# ASSAM ELECTRICITY GRID CORPORATION LIMITED

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*SINGLE STAGE TWO ENVELOPE*

**Bidding Document**

**For**

## Procurement of 33kV Terminal Equipment for 220/132/33kV SAMAGURI GSS, AEGCL

**DEPUTY GENERAL MANAGER**

**TEZPUR T&T CIRCLE**

**AEGCL, TEZPUR-784001**

**Tender Cost: ₹1000.00**

**EMD: ₹25,500.00**

**BID NO: AEGCL/DGM/TTC/TEZ/T-20/2022/ 160** **Date: 14 .06.2022**

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.

| Sl. No. | Name of work | Estimated Cost In ₹ | Time of completion In Days | Consignee address |
|---|---|---|---|---|
| 1 | **Procurement of Terminal Equipment for 220/132/33kV Samaguri GSS, AEGCL** | **₹ 12, 65,550.00** | **45 days from the date of issue of work order** | **O/O AGM, 220/132/33kV Samaguri Grid Substation, AEGCL** |

**1.0 Cost of Bidding Document:**

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

**2.0 Bidding Address:**

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

2.1 **Key Dates:-**

a) Bid Document available date: 10:00hrs of 14-06-2022
b) Bid Submission Start Time & date: 11:00hrs of 14-06-2022
c) Bid Submission end time & date: 11:00hrs of 05-07-2022
d) Techno-Commercial Bid Opening time: 12:00hrs of 05-07-2022

**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 **₹ 25,000.00** only in the form of Bank Guarantee/Demand Draft from any Nationalised Bank payable at Guwahati in favour of **AEGCL, Bijulee Bhawan, 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 initialed 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 initialed 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 **₹3,80,000.00** 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, **₹3,80,000.00 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 than **₹ 5,07,000.00.**
(b) Two (2) similar completed works costing not less than **₹ 6,33,000.00.**
(c) One (1) similar completed works costing not less than **₹ 10,13,000.00.**

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 practiced for identification and treatment of the Abnormally Low Bids (ALB) in this tender process of AEGCL:

(i) Absolute Approach is to be considered when there is fewer than five substantially 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 analyses 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 above 33kV Voltage level in case of electrical work |

**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 **"Procurement of Terminal Equipment for 220/132/33kV Samaguri GSS, AEGCL" as listed in table 1.0 below.** The Contractor's proposal shall be based on the use of materials complying fully with the requirements specified herein.

***Table: 1.0***

| Sl. No. | Particulars | Unit | Qty. |
|---|---|---|---|
| **1** | **Supply of Equipment** | | |
| **1.1** | Supply of **Circuit Breaker** with **mounting structure** and terminal connectors as required including Gas filling Kit. | | |

| | | | |
|---|---|---|---|
| | (i) 33kV,25kA,800A, SF6 Gang operated Circuit breaker completes with mounting structure and accessories including terminal connectors and gas filling kit | Set | 1 |
| **1.2** | Supply of feeder **Current transformers** (1-Phase, 0.2 class live tank type) including all accessories and terminal connectors, marshalling box as required. | | |
| | (i) 33 kV, 400-200/1-1 A, 2 core single phase CT | Nos | 3 |
| **1.4** | Supply of **33 kV motor operated Isolators** with terminal connectors and complete with all fittings and fixtures. | | |
| | (i) 33kV, 25kA, 1250 A motorised isolators with earth switch complete with all fittings and accessories including terminal connectors | Set | 1 |
| | (ii) 33kV, 25kA, 1250a motorised isolators Without Earth Switch complete with all fittings and accessories including terminal connectors | Set | 1 |
| **1.5** | Supply of **Lightning Arrester** with surge monitor & terminal connectors complete. | | |
| | (i) 33 KV Lightning Arrestor | Nos | 3 |

**18.0 Scope:**

The major scopes of work are as follows: -

a) Design, Supply, delivery of Terminal Equipment as mentioned in Table 1.0.

b) Transportation and movement of supplied materials up to 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 shall be in the scope of the contractor.

The works to be executed shall be as per the items mentioned in the BOQ 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.

## TECHNICAL SPECIFICATION FOR 33KV CIRCUIT BREAKER (AIS)

### 25.1.0. SCOPE

25.1.1. The intention of this Section of the Specification is to cover design, manufacture, testing at manufacturer's works and supply 33 KV Circuit Breakers with all fittings and accessories including mounting structures as specified hereunder.

### 25.2.0. GENERAL REQUIREMENTS

25.2.1. The circuit breaker shall be of three phase unit (gang operated) (or) three identical single-phase units (as said in data sheet), outdoor, single pressure puffer type. The operating mechanism shall be electrically and mechanically trip/free with anti-pumping facility suitable for remote electrical closing, tripping as well as local Operation facility as specified. The CBs are meant for installation with Transformers & Lines

25.2.2. The circuit breaker shall be capable of 3-ph auto-reclosing.

25.2.3. The circuit breaker shall be so designed to withstand the effects of temperature, wind load, short circuit conditions and other adverse conditions.

25.2.4. The circuit breaker shall be capable of switching transformer magnetizing currents and shall be restrike - free.

25.2.5. All similar parts, particularly removable ones, shall be interchangeable with one another.

25.2.6. All cable ferrules, lugs, tags, etc. required for cabling from equipment control cabinet/operating mechanism to the central control cabinet of the breaker shall be supplied loose as per approved schematics.

25.2.7. The SF6 breaker shall be designed to ensure that condensation of moisture is controlled by proper selection of organic insulating materials having low moisture absorbing characteristics.

25.2.8. The support structure of circuit breaker shall be hot dip galvanised. Sufficient galvanising thickness shall be achieved with 615 gm/m². All other parts shall be painted as per painting specification enclosed separately.

25.2.9. All mechanical parts and linkages shall be robust in construction and maintenance free , over at least 10,000 switching operations except for lubrication of pins/articulated joints at 5000 operations.

**25.3.0. OPERATING MECHANISM**

25.3.1. A power spring operated mechanism for closing and tripping shall be provided in the breaker control cabinet. This device shall be so interlocked that while it is under maintenance, the breaker cannot be operated from remote. A slow acting, manually operated device shall be provided for inspection and maintenance purposes.

25.3.2. Circuit breaker operating mechanism shall be capable of storing energy for at least two complete closing and tripping operations.

25.3.3. Each mechanism shall have an operation counter.

25.3.4. The operating mechanism shall be mounted and enclosed in a weather-proof, vermin-proof, sheet steel cabinet conforming to IP: 55 degree of protection. Sheet steel thickness shall be as specified in data sheet. The cabinet shall also house relays, control and auxiliary equipment of each breaker and provision for terminating all control, alarm and auxiliary circuits. It shall be provided with hinged doors with provision for locking and removable gland plates to be drilled at site. Inspection window shall be provided for observation of the instruments without opening the cabinet. It shall be mounted so as to provide convenient access from ground level.

25.3.5. The cabinet shall be fitted with a thermostatically controlled anti-condensation heater, a 15A, 1 phase, 5 pin socket outlets with switch and a cubicle illuminating lamp suitable for operation on 240 V AC 50Hz supply.

25.3.6. Circuit breakers shall feature high repeatability of absolute closing time over a wide range of parameters (ambient temperature, pneumatic pressure, control voltages, etc).

25.3.7. Main poles shall operate simultaneously. There shall be no objectionable rebound and the mechanism shall not require any critical adjustment. It shall be strong, rigid, positive and fast in operation.

25.3.8. Disagreement circuit shall be provided which shall detect pole position discrepancy.

25.3.9. The design of the circuit breaker shall be such that contacts will not close automatically upon loss of gas/ air pressure.

25.3.10. Closing release shall be capable of operating within the range of the rated voltage as specified in the data sheet. Shunt trip shall operate satisfactorily under all operating conditions of the circuit breaker up to the rated breaking capacity of the circuit breaker within the range of the rated voltages specified in the Data sheet.

25.3.11. Working parts of the mechanism shall be of corrosion resisting material. Bearings which require grease shall be equipped with pressure type grease fittings. Bearing pin, bolts, nuts and other parts shall be adequately pinned or locked to prevent loosening or changing adjustment with repeated operation of the breaker.

25.3.12. All controls, gauges, relays, valves, hard drawn copper piping and all other accessories as necessary shall be provided including the following:

25.3.13. Low pressure alarm and lock out relay with adjustable pressure setting suitable for operation on DC system

25.3.14. A no-volt relay for remote indication of power failure for compressor motor/ Spring Charge motor.

25.3.15. As long as power is available to the motor, continuous sequence of closing and opening operations shall be possible.

25.3.16. After failure of power supply to the motor, at least one open-close-open operation of the circuit breaker shall be possible.

25.3.17. Spring charging motor shall be standard single phase universal motor suitable for 220 volts supply.

25.3.18. Motor rating shall be such that it requires only about 30 seconds for full charging of the closing spring.

25.3.19. Closing action of the circuit breaker shall compress the opening spring ready for tripping.

25.3.20. During closing, springs are discharged and after closing of breaker, springs shall automatically be charged for the next operation. Facility for manual charging of closing springs shall be provided. Mechanical interlocks shall be provided in the operating mechanism to prevent discharging of closing springs when the breaker is already in the closed position.

**25.4.0. OPERATING MECHANISM CONTROL**

25.4.1. The breaker shall normally be operated by remote electrical control. However, provision shall be made for local electrical control. For this purpose, a local/remote selector switch, close and trip control switch/push button shall be provided in the breaker central control cabinet.

25.4.2. Two electrically independent trip circuit including two trip coils per breaker shall be provided fed from two separate DC sources. First trip coil shall be utilized for tripping the breaker on main protection fault detection. Whereas second trip coil shall be used to trip the breaker when first trip coil fails to trip the breaker and backup protection comes into operation and shall also be used to trip the breaker on command. All the breakers shall have provision for independent electrical operation of trip coils from local as well as remote through local/remote selector switch.

25.4.3. The trip coils shall be suitable for trip circuit supervision during both open and close/pre-close/post close position of the breaker. Necessary terminals shall be provided in the central control cabinet of the circuit breaker by the Supplier.

