refuses to execute the Form of Contract Agreement in accordance with the Instructions to Bidders, if required; or
  - b) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Bidders;

We undertake to pay to the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that in its demand the Purchaser will note that the

amount claimed by it is due to it owing to the occurrence of one or all of the three conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date \_\_\_\_ days after the deadline for submission of bids as such deadline is stated in the Instructions to Bidders or as it may be extended by the Purchaser, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date.

DATE \_\_\_\_\_ SIGNATURE OF THE BANK \_\_\_\_\_

WITNESS \_\_\_\_\_ SEAL \_\_\_\_\_

\_\_\_\_\_

(Signature, Name, and Address

**ANNEXURE: I**

***Following information is to be furnished in the 'Technical and Commercial bid' as first page.***

(Please tick mark where necessary.)

1)	Earnest money (EMD)	:Submitted/Not submitted
	a) Amount of EMD	:Rs.
	b) Submitted in the form of	
	Bank Guarantee /Demand Draft	: Yes/No.
2)	Validity of the offer	: ..... days from the date of opening of 'Technical & Commercial Bid' & 'Price bid'.
3)	Nature of price offered	
	i) 'FIRM' Price	: Yes/No
4)	Terms of payment  (Whether agreeable to accept payment as specified in clause- 34)	: Yes/No
5)	Date of completion of supply/Erection.  (Please specify the date of completion of supply/Erection as per specification)	: Yes/No
6)	'Security and performance guarantee'  (Whether agreeable to accept as specified in Clause no-35)	: Yes/No
7)	List of orders executed for similar works furnished	: Yes/No
8)	Performance certificate from the Govt/Govt undertaking furnished	: Yes/No
9)	Deviation from the specifications	

	a) Technical	: Yes/No
	b) Commercial	: Yes/No
10)	Information in respect of technical capability is furnished	: Yes/No
11)	Information in respect of Financial capability certificate from the Banker is furnished	: Yes/No
13)	PAN card as per Cl. No. 15.3.2	: Yes/No
14)	GST registration no. as per Cl. No. 15.3.4	: Yes/No
15)	Registered Power of Attorney as per Cl.no. 15.3.5enclosed.	: Yes/No

Name of the Bidder:-

Signature of the Bidder/Firm .....

Full Name .....

Postal Address .....

Phone/Mobile No. ....

**SCHEDULE - A**

**GUARANTEED TECHNICAL AND OTHER PARTICULARS FOR THE TRANSFORMER**

**(To be filled in by Bidder and shall be furnished with the Technical Bid)**

<b>S.N</b>	<b>Particulars</b>	<b>Details</b>
1	Name of Manufacturer	
2	Type of Transformer	
3.	Reference Standards	
4	Rating	
5.	Type of Winding	
6.	Rating Voltage :a)HV Winding b)LV Wind	KV
7.	Rating Frequency	Hz
8.	Number of phase	
9.	Rated current :	HV LV
10	Connections : a)HV Winding b)LV Winding	
11.	Connection symbol	
12.	Type of cooling	
13.	Tap changing equipment a)Manufacturer b)Lv –variation(+5% to - 5% allowable) c)Type d)No. of steps(min 4steps)	
14.	Guaranteed positive sequence impedance at 75 Deg. C. with 100 %rating at Principal tap :	
15.	Temperature rise over an ambient of 50deg. C. a)Oil temperature Deg. C. b)Winding (by resistance measurementmethod) Deg. C.	
16.	Guaranteed losses at rated voltage (excluding cooler loose) on principlatap and at rated frequency.(bidder should offer no load loss & load lossseparately) a)No load loss or iron loss. b)Copper loss at full load at 75 Deg. C. c)Total losses	



17.	Core Material	
18.	Withstand time for three phase shortcircuit at terminals (secs.) NOTE:- The Xmer is protected by means of DO fuses as such the fault clearance is not rapid . The Xmer mustbe designed with proper supports for	

**SCHEDULE - B**

**GUARANTEED TECHNICAL AND OTHER PARTICULARS FOR THE CLAMP**

**(To be filled in by Bidder and shall be furnished with the Technical Bid)**

Sl no.	Description	T clamp for Moose to Moose
1	Manufacture's Name & Address	
2	Quality of materials and Standard to which confirming	
3	Material (State percentage composition of constituents and impurities present)	
	a)Clamp Body & keeper	
	b)Bolts and Nuts & plain washer	
	c)Spring washers	
	d)Liners if any	
4	Current Rating	
5	Short Circuit Current rating(for 3sec)	
6	Dry lightning impulse withstand voltage	
7	Dry and wet one minute power frequency withstand voltage	
8	Galvanising	
9	Maximum temperature rise over ambient temperature when carrying rated current(°C)	
10	Rated terminal load	
11	Slip strength	
12	Maximum thickness of any part	

13	Weight of Clamp complete with hardware	
14	PACKING	
15	General tolerance	
16	Electrical Resistance	
17	Type Tests Certificate	
18	Mechanical test	
	a)Heat run test	
	b)Materials compositing tests	
	c)Tests for checking blow holes cracks etc	

**ANNEXURE-C**

**GUARANTEED TECHNICAL AND OTHER PARTICULARS OF 30kV,10kA, LIGHTNING ARRESTOR  
(To be filled in by Bidder and shall be furnished with the Technical Bid)**

Sl.no	Description	Unit	Particulars
1.	Name & Address of Supplier & Manufacturer		
	➤ Lightning Arrester		
	➤ Surge Monitor		
	➤ Line Dis-connector		
	➤ Metal Oxide Block		
	➤ Terminal Clamp		
2.	Name& address of collaborator, if any		
3.	Standard to which lightning arresters conforms		
4.	Lightning Arrester		
4.1	Voltage rating(KV rms)		
4.2	Continuous Operating Voltage(KV rms)		
	a) Continuous Operating Voltage(KV rms)		

	b) Leakage current at continuous operation voltage		
	c) Partial discharge at 1.05 COV (PC)		
	d) Permitted leakage current of arrester beyond which arrester is faulty:		
5.	Frequency(Hz)		
6.	Nominal discharge current(waveshape-8/20 microsecond)(KA)		
7.	Pressure relief rated current(KA rms)		
8.	Steep current protection level at 10KA		
	a) Lighting impulse protection level at 5 KA and 10KA(KVP)		
	b) Switching impulse protection level with 40x80 micro-sec. Wave at 500/1000A		
9.	Long duration current impulse with stand capacity and virtual duration		
10.	Line discharge class		
11.	Thermal runaway limit of arrester		
12.	Energy capability(kJ/KV)		
13.	Pressure relief rating		
14.	Dry arcing distance		
15.	Reference current and reference voltage		
16.	Arrester housing		
16.1	Power frequency one minute wet withstand voltage(kVrms)		
16.2	Lighting impulse dry withstand voltage(KVP)		
16.3	Creepage distance		
	a) Protected		
	b) Total		
16.4	Short circuit withstand capacity		

16.5	Bending moment(mm)		
17.	Dis-connector		
	a) Constructional Details		
18.	Surge monitor		
	a) Constructional details		
	b) Degree of protection		
19.	Suitable for hotline washing		
20.	Dimension & weight		
21.	G A drawing indicating height of complete unit from base to line, minimum recommended center to center spacing, clearance from ground equipment at various height of arrester, earthing arrester, earthing arrangement on earthed site of arrester etc.		
22.	Details of packing		
23.	Licence number and date for using ISI certification mark if any		
24.	Ammeter for discharge current		
	a) Type & Make		
	b) Accuracy		
	c) Range(mA)		
25.	Residual voltage		
26.	Follow current		
27.	Any other information		