

ASSAM ELECTRICITY GRID CORPORATION LIMITED

Regd. Office: 1st Floor, Bijulee Bhawan, Paltan Bazar, Guwahati – 781001

CIN: U40101AS2003SGC007238

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BID IDENTIFICATION NO: AEGCL/DGM/LAC/TT/TLS-69/2024/720 ; Dated: 07/06/2024

Bidding Document
For

**Procurement of 11kV Outdoor VCB, 11KV CT, 11KV LA, 11KV PT at 132/11 KV Capital GSS,
AEGCL.**

**DEPUTY GENERAL MANAGER,
LOWER ASSAM T&T CIRCLE, AEGCL
NARENGI, GUWAHATI-26.**

SECTION - 1
INSTRUCTION TO BIDDER

1.1.0 SCOPE OF BID :-

1.1.1. The **Deputy General Manager, Lower Assam, T&T Circle, AEGCL** on behalf of **Assam Electricity Grid Corporation Ltd**, hereinafter referred to as **AEGCL** or Purchaser invites sealed 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.

- a) **NAME OF WORK :- Procurement of 11kV Outdoor VCB, 11KV CT, 11KV LA, 11KV PT at 132/11 KV Capital GSS, AEGCL.**
- b) **ESTIMATED VALUE FOR THE WORK :- Rs. 6,21,696.00 (Rupees Six Lakh Twenty One Thousand Six hundred and ninety Six) only including taxes and F&I.**
- c) **Fund: O&M HQ (LAR) fund for FY 2024-25**
- d) **Key Dates: Refer to NIT.**
- e) **Bidding address :-**
O/o The Deputy General Manager
Lower Assam, T&T Circle, AEGCL,
Narengi, Guwahati-26

[e-mail: dqmttc.guwahati@aeqcl.co.in]
- f) **Interested bidders may purchase the tender documents from the office of The Deputy General Manager, Lower Assam, T&T Circle, AEGCL, Narengi, Guwahati-26 during office hours.** Bidders may obtain further information from the office of the Deputy General Manager, Lower Assam T&T Circle, AEGCL, Narengi, Guwahati - 781026, Assam.
- g) **Cost of Bidding :-** The bidder shall bear all costs associated with the preparation and submission of its bid and AEGCL will in no case be responsible or liable for those costs. **The cost of the tender paper is Rs. 1000/- (Rupees One Thousand) only to be pledged in favour of "AEGCL, Guwahati" (in the form of A/C payee DD/Bankers Cheque).**

1.2.0 BIDDING PROCEDURE :-

Two envelope bidding procedure will be adopted. Bidders are to submit two sealed envelopes simultaneously, one containing the technical & Commercial proposal, Part-I (Technical & Commercial Bid) and the other containing the price proposal Part-II (Price Bid), enclosed together in one sealed envelope. Initially, only the Part-I bids shall be opened. Part-I proposals submitted by bidders, which do not conform to the specified requirement, may be rejected as deficient bids. The Part-II (Price Bid) proposals of technically qualified bidders will be opened at a date and time, which will be informed to all the qualified bidders of Part-I.

1.3.0 SCOPE OF WORK :-

1.3.1 The brief description of the scope of work covered under this bidding document is furnished below:

- a. Design and supply of 2 sets of 11kV, 1250A, 25KA gang-operated outdoor Vacuum Circuit breaker (of reputed make) with mounting structure at 132/11 kV Capital GSS as per bid specification and price schedule.
- b. Design and supply of 1 set of 11kV, 1-phase Current Transformer with GI mounting structure and marshalling box of CT ratio: 400-200/1-1A, 25KA for 3sec, 0.5 class (of reputed make) at 132/11 kV Capital GSS as per bid specification and price schedule.
- c. Design and supply of 1 set of 11kV, 1-phase 11kV/110V Potential Transformer with GI mounting structure with connectors at 132/11 kV Capital GSS as per bid specification and price schedule.
- d. Design and supply of 2 sets of 11kV, 10KA Lightning Arrestor at 132/11 kV Capital GSS as per BOQ and bid specification.
- e. Loading at manufacturer's works, transportation and delivery at the substation site, including unloading at destination site.
- f. Freight & Transit Insurance, storage at site and site insurance of all materials at site shall be in the scope of the contractor.
- g. Arrangements of any permits required for transportation and movement of supplied materials. However, AEGCL shall assist as far as practicable in the process.

- 1.3.2 The Bill of Quantities for indicative purposes is furnished in Price Schedules.
- 1.3.3 The bidder on its own responsibility may visit and examine the Site of Works and its surroundings and obtain information that may be necessary for preparing the bid. Any permits or licenses that may be required to execute the works should also be obtained by the contractor.
- 1.3.4 **The items mentioned in these Annexure shall only be used while quoting the bid prices. Any other items not specifically mentioned in the specification but which are required for installation, testing, commissioning and satisfactory operation of the equipment as per Indian Standards/IE Rules/IE Act and concerned authority regulations are deemed to be included in the scope of the specification and no deviation in this regard shall be accepted.**
- 1.3.5 **No modifications/additions/ deletions shall be made by the bidder to the items and quantities given in these schedules.**
- 1.3.6 The successful bidder will be expected to complete the works within **6 (six) months from the date of issue of LOA**. Bidders should note that time is the essence of this bid.

1.4.0 ELIGIBILITY CRITERIA OF THE BIDDER:

- 1.4.1 A Bidder may be a private entity or a government-owned entity. However, **no Joint Venture Bid shall be allowed.**
- 1.4.2 A 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.
- 1.4.3 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.
- 1.4.4 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. Bidders shall provide such evidence of their continued eligibility satisfactory to the AEGCL, as the Employer shall reasonably request.

1.5.0 FINANCIAL CAPABILITY

- 1.5.1 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. Wherever necessary the Employer may make enquiries with Bidder's bankers.
- 1.5.2 Average Annual Turnover : Minimum average annual turnover INR 3,10,845.00 calculated as total certified payments received for contracts in progress or completed, within the last 3 (Three) Years.
- 1.5.3 Financial Resources: Bidder needs 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 cash-flow requirement of atleast 70% of the work value and
 - (2) the overall cash flow requirements for this contract and its current works commitment.
- 1.5.4 Bidder must keep GST liabilities up to date and non-payment of GST liabilities and non-filing of relevant GST return more than 3 (three) months shall be reckoned as GST defaulter and this may be considered a cause for disqualification of a bidder and the bid may be rejected.
- 1.5.5 The Contractor must furnish their Bank Solvency Certificate to show the bidder's financial position indicating the amount by concerned authority in necessary format as per their banks

1.6.0 EQUIPMENT CAPABILITIES

- 1.6.1 The bidder should have assured access to supply of equipment as per bid and shall demonstrate that he or his supplier has capable of, manufacture & supply of such material. Bidders are required to demonstrate that based on known commitments the materials will be available for use in the proposed contract.

- 1.6.2 **Bidder may be manufacturer of the offered products or a firm/company having authorisation from a manufacturer. In case the bidder is not a manufacturer of the offered products, bidder must submit manufacturer's authorisation using for that purpose Form-MA provided in Section-3 Bidding forms.** Offered product's manufacturer must have least Five years of experience in design, manufacture and supply of 11kV equipment as mentioned in this bid. The offered product's manufacturer must have supplied such equipment which are in successful operation for atleast three years. Bidder shall submit copy of orders and performance certificates to establish its eligibility
- 1.7.0 EXPERIENCE:**
- 1.7.1 Experience in similar nature of works under contracts in the role of manufacturers, contractor, subcontractor, or management contractor for at least the last 5 (Five) years prior to the bid submission deadline.
- 1.7.2 Participation as manufacturer/ contractor Experience having successfully completed similar works during last 5 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 40% of total estimated cost.
 - (b) Two (2) similar completed works costing not less than 50% of total estimated cost.
 - (c) One (1) similar completed works costing not less than 80% of total estimated cost.
- 1.7.3 The Bidder must have experience of executing work of similar nature previously in AEGCL/APDCL or any other Govt. organisation. The bidder must submit experience and completion certificate for scrutiny by AEGCL. Each of such project/ works should consist of completion certificate.
- 1.8.0 LITIGATION HISTORY**
- Bidders shall submit details of all litigation, arbitration or other claims, whether pending, threatened or resolved in the last five years, with the exception of immaterial claims with a cumulative impact of not more than 10% of their total assets. The Employer may disqualify bidders in the event that the total amount of pending or threatened litigation or other claims represent more than 50% of their total assets.
- 1.9.0 DOCUMENTS COMPRISING THE BID**
- 1.9.1 The bid submitted by the bidder shall comprise two envelopes submitted simultaneously, one containing only the technical proposal and the other the price proposal.
- 1.9.2 **The Technical Bid submitted by bidders shall contain the following:**
- a) Bid Submission Sheet
 - b) Documentary evidence to establish that the Bidder meet the qualifying requirements in accordance with Clause 1.5.0.
 - c) Documents to be furnished as per Clause 1.9.3
 - d) The Bid Guarantee (Bid Security) in accordance with Clause 1.20.0 & its sub-clauses of this Section.
 - e) All Bidding Schedules properly filled up including Price Bid Schedules.
 - f) All other information and documents such as Guaranteed and Technical Particulars, type test reports, drawings, technical leaflets etc, as required in the Technical Specification
- 1.9.3 **To establish its eligibility and qualifications to perform the contract, the bidder shall provide along with the above-mentioned documents the following additional documents (mandatory) on qualifying requirements such as:**
- a) *Copies of original documents defining the constitution or legal status, place of registration, and principal place of business, written power of attorney of the signatory of the Bid to commit the Bidder.*
 - b) *Copies of valid Trade License issued by competent authority in the State of Assam or in the State where the bidder's business is registered.*
 - c) *Copies of PAN, GST Registration Certificate as per Goods & Services Tax laws.*
 - d) *Total monetary value of similar work performed by the bidder in each of the last three years.*
 - e) *Experience in works of a similar nature and volume for each of the last three years, and details of works under way or contractually committed in AEGCL or any other Govt. entity/PSU who may be contacted for further information on those contracts.*
 - f) *Qualifications and experience of key site management and technical personnel proposed for the Contract.*