25.4.4. The auxiliary switch of the breaker shall be positively driven by the breaker operating rod.

25.4.5. A conveniently located manual tripping lever or button shall also be provided for local tripping of the breaker and simultaneously opening the reclosing circuit. A local manual closing device which can be easily operated by one man standing on the ground shall also be provided for maintenance purpose. Direction of motion of handle shall be clearly marked.

25.4.6. **When the spring get fully charged either through motor or hand cranking, the spring charging motor and the hand cranking device should get disengaged mechanically from the charged spring and this should not be depended upon only the limit switch**.

**25.5.0. SF6 GAS SYSTEM**

25.5.1. SF6 gas shall serve as an arc-quenching medium during opening/closing operation and as an insulating medium between open contacts of the circuit breaker.

25.5.2. The circuit breaker shall be single pressure type. The design and construction of the circuit breaker shall be such that there is a minimum possibility of gas leakage and entry of moisture. There should not be any condensation of SF6 gas on the internal insulating surfaces of the circuit breaker.

25.5.3. All gasketed surfaces shall be smooth, straight and reinforced, if necessary, to minimise distortion and to make a tight seal, the operating rod connecting the operating mechanism to the arc chamber (SF6 media) shall have adequate seals. The SF6 gas leakage should not exceed 1% per year

25.5.4. In the interrupter assembly there shall be an absorbing product box to minimise the effect of SF6 decomposition products and moisture. The material used in the construction of the circuit breakers shall be such as fully compatible with SF6 gas decomposition products.

25.5.5. For CBs of voltage class of 36 kV, a common SF6 scheme/density monitor shall be acceptable.

25.5.6. The dial type SF6 density monitor shall be adequately temperature compensated to model the pressure changes due to variations in ambient temperature within the body of circuit breaker as a whole. The density monitor shall have graduated scale and shall meet the following requirements:

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

**25.6.0. VACUUM INTERRUPTER ASSEMBLY**

22.6.1. Each pole of the circuit breaker shall be provided with vacuum interrupter, one for each phase, hermetically sealed for life and encapsulated by ceramic insulators. The interrupter shall be provided with steel chromium arc chamber to prevent vaporized contact material being deposited on the insulating body. A further shield giving protection to the metal bellows shall also follow the travel of the moving contacts to seal the interrupter against the surroundings atmosphere.

22.6.2. It shall have high and consistent dielectric strength of vacuum unaffected by environment and switching operations. Bronzed joints should ensure retention of vacuum for life time. It shall have low and stable contact resistance due to absence of oxidation effects and shall ensure low power loss. The arcing voltage shall be low and minimum contact erosion

**25.7.0. BUSHINGS AND INSULATORS**

25.7.1. Bushings and Insulators shall be of Porcelain, Solid core type. Porcelain used for the manufacture of bushings and insulators shall be homogeneous, free from defects, cavities and other flaws or imperfections that might affect the mechanical or dielectric quality and

shall be thoroughly vitrified, tough and impervious to moisture.

25.7.2. Glazing of the porcelain shall be of uniform brown colour, free from blisters, burns and other similar defects. Bushings shall be designed to have sufficient mechanical strength and rigidity for the conditions under which they will be used. All bushings of identical ratings shall be interchangeable.

25.7.3. Puncture strength of bushings shall be greater than the dry flashover value. When operating at normal voltage, there shall be no electric discharge between the conductors and bushing which would cause corrosion or injury to conductors, insulators or supports by the formation of substances produced by chemical action. No radio interference shall be caused by the bushings when operating at the normal rated voltage.

25.7.4. Bushings shall satisfactorily withstand the insulation level specified in data sheet.

**25.8.0. FIXED AND MOVING CONTACTS**

25.8.1. Main contacts shall have ample area and contact pressure for carrying the rated current and the short time rated current of the breaker without excessive temperature rise which may cause pitting or welding. Contacts shall be adjustable to allow for wear, easily replaceable and shall have minimum moving parts and adjustments to accomplish these results. Main contacts shall be the first to open and the last to close so that there will be little contact burning and wear out.

25.8.2. Arcing contacts, if provided, shall be the first to close and the last to open and shall be easily accessible for inspection and replacement. Tips of arcing and main contacts shall be silver faced.

25.8.3. If multi-break interrupters are used, they shall be so designed and augmented that a fairly uniform voltage distribution is developed across them.

**25.9.0. INTERLOCKS**

25.9.1. Key release mechanical interlocks shall be incorporated in the operating mechanism for interlocking with the associated isolators, so that operation of the circuit breaker is dependent on a "key-trapped" situation. In addition, electrical interlocks with associated isolators shall be provided.

**25.10.0. ADDITIONAL DUTY REQUIREMENTS**

25.10.1. Circuit breakers shall be capable of clearing short line faults with the same impedance behind the bus corresponding to the rated fault current.

25.10.2. Circuit breakers shall be capable of breaking 25% of rated fault current at twice rated voltage under out of phase conditions.

25.10.3. The Bid shall highlight the design features provided to effectively deal with:

a) Breaking of inductive currents and capacitive currents.
b) Charging of long lines and cables.
c) Clearing developing faults within the full rating of the breaker.
d) Opening on phase opposition.

**25.11.0. ACCESSORIES**

25.11.1. **Gas Pressure Detector**

The circuit breaker shall be provided with gas pressure monitor with temperature compensation for initiating alarm and locking the operating mechanism in the event of abnormality.

25.11.2. **Position Indicator**

Each pole of the circuit breaker shall be provided with a position indicator.

25.11.3. **Terminals**

Each circuit breaker shall be provided with suitable terminal pads of high conductivity aluminium alloy for connecting to the line.

25.11.4. **Auxiliary Switches**

Each circuit breaker shall be equipped with auxiliary switches with sufficient number of contacts for control, indication and interlocking purposes. Twelve normally open and twelve normally closed contacts shall be provided as spares. All contacts shall be rated for the DC voltage specified in data sheet.

25.11.5. **Terminal Blocks**

All accessories and control devices shall be completely wired. All wirings which are connected to external circuit shall be terminated on terminal blocks installed in the control cabinet. The terminal blocks provided shall have twenty (20) percent spares.

25.11.6. Operating mechanism housing shall be supplied with all required accessories including the following:

a) Padlocks and duplicate keys.
b) Space heaters equipped with automatic thermostatic control.
c) Local/remote changeover switch.
d) Manually operated tripping push button/lever (mechanical) conveniently located to trip all three phases simultaneously.
e) Control switches to cut off control power supplies.
f) Fuses as required.
g) Two earthing terminals.
h) Auxiliary relays required for satisfactory operation.
i) Motor contactor with thermal release
j) Provision for mechanical interlock with isolator.

**25.12.0. SUPPORT STRUCTURES**

25.12.1. The Circuit Breakers shall be suitable for mounting on steel structures.

25.12.2. The support structure shall be of steel hot dip galvanised type. The height of support structure shall be designed to keep the bottom most live part and bottom of insulators of circuit breakers at minimum clearance from the plinth as specified in data sheet.

25.12.3. All necessary galvanised bolts, nuts and washers to complete the erection shall be furnished including the embedded anchor bolts for securing the supporting structure to the concrete foundations.

**25.13.0. NAME PLATES**

25.13.1. All equipment shall have non-corrosive name plates fix at a suitable position indelibly mark with full particular there on in accordance with the standard adapted.

**25.14.0. EARTHING**

25.14.1. Two earthing pads shall be provided on each supporting structure. Each control cabinet or

terminal box mounted on the supporting structure shall also be connected to an earthing pad. Separately mounted control cabinets shall be provided with two earthing pads adjacent to the base of the cabinet. The earthing connection shall be bolted type and suitable for receiving 65mm x 12mm GI/MS strip.

**25.15.0. TERMINAL CONNECTORS**

25.15.1. The equipment shall be supplied with required number of terminal connectors of approved type suitable for ACSR conductors. The type of terminal connector, size of connector, material, and type of installation shall be approved by the Employer, as per installation requirement while approving the equipment drawings.

**25.16.0. TESTS**

25.16.1. All routine tests shall be carried out in accordance with relevant IS. All routine/acceptance tests shall be witnessed by the Employer/his authorised representative. The tests shall include the following:

a) **Routine/Acceptance Tests (all units)**

i) Mechanical Operation tests
ii) Power frequency voltage withstand test (dry)
iii) Tests on auxiliary & control circuits
iv) Measurement of resistance of the main circuit.
v) Insulation resistance of each pole.
vi) Breaker closing and opening time.
vii) Slow and Power closing operation and opening.
ix) Minimum pick-up voltage of coils.
x) Resistance measurement of main circuit
xi) Trip free and anti-pumping operation.
xii) Dynamic Contact resistance measurement.

b) **Type Tests:**

The bidder shall furnish type test certificates and results for the following tests along with the bid for breaker of identical design.

i) Breaking and making capacity test
ii) Short-time current test
iii) Temperature rise tests
iv) Lightning Impulse voltage test

c) **Test Certificates**

Copies of routine/acceptance test certificates shall be produced with the endorsement of the inspecting authority to the Employer before effecting despatch. The test report shall contain the following information.

i) Complete identification data, including serial No. of the breaker.
ii) Method of application, where applied, duration and interpretation of results in each test.

**25.17.0. SPECIAL TOOLS AND TACKLES**

25.17.1. The Bidder shall furnish a list of any special tools and tackles required for maintenance and operation purposes with recommended quantities for each substation.

## 25.18.0. TECHNICAL DATA SHEET FOR CIRCUIT BREAKER

| Sl. No. | Particulars | Unit | Data for 33 kV CB |
|---|---|---|---|
| I | II | III | IV |
| 1 | Type | | $VCB/SF_6$ |
| 2 | No of poles | | 3 |
| | | | (3 Phase Ganged Unit) |
| 3 | Service | | Outdoor |
| 4 | Rated System Voltage | kV | 33 |
| 5 | Highest System Voltage | kV | 36 |
| 6 | System earthing | | Solidly earthed system |
| 7 | Rated Voltage of Breaker | kV | 36 |
| 8 | Rated Continuous Current | Amps | 1250 |
| 9 | Rated Frequency | Hz | 50 |
| 10 | Rated Short Circuit breaking current ( I ) | kA RMS | 31.5 |
| | - 3secs - symmetrical | | |
| 11 | Rated Short Circuit making current | kA PEAK | 2.5*I |
| 12 | Duty cycle | | 0-0.3 Sec - CO -3 Min -CO |
| 13 | First pole to clear factor | | 1.3 |
| 14 | Operating time | | |
| | i) Opening Time | ms | Not exceeding |
| | | | 50 ms |
| | ii) Closing Time | ms | Not exceeding |

| | | | |
|---|---|---|---|
| | | | 120 ms |
| 15 | Insulation level | | |
| | i) One minute Power Frequency withstand Voltage (Dry) | kV RMS | 75 |
| | ii) Full Wave Impulse withstand Voltage (1.2/50 µsec) | kV Peak | 170 |
| 16 | Minimum clearance between phases | mm | 320 |
| 17 | Minimum clearance between phase to earth | mm | 320 |
| 18 | Minimum Ground clearance (from bottom most live part to plinth level) | mm | 3700 |
| 19 | Minimum clearance from bottom of support insulator to plinth level | mm | 2500 |
| 20 | i) Minimum Creepage Distance (Total) | mm | 1116 |
| | ii) Minimum Creepage Distance (Protected) | mm | 460 |
| 21 | Operating mechanism | | |
| | a) Type | | Spring Charged |
| | b) Rated 3 Phase, 50Hz Voltage for Drive Motor | V | 415 |
| | | | |
| | c) Rated voltage of Shunt trip coil & operating range | V. DC | 220 or 110 [50% - 110%] |
| | d) Rated voltage of Closing coil & operating range | V. DC | 220 or 132 [80% - 110%] |
| | e) No. of trip coils | No | 2 per CB |
| | f) No. of closing coils | No | 1 per CB |
| | g) No of spare auxiliary contacts & contact rating | Nos<br>AMPS | 12 N/O+12 N/C (per CB)<br>10 A at 240V AC<br>& 2A at 220V/ 110V DC |

| | | | |
|---|---|---|---|
| | h) Minimum thickness of steel sheet for control cabinet | mm | 3 |
| | i) Enclosure Protection | | IP55 |
| | | | |
| 22 | Reclosing | | Three Phase |
| | | | auto reclosing |
| 23 | Support structure | | Galvanised |
| | (Painted / Galvanised) | | |
| 24 | All other parts (Painted / Galvanised) | | Synthetic enamel shade<br>631 of IS5<br>(125 microns) |
| 25 | Minimum size of control wiring (Copper) | Sq. mm | 2.5 |

## TECHNICAL SPECIFICATION FOR 33KV CURRENT TRANSFORMERS (AIS)

### 26.1.0. SCOPE OF CONTRACT

26.1.1. This Section of the Specification covers general requirements for design, engineering, manufacture, assembly and testing at manufacturer's works and supply of 33 kV outdoor Current and Potential Transformers.

### 26.2.0. STANDARDS

26.2.1. 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 and shall conform to the regulations of local statutory authorities.

26.2.2. In case of any conflict between the Standards and this specification, this specification shall govern.

26.2.3. The current transformer shall comply also with the latest issue of the following Indian standard.

| | | |
|---|---|---|
| (i) | IS: 2705(Part-I) | Current transformers: General requirement. |
| (ii) | IS: 2705(Part-II) | Current transformers: Measuring Current transformers |

| | | |
|---|---|---|
| (iii) | IS: 2705(Part-III) | Current transformers: Protective Current transformers |
| (iv) | IS: 2705(Part-IV) | Current transformers: Protective Current transformers for special purpose application. |

**26.3.0. GENERAL REQUIREMENTS**

26.3.1. The cores of the instrument transformers shall be of high grade, non-aging CRC steel of low hysteresis loss and high permeability.

26.3.2. Current transformers shall be of Live Tank design.

26.3.3. The instrument transformers shall be truly hermetically sealed to completely prevent the oil inside the tank coming into contact with the outside temperature. To take care of oil volume variation the tenderer are requested to quote the current transformers with stainless steel diaphragm (bellow).

26.3.4. The instrument transformers shall be completely filled with oil.

26.3.5. A complete leak proof secondary terminal arrangement shall be provided with each instrument transformers, secondary terminal shall be brought into weather, dust and vermin proof terminal box. Secondary terminal boxes shall be provided with facilities for easy earthing, shorting, insulating and testing of secondary circuits. The terminal boxes shall be suitable for connection of control cable gland. IP rating of terminal box shall be IP 55. Spare terminals shall be provided. TBs shall be of Elmex/Connect well.

26.3.6. All instrument transformers shall be of single-phase unit.

26.3.7. The instrument transformers shall be so designed to withstand the effects of temperature, wind load, short circuit conditions and other adverse conditions.

26.3.8. All similar parts, particularly removable ones, shall be interchangeable with one another.

26.3.9. All cable ferrules, lugs, tags, etc. required for identification and cabling shall be supplied complete for speedy erection and commissioning as per approved schematics.

26.3.10. The instrument transformers shall be designed to ensure that condensation of moisture is controlled by proper selection of organic insulating materials having low moisture absorbing characteristics.

26.3.11. All steel work shall be degreased, pickled and phosphated and then applied with two coats of Zinc Chromate primer and two coats of finishing synthetic enamel paint.

**26.4.0. INSULATING OIL**

26.4.1. The quantity of insulating oil for instrument transformers and complete specification of oil shall be stated in the tender. The insulating oil shall conform to the requirement of latest edition of IS: 335

**26.5.0. COMMON MARSHALLING BOXES (shall be supplied by CT manufacturer)**

26.5.1. The outdoor type common marshalling boxes shall conform to the latest edition of IS 5039 and

other general requirements specified hereunder.

26.5.2. The common marshalling boxes shall be suitable for mounting on the steel mounting structures of the instrument transformers.

26.5.3. One common marshalling box shall be supplied with each set of instrument transformers. The marshalling box shall be made of sheet steel and weather-proof. The thickness of sheet steel used shall be not less than 3.0 mm. It is intended to bring all the secondary terminals to the common marshalling. The marshalling box shall be of hot dipped galvanized steel.

26.5.4. The enclosures of the common marshalling boxes shall provide a degree of protection of not less than IP 55 (As per IS 2147).

26.5.5. The common marshalling boxes shall be provided with double hinged front doors with pad locking arrangement. All doors and removable covers and plates shall be sealed all around with neoprene gaskets or similar arrangement.

26.5.6. Each marshalling box shall be fitted with terminal blocks made out of moulded non-inflammable plastic materials and having adequate number of terminals with binding screws washers etc. Secondary terminals of the instrument transformers shall be connected to the respective common marshalling boxes. All out going terminals of each instrument transformer shall terminate on the terminal blocks of the common marshalling boxes. The terminal blocks shall be arranged to provide maximum accessibility to all conductor terminals.

26.5.7. Each terminal shall be suitably marked with identification numbers. Not more than two wires shall be connected to any one terminal. At least 20 % spare terminals shall be provided over and above the required number. TBs shall be of Elmex/Connectwell.

26.5.8. All terminal strips shall be of isolating type terminals and they will be of minimum 10 A continuous current rating.

26.5.9. All cable entries shall be from bottom. Suitable removable gland plate shall be provided on the box for this purpose. Necessary number of cable glands shall be supplied fitted on to this gland plate. Cable glands shall be screw on type and made of brass.

26.5.10. Each common marshalling box shall be provided with two numbers of earthing terminals of galvanised bolt and nut type.

26.5.11. All steel, inside and outside work shall be degreased, pickled and phosphated and then applied with two coats of Zinc Chromate primer and two coats of finishing synthetic enamel paint. The colour of finishing paint shall be as follows: -

| | | |
|---|---|---|
| i) | Inside: | Glossy White |
| ii) | Outside: | Light Grey (Shade No. 697 of IS: 5) |

**26.6.0. BUSHINGS AND INSULATORS**

26.6.1. Bushings and Insulators shall be of Porcelain, Solid core type. Porcelain used for the manufacture of bushings and insulators shall be homogeneous, free from defects, cavities and other flaws or imperfections that might affect the mechanical or dielectric quality and shall be thoroughly vitrified, tough and impervious to moisture.

26.6.2. Glazing of the porcelain shall be of uniform brown colour, free from blisters, burns and other similar defects. Bushings shall be designed to have sufficient mechanical strength and rigidity for the conditions under which they will be used. All bushings of identical ratings shall be interchangeable.

26.6.3. Puncture strength of bushings shall be greater than the dry flashover value. When operating at

normal voltage, there shall be no electric discharge between the conductors and bushing which would cause corrosion or injury to conductors, insulators or supports by the formation of substances produced by chemical action. No radio interference shall be caused by the bushings when operating at the normal rated voltage.

26.6.4. The design of bushing shall be such that the complete bushing is a self-contained unit and no audible discharge shall be detected at a voltage up to a working voltage (Phase Voltage) plus 10%. The minimum creepage distance for severely polluted atmosphere shall be 31 mm/KV.

26.6.5. Sharp contours in conducting parts should be avoided for breakdown of insulation. **The insulators shall be capable to withstand the seismic acceleration of 0.5 g in horizontal direction and 0.6g in vertical direction.**

26.6.6. Bushings shall satisfactorily withstand the insulation level specified in data sheet.

26.6.7. Rain shed/drain cover/dome shall be present in CT.

26.6.8. Bellow level indicator shall be present in CT.

26.6.9. **Nitrite butyl rubber/Neoprene gaskets shall be used.**

**26.7.0. TESTS**

26.7.1. **Routine/Acceptance Tests (all units)**

All routine tests shall be carried out in accordance with relevant Standards. All routine/acceptance tests shall be witnessed by the Employer/his authorised representative.

26.7.2. **Type Tests:** The bidder shall furnish type test certificates and results for the all tests as per relevant Standards along with the bid for current and potential transformers of identical design. Type test certificates so furnished shall not be older than 5 (five) years as on date of Bid opening.

**QAP:** QAP shall be submitted.

**26.8.0. NAME PLATES**

26.8.1. All equipment shall have non-corrosive name plates fix at a suitable position indelibly mark with full particular there on in accordance with the standard adapted. Thickness (1mm), purchase order, project name, serial no etc. shall be present in the Name plate.

**26.9.0. MOUNTING STRUCTURES**

26.9.1. All the equipment covered under this specification shall be suitable for mounting on steel structures. Supply of mounting structures is also in the scope of this tender.

26.9.2. Each equipment shall be furnished complete with base plates, clamps, and washers etc. and other hardware ready for mounting on steel structures.

**26.10.0. SAFETY EARTHING**

26.10.1. The non-current carrying metallic parts and equipment shall be connected to station earthing grid. For these two terminals suitable for 40mm X 10mm GI strip shall be provided on each equipment.

**26.11.0. TERMINAL CONNECTORS (Shall be under manufacturer scope)**

26.11.1. The equipment shall be supplied with required number of terminal connectors of approved type suitable for ACSR. The type of terminal connector, size of connector, material, and type of installation shall be approved by the Employer, as per installation requirement while approving the equipment drawings. No part of a clamp shall be less than 12mm. thick.

**26.12.0. PRE-COMMISSIONING TESTS**

26.12.1. Contractor shall carry out following tests as pre-commissioning tests. Contractor shall also perform any additional test based on specialties of the items as per the field instructions of the equipment Supplier or Employer without any extra cost to the Employer. The Contractor shall arrange all instruments required for conducting these tests along with calibration certificates and shall furnish the list of instruments to the Employer for approval.

(a) **Current Transformers**

(i) Insulation Resistance Test for primary and secondary.

(ii) Polarity test.

(iii) Ratio identification test - checking of all ratios on all cores by primary injection of current.

(iv) Dielectric test of oil (wherever applicable).

(v) Magnetising characteristics test.

(vi) Tan delta and capacitance measurement

(vii) Secondary winding resistance measurement

(viii) Contact resistance measurement (wherever possible/accessible).

**26.13.0. TECHNICAL DATA SHEET FOR CURRENT**

26.13.1. For 245/145/36 kV CTs the instrument security factor at all ratios shall be less than five (5) for metering core. If any auxiliary CTs/reactor are used in the current transformers then all parameters specified shall have to be met treating auxiliary CTs as an integral part of the current transformer. The auxiliary CTs/reactor shall preferably be inbuilt construction of the CTs. In case these are to be mounted separately these shall be mounted in the central marshalling box suitably wired upto the terminal blocks.

26.13.2. **TYPE AND RATING:**

All instrument transformer shall be outdoor type, single phase, oil immersed, self-cooled suitable for mounting on steel structure. The instrument transformer shall have the following ratings and particulars.

| **SL No.** | **A. Item** | **Ratings and Particulars** |
|---|---|---|
| **I** | **II** | **III** |
| A | Nominal system voltage | 33 kV |
| B | Highest system voltage, kV | 36 |
| C | Rated frequency, HZ | 50 |
| D | System earthing | Solidly earth |
| E | Insulation level | |
| a) | Impulse withstand voltage: kVp | 170 |
| b) | One-minute p.f. Withstand voltage, kV (r.m.s.) | 70 |
| F | Short time current for 3 seconds, kA | 31.5 |
| G | Minimum creepage distance, mm | 1116 |
| H | Temperature rise | As per ISS |
| | | |
| **I** | **FEEDER C.T.** | |

| | | |
|---|---|---|
| | (i) No. of Cores | 2 |
| | (ii) Transformation ratio | 200-400/1-1 |
| | (iii) Rated out put | |
| | (a) Core-1 | 30 VA |
| | (b) Core-2 | 15 VA |
| | (c) Core-3 | N.A. |
| | (d) Core-4 | N.A. |
| | (e) Core-5 | N.A. |
| | (iv) Accuracy class | |
| | (a) Core-1 | 0.2S |
| | (b) Core-2 | 5P |
| | (c) Core-3 | N.A. |
| | (d) Core-4 | N.A. |
| | (e) Core-5 | N.A. |
| | (v) Accuracy limit factor | |
| | (a) Core-1 | - |
| | (b) Core-2 | 20 |
| | (c) Core-3 | - |
| | (d) Core-4 | N.A. |
| | (e) Core-5 | N.A. |
| | (vi) Instrument security factor | |
| | (a) Core-1 | <5 |
| | (b) Core-2 | - |
| | (c) Core-3 | - |
| | (d) Core-4 | N.A. |
| | (e) Core-5 | N.A. |
| | (vii) Minimum Knee point voltage, Volts | |
| | (a) Core-1 | - |
| | (b) Core-2 | - |
| | (c) Core-3 | N.A. |
| | (d) Core-4 | N.A. |
| | (e) Core-5 | N.A. |
| | (viii) Maximum secondary resistance, ohm | |
| | (a) Core-1 | - |
| | (b) Core-2 | - |
| | (c) Core-3 | N.A. |
| | (d) Core-4 | N.A. |
| | (e) Core-5 | N.A. |
| | (ix) Maximum exciting current, at Vk/4 mA | |
| | (a) Core-1 | - |
| | (b) Core-2 | - |
| | (c) Core-3 | N.A. |

| | | |
|---|---|---|
| | (d) Core-4 | N.A. |
| | (e) Core-5 | N.A. |
| | | |

Note:

(i) It is intended to use different ratios of the same CT at the same time for various protections and metering cores. The CTS should therefore be suitable for the above purpose by secondary tapings only. The ratio change by secondary taps is acceptable as long as the required CT specifications are achieved at all ratios.

(ii) The knee point voltage specified above shall be at higher ratio/ taps.

(iii) CT and PT sizing calculations shall be submitted. Burden values and knee point voltage, shall be decided as per the calculations during detailed engineering

## TECHNICAL SPECIFICATION FOR 33kV ISOLATORS (AIS)

### 27.0 TECHNICAL PARTICULARS OF 33 KV ISOLATOR

| | **Type:** | **33 kV** |
|---|---|---|
| **I** | **II** | **III** |
| 1 | Main switch | Horizontal Double break |
| 2 | Service | Outdoor |
| 3 | Applicable standard | IS : 9921 / IEC-62271-102 |
| 4 | No. of Phases | 3 phase |
| 5 | Design Ambient temperature | 50°C |
| 6 | Type of operation | Mechanically Ganged |
| 7 | Rated voltage (kV) | In KV |
| | a) Nominal | 33 |
| | b) Maximum | 36 |
| 8 | Rated current (Amps) | 1250 |
| 9 | Short time current for 1sec.(kA) | 31.5 |
| 10 | Rated frequency | 50 HZ ± 5% |
| 11 | System earthing | Effectively earthed |
| 12 | Temperature rise | As per relevant IS/IEC standards |
| 13 | Lightening Impulse withstand voltage (kVp) | |
| | (a) Across Isolating distance | 195 |
| | (b) To earth | 170 |
| 14 | 1-minute power frequency withstand voltage | |
| | a) Across Isolating distance | 80 |
| | b) To earth | 70 |
| 15 | Switching Impulse withstand voltage (kVp) | |
| | a) Across Isolating distance | - |
| | b) To earth | - |
| 16 | Max. RIV for frequency between 0.5MHz and 2MHz (micro-volt) | - |
| 17 | Corona Extinction Voltage (kV) | - |
| 18 | Operating mechanism | |
| | a) Isolator | Motor |
| | b) Earth switch | Manual |
| 19 | Auxiliary voltage | |

| | | |
|---|---|---|
| | a) Control & Interlock | 220V DC 80% to 110% |
| | b) Motor voltage | 3 Phase 415V AC 50Hz |
| | c) Heater, lamp & socket | Single phase 240 V 50HZ |
| 20 | Safe duration of overload | |
| | 150% of rated current | 5 minute |
| | 120% of rated current | 30 minute |
| 21 | Minimum creepage distance of insulator (mm) | |
| 22 | Mounting structure | Tubular / Lattice |
| 23 | Operating time | Less than 12 secs |
| 24 | Insulator Data | |
| | a) Bending Strength (kgf) | 600 |
| | **Type:** | **33 kV** |
| | b) Height (mm) | 508 |
| | c) Bottom PCD (mm) | 76 |
| | d) No. of holes & hole dia. | 4xM12 |
| | e) Top PCD | 76 |
| | f) No. of holes & hole dia. | 4xM12 |
| | g) Minimum creepage distance (mm) 31mm/kV | 1116 |
| 25 | Working clearance (live part to ground) (in mm) | 4000 |
| 26 | Phase Spacing (mm.) | 1500 |
| 27 | Minimum clearances (mm.) | |
| | a) Phase to Phase | 320 |
| | b) Phase to earth | 320 |
| | c) Sectional clearance | 3000 |

**27.1 SCOPE**

This specification provides for design, manufacturer, testing at manufacturer's Works and delivery of outdoor station type 33KV, Isolator with/ without earth switches, with electrical interlock, insulators and complete in all respect with bimetallic connectors arcing horns operating mechanism, auxiliary switches, indicating devices, fixing detail etc. as described hereinafter.

**27.2 STANDARDS**

Disconnecting switches covered by this specification shall conform to latest edition IEC-129/IEC 62271-102 I.S.1813 and IS: 9921, IS-325 and unless specifically stated otherwise in this specification.

**27.3 TYPE**

The 33KV Isolators (SI or DI) shall be outdoor type with three phase double break center rotating manual as well as motor operated type with local/remote operation. They shall have crank and reduction gear mechanism.
All Isolators offered shall be suitable for horizontal upright mounting on steel structures. Each pole unit of the multiple Isolators shall be of identical construction and mechanically linked for gang operation.
Each pole of the Isolator shall be provided with two sets of contacts to be operated in series and the moving contact blades shall rotate in horizontal plane.
The design shall be such that the operating mechanism with the linkages shall be suitable for mounting on any of the outer pole ends without much difficulty and with minimum shifting of parts.
Moving contacts of all isolators shall rotate through 90 deg. from their "fully closed position" to "fully open position so that the break is distinct and clearly visible from ground level.
The Isolators offered by the Bidder shall be designed for Normal rating current for Isolator as follows:

| | |
|---|---|
| Voltage | 33kV |
| Current | 1250A |

It should suitable for continuous service at the system voltages specified herein. The Isolators shall be suitable to carry the rated current continuously and full short circuit current of 31.5 KA for 33 KV for 1 second at site condition without any appreciable rise in temperature. These shall also be suitable for operation at 110% rated (normal) voltage. The Isolators shall be suitable for Isolating low capacitive / inductive currents of 0.7amp at 0.15 power factor. The isolators shall be so constructed that they don't open under the influence of short circuit conditions.

The Isolators and earthing switches are required to be used on electrically exposed installation and this should be taken into account while fixing the clearance between phases and between phase and earth.

**27.4 MAIN CONTACTS**

All Isolators shall have heavy duty, self-aligning and high-pressure line type contacts made of high conductivity, corrosion resistant, hard-drawn electrolytic copper strips of proper thickness and contact area. Fixed contact should consist of loops of above copper strips suitable for 1250Amps ratings for 33KV Isolators. The hard dawn electrolytic copper strips should be silver plated 25micron thickness and fixed contacts should be backed by powerful phosphor bronze/stainless steel springs of suitable numbers. The main contacts should be preferably of tulip type design. However, the thickness and contact area of the contact should conform to the drawing approved during type test. Moving contact with moving arm should be of hard- drawn electrolytic copper of proper thickness and contact area.

These fixed and moving contacts shall be able to carry the rated current continuously and the maximum fault current of 31.5 KA for 33KV for 1 seconds without any appreciable rise in temperature. The Isolator blades shall retain their form and straightness under all conditions of operation including all mechanical stress arising out of operation as well as under rated short circuit condition.

Fixed guides shall be provided so that even when the blades are out of alignment by one inch (maximum), closing of the switches, proper seating of the blades in between contacts and adequate pressure to give enough contact surface is ensured. Wherever possible, the blades shall be counter balanced by weights and springs. The contact shall be self-cleaning by the wiping action created by the movements of the blades. The surface of the contacts shall be tendered smooth and silver plated (25 micron).

The Isolator shall be self-cleaning type so that when isolators remain closed for long periods in a heavily polluted atmosphere, binding does not occur. No undue wear or scuffing shall be evident during the mechanical endurance tests, contacts and springs shall be designed so that adjustment of contact pressure shall not be necessary throughout the life of the isolator. Each contact or part of contacts shall be independently sprung so that full pressure is maintained on all contact at all times.

**27.5 ARCING HORN AND GRADING HORN**

Suitable arcing horn made of tinned electrolytic copper which are required for guiding contacts shall be provided on the fixed and moving contacts of all Isolators. The contacts shall be of 'make before and break after" type.

**27.6 ELECTRICAL INTERLOCK / MECHANICAL INTERLOCK**

The disconnecting switches whenever required shall be with an approved type electrical interlock for interlocking with the associated circuit breakers and earth switch. Electrical interlock assembly should be more right in construction and properly mounted to ensure reliable operation. The design should be such that the electrical circuit for the interlocking mechanism will only remain energised during operation of the switches.

**27.7 AUXILIARY SWITCHES**

All isolators and earthing switches shall be provided with 220VDC auxiliary switches for their remote position indication on the control board and for electrical locking with other equipment. The auxiliary

switch shall be provided with a minimum of six auxiliary contacts- 10 normally open and 10 normally closed and 10 normally open and 10 normally closed for earth switch. Separate auxiliary switches shall be provided for isolating and earth switches. 6 additional NO and NC contact to be provided as spare in each case.
The auxiliary switches and auxiliary circuits shall have a continuous current carrying capacity of at least 10 Amps. Auxiliary switches shall not be used as limit switches. Details of make, rating and type of limit switch shall be furnished in the offer.

**27.8 EARTH SWITCH**

Line earth switch shall consist of three earthing blades for Isolator which normally rest against the frame when the connected Isolator is in closed position. The earthing blades for three phases shall be mechanically linked to a coupling shaft which shall be capable of being fitted on either side of the Isolator. The earthing blades shall match and be similar to the main switch blades and shall be provided at the hinge; with suitable flexible conductors with terminal lugs for connecting to the station ground bus. The earthing blades shall be operated by a separate mechanism but shall be mechanically interlocked with the main switch so that the earthing blades can be closed only when the main switches are in open position and vice-versa. The earthing blades shall be gang operated and all the three blades will operate simultaneously.

**27.9 OPERATING MACHANISM**

The operating mechanism shall be simple and shall ensure quick and effective 1000 operation. The design shall be such as to enable one man to operate it with nominal effort. The operating mechanism box shall be made out of aluminum extruded (Aluminum alloy) sections of minimum 3.0 mm thickness. The operating mechanism shall be strong rigid and not subject to rebound.
The Isolator blades shall be in positive continuous control throughout the entire cycles of operation. The operating rods and pipes shall be rigid enough to maintain positive control under most adverse conditions and to withstand all torsional and bending stresses arising from operation. Operation of the switches at any speed should not result in improper functioning, in displacement of parts / machines after final adjustment has been made. All holes in cranks, linkages etc. having moving pins shall be drilled and fitted accurately so as to prevent slackness and lost motion.
Provision shall be made for padlocking the operating mechanism of disconnecting and earth switches in both open and closed positions.
Bearings shall be ball and roller type shall be protected from weather and dust by means of cover and grease retainers. Bearings pressures shall be kept low to ensure long life and care of operation.
Each power operated isolator shall be motor driven as well as manually operated and shall be complete with local / remote selector switch and open / close push buttons. The function of all control facilitates operating isolators.
Provision shall be made in the control cabinet to disconnect power supply to prevent local / remote power operation. Limit switches for open and close positions of re-isolations and earth switches.
All the terminal blocks to be used in the operating mechanism should of stud type of Poly-amide/Mealmine material of make like Elmex (OAT-6 for non-disconnecting type & OAT –6T for disconnecting type) / connectwell (Equivalent).

**27.10 DESIGN, MATERIALS AND WORKMANSHIP**

The live parts shall be designed to eliminate sharp points, edges and similar corona producing surfaces. Where this is impracticable, adequate shields to be provided. All ferrous metal parts shall be hot dip galvanized, as per IS 2629.All metal parts shall be of such materials or treated in such a way so as to avoid rust, corrosion and deterioration due to continued exposure to atmosphere and rain. All current carrying parts shall be made from high conductivity electrolytic copper / aluminium.
Bolts, screws and pins shall be provided with standard locking device viz. Locknuts, spring washers, keys etc. and when used with current carrying parts, they shall be made of copper silicon or other high conductivity and wear resistant alloys.
The switches should not need lubrication of any parts except at very long interval of five year

minimum.

**27.11 PROTECTIVE COATINGS**

All ferrous parts including bolts, nuts and washers of the switches assembly shall be galvanized to withstand at least six one minute dips in copper sulphate solution of requisite strength (Prece tests) except the threaded portions which should withstand four dips.

**27.12 INSULATORS**

Support insulators for all type of isolators shall be of solid core type. The insulator shall be made of homogeneous and vitreous porcelain of high mechanical and dielectric strength. It shall have sufficient mechanical strength to sustain electrical and mechanical loading on account of wind load, short circuit forces etc. Glazing of the porcelains shall be of uniform dark brown color with a smooth surface arranged to shed away raise water. The porcelain shall be free from laminations and other flaws or imperfections that might affect the mechanical or dielectric quality. It shall be thoroughly vitrified, tough and impervious to moisture. The porcelain and metal ports shall be assembled in such a manner and with such material that any thermal differential expansion between the metal and porcelain parts throughout the range of temperature specified in this specification shall not loosen the parts or create under internal stresses which may affect the mechanical or electrical strength or rigidity. The assembly shall not have excessive concentration of electrical stresses in any section or across leakage surfaces. The cement used shall not give rise to chemical reaction with metal fittings. The insulator shall be suitable for water washing by rain or artificial means in service condition. Profile of the insulator shall also conform to IEC-815. Insulator shall have a minimum cantilever strength of 600 Kgs for (33KV and 66kV). Caps to be provided on top of the insulator shall be of high-grade cast iron or malleable steel casting. It shall be machine faced and hot dip galvanized. The cap shall have four numbers of tapped holes spaced on a pitch circle diameter of 127mm. The holes shall be suitable for bolts with threads having anti corrosive protection. The effective depth of threads shall not be less than the nominal diameter of the bolt. The cap shall be so designed that it shall be free from visible corona and shall have radio interference level within 500 micro volts. Casing shall be free from blow holes cracks and such other defects.

**27.13 CONTROL CABINET:**

The control cabinet of the operating mechanism shall be made out of minimum 3mm thick aluminium alloy sheet. Hinged door shall be provided with pad locking arrangement. Sloping rain hood shall be provided to cover all sides. 15 mm thick neoprene or better type of gaskets shall be provided to ensure degree of protections of at least IP 55 as per IS 2147/IS-3947. The cabinet shall be suitable for mounting on support structure with adjustment for vertical, horizontal and longitudinal alignment. Details of these arrangements shall be furnished along with the offer.

**27.14 MOTOR:**

Motors rated 1 Kw and above shall be suitable for operation on 3 phase, 415 V, 50 HZ supply. Motors of lower rating shall be single phase type suitable for 240V, 50HZ system. It shall be totally enclosed type if mounted outside the control cabinet. The motor shall withstand without damage stalled torque for at least 3 times the time lag of the tripping device. The motor shall, in all other respects, conform to the requirement of I.S. 325.

**27.15 GEAR:**

The dis-connector / isolator may be required to operate occasionally, with considerably long idle intervals. Special care shall be taken for selection of material for gear and lubrication of gears to meet this requirement. The gear shall be made out of aluminium bronze or any other better material lubricated for life with graphite or better-quality non-drawing and non-hardening type grease. Wherever necessary automatic relieving mechanism shall be provided suitable relay, Device shall be provided to prevent over loading of the motor. Single phase preventer (for 3 phase meter) shall be

provided to operate on open circuiting of any phase and shall trip off the motor. Complete details of the devices shall be furnished in the offer.

**27.16 SPACE HEATERS:**
Space heaters suitable for 1 phase 240V AC supply shall be provided for each motor operated operating mechanism to prevent condensation and shall be operated by MCB.

**27.17 TERMINAL BLOCK AND WIRINGS**
Each operating mechanism shall be provided with 1100V grade stud type terminal block. All auxiliary switches, interlocks and other terminals shall be wired up to terminal block. The terminal block shall have at least 20% extra terminals. All wiring shall be carried out with 1.1KV grade insulated 2.5 sq.mm. copper wires.

**27.18 INTERIOR ILLUMINATION:**
A holder suitable for a 240 V lamp shall be provided in each of the motor operated mechanism of three poles & shall be door operated type.

**27.19 CONTROL AND AUXILIARY SUPPLY:**
A 3-phase switch with MCB for phases and link for neutral, shall be provided for power supply and a 2 pole MCB shall be provided for control supply.

**27.20 POSITION INDICATOR:**
A position indicator to show the isolator is in ON or OFF position to be provided.

**27.21 NAME PLATE:**
Isolator, earthing switches and their operating devices shall be provided with name plate. The name plate shall be weatherproof and corrosion proof. It shall be mounted in such a position that it shall be visible in the position of normal service and installation. It shall carry the following information duly engraved or punched on it.

**A. Isolator Base**

Name: AEGCL
Name of manufacturer –
Order No. –
Type Designation –
Manufacturers serial No. –
Rated voltage –
Rated normal current –
Rated short time current (rms) and duration –
Rated short time peak current (KAP)
Weight

B. **Earthing Switch**
Name: AEGCL
Name of manufacturer –
Order No. –
Type Designation –
Manufacturers serial No. –
Rated voltage –
Rated normal current –
Rated short time current (rms) and duration
Rated short time peak current (KAP)
Weight

**C. Operating Device**

Name – AEGCL
Name of manufacturer –
Order No.
Type Designation –
Reduction gear ratio –
AC motor
i) Rated auxiliary voltage
ii) Starting current
iii) Designation of AC motor as per IS 4722/325
iv) Starting torque at 80% of supply voltage
v) Over travel in degrees after cutting off supply
Total operating time in seconds
i) Close operation – Electrical
ii) Open operation – electrical
iii) Open operation – manual

**27.22 PAINTING GALVANIZING AND CLIMATE PROOFING:**

At interiors and exteriors of enclosures, cabinets and other metal parts (other than made up of aluminium) shall be thoroughly cleaned to remove all rust, scales, corrosion, grease and other adhering foreign matter and the surfaces treated by phosphating (e.g. seven tank phosphating sequence). After such preparation of surfaces, two coats of zinc oxide primer shall be given by suitable stoving and air drying before final painting. Colour of the final paints shall be of shade no. 697 of IS:5. The finally painted cubicle shall present aesthetically pleasing appearance free from any dent or uneven surface.

Paint inside the metallic housing shall be of anti-condensation type and the paint on outside surfaces shall be suitable for outdoor installation.

All components shall be given adequate treatment of climate proofing as per IS:3202 so as to withstand corrosive and severe service conditions.

All metal parts not suitable for painting such as structural steel, pipes, rods, levers, linkages, nuts and bolts used in other than current path etc. shall be hot dip galvanized as per IS –2629. Galvanization test will be carried out during routine test.

Complete details of painting, galvanizing and climate proofing of the equipment shall be furnished in the offer.

**27.23 TESTS:**

**Type Tests:**

Isolators offered, shall be fully type tested as per the relevant standards. The Bidder shall furnish Three sets of the following valid type test reports for their different type of offered Isolators along with the offer. The Purchaser reserves the right to demand repetition of some or all the type tests in the presence of purchaser's representative. For this purpose, the Bidder may quote unit rates for carrying out each type test and this will be taken during bid price evaluation, if required.

a) short time withstand & peak withstand current test for Isolator & Earth Switch.
b) power frequency (Dry & Wet), Lightening Impulse dry withstand Test
c) Mechanical endurance Test
d) IP-55 test

During type tests the isolator shall be mounted on its own support structure or equivalent support structure and installed with its own operating mechanism to make the type tests representative. Drawing of equivalent support structure and mounting arrangements shall be furnished for Purchaser's approval before conducting the type tests.

The type tests shall be conducted on the isolator along with approved insulators and terminal connectors. Mechanical endurance test shall be conducted on the main switch as well as earth switch of one isolator of each type.

**Acceptance and Routine Test:**

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

Mechanical operation test (routine test) shall be conducted on isolator (main switch and earth switch) at the supplier's works as well as purchaser's substation site.

Immediately after finalization of the programme of type / acceptance, routine testing the supplier shall give sufficient advance intimation (clear 20 days advance intimation), along with shop routine test certificates, valid calibration reports from Govt. approved test house for the equipments, instruments to be used during testing for scrutiny by the purchaser to enable him to depute his representative for witnessing the tests. If there will be any discrepancies in the shop routine test certificates and calibration reports furnished by the firm then after settlement of the discrepancies only, purchaser's representative will be deputed for witnessing the tests. Special tests proposed to be conducted (if decided to conduct) as type test on isolators, are given at Annexure- II. These special type test charges shall be quoted along with all other type tests as per relevant IEC standard and these charges shall be included in the total bid price.

Test certificates of various items including but not limited to the following shall be furnished at the time of routine tests.

a) Chemical analysis of copper along with a copy of excise certificate indicating genuine source of procurement of electrolytic grade copper.
b) Bearings
c) Fasteners
d) Universal / swivel joint coupling
e) Insulators
f) Motor
g) Gears
h) Auxillary switch
i) Limit switch
j) Timer
k) Overload / single phase preventer relay
l) Interlocking devices
m) Terminal block
n) Any other item

**27.24 INSPECTION:**

i) The Purchaser shall have access at all times to the works and all other places of manufacture, where the disconnectors, earth switches and associated equipment are being manufactured and the supplier shall provide all facilities for unrestricted inspection of the works raw materials manufacture of all the accessories and for conducting necessary tests as detailed herein.
ii) The supplier shall keep the purchaser informed in advance of the time of starting 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 the equipment shall in no way relieve the supplier of his responsibility for meeting all the requirements of this specification and shall not prevent subsequent rejection if such equipment is later found to be defective.

**27.25 QUALITY ASSURANCE PLAN:**

The Bidder shall invariably furnish following information along with his offer, failing which his offer shall be liable for rejection.

(i) Names of sub suppliers for raw materials, list of standards according to which the raw materials are tested, list of tests normally carried out on raw materials in presence of Supplier's

representative, copies of test certificate

(ii) Information and copies of test certificates as in (i) and (ii) above in respect of bought out accessories.

(iii) List of manufacturing facilities available

(iv) Level of automation achieved and lists of areas where manual processing still exists.

(v) List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections.

(vi) List of testing equipments with calibration certificates from Govt. approved test house available with supplier for final testing equipment and test plant limitation if any, vis-à-vis the type, special acceptance and routine test specified in the relevant standards. These limitations shall be very clearly brought out in the specified test requirements.

The supplier shall within 30 days of placement of order, submit following information to the purchaser.

i) List of raw material as well as bought out accessories and the names of sub-suppliers selected from the lists furnished along with offer.

ii) Type test certificates of the raw material and both bought out accessories.

iii) Quality Assurance Plan (QAP) withhold points for purchaser's inspection.

The supplier shall submit the routine test certificates of bought out accessories and raw material viz. Copper, aluminum conductors, lubricating material, gear material etc. at the time of routine testing of the fully assembled isolator.

**27.26 DOCUMENTATION:**

All drawings shall conform to relevant international standards organization (ISO). All drawings shall be in ink and suitable for micro filming. All dimensions and data shall be in S.I. Units.

**List of Drawings and Documents**

The Bidder shall furnish four sets of following drawings / documents along with his offer.

a) General outline and assembly drawings of the dis-connector operating mechanism, structure, insulator and terminal connector.

b) Sectional views and descriptive details of items such as moving blades, contacts, arms contact pressure, contact support bearing housing of bearings, balancing of heights, phase coupling pipes, base plate, operating shaft, guides, swivel joint operating mechanism and its components etc.

c) Loading diagram

d) Drawings with structure for the purpose of type tests.

e) Name plate.

f) Schematic drawing.

g) Type test reports.

h) Test reports, literature, pamphlets of the bought-out items and raw material.

The supplier shall within 2 weeks of placement of order submit four sets of final versions of all the above said drawings for Purchaser's approval. The purchaser shall communicate his comments / approval on the drawings to the supplier. The supplier 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 comments. After receipt of approval the supplier shall within three weeks submit 15 prints and two good quality re-producibles of the approved drawings for purchaser's use.

Six sets of the type test report, duly approved by the Purchaser shall be submitted by the supplier for distribution, before commencement of supply Adequate copies of acceptance and routine test certificates, duly approved by the Purchaser shall accompany the dispatched consignment.

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

**27.27 INSTRUCTION MANUALS:**

Fifteen copies of the erection, operation and maintenance manuals in English to be supplied for each type of disconnector one month prior to dispatch of the equipment. The manual shall be bound volumes and shall contain all drawings and information required for erection, operation and maintenance of the

disconnector including but not limited to the following particulars.

(a) Marked erection prints identifying the component parts of the disconnector as shipped with assembly drawings.
(b) Detailed dimensions and description of all auxiliaries.
(c) Detailed views of the insulator stacks, metallics, operating mechanism, structure, interlocks, spare parts etc.

**27.28 PACKING AND FORWARDING:**

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 supplier 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 symbols.

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 supplier without any extra cost.

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 supplier shall ensure that the bill of material is approved by the purchaser before dispatch.

**27.29 SUPERVISION OF ERECTION TESTING AND COMMISSIONING (ET&C):**

Purchaser proposes to utilize the services of the supplier for supervision of testing and commissioning of the equipment being supplied by him, if it is required. For this purpose, the supplier should make available the services of trained personnel (Engineers) who shall correct in the field, any errors or omissions in order to make the equipment and material properly perform in accordance with the intent of this specification. The Engineer shall also instruct the plant operators in the operation and maintenance of the commissioned equipment. The supplier shall be responsible for any damage to the equipment on commissioning the same, if such damage results for the faulty or improper ET&C. Purchaser shall provide adequate number of skilled / semi-skilled workers as well as ordinary tools and equipment and cranes required for equipment erection, at his own expenses. Apart from the above, the Purchaser shall not be responsible for providing any other facilities to the supplier. Special tools if required for erection and commissioning shall be arranged by the supplier at his cost and on commissioning these shall be supplied to the purchaser free of cost for future use.

**APPENDIX – I**

(Isolators)

LIST OF SPECIAL TESTS TO BE CARRIED OUT IF DECIDED BY THE PURCHASER

| Sl. No. | Name of the Test | Standard to which it conforms. |
|---|---|---|
| 1. | Test for visible Corona and Radio interference voltage (RIV) on disconnectors and terminal connector | NEMA Pub No. 107-1964<br>ISRI Pub No. 1-1972 |
| 2. | Tests on insulators | IS-2544 IEC. 168 |
| 3. | Tests on terminal connectors | IS:5561 |
| 4. | Tests on galvanized components | IS:2633 |
| 5. | Stalled torque test on motor operating mechanism | At 110% of supply voltage |

## TECHNICAL SPECIFICATION FOR 30KV SURGE ARRESTER

### 28.1.0. SCOPE

28.1.1. **This Section covers the specifications for design, manufacture, laboratory testing before dispatch at Station, delivery at site of class heavy duty, gapless metal (zinc) oxide Surge Arrestors complete with fittings & accessories for 33 kV systems.**

### 28.2.0. STANDARDS

28.2.1. The design, manufacture and performance of Surge Arrestors shall comply with IS: 15086 Part-4 / IEC: 60099-4 unless otherwise specifically specified in this Specification

### 28.3.0. GENERAL REQUIREMENT

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

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

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

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

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

28.3.6. Surge arrestors 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 arrestor failure.

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

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

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

### 28.4.0. ARRESTOR HOUSING

28.4.1. The arrestor housing shall be made up of porcelain/***silicon polymeric*** housing 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.

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

28.4.2. 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 arrestor. The arrestors shall not fail due to contamination. The arrester housings shall be designed for pressure relief class as given in Technical Parameters of the specification.

28.4.3. Sealed housings shall exhibit no measurable leakage.

**28.5.0. FITTINGS & ACCESSORIES**

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

28.5.2. 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 arrestor shall be galvanized. The line terminal shall have a built-in clamping device which can be adjusted for both horizontal and vertical takeoff.

28.5.3. Grading corona control rings if necessary, shall be provided on each complete arrestor pole for proper stress distribution.

**28.6.0. SURGE MONITOR**

28.6.1. 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 surge arrestor shall also be supplied within the same enclosure. The number of operations performed by the arrestor shall be recorded by a suitable cyclometric counter and surge monitor shall be provided with an inspection window. There shall be a provision for putting ammeter to record the current/alarm contacts in the control room if the leakage current exceeds the permitted value. Similar provision shall be considered for surge counter also.

28.6.2. 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 up to grounding point and bends are minimum.

**28.7.0. TESTS**

28.7.1. **Test on Surge Arrestors**

The Surge Arrestors offered shall be type tested and shall be subjected to routine and acceptance tests in accordance with IS: 15086 (Part-4). In addition, the suitability of the Surge Arrestors 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.

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

28.7.3. 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.

**28.8.0. NAME PLATE**

28.8.1. The name plate attached to the arrestor 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 Manufacturer
Name of the manufacture
Purchase Order Number along with date.

**28.9.0. TYPE AND RATINGS**

| **SL No.** | **Particulars** | **36 kV** |
|---|---|---|
| **I** | **II** | **III** |
| 1 | Rated voltage of arrester, kV | 30 |
| 2 | Continuous operating voltage, kV | 25 |
| 2 | Rated frequency, Hz | 50 |
| 3 | Nominal discharge current of arrester, kA | 10 |
| 4 | (i) Min. switching surge residual voltage (2kA),kVp | - |
| | (i) Max. switching surge residual voltage (500 kA),kVp | - |
| 5 | Maximum residual voltage at, | |
| | (i) 5 kA nominal discharge current, kV (peak) | 85 |
| | (ii) 10kA nominal discharge current, kV (peak) | 90 |
| | (iii) 20kA nominal discharge current, kV (peak) | 100 |
| | (iv) Steep fronted wave residual voltage, kV (peak) | - |
| 6 | One minute power frequency withstand voltage of arrester housing, kV (rms) | 70 |
| 7 | 1.2 / 50 μ second impulse withstand voltage of arrester housing, kV (peak) | 170 |
| 8 | Switching impulse withstand voltage (250/2500 micro second) of arrester housing dry and wet, kV (peak) | - |
| 9 | Creepage distance of insulator housing (mm) | 1116 |

| | | |
|---|---|---|
| 10 | Line discharge class | 3 |
| 11 | Short time current rating, kA for 3 sec | 31.5 |
| 12 | Pressure Relief Class | A |
| 13 | Pressure relief current | 40kA |

**29.1 DOCUMENTATION**

The successful bidder shall submit four sets of 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) Wiring diagram of battery charger

**29.2 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.

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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.

**30.0 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:

30.1 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.

30.2 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.

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

**31.0 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.

**32.0 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.

**32.0 Warranty:**

32.1 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.

32.2 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.

32.3 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.

32.4 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.

32.5 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.

**33.0 Safety:**

33.1 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.

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

| **34.0** | **Payment terms:** |
|---|---|
| 34.1 | No advance/Mobilization advance shall be made in this contract. |
| 34.2 | **Progressive payments for erection works wherever applicable** |
| 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 1st Progressive erection Invoice/Bill would be entertained on completion of 30% of total erection cost of the Project. |
| 34.2.4 | Minimum value of 2nd and 3rd 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 | Payment will be made by DGM, Tezpur (T&T) Circle, AEGCL, Dhanuwa Nagar, Tezpur. The Bidder / Firm will have to be submitted the following Net Banking details.<br><br>(a) Banker's Name & Branch<br>(b) Account No<br>(c) Banker's address<br>(d) Banker's IFSC Code<br>(e) Banker's RTGS Code |
| **35** | **Performance security deposit:** |
| 35.1 | The successful bidder shall have to deposit through a **Bank Guarantee/Demand Draft** 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 **AEGCL, Bijulee Bhawan, Paltanbazar, Guwahati-1,** 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 **O/O the Deputy General Manager, Tezpur T&T Circle, AEGCL, Tezpur-784001** 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. |
| **36** | **Retention Money:** |
| 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 Clause33. 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 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)***

| Sl. No. | Particulars | Unit | Qty. | Unit Price (₹) | Unit F&I (₹) | Total Amount (₹) | Remarks |
|---|---|---|---|---|---|---|---|
| **1** | **Supply of Equipment** | | | | | | |
| **1.1** | Supply of **Circuit Breaker** with **mounting structure** and terminal connectors as required including Gas filling Kit. | | | | | | |
| | (i) 33kV,25kA,800A, SF6 Gang operated Circuit breaker completes with mounting structure and accessories including terminal connectors and gas filling kit | Set | 1 | | | | |
| **1.2** | Supply of feeder **Current transformers** (1-Phase, 0.2 class live tank type) including all accessories and terminal connectors, marshalling box as required. | | | | | | |
| | (i) 33 kV, 400-200/1-1 A, 2 core single phase CT | Nos | 3 | | | | |
| **1.4** | Supply of **33 kV motor operated Isolators** with terminal connectors and complete with all fittings and fixtures. | | | | | | |
| | (i) 33kV, 25kA, 1250 A motorised isolators with earth switch complete with all fittings and accessories including terminal connectors | Set | 1 | | | | |
| | (ii) 33kV, 25kA, 1250a motorised isolators Without Earth Switch complete with all fittings and accessories including terminal connectors | Set | 1 | | | | |
| **1.5** | Supply of **Lightning Arrester** with surge monitor & terminal connectors complete. | | | | | | |
| | (i) 33 KV Lightning Arrestor | Nos | 3 | | | | |
| **A** | **Total cost of equipment and materials inclusive Freight and insurance (excluding GST)** | | | | | | |
| **B** | GST @ 18% | | | | | | |
| **C** | Grand total (A+B) | | | | | | |
| **D** | Say | | | | | | |

Rupees 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

**Manufacturer's Authorization (MA)**
**(MA for both shall be furnished by the Bidder from the manufacturer)**
**(Circuit Breaker, Current Transformer, Isolator with Earth Switch & without Earth Switch, Lightning Arrestor)**

Date: *[insert date (as day, month and year) of Bidding submission]*

Bid No.: *[insert number of bidding process]*

To: *[insert complete name of the Employer]*

WHEREAS

We *[insert complete name of the manufacturer or manufacturer's authorized agent]*, who are official manufacturers or agent authorized by the Manufacturer of *[insert type of goods manufactured]*, having factories at *[insert full address of manufacturer's factories]*, do hereby authorize *[insert complete name of the Tenderer]* to submit a Tender the purpose of which is to provide the following goods, manufactured by us *[insert name and/or brief description of the goods]*, and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with Clause 32.0 of the bidding document, with respect to the goods offered by the above firm.

Further, we also hereby declare that we and ……, *[insert: **name of the Bidder**]* have entered into a formal relationship in which, during the duration of the Contract (**including related services and warranty / defects liability**) we, the Manufacturer or Producer, will make our technical and engineering staff fully available to the technical and engineering staff of the successful Bidder to assist that Bidder, on a reasonable and best effort basis, in the performance of all its obligations to the Purchaser under the Contract.

In the capacity of *[insert: **title of position or other appropriate designation**]* (***and this should be signed by a person having the power of attorney to legally bind the manufacturer)*.**

Signed: *[insert signature(s) of authorized representative(s) of the manufacturer]*

Name: *[insert complete name(s) of authorized representative(s) of the manufacturer]*

Title: *[insert title]*

Duly authorized to sign this Authorization on behalf of *[insert complete name of the manufacturer]*

Dated on _____ day of _____, _____ *[insert date of signing]*

***Notes:***

***1.The letter of Undertaking should be on the letterhead of the Manufacturer and should be signed by a person competent and having Power of Attorney to sign on behalf of the Manufacturer (to be attached with this MA) to legally bind the Manufacturer. It shall be included by the bidder in its bid.***

**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 | : ₹ |
| | 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<br>(Whether agreeable to accept payment as specified in clause- 34) | : Yes/No |
| 5) | Date of completion of supply/Erection.<br>(Please specify the date of completion of supply/Erection as per specification) | : Yes/No |
| 6) | 'Security and performance guarantee'<br>(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. 15.3.5 enclosed. | : Yes/No |
| 16) | Manufacturer Authorization for each item listed in Table 1.0 | : Yes/No |
| 17) | Guaranteed Technical and Other Particulars | : Yes/No |

Name of the Bidder:-

Signature of the Bidder/Firm …….

Full Name ……

Postal Address ……

Phone/Mobile No. ……

## SCHEDULE - A

## GUARANTED TECHNICAL AND OTHER PARTICULARS

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

**1. 33kV Circuit Breaker**

| Sl. No. | Particulars | Unit | Data for 33 kV CB |
|---|---|---|---|
| I | II | III | IV |
| 1 | Type | | |
| 2 | No of poles | | |
| | | | (3 Phase Ganged Unit) |
| 3 | Service | | |
| 4 | Rated System Voltage | kV | |
| 5 | Highest System Voltage | kV | |
| 6 | System earthing | | |
| 7 | Rated Voltage of Breaker | kV | |
| 8 | Rated Continuous Current | Amps | |
| 9 | Rated Frequency | Hz | |
| 10 | Rated Short Circuit breaking current ( I ) | kA RMS | |
| | - 3secs - symmetrical | | |
| 11 | Rated Short Circuit making current | kA PEAK | |
| 12 | Duty cycle | | |
| 13 | First pole to clear factor | | |
| 14 | Operating time | | |
| | i) Opening Time | ms | |
| | | | |

| Sl. No. | Particulars | Unit | Data for 33 kV CB |
|---|---|---|---|
| I | II | III | IV |
| | | | |
| | ii) Closing Time | ms | |
| | | | |
| 15 | Insulation level | | |
| | i) One minute Power Frequency withstand Voltage (Dry) | kV RMS | |
| | ii) Full Wave Impulse withstand Voltage (1.2/50 µsec) | kV Peak | |
| 16 | Minimum clearance between phases | mm | |
| 17 | Minimum clearance between phase to earth | mm | |
| 18 | Minimum Ground clearance (from bottom most live part to plinth level) | mm | |
| 19 | Minimum clearance from bottom of support insulator to plinth level | mm | |
| 20 | i) Minimum Creepage Distance (Total) | mm | |
| | ii) Minimum Creepage Distance (Protected) | mm | |
| 21 | Operating mechanism | | |
| | a) Type | | |
| | b) Rated 3 Phase, 50Hz Voltage for Drive Motor | V | |
| | | | |
| | c) Rated voltage of Shunt trip coil & operating range | V. DC | |
| | d) Rated voltage of Closing coil & operating range | V. DC | |

| Sl. No. | Particulars | Unit | Data for 33 kV CB |
|---|---|---|---|
| I | II | III | IV |
| | e) No. of trip coils | No | |
| | f) No. of closing coils | No | |
| | g) No of spare auxiliary contacts & contact rating | Nos<br>AMPS | |
| | h) Minimum thickness of steel sheet for control cabinet | mm | |
| | i) Enclosure Protection | | |
| | | | |
| 22 | Reclosing | | |
| | | | |
| 23 | Support structure | | |
| | (Painted / Galvanised) | | |
| 24 | All other parts (Painted / Galvanised) | | |
| 25 | Minimum size of control wiring (Copper) | Sq. mm | |

**2. <u>Current Transformer</u>**

| SL No. | A. Item | Ratings and Particulars |
|---|---|---|
| I | II | III |
| A | Nominal system voltage | |
| B | Highest system voltage, kV | |
| C | Rated frequency, HZ | |
| D | System earthing | |
| E | Insulation level | |
| a) | Impulse withstand voltage: kVp | |
| b) | One-minute p.f. Withstand voltage, kV (r.m.s.) | |

| | | |
|---|---|---|
| | | |
| F | Short time current for 3 seconds, kA | |
| G | Minimum creepage distance, mm | |
| H | Temperature rise | |
| | | |
| **I** | **FEEDER C.T.** | |
| | (i) No. of Cores | |
| | (ii) Transformation ratio | |
| | (iii) Rated out put | |
| | (a) Core-1 | |
| | (b) Core-2 | |
| | (c) Core-3 | |
| | (d) Core-4 | |
| | (e) Core-5 | |
| | (iv) Accuracy class | |
| | (a) Core-1 | |
| | (b) Core-2 | |
| | (c) Core-3 | |
| | (d) Core-4 | |
| | (e) Core-5 | |
| | (v) Accuracy limit factor | |
| | (a) Core-1 | |
| | (b) Core-2 | |
| | (c) Core-3 | |
| | (d) Core-4 | |
| | (e) Core-5 | |
| | (vi) Instrument security factor | |
| | (a) Core-1 | |
| | (b) Core-2 | |
| | (c) Core-3 | |
| | (d) Core-4 | |
| | (e) Core-5 | |
| | (vii) Minimum Knee point voltage, Volts | |
| | (a) Core-1 | |
| | (b) Core-2 | |
| | (c) Core-3 | |
| | (d) Core-4 | |
| | (e) Core-5 | |
| | (viii) Maximum secondary resistance, ohm | |
| | (a) Core-1 | |
| | (b) Core-2 | |

| | | |
|---|---|---|
| | (c) Core-3 | |
| | (d) Core-4 | |
| | (e) Core-5 | |
| | (ix) Maximum exciting current, at Vk/4 mA | |
| | (a) Core-1 | |
| | (b) Core-2 | |
| | (c) Core-3 | |
| | (d) Core-4 | |
| | (e) Core-5 | |
| | | |

**3. <u>33kV Isolator</u>**

| | **Type:** | **33 kV** |
|---|---|---|
| **I** | **II** | **III** |
| 1 | Main switch | |
| 2 | Service | |
| 3 | Applicable standard | |
| 4 | No. of Phases | |
| 5 | Design Ambient temperature | |
| 6 | Type of operation | |
| 7 | Rated voltage (kV) | |
| | c) Nominal | |
| | d) Maximum | |
| 8 | Rated current (Amps) | |
| 9 | Short time current for 1sec.(kA) | |
| 10 | Rated frequency | |
| 11 | System earthing | |
| 12 | Temperature rise | |
| 13 | Lightening Impulse withstand voltage (kVp) | |
| | (a) Across Isolating distance | |
| | (b) To earth | |
| 14 | 1-minute power frequency withstand voltage | |
| | a) Across Isolating distance | |
| | b) To earth | |
| 15 | Switching Impulse withstand voltage (kVp) | |
| | a) Across Isolating distance | |
| | b) To earth | |
| 16 | Max. RIV for frequency between 0.5MHz and 2MHz (micro-volt) | |
| 17 | Corona Extinction Voltage (kV) | |
| 18 | Operating mechanism | |
| | a) Isolator | |
| | b) Earth switch | |
| 19 | Auxiliary voltage | |
| | a) Control & Interlock | |
| | b) Motor voltage | |

| | | |
|---|---|---|
| | c) Heater, lamp & socket | |
| 20 | Safe duration of overload | |
| | 150% of rated current | |
| | 120% of rated current | |
| 21 | Minimum creepage distance of insulator (mm) | |
| 22 | Mounting structure | |
| 23 | Operating time | |
| 24 | Insulator Data | |
| | a) Bending Strength (kgf) | |
| | **Type:** | |
| | b) Height (mm) | |
| | c) Bottom PCD (mm) | |
| | d) No. of holes & hole dia. | |
| | e) Top PCD | |
| | f) No. of holes & hole dia. | |
| | g) Minimum creepage distance (mm) 31mm/kV | |
| 25 | Working clearance (live part to ground) (in mm) | |
| 26 | Phase Spacing (mm.) | |
| 27 | Minimum clearances (mm.) | |
| | a) Phase to Phase | |
| | b) Phase to earth | |
| | c) Sectional clearance | |

**4. <u>Surge Arrestor</u>**

| SL No. | Particulars | 36 kV |
|---|---|---|
| **I** | **II** | **III** |
| 1 | Rated voltage of arrester, kV | 30 |
| 2 | Continuous operating voltage, kV | 25 |
| 2 | Rated frequency, Hz | 50 |
| 3 | Nominal discharge current of arrester, kA | 10 |
| 4 | (i) Min. switching surge residual voltage (2kA),kVp | - |
| | (i) Max. switching surge residual voltage (500 kA),kVp | - |
| 5 | Maximum residual voltage at, | |
| | (i) 5 kA nominal discharge current, kV (peak) | 85 |
| | (ii) 10kA nominal discharge current, kV (peak) | 90 |
| | (iii) 20kA nominal discharge current, kV (peak) | 100 |

| SL No. | Particulars | 36 kV |
|---|---|---|
| **I** | **II** | **III** |
| | (iv) Steep fronted wave residual voltage, kV (peak) | - |
| 6 | One minute power frequency withstand voltage of arrester housing, kV (rms) | 70 |
| 7 | 1.2 / 50 μ second impulse withstand voltage of arrester housing, kV (peak) | 170 |
| 8 | Switching impulse withstand voltage (250/2500 micro second) of arrester housing dry and wet, kV (peak) | - |
| 9 | Creepage distance of insulator housing (mm) | 1116 |
| 10 | Line discharge class | 3 |
| 11 | Short time current rating, kA for 3 sec | 31.5 |
| 12 | Pressure Relief Class | A |
| 13 | Pressure relief current | 40kA |