- g) *Reports on the financial standing of the Bidder, such as profit and loss statements and audited annual accounts certified by CA of the company for the last three years including IT return duly acknowledged by the tax department for the last three years.*
- h) *Evidence of adequacy of working capital for this contract (access to line (s) of credit and availability of other financial resources).*
- i) *Information regarding any litigation, current or during the last five years, in which the Bidder is involved, the parties concerned, and disputed amount.*

1.9.2 Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements.

1.9.3 Notwithstanding anything stated herein above, AEGCL reserves the right to assess the capacity and capability of the bidder to execute the work, should the circumstance warrant such assessment in the overall interest of AEGCL.

1.10.0 DOCUMENTS ESTABLISHING CONFORMITY OF THE GOODS AND SERVICES

1.10.1 The documentary evidence of the conformity of the goods and services to the Bidding Document may be in the form of literature, drawings and data, and shall furnish:

- a) A detailed description of the essential technical and performance characteristics of the goods and services, including the functional guarantees of the Goods, in response to the Specification;
- b) A commentary on the Purchaser's Specification and adequate evidence demonstrating the substantial responsiveness of the plant and services to those specifications. Bidders shall note that standards for workmanship, materials and equipment designated by the Purchaser in the Bidding Document are intended to be descriptive (establishing standards of quality and performance) only and not restrictive. The Bidder may substitute alternative standards, brand names and/or catalog numbers in its bid, provided that it demonstrates to the Purchaser's satisfaction that the substitutions are substantially equivalent or superior to the standards designated in the Specification.

1.11.0 SITE VISIT

The interested bidders are advised to visit any grid substation of AEGCL and examine the site of works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid. The costs of visiting the Site shall be at the bidder's own expense.

1.12.0 CLARIFICATION ON BIDDING DOCUMENTS :-

1.12.1 A prospective bidder requiring any clarification of the bidding documents may notify AEGCL in writing at the following address-
Deputy General Manager, Lower Assam T&T Circle, AEGCL, Narengi, Guwahati-26

AEGCL will respond to any request for clarification which it receives earlier than 7 (**seven**) days prior to the deadline for submission of bids.

1.12.2 Verbal clarification and information given by AEGCL or its employee(s) or representative (s) shall not in any way be binding on AEGCL.

1.13.0 AMENDMENT OF BIDDING DOCUMENTS

1.13.1 At any time prior to the deadline for submission of bids, the AEGCL may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the bidding documents by issuing addenda.

1.13.2 Any addendum thus issued shall be part of the bidding documents pursuant to Sub-Clause, and shall be communicated in writing or by fax to all purchasers of the bidding documents. Prospective bidders shall acknowledge receipt of each addendum by fax to AEGCL.

1.14.0 LANGUAGE OF BID

1.14.1 The bid, and all correspondence and documents related to the bid, exchanged between the bidder and AEGCL shall be written in the English language. Supporting documents and printed literature furnished by the bidder shall also be in English language.

1.15.0 BID FORM AND PRICE SCHEDULES

1.15.1 The Bidder shall complete the Bid Form and the appropriate Price Schedules furnished in the bidding documents in the manner and detail indicated therein.

1.16.0 BID PRICES

1.16.1 Bidders shall give a breakdown of the prices in the manner and detail called for in the **Schedules of Prices**.

1.16.2 In the Schedules, Bidders shall give the required details and a breakdown of their prices, including all taxes, duties, levies, and charges payable as of twenty eight (28) days prior to the deadline for submission of bids, as follows:

- (a) Plant and equipment (**Schedules of Prices**) shall be quoted on an EXW (ex-factory, ex-works, ex-warehouse or off-the-shelf, as applicable). All taxes and duties taxes as applicable and freight and insurance shall be indicated separately.

1.16.3 Price Adjustment: Prices quoted by the Bidder shall be FIRM during performance of the contract. Duties and Taxes shall be adjusted, except there is variation due to changes in legislation of the Country.

1.17.0 INSURANCE

The Bidder shall insure the Works/Materials (in transit and at the site) in accordance with the requirements of General Conditions of Contract. The Bidder shall provide details of the policies that he intends to take out as part of his Bid submission. **The bid price shall include all costs in pursuance of fulfilling insurance liabilities under the contract.**

1.18.0 BID VALIDITY

1.18.1 Bids shall remain valid for a period of **180 (One Eighty)** days after the date of opening of Technical Bids.

1.18.2 In exceptional circumstances, prior to expiry of the original bid validity period, AEGCL may request that the bidders extend the period of validity for a specified additional period. The request and the responses thereto shall be made in writing. A bidder may refuse the request without forfeiting its bid security. A bidder agreeing to the request will not be required or permitted to modify its bid, but will be required to extend the validity of its bid security for the period of the extension, and in compliance with Clause 1.19.0 in all respects.

1.19.0 BID SECURITY (EARNEST MONEY)

1.19.1 **The Bidder shall furnish, as part of its bid with the Technical Proposal, a bid security in the amount of Rs. 12,500.00 (Rupees Twelve Thousand and Five Hundred) only.**

1.19.2 For participation in the bidding procedure, participants must compulsorily pay the Bid Security / Earnest Money Deposit in the form of DD/Fixed Deposit/bank Guarantee/Banker's Cheque in favour of '**AEGCL, Guwahati**'. The bid security shall remain valid for 30 days beyond the original validity period for the bid, and beyond any period of extension subsequently requested.

1.19.3 Any bid not accompanied by an acceptable bid security shall be rejected as non-responsive.

1.19.4 The bid securities of unsuccessful bidders will be returned as promptly as possible, against written request from the unsuccessful bidders.

1.19.5 The bid security of the successful bidder will be returned when the bidder has signed the Contract Agreement and furnished the required performance security.

1.19.6 The bid security may be forfeited

- (a) if the bidder withdraws its bid, except as provided in Sub-Clause 1.24.1;
- (b) if the bidder does not accept the correction of its bid price, pursuant to Sub-Clause 1.24. or
- (c) in the case of a successful bidder, if it fails within the specified time limit to
- (i) sign the Contract Agreement,
- (ii) furnish the required performance security.

1.19.7 No interest shall be payable by AEGCL on the above bid guarantee.

1.20.0 ALTERNATIVE PROPOSALS BY BIDDERS

1.20.1 Bidders shall submit offers, which comply with the Bidding Documents, including the basic AEGCL's Requirements as indicated in the bidding documents. Alternatives will not be considered. The attention of bidders is drawn to the provisions of Clause 1.29.0 regarding the rejection of bids which are not substantially responsive to the requirements of the bidding documents.

1.21.0 FORMAT AND SIGNING OF BID

1.21.1 The bidder shall prepare one original and two copies of the bid proposal, clearly marking each one as: "ORIGINAL- BID PROPOSAL, etc as appropriate. In the event of discrepancy between the original and any copy, the original shall prevail.

1.21.2 The original and all copies of the bid shall be typed or written in indelible ink (in the case of copies, Photostats are also acceptable) and shall be signed by a person or persons duly authorized to sign on behalf of the bidder. All pages of the bid where entries or amendments have been made shall be initialed by the person or persons signing the bid.

- 1.21.3 The bid shall contain no alterations, omissions or additions, except those to comply with instructions issued by AEGCL, or as necessary to correct errors made by the bidder, in which case such corrections shall be initiated by the person or persons signing the bid.
- 1.21.4 The Bidders must submit the Bid Guarantee in separate sealed envelope, super-scribed as under:
“BID GUARANTEE (Name of the Package)”
- 1.21.5 The Bid must contain the name, residence and place of business of the person or persons making the Bid and must be signed and sealed by the Bidder with his usual signature. The names of all persons signing should also be typed or printed below the signature.
- 1.21.6 Bids by Corporation / Company must be signed with the legal name of the Corporation/Company by the President, Managing Director or by the Secretary or other person or persons authorized to Bid on behalf of such Corporation/Company in the matter.
- 1.21.7 A Bid by a person who affixes to his signature the word ‘President’, ‘Managing Director’, ‘Secretary’, ‘Agent’, or other designation without disclosing his principal will be rejected.
- 1.21.8 Satisfactory evidence of authority of the person signing on behalf of the Bidder shall be furnished with the Bid.
- 1.21.9 The Bidder’s name stated on the proposal shall be exact legal name of the firm
- 1.21.10 Bids not conforming to the above requirements of signing may be disqualified.
- 1.21.11 If the outer envelope is not sealed and not marked as above, AEGCL will assume no responsibility for the misplacement or premature opening of the bid.
- 1.21.12 The Bid must be accompanied with requisite BID SECURITY in a separate sealed cover.
- 1.21.13 The Bidders have the option of sending the Bids by post/courier or in person. Bids submitted by Telex/ Telegram/Fax will not be accepted. No request from any Bidder to AEGCL to collect the proposal from Airlines/Cargo Agents etc shall be entertained by AEGCL.
- 1.22.0 DEADLINE FOR SUBMISSION OF BIDS**
- 1.22.1 Bids must be received by AEGCL at the address specified above no later than refer to NIT.
- 1.22.2 AEGCL may, at its discretion, extend the deadline for submission of bids by issuing an addendum in accordance with Clause 1.13.0, in which case all rights and obligations of AEGCL and the bidders previously subject to the original deadline will thereafter be subject to the deadlines extended.
- 1.23.0 LATE BIDS**
- 1.23.1 Any bid received by AEGCL after the deadline for submission of bids prescribed in Clause 1.22.0 will be rejected and returned unopened to the bidder.
- 1.24.0 WITHDRAWAL OF BIDS**
- 1.24.1 The bidder may withdraw its bid after bid submission, provided that written notice of the withdrawal is received by AEGCL prior to the deadline for submission of bids.
- 1.24.2 The bidder’s withdrawal notice shall be prepared, sealed, marked and delivered with the envelopes additionally marked “WITHDRAWAL”.
- 1.24.3 Withdrawal of a bid during the interval between the deadline for submission of bids and the expiration of the period of bid validity specified in Sub-Clause 1.18.0 may result in the forfeiture of the bid security pursuant to Sub-Clause 1.19.6.
- 1.25.0 OPENING OF BIDS**
- 1.25.1 AEGCL will open the Technical Bids (Part-I) , in the presence of bidders’ representatives who choose to attend; at the following location:
Deputy General Manager.
LA T&T Circle, AEGCL, Narengi
Guwahati-26
- The bidders’ representatives who are present shall sign a register evidencing their attendance.
- 1.25.2 Envelopes marked “WITHDRAWAL” shall be opened and read out first. Bids for which an acceptable notice of withdrawal has been submitted pursuant to Claus 1.24.0 Oshall not be opened.

- 1.25.3 The bidders' names, the Bid Prices, the presence or absence of Bid Security, and such other details as AEGCL may consider appropriate, will be announced and recorded by AEGCL at the opening. The bidders' representatives will be required to sign this record.
- 1.26.0 PROCESS TO BE CONFIDENTIAL**
- 1.26.1 Information relating to the examination, clarification, evaluation and comparison of bids and recommendations for the award of a contract shall not be disclosed to bidders or any other persons not officially concerned with such process. Any effort by a bidder to influence AEGCL's processing of bids or award decisions may result in the rejection of the bidder's bid.
- 1.27.0 PRELIMINARY EXAMINATION OF BIDS AND DETERMINATION OF RESPONSIVENESS**
- 1.27.1 Prior to the detailed evaluation of bids, AEGCL will examine the bids to determine whether they are complete and all documents as per Clause 1.9.0 are provided or not, whether the documents have been properly signed, whether the required security is included, and whether the bids are generally in order and provides any clarifications and/or substantiation that AEGCL may require pursuant to Clause 1.27.0.
- 1.27.2 A substantially responsive bid is one which conforms to all the terms, conditions and requirements of the bidding documents, without material deviation or reservation and includes the amendments and changes, if any. AEGCL may waive any minor non-conformity or irregularity in a Bid which does not constitute a material deviation or reservation, provided such deviation or reservation does not (i) affect in any substantial way the scope, quality or performance of the Works; (ii) limit in any substantial way, inconsistent with the bidding document, AEGCL's rights or bidder's obligations under the contract; or (iii) whose rectification would affect unfairly the competitive position of other bidder's presenting substantially responsive bids.
- 1.27.3 Any bids found to be non-responsive for any reason or not meeting the minimum levels of the performance or other criteria specified in the bidding documents will be rejected by AEGCL and not included for further consideration.
- 1.28.0 CLARIFICATION OF BID PROPOSALS AND CONTACTING AEGCL**
- 1.28.1 To assist in the examination, evaluation and comparison of Bids, AEGCL may, at its discretion, ask any bidder for clarification of its bid. The request for clarification and the response shall be in writing or by mail, but no change in the price or substance of the bid shall be sought, offered or permitted except as required to confirm the correction of arithmetic errors discovered by AEGCL in the evaluation of the bids in accordance with Clause 1.28.0.
- 1.28.2 Subject to Sub-Clause 1.28.1, no bidder shall contact AEGCL on any matter relating to its bid from the time of opening Bids to the time the contract is awarded. If the bidder wishes to bring additional information to the notice of AEGCL, it should do so in writing.
- 1.28.3 Any effort by the bidder to influence AEGCL in AEGCL's evaluation of price proposals, bid comparison or contract award decisions may result in the rejection of the bidder's bid.
- 1.29.0 CORRECTION OF ERRORS**
- 1.29.1 Price Proposals determined to be substantially responsive will be checked by AEGCL for any arithmetic errors. Arithmetic errors will be rectified on the following basis. If there is a discrepancy between the unit rate and the total cost that is obtained by multiplying the unit rate and quantity, the unit rate shall prevail and the total cost will be corrected unless in the opinion of AEGCL there is an obvious misplacement of the decimal point in the unit rate, in which case the total cost as quoted will govern and the unit rate corrected. If there is a discrepancy between the total bid amount and the sum of total costs, the sum of the total costs shall prevail and the total bid amount will be corrected.
- 1.29.2 The amount stated in the Form of Bid for Price Proposal will be adjusted by AEGCL in accordance with the above procedure for the correction of errors and, shall be considered as binding upon the bidder. If the bidder does not accept the corrected amount of bid, its bid will be rejected, and the bid security may be forfeited in accordance with Sub-Clause 1.19.6 (b).
- 1.30.0 EVALUATION AND COMPARISON OF BID PROPOSALS**
- 1.30.1 AEGCL will evaluate and compare only the bids determined to be substantially responsive in accordance with Clause 1.27.0.
- 1.30.2 For equipment and materials, the comparison shall be of the ex-factory price of equipment and materials offered (such price to include all costs as well as duties and taxes paid or payable on components and raw material incorporated); plus the cost of transportation, local taxes and duties, civil works, installation and other services required under the contract with due corrections as per Clause 1.29.0, AEGCL's comparison will also include the costs if any, resulting from application of the evaluation procedures described in Sub-Clause 1.30.4.
- 1.30.3 AEGCL will carry out a detailed evaluation of the bids in order to determine whether the bidders are qualified and whether the technical aspects are substantially responsive to the requirements set forth in the bidding documents. In order to reach such a determination,

AEGCL will examine the information supplied by the Bidders and other requirements in the bidding documents, taking into account the following factors:

- (a) Qualification
 - (i) the determination will take into account the Bidder's financial and technical capabilities and past performance; it will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to Clause 1.5.0 as well as such other information as AEGCL deems necessary and appropriate; and
 - (ii) an affirmative determination will be a prerequisite for AEGCL to continue with the evaluation of the proposal; a negative determination will result in rejection of the Bidder's bid.
- (b) Technical
 - (i) overall completeness and compliance with AEGCL's Requirements; the technical merits of materials and equipments offered and deviations from AEGCL's Requirements; suitability of the facilities offered in relation to the environmental and climatic conditions prevailing at the site; quality, function and operation of any process control concept included in the bid;
- (c) Commercial
 - (i) Deviations and omissions from the contractual and commercial conditions as identified in the Bid.
 - (ii) compliance with the time schedule called for in the Bidding Document and evidenced as needed in a milestone schedule provided in the bid; and
 - (iii) the functional guarantees of the facilities offered against the specified performance criteria of the plant and equipment.

1.30.4 Pursuant to Sub-Clause 1.30.4, the following evaluation methods will be followed:

- (a) **Time Schedule:** The plant and equipment covered by this bidding are required to be shipped, installed and the facilities completed within the period specified in Sub-Clause
Bidders submitting bids which deviate from the time schedule specified will be rejected.
- (b) **Deviations from the Bidding Document:**
Bidders shall base their Bid price on the terms & conditions specified in the Bidding Documents.
Bids with material deviations and omissions shall be rejected.
- (c) **Functional Guarantee of the facilities:**
Bidders shall state the functional guarantees (e.g. guaranteed performance or ratings or efficiency) of the proposed Goods in response to AEGCL's Requirements (Technical Specifications). Goods, Plant and equipment offered shall have a minimum performance (functional guarantees/ratings) specified in the Technical Specifications to be considered responsive. Bids offering Goods, plant and equipment with functional guarantees less than the minimum specified shall be rejected.

1.30.5 **Bid Evaluation Process for Abnormally Low Bids:**

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

(a) Identification:

For the identification of the Abnormally Low Bids, two approaches as applicable shall be adopted:

- i. **Absolute Approach** 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 a statistical comparison method which will be applied when there are more than five nos. of substantially responsive bids. A potential ALB is identified where the low Bid is more than one standard deviation below the average of substantially responsive bids received.

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.

(b) In case of ALB, the tender evaluation committee of the respective tenders shall undertake the following three stage review which are as follows:

- i. Identify ALB as per the step mentioned in Clause No.(a).(i) and 10.b).(ii) whichever is applicable.
- ii. Clarify and analyse the bidders resource inputs and pricing, including overheads, contingencies and profit margins. In that respect committee may seek the reference of the guidelines of World Bank, AIIB, ADB etc.

- iii. Decide whether to accept or reject the tender.
- (c) Additional Performance Security in case of acceptance of ALB:
- i. If any abnormally low bid is accepted under point no. (b) (iii), after taking of additional performance security as per the assessment of the committee, however the total performance security should not have to exceed 20% of the total contract value.
 - ii. The additional performance security shall be treated as part of the original performance security and shall be valid for a period coextensive with the applicable defect liability period of the contract.
 - iii. Non submission of the additional performance security shall constitute sufficient ground to rejection of the bid and similar assessment shall be initiated for the next ranked bidder identified as ALB.
- 1.30.6 AEGCL reserves the right to accept or reject any variation or deviation. Variations, deviations, and other factors which are in excess of the requirements of the bidding documents or otherwise result in the accrual of unsolicited benefits to AEGCL shall not be taken into account in bid evaluation.
- 1.31.0 AWARD**
- 1.31.1 AEGCL will award the Contract to the bidder whose bid has been determined to be substantially responsive to the bidding documents provided that such bidder has been determined to be qualified in accordance with the provisions of the Bid.
- 1.32.0 EMPLOYER'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS**
- 1.32.1 Notwithstanding Clause 1.31,0, AEGCL reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids, at any time prior to award of Contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders of the grounds for AEGCL's action. AEGCL is not bound to accept the offer of the lowest bidder.
- 1.33.0 NOTIFICATION OF AWARD**
- 1.33.1 Prior to expiration of the period of bid validity prescribed by AEGCL, AEGCL will notify the successful bidder by fax, confirmed by letter, that its bid has been accepted. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") shall name the sum which AEGCL will pay the Contractor in consideration of the execution, completion and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Conditions of Contract called "the Contract Price").
- 1.33.2 The notification of award will constitute the formation of the Contract.
- 1.34.0 SIGNING OF CONTRACT AGREEMENT**
- 1.34.1 At the same time that it notifies the successful bidder that its bid has been accepted, AEGCL will send the bidder the Form of Contract Agreement incorporating all agreements between the parties.
- 1.34.2 Within **15 (fifteen) days** of receipt of the Form of Agreement, the successful bidder shall sign the Form and return it to AEGCL.
- 1.35.0 WARRANTY**
- 1.35.1 The contractor warrants that all 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. The term period of warranty shall mean the period of 18 months from the date of the materials are received at site in good and acceptable condition. If during the period of warranty, any defect is found, the Contractor shall rectify all defects in design, materials and workmanship that may develop under normal use of the equipment upon written notice from the Purchaser who shall indicate in what respects the equipment is faulty. The rectification / free replacement must be carried out within a reasonable time period and at free of cost.
- 1.35.2 In the event of any emergency, where in the judgment of AEGCL, delay would cause serious loss or damages, repairs or adjustment may be made by the engineer or a third party chosen by the engineer without advance notice to the contractor and the cost of such work shall be paid by the contractor. In the event such action is taken by the engineer, the contractor will be notified promptly and he shall assist wherever possible in making necessary corrections. This shall not relieve the contractor of his liabilities under the terms and conditions of the contract.
- 1.35.3 If it becomes necessary for the contractor to replace or renew any defective portions of the works, the provision of this clause shall apply to portion of the works so replaced or renewed until the expiry of twelve (12) months from the date of such replacement or renewal.

- 1.35.4 The repaired or new parts will be furnished and erected free of cost by the contractor. If any repair is carried out on his behalf at the site, the contractor shall bear the cost of such repairs.
- 1.35.5 The acceptance of the equipment by the Employer shall in no way relieve the contractor of his obligation under this clause.
- 1.35.6 In the case of those defective parts, which are not repairable at site but are essential for the commercial operation of the equipment, the contractor and the engineer shall mutually agree to a programme of replacement or renewal, which will minimize interruption to the maximum extent in the operation of the equipment.

1.36.0 PERFORMANCE SECURITY (Contract Performance Guarantee)

- 1.36.1 As a Contract Performance Security, the successful Bidder, to whom the work is awarded, shall be required to furnish a Performance Guarantee from a Nationalized Bank, in the form attached with the Bidding Document (Section –5) in favour of the AEGCL. The guarantee amount shall be equal to ten percent (10%) of the Contract Price and it shall guarantee the faithful performance of the contract in accordance with the terms and conditions specified in these documents and specifications. The guarantee shall be valid up to 90 (ninety) days after the end of Warranty Period.
- 1.36.2 In case the bidder fails to submit the Performance Security in the form of Bank Guarantee, an amount equivalent to 10% of the Contract Price shall be retained as Security Deposits which shall be retained up to 90 (ninety) days after the end of Warranty Period
- 1.36.3 The performance guarantee shall cover additionally the following guarantees to the owner:
- a) The successful Bidder guarantees the successful and satisfactory operation of the equipment furnished and erected under the contract, as per the specifications and documents.
 - b) The successful Bidder further guarantees that the equipment/material provided and installed by him shall be free from all defects in design, material and workmanship and shall upon written notice from the Owner fully remedy must be guaranteed.
- 1.36.4. The Contract performance Guarantee will be returned to the Contractor without any interest at the end of warranty period and written request from the contractor.

1.37.0 TERMS OF PAYMENT

The terms of payment for the supply work shall be as follows

- i. No advance payment shall be made in this contract.
- ii. No claim for interest shall be entertained by AEGCL
- iii. The price is firm and no price variation shall be applicable.
- iv. Final bill must contain the original site register.
- v. Payment shall be released against receipt of materials in full and good condition at site. The Bidder / Firm will have to be submitted the following Net Banking details.
 - a) Banker's Name & Branch
 - b) Account No
 - c) Banker's address
 - d) Banker's IFSC Code
 - e) Banker's RTGS Code

1.38.0 CORRUPT OR FRAUDULENT PRACTICES

1.38.1 It is required that bidders/suppliers/contractors observe the highest standard of ethics during the procurement and execution of the contracts. In Pursuance of this Clause AEGCL;

- (a) defines, for the purposes of this provision, the terms set forth below as follows:
- (i) "corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and
 - (ii) "fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition;
- (b) will reject a proposal for award if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

- (c) will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract by AEGCL if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a contract.

1.39.0 PENALTY FOR DELAYED EXECUTION

In the event of delay in completing the work extending beyond the date of completion or beyond the extended date, if any, permitted by the Board, the contractor shall pay as agreed liquidated damage and not as a penalty a sum equal to 1% of the contract price under this contract for each week of delay or part thereof subject to a maximum of 10% of the contract price.

1.40.0 FORCE MAJEURE

Force Majeure shall be considered as any circumstances beyond the reasonable control of the party claiming relief, including but not limited to strikes lockout, civil commotion, riot, insurrection, hostilities, war, fire, flood, earthquake, delay in delivery of equipments or part thereof by AEGCL, would entitle contractor to extension of time.

1.41.0 SETTLEMENT OF THE DISPUTE & ARBITRATION

Any dispute arising out of the contract will first be discussed and settled bilaterally between the Assam Electricity Grid Corporation Limited and firms/ contractors. In case, the dispute cannot be settled bilaterally, it will be referred to arbitration by an arbitrator to be appointed by the AEGCL, The contractor shall not stop the work during settlement of any arbitration case. All disputes arising out of the agreement so made shall be subjected to the jurisdiction of district court of Kamrup District.

SECTION-2

PURCHASER'S REQUIREMENTS

2.1.0 SCOPE OF WORK:

2.1.1 This section of the specification deals with the technical information & criteria for "Supply of 11kV outdoor VCB, 11kV CT, 11kV PT, 11kV LA at 132/11kV Capital GSS". The Contractor's proposal shall be based on the use of materials complying fully with the requirements specified herein.: The work involves design, engineering, manufacture, assembly, inspection, testing at the manufacturer's works before dispatch, packing, supply, including insurance during transit, delivery at site of various equipment and materials including substation steel structures as specified in subsequent Clauses and Sections.

2.1.2 It is not the intent to specify completely herein all details of design and construction of the equipment and accessories. However, the equipment and accessories shall conform in all respects to high standards of engineering, design and workmanship and be capable of performing in continuous operation up to the bidder's guarantees in a manner acceptable to the Purchaser. The Purchaser will interpret the meaning of drawings and specifications and shall be entitled to reject any work or material, which in his judgment is not in full accordance therewith.

2.1.3 The various items of supply are described very briefly in the schedule of Bid Form, Prices & Other Schedules and annexure. The various items as defined in these schedules shall be read in conjunction with the corresponding section in the technical specifications including amendments and, additions if any.

2.2.0 CONTRACTOR TO INFORM HIMSELF FULLY

2.2.1 The contractor should admit that he has examined the general condition of contract, specifications and schedule and has satisfied as to all the conditions and circumstances affecting the contract prices 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. The purchaser shall not be responsible for any misunderstanding or incorrect information obtained by the contractor other than information given to the contractor in writing by the purchaser.

2.3.0 STANDARDS

2.3.1 The equipment covered under this bidding document 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. In case of any conflict between the standards and this specification, this specification shall govern.

2.3.2 Equipment conforming to other international or authoritative Standards which ensure equivalent or better performance than that specified under Clause 3.6.0 above shall also be accepted. In that case relevant extracts of the same shall be forwarded with the bid.

2.4.0 ENGINEERING DATA

2.4.1 The furnishing of engineering data by the Contractor shall be in accordance with the Bidding Document. The review of these data by the Employer will cover only general conformance of the data to the specifications and not a thorough review of all dimensions, quantities and details of the materials, or items indicated or the accuracy of the information submitted. This review by the Employer shall not be considered by the Contractor, as limiting any of his responsibilities and liabilities for mistakes and deviations from the requirements, specified under these specifications.

2.4.2 All engineering data submitted by the Contractor after review by the Employer shall or part of the contract document.

2.5.0 MATERIALS HANDLING AND STORAGE

2.5.1 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.

2.5.2 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.

2.5.3 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.

- 2.5.4 All items shall be handled very carefully to prevent any damage or loss. The materials stored shall be properly protected to prevent damage. The materials from the store shall be moved to the actual location at the appropriate time so as to avoid damage of such materials at Site.
- 2.5.5 All the materials stored in the open or dusty location must be covered with suitable weather-proof and flameproof covering material wherever applicable.
- 2.5.6 The Contractor shall be responsible for making suitable indoor storage facilities, to store all items/materials, which require indoor storage.
- 2.5.7 The Contractor shall have total responsibility for all equipment and materials in his custody, stored, loose, semi-assembled and/or erected by him at site. The contractor shall make suitable security arrangements including employment of security personnel to ensure the protection of all materials, equipment and works from theft, fire, pilferage and any other damages and loss.

2.6.0 COMMISSIONING SPARES

- 2.6.1 It will be the responsibility of the Contractor to provide all commissioning spares required for initial operation till the Employer declares the equipment as ready for commissioning. All commissioning spares shall be deemed to be included in the scope of the Contract at no extra cost to the Employer.
- 2.6.2 These spares shall be received and stored by the Contractor at least 1 month prior to the schedule date of commencement of commissioning of the respective equipment and utilized as and when required. The unutilized spares and replaced parts, if any, at the end of successful completion of performance and guarantee test shall be the property of the Contractor and he will be allowed to take these parts back at his own cost with the permission of Employer's Representative.

2.7.0 CONSIGNEE DETAILS

- 2.7.1 The Contractor shall supply the equipment/materials at **132/11kV Capital GSS**.

2.8.0 TECHNICAL SPECIFICATION FOR 11KV OUTDOOR VACUUM CIRCUIT BREAKERS

1. SCOPE

- 1.1. This specification covers design, manufacturing, assembly, testing at manufactures works, supply of 11KV, 1250A, 25kA gang operated outdoor Vacuum Circuit Breakers complete with mounting structure and all accessories required for their satisfactory operation for the sub-transmission system. The Breakers shall be used for Transformer protection or Feeder Control in the system. The Vacuum Circuit Breakers shall be complete with all the accessories and auxiliary equipments required for their satisfactory operation in sub-stations of AEGCL.
- 1.2. The breaker shall conform, in all respects to highest standards of engineering, design and workmanship as per recent Indian or International standards. It shall be capable of performing in continuous commercial operation up to the supplier's guaranteed life in a manner acceptable to the purchaser
- 1.3. The equipment offered shall be complete with all parts necessary for their effective and trouble-free operation. Such parts shall be deemed to be within the scope of the supply irrespective of whether they are specifically indicated in this bid document/work order or not.
- 1.4. The Bidder/supplier shall bind himself to abide by the considerations of the technical specifications to the entire satisfaction of the purchaser and shall be required to adjust such details at no extra cost to the purchaser over and above the tendered rates and prices.

2. SYSTEM CONDITIONS

The Vacuum Circuit Breakers shall be designed for the power system having the following parameters.

- a) Nominal system voltage: 11KV
- b) Highest system voltage: 12KV
- c) Number of phases: 3
- d) Frequency: 50 Hz \pm 3%.
- e) System earthing: Solidly earthed neutral
- f) Short Current Rating: 25kA for 3 sec for 11kV. (Minimum)

3. SERVICE CONDITIONS:

Maximum altitude above sea level	100m
Minimum ambient air temperature	45°C
Maximum daily average ambient air temperature	40° C
Minimum ambient air temperature	2° C
Maximum temperature attainable by an object exposed to the sun	60° C
Maximum yearly weighted average ambient temperature	32° C
Maximum relative humidity	98%
Average number of thunderstorm days per annum (isokeraunic level)	45:50(MV)
Average number of rainy days per annum	120
Average annual rainfall	2200 mm
Maximum annual rainfall	3500 mm
Maximum wind pressure	260Kg/m ²
Seismic level(Horizontal acceleration)	0.24g to 0.48g
Climatic condition Moderately hot and humid tropical climate conducive to rust and fungus growth.	

4. STANDARDS

- 4.1. The design, manufacture and performance of the Vacuum circuit breaker shall comply with all currently applicable statutes, regulations and safety codes.
- 4.2. Equipment, meeting any other authoritative standard, which ensures equal or better quality than the standard mentioned above, would also be acceptable. The bidders shall clearly indicate the applicable standards to which their equipment complies-with. A copy of such standard may also be enclosed.

#	Standard	Item
1	IS 13118/ IEC 62271 -100 amended upto date	High-voltage alternating-current circuit- breakers.
2	IEC 694	Common clauses for switchgear
3	IS 2099/IEC:815 IS5621:1980	Porcelain Bushings
4	IS 2544	Porcelain Post Insulators
5	IE C-2331	High Voltage porcelain bushings.
6	IS 325 -	Specification for 1phase induction motor
7	IS 12063/ 1987 IEC: 529	Degree of protection provided by enclosures of electrical equipment.
8	IS 5	Colour for ready mixed paints and enamels.
9	IEC - 60 -	High voltage test techniques
10	IS 5578 & IS:11353	Marking and arrangements for switchgears, busbars, main connections and auxiliary wiring.
11	IS 4794	Push button switches.
12	IEC - 71 Part-I & II -	Insulation co-ordination, Terms, definitions, principles and rules
13	IEC 270-	Partial discharge measurements.
14	IS 2629 -	Recommended practice for hot dip galvanizing of iron and steel.

15	Indian Electricity Rules 2005	
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5. KEY TECHNICAL PARAMETERS

- 5.1. The circuit breakers shall be suitable for outdoor operation under climatic conditions, as specified under 'Service Conditions' for power transformers, without any protection from sun and rain.
- 5.2. The circuit breakers shall have the following rating :

S.No.	Particulars	11 KV
i)	Number of Poles	3 Nos.
ii)	Frequency	50 Cycles
iii)	Nominal System Voltage	11 KV
iv)	Highest System Voltage	12 KV
v)	Interrupting Capacity at nominal system voltage	500 MVA
vi)	Rated Continuous Current	1250 Amps
vii)	Short-time Current Rating for 3 Secs.	25 KA
viii)	Basic Insulation Level	75 KV
ix)	Power Frequency Withstand Voltage for one Minute	28 KV
x)	Total Break-time for any Current up to the rated breaking current	3 cycles (max.)
xi)	Control Circuit Voltage	110 Volt D.C.
xii)	Operating duty for gang operation	O – 0.3 Sec – CO – 3 Min – CO
xiii)	Mechanical Endurance	M2 class
xiv)	Electrical Endurance	E2 class
xv)	Capacitor Switching Duty	C2 class
xvi)	The VCBs shall be suitable for one reclosing followed by one delayed reclosing and lock out	
xvii)	Minimum clearances	
a)	Between Phases	280 mm
b)	Between Live Parts & Ground	3700 mm
c)	Creepage Distance	300 mm

The above are minimum requirements. The manufacturers may offer their standard design, keeping in view our minimum requirements.

6. GENERAL TECHNICAL REQUIREMENTS

- 6.1. The circuit breaker shall be of porcelain clad, arc interruption in vacuum type. The breaker, complete in all respect, shall be supplied with all accessories in-place and all internal wiring installed and terminated in the mechanism housing and the equipment shall be complete in all respects.
- 6.2. The circuit breakers shall provide rapid and smooth interruption of current under all conditions, completely suppressing all undesirable phenomena, even under the most severe and persistent short-circuit conditions or when interrupting small currents or leading / lagging reactive currents. The details of any device incorporated to limit or control the rate of rise of re-striking voltage (R.R.R.V.) across the circuit breaker contacts shall be stated. The over voltage caused by the circuit breaker switching on inductive or capacitive load shall not exceed 3.2 times the normal phase to neutral voltage. The total break-time for the circuit breaker, throughout the range of breaker

operating duty, shall be stated in the tender and shall be guaranteed. The breaker shall be fit for capacitor switching for 5 MVAR Bank.

6.3. The breakers shall be provided with 'trip free' mechanism.

6.4. The circuit breakers shall be suitable for mounting on steel structures. The cost of necessary frames for mounting the circuit breakers shall be included in the offered prices. All the structures shall be hot dip galvanized with 3 dips. Please note that cantilever type supports for mechanism box are not acceptable. The mechanism box shall have firm supports from bottom. This is necessary to minimize vibration of mechanism box, which in turn may disturb various settings. The agency shall indicate clearly the vibration level and dynamic load of the breaker during fault / normal ON OFF operations in all three directions.

6.5. The circuit breakers shall consist of three identical phase units with a common operating mechanism. While offering the circuit breaker, the following details should be confirmed and furnished with the tender:

- a) Complete construction details of the equipment offered. It should be noted that the breakers should be suitable for out-door duty. Indoor breakers accommodated in out-door kiosks are not acceptable.
- b) Type, make & source of vacuum interrupters with relevant details shall be indicated in the offer, clearly.
- c) The capacity of breaker to interrupt inductive and capacitive currents shall be indicated in the offer (rating of capacitor bank should be stated and type test report shall be furnished).
- d) Spare availability of vacuum interrupter should be confirmed by the bidder for the designed expected life of the breakers being offered.
- e) Items inside the cabinet made of organic material shall be coated with a fungus resistant varnish.

6.6 VACUUM INTERRUPTER

- a) Interrupters shall be rated for minimum 30,000 mechanical or load operations
- b) The design of the vacuum interrupter shall be such that it gives trouble free operation under normal load and fault conditions throughout the life of the equipment. As the efficiency of the breaker depends on the degree of vacuum inside the interrupter, manufacturer shall ensure that the same is maintained consistently during service. To know the residual life of vacuum interrupter, an indicator to indicate the status of contact erosion shall be provided.
- c) The insulating ceramic body of the interrupter should have high mechanical strength and it should be capable of withstanding high temperature without any significant deterioration in its mechanical and electrical properties.
- d) The metal / alloy used for the fixed and moving contacts shall have very low resistivity and low gas content. They should be resistant to arc erosion and the contact should have no tendency to get cold-welded under the high vacuum in the interrupter. Silicone encapsulated Interrupters to avoid tracking due to condensation
- e) The interrupter design should ensure rapid de-ionization of the gap so that normal electrical strength of the gap is restored instantaneously.
- f) The metallic bellow or any other similar vacuum sealing arrangement should be provided at the moving contact and should have a long fatigue life.
- g) Manufacturer's catalogue on vacuum interrupter, indicating all the details shall essentially be submitted with the tender.

6.7 TEMPERATURE RISE

The maximum temperature attained by any part of the equipment, when in service at site, under continuous full load conditions, exposed to the direct rays of the sun, shall not exceed 45° Centigrade, above maximum daily

average ambient temperature. The limits of temperature rise shall be as per relevant standards. The corrections proposed shall be stated in the tender and shall be subject to approval of the owner.

6.8 INSULATION OF THE CIRCUIT BREAKER

The insulation to ground, the insulation between open contacts and the insulation between phases of the completely assembled circuit breaker shall be capable of withstanding satisfactorily di-electric test voltage corresponding to specified basic insulation level in the standard.

6.9 INSULATORS

a) The basic insulation level of the Insulator and insulating porcelains shall be as specified and porcelain shall be homogenous and free from cavities and other flaws.

They shall be designed to have ample insulation, mechanical strength and rigidity for satisfactory operation under conditions specified above. All insulators of identical ratings shall be inter-changeable. The puncture strength of the insulators shall be greater than the flash over value. The insulators shall be type tested from independent Govt. Laboratory as per relevant standards or at any recognized and reputed international laboratory or testing institutions.

b) The porcelain housing for the interrupter shall be of a single piece construction without any joint. It shall be made of homogeneous, vitreous porcelain of high mechanical and dielectric strength. Glazing of porcelain shall be of uniform brown or dark brown colour with a smooth surface arranged to shed away rainwater or condensed water particles (fog).

6.10 OPERATING MECHANISM

- a) The circuit breakers shall be designed for remote control from the control room and in addition there shall be provision for manual operation of circuit breakers during maintenance and for local tripping and closing by the normal means.
- b) The circuit breakers shall have operation control and mechanical "open" "close" indicator, in addition to facilities for remote electrical indication.
- c) All metal parts in the mechanism shall be of corrosion resistant material. All bearings which require greasing shall be equipped with pressure grease fittings.
- d) The design of the operating mechanism shall be such that it shall be practically maintenance free. The guaranteed number of years in maintenance free operation, the number of possible full load and full rated short circuit current breaking operations without requiring any maintenance or overhauling shall be clearly stated in the tender bid. As far as possible, the need for lubricating the operating mechanism shall be kept to the minimum and eliminated altogether, if possible.
- e) The operating mechanism shall be of the spring charging type, by electric control under normal operation. The mechanism shall be trip free and operable electrically and mechanically. The mechanism shall be capable of performing satisfactorily, the reclosing duty cycles indicated above, within the time specified. All working parts in the mechanism shall be of corrosion resistant material and all bearings, which require greasing, shall be equipped with pressured grease fittings. The mechanism shall be strong positive quick in action and shall be removable without disturbing the other parts of the circuit breaker. The mechanism and breaker shall be such that the failure of any spring will not prevent tripping and at the same time will not cause any false tripping or closing. The operating Mechanism should be motor operated spring charged type preferably without chain drive. The motor for spring charging shall be suitable to perform satisfactorily for input supply voltage of 230 Volt A.C 50 Hz/D.C with a variation of **plus / minus 20 per cent**. The A.C.

Motor should have overload protection. Provision should also be made for mounting of mechanism box at an adequate height and gear ratios shall be so chosen that one man should be able to charge the spring, without any additional efforts. Provision shall be available for charging the springs manually as well, and to close CB mechanically.

- f) The time taken for charging of closing spring shall not exceed 30 seconds. The spring charging shall take place automatically preferably after a closing operation. Breaker operation shall be independent of the spring charging motor which shall only charge the closing spring. Opening spring shall get charged automatically during closing operation. As long as power supply is available to the charging motor, a continuous sequence of closing and opening operations (CO) shall be possible.
- g) In each circuit breaker, one potential free contact of the limit switch of spring charging motor shall be provided for remote indication of spring charged. This contact shall be wired up and brought to the terminal block.
- h) Electrical anti-pumping device shall be provided for breaker.

6.11 CONTROL CUBICLE

- a) A common control cubicle shall be provided to house electrical, controls, monitoring devices and all other accessories, except those which must be located on individual poles. The cubicle shall be gasketed and shall have weather-proof construction, fabricated from sheet steel of minimum 3 mm thickness. The type test report on degree of protection test (IP-55) shall also be furnished.
- b) There shall be sufficient reinforcement to provide level surfaces, resistance to vibrations and rigidity during transportation and installation. Control cubicles shall be provided with double hinged door and padlocking arrangement. The door hinges shall be of union joint type to facilitate easy removal and the distance between hinges shall not exceed 350 mm. Door shall be properly braced to prevent wobbling.
- c) It shall have backwards slanting rain hood of 2 mm thick (14 SWG) sheet for protection against rain water.
- d) The cubicle shall have front access door with lock and keys, space heater, internal illumination lamp, 3 pins 5 Amp socket with individual ON-OFF switches shall be provided in the cubicle.
- e) For local operation following shall be provided :
 - i) LOCAL / REMOTE selector switch
 - ii) TRIP / NORMAL / CLOSE control switches with pistol grip handle
- f) The control circuits shall be designed to operate on 110 Volt DC, as indicated in the schedule and it shall be possible to adopt to work on other voltages by simply changing the operating coils. The shunt tripping coils shall be designed to operate satisfactorily within 110% and 70% of the rated DC supply voltage and the shunt closing coils should operate up to 85% of the rated DC voltage. These checks shall be repeated during pre-commissioning checks at site before putting the breakers in service.
- g) AC Power supply for auxiliaries will be available at 230 Volt (+/- 10% variation) single phases 50 C/s at substation. The agency shall be required to extend this supply, using proper protection, to desired location through cable.
- h) Necessary double compression type cable glands for the cables of the operating mechanism shall be provided. The cables used for operation are all un-armoured 2.5 sq. mm copper control cables of 1100 V grade. The cable glands shall be suitable for 1 no. 8 core and 2 nos. 4 core cables and cables as per site requirements. The gland plate should be made of non-magnetic materials and suitably drilled at site to suit the cable entry.
- i) The Circuit breaker shall be provided with trip free Mechanism so that tripping instructions could over-ride the closing instructions. An additional tripping coil shall also be provided in the trip circuit. The second coil shall have separate tripping lever arrangements in the mechanism, so as to avail full advantage of second trip coil. Also the two trip coils shall have separate fuses in the DC circuit, so that in the event of any short

circuit/damage in any one of the trip coils, the supply is available to the other one.

- j) The circuit diagram of Control circuit of VCB along with operating instructions (DOS/ DON'T) shall be embossed on metallic plate duly laminated and the same shall be fixed on the rear door of the control cubicle from inside.

6.12 WIRING

- a) Wiring shall be completed in all respects to ensure proper functioning of the control, protection, monitoring and interlocking schemes.
- b) All the wiring shall be carried out with 1100 V grade, PVC insulated stranded copper conductor of 2.5 sq. mm as per IS: 1554.
- c) Each wire shall be identified at both ends with permanent markers bearing wire numbers as per wiring diagram.
- d) Wire termination shall be done with crimping type connectors with insulating sleeves. Wires shall not be spliced between terminals.
- e) All spare contacts of auxiliary switches etc. shall be wired up to terminal blocks in the control cubicle.

6.13 TERMINAL BLOCKS

- a) Terminal blocks shall be of 1100 V grade, box clamp type ELMEX 10 sq. mm or approved equivalent. Not more than two wires shall be connected to any terminal. Spare terminals, equal in number to 20% of active terminals, shall be provided.
- b) Terminal block shall be such located to allow easy access. Wiring shall be so arranged that individual wires of an external cable can be connected to consecutive terminals.

6.14 TERMINAL CONNECTORS

6 Nos. Terminal bi-metallic connector suitable for Dog conductors shall be supplied with each breaker. For ensuring quality and uniformity, the owner may decide to specify the design of terminal connector, the material of terminal connector and thickness of clamps. Further compliance of which will have to be done by the agency without any extra cost. Suitable earth connector for earthing connections shall also be supplied. The connector drawing shall be got approved from the owner.

6.15 AUXILIARY CONTACTS

- a) Eight numbers each of auxiliary contacts both of the normally open and normally closed types shall be provided in each circuit breaker for use in the remote indication and control scheme of the circuit breaker and for providing safety interlocking. Special contacts for use with trip coils, which permit for relative adjustment with respect to the travel of the circuit breaker contact, shall also be provided, wherever required. There shall be provision to add more auxiliary contacts at a later date, if required.
- b) The normally open and normally closed contacts for the control and operation of the equipment shall have continuous current rating of 10 Amp. The Breaking capacity of the contacts shall be minimum 2 Amp with circuit time constant less than 20 milli seconds at the rated D.C. voltage.
- c) Insulation level of auxiliary contacts shall be 1100 volts, 2.5 kV for 1 min.

6.16 ACCESSORIES

The vacuum circuit breaker shall be supplied as a complete unit with internal wiring installed and terminated in mechanism box and equipped with the following accessories:

1	Motor operated spring charged mechanism (nominal motor voltage – 230 V AC)	1 No.
2	Trip coil suitable for 110 V DC	2 Nos.
3	Closing Coil suitable for 110 V DC	1 No.
4	Pistol grip C.B. Control switch having Trip/ Normal/ Close	1 No.
5	Local / Remote selector switch	1 No.
6	Spring Charged indicator	1 No.
7	Manual operating handle for maintenance	1 No.
8	Facility for manual charging of spring	1 No.
9	Operation counter	1 No.
10	Auxiliary contacts (8 N/O + 8 N/C)	1 Set
11	Anti-pumping device suitable for 110 V DC	1 No.
12	Terminal connectors suitable for connecting Dog Conductor	6 Nos.
13	Cubicle illuminating lamp with cage and switch	1 No.
14	Spare terminals connectors	20% of Total Terminals
15	Mechanical ON/OFF Indicator	1 No.
16	MCB for both AC and DC supply	1 No. each
17	Space heater and ON-OFF switch in the mechanism box	1 No.
18	Power Type 3 Pin Socket with ON-OFF switch	1 Set
19	Earthing Terminals	2 Nos.
20	LED indicating lamps	Complete set

6.17 INDICATING LAMPS

The indicating LED lamps should have in-built low voltage protection Circuit (LVGP) and surge suppressor circuit. Lamp assembly should be of fire – retardant glass epoxy PCB, industrial heat resistant, fire resistant, non- Hygroscopic DMC material , chrome – plated corrosion resistant solid brass bezel , polycarbonate lens in desired colour shades of Red , Green, Amber, Yellow etc. the intensity of light should be minimum 100 mcd at 20 mA . Indication lamp should be suitable to operate on 110 V Direct Current supply source.

6.18 SURFACE FINISH

All metal sheet surfaces exposed to atmosphere shall be given two primer coats of zinc phosphate and two coats of epoxy paint with epoxy base thinner. All metal parts not accessible for painting shall be made of corrosion resisting material. All machine finished or bright surfaces shall be coated with a suitable preventive compound and suitably wrapped or otherwise protected. All paints shall be carefully selected to withstand tropical heat and extremes of weather within the limits specified. The paints shall be light admiral grey shade No.627 of IS 5. The paint shall not scale off or wrinkle or be removed by abrasion due to normal handling.

6.19 GALVANIZING

All ferrous parts including nuts, bolts, plain and spring washers of size M 10 and above, support channels, structures, etc. shall be hot dip-galvanized to conform to latest version of IS 2629 or any other equivalent authoritative standard. All other fixing nuts, bolts, washers of size below M 10 shall be made out of stainless steel.

6.20 EARTHING

The operating mechanism housing, support structures etc. shall be provided with two separate earthing terminals for bolted connection to 50 x 8 mm MS flat to be provided by the purchaser for connection to station earth mat. The connecting point shall be marked with "earth" symbol No.86 of IEC publication 117-1 part 1

6.21 MOUNTING

- a) The design and supply of support structure, required for mounting the Circuit Breaker in Purchaser's switch yard, shall be in the bidder's scope. The bidder's scope shall also include foundation bolts, nuts, plain washers, spring washers etc necessary for the support structure. The support structure can be lattice type or tubular type and shall be made out of hot dip galvanized steel. Wheel mounted type support shall not be accepted. The support structure shall be installed on a concrete plinth of 300 mm height to be arranged by the Purchaser. The height of the support structure shall meet the following requirements.
 - i) Vertical clearance of lowest live part as specified in clause 6.
 - ii) Minimum height of 2950 mm above the top of concrete plinth (This is a Statutory Regulation).
- b) The Circuit Breaker shall be connected to adjacent equipment in the switch yard through ACSR conductor.
- c) The loading data to be considered by the bidder for design of support structure shall include the following.
 - i) Dead weight of the Circuit Breaker, Structure, Bus Bars
 - ii) Operational steady state and impact loading
 - iii) Wind load on a Circuit Breaker, Structure, Bus Bars
 - iv) Short circuit forces
- d) The support structure shall be designed on the basis of applicable Indian/ International Standards and codes of practice.

7 TYPE TESTS

- 7.1 Type test certificates on VCB for the following tests, strictly as per IS 13118, with latest amendment thereof, from any of the independent Govt. Laboratory, or at any recognized and reputed international laboratory or testing institution, shall invariably furnished:
 - a) Short Circuit Duty Tests
 - b) Out of phase making and breaking tests.
 - c) Short Time Current Rating Tests
 - d) Mechanical Endurance Test & Electrical operation Test.
 - e) Temperature Rise Test
 - f) Lightning Impulse Voltage withstand Test
 - g) Capacitor Switching Duty Test for Single Bank of 5 MVAR capacity
 - h) Power Frequency withstand Voltage Test dry & wet
 - i) Degree of protection IP-55 for control cubicle
- 7.2 The above type test certificates must accompany drawing of type tested equipment, duly signed by type testing authority.
- 7.3 The above tests must not have been conducted on the equipment earlier than 5 years from the date of opening

of bids.

- 7.4 In case of any change in design/type of Breaker already type tested and the one offered against this specification, the owner reserves the right to demand repetition of type tests, without any extra cost.

7.5 **ACCEPTANCE AND ROUTINE TESTS**

All acceptance and routine tests, as stipulated in relevant standards, shall be carried out by the manufacturer, in presence of owner's representative. Immediately after finalization of the programme of testing, the manufacturers/supplier shall give, fifteen days advance intimation to the owner, to enable him depute his representative for witnessing the tests.

8 **INSPECTION**

The inspection may be carried out by the purchaser or his representative at any stage of manufacture. The successful Bidder/manufacturer shall grant free access to the purchaser's representative/s at a reasonable notice when the work is in progress. Inspection and acceptance of any equipment under this specification by the purchaser, shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specification and shall not prevent subsequent rejection if the equipment is found to be defective.

9 **RATING PLATES**

The detailed rating plate shall be as per IS and in addition, shall indicate the following:

- a) Circuit Breaker and its operating device shall be provided with rating plate/s made out of corrosion proof metal, marked with the following data. The data shall be either punched or engraved on the plate/s.
- b) Manufacturer's name or trade mark by which he may be readily identified.
- c) Serial number and type designation of CB & Operating mechanism
- d) Year of manufacture
- e) Voltage
- f) Lightning impulse withstand voltage
- g) Normal current
- h) Short circuit breaking current
- i) Duration of short circuit
- j) Mass of circuit breaker with support structure.
- k) Auxiliary D.C. supply voltage of closing and opening devices
- l) Out of phase making & breaking current
- m) A.C. supply voltage of auxiliary circuits. Insulation level
- n) Frequency
- o) Purchase order reference
- p) Operating sequence.

The rating plates shall be installed in such positions that the same shall be clearly visible to a man standing on ground. i.e. at the level of eye site.

10 **DOCUMENTATION**

- 10.1 All drawings shall conform to international standards organization (ISO) 'A' series of drawing sheet/Indian Standards Specification IS 656. All drawings shall be in ink and suitable for micro filming. All dimensions and data shall be in System International Units.

- 10.2 **DRAWINGS:** The bidder shall furnish a set of relevant descriptive and illustrative published literature/pamphlets

and the following drawings for preliminary study:

- i) General outline drawings showing outside dimensions, shipping dimensions, weights, quantity of insulating media air receiver capacity and such other prominent details.
- ii) Sectional views showing the general constructional features of the circuit breaker including operating mechanism, arcing chambers, contacts, with lifting dimensions for maintenance.
- iii) Schematic diagrams of the scheme for control, supervision and reclosing.
- iv) Structural drawing, design calculations and loading data for support structures.
- v) Foundation drilling plan and loading data for foundation design.
- vi) Bill of Materials.
- vii) Type test reports of circuit breakers along with a separate list showing all the tests carried out with date & place of test.

10.3 Test reports, literatures and pamphlets of bought out items and raw materials. The successful bidder shall submit four sets of final versions of all the above said drawings in A-3 size, bill of material, packing list & all type test reports for purchaser's approval to the office of CGM(PP&D). The purchaser shall communicate his comments/approval on the drawings to the supplier within reasonable period.

10.4 The successful bidder shall furnish in the form of nicely bound volumes, the manuals covering erection, commissioning, operation and maintenance instructions and all relevant information and drawings pertaining to the Vacuum Circuit Breakers as well as auxiliary devices. Each manual shall also contain one set of all the approved drawings type test reports as well as acceptance test reports to corresponding consignment dispatched. The total quantity of the operating manuals/approved drawings sets to be supplied by the supplier shall be equal to the number of three phase breakers of rating, ordered.

10.5 The manufacturing of the Vacuum Circuit Breakers 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 Vacuum Circuit Breakers prior to the approval of the drawings shall be at the supplier's risk.

10.6 The successful bidders shall submit all relevant documents and drawings as applicable **for approval to the Employer which shall be in quadruplicate**. One print of such drawings shall be returned to the Contractor by the Employer marked "approved/approved with corrections". The contractor shall there upon furnish the Employer additional prints as may be required along with one reproducible in original of the drawings after incorporating all corrections

10.7 Approval of drawings/work by the purchaser shall not relieve the supplier of any of his responsibility and liability for ensuring correctness and correct interpretation of the drawings for meeting the requirements of the latest revisions of applicable standards, rules and codes of practices.

11 PACKING AND FORWARDING

11.1 The Vacuum Circuit Breakers shall be packed in suitable crates so as 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 materials shall be carefully packed and marked with the appropriate caution symbols. Wherever necessary, proper lifting arrangement 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.

11.2 Each consignment shall be accompanied by a detailed packing list containing the following information:

- i) Name of the consignee.
- ii) Details of consignment.
- iii) Destination.
- iv) Total weight of consignment.
- v) Sign showing upper/lower side of the crate.
- vi) Handling and unpacking instructions.
- vii) Bill of materials indicating contents of each package and spare materials

11.3 The supplier shall ensure that the packing list and bill of materials are approved by the purchaser before dispatch.

2.9.0 TECHNICAL SPECIFICATION FOR 11 OUTDOOR TYPE CURRENT TRANSFORMER

1. INTRODUCTION

This section covers the specification of 11kV Current Transformer of CT ratio 400-200/1-1A suitable for outdoor service. Any other parts not specifically mentioned in this specification but otherwise required for proper functioning of the equipment should be included by the tender in the offer

2. APPLICABLE STANDARDS

Unless otherwise modified in this specification, the Current Transformer shall comply with the latest version of relevant standards (IS 2165, IS 2705(I-IV), IS 2099, IS 5621, IS 2071, IS 335, IS 13947(part I), IEC 185, IEC 270, IEC 44(4), IEC 171, IEC 60, IEC 8263, IEC 815,

Indian electricity Rules 2003) or better international standards. This list of standards is for guidance only. The contractor shall be solely responsible to design & manufacture the CT suitable for 11 kV systems.

3. SERVICE CONDITIONS

The CT supplied against these specifications shall be suitable for satisfactory continuous operation under the tropical conditions, as mentioned for power transformers.

Maximum altitude above sea level	100m
Minimum ambient air temperature	45°C
Maximum daily average ambient air temperature	40° C
Minimum ambient air temperature	2° C
Maximum temperature attainable by an object exposed to the sun	60° C
Maximum yearly weighted average ambient temperature	32° C
Maximum relative humidity	98%
Average number of thunderstorm days per annum (isokeraunic level)	45:50(MV)
Average number of rainy days per annum	120
Average annual rainfall	2200 mm
Maximum annual rainfall	3500 mm
Maximum wind pressure	260Kg/m ²
Seismic level(Horizontal acceleration)	0.24g to 0.48g
Climatic condition Moderately hot and humid tropical climate conducive to rust and fungus growth.	

4. SYSTEM PARTICULARS

a)	Nominal System Voltage	11kV
b)	Highest system Voltage	12kV
c)	Rated Frequency	50Hz
d)	No of phases	Three
e)	System neutral earthing	-Solidly Earthed-
f)	One minute Power Freq. voltage (rms)	28kV withstand
g)	Lighting Impulse withstand Voltage	75kVp
i)	System fault level	-25kA for 3sec-

5. TECHNICAL PARAMETERS OF CT

a)	Type	Single phase, dead tank, outdoor, oil filled & hermetically sealed	
b)	Type of mounting	Pedestal type	
c)	Rated primary current	200-400A	
d)	Rated secondary current	1-1A	
e)	Rated Continuous thermal current	120 % of rated	
f)	Rated short time withstand Requirement for sec. Winding	As per IS 2705 Pt. I25kA (RMS)	
g)	Rated short time withstand Current		
i)	Duration (for primary current of 150amps and above)	3Sec	
ii)	Duration (for primary current below 150amps)	1 Sec	
h)	Rated dynamic withstand Current (KA rms)	62.5	
i)	Max temp rise	As per IEC-185/ IS 2705	
j)	Minimum creepage distance porcelain housing(mm)	25 mm /KV of	
k)	One minute power frequency Withstand voltage between Secondary terminal & earth	3	kV
l)	Detail of Secondary Cores	Metering	Protn.
	Current ratio	(As per BPS)	
	Accuracy class	0.5	5P10
	Burden (VA)	15	15
	Instrument security Factor	≤5	-
	Accuracy Limit Factor	-	±10

Note: The ratings indicated for instrument transformer are tentative only and may be changed to meet the requirements.

6. INSULATION

The insulation of the CT shall be so designed that the internal insulation shall have higher electrical withstand capability than the external insulation. The designed dielectrics withstand values of external and internal insulations shall be clearly brought out in the GTP. The dielectric withstand values specified in this specification are meant for fully assembled CT. The temperature rise on any part of equipment shall not exceed the maximum temperature rise limits specified in the relevant standard.

7. PORCELAIN HOUSING

It shall be single piece of homogeneous, vitreous porcelain of high mechanical & dielectric strength. It will be glazed with uniform Brown or Dark brown colour with smooth surface finish. The Creepage distance for the porcelain housing shall be at least 25 mm per kV.

8. TANK & SURFACE FINISH

The metal tanks shall have bare minimum number of welded joints so as to minimize possible locations of oil leakage. The tank shall be fabricated of MS steel sheet of min. 3.15 mm for sides & 5 mm for top & bottom. The bottom of the tank shall be adequately accessible for periodical maintenance of open surface.

The metal tanks shall be coated with at least two coats of zinc rich epoxy painting. The inner surface shall be painted with oil resistance white enamel paint. All the ferrous hardware, exposed to atmosphere, shall be hot dip galvanized. All other fixing nuts, bolts, washers in the electrical current path shall be made out of stainless steel.

9. GENERAL CONSTRUCTIONAL REQUIREMENTS

- 9.1 The CT shall be of dead tank design and shall be so constructed that it can be easily transported to site within the allowable transport limitation, even in horizontal position, if the transport limitation so demands. The C.T. shall be hermetically sealed and method of such sealing shall be detailed in the offer.
- 9.2 CT secondary terminals shall be brought out in a weatherproof terminal box. The terminal box shall be provided with removable gland plate and glands. The cable glands shall be suitable for 1100 volts grade PVC insulated, PVC sheathed multi core stranded 6 sq.mm copper conductor cable. This terminal box shall be dust and vermin proof. The dimensions of the terminal box and its opening shall be adequate to enable easy access and working space with the use of normal tools.
- 9.3 Polarity shall be invariably marked in each primary and secondary terminal. Facility shall be provided for short circuiting and grounding of the CT secondary terminals inside the terminal box.
- 9.4 The CT shall be provided with a rating plate with dimensions and marking as per IS-16227. The markings shall be punched and not painted. The serial number and code of the supplier shall also be punched on the tank to identify the unit in case of loss or damage to the rating plate.
- 9.5 The CT shall be vacuum-filled with oil after processing and thereafter hermetically sealed to eliminate breathing and to prevent air and moisture entering into the tank. Oil filling and / or oil sampling cocks, if provided to facilitate factory processing should be permanently sealed before dispatching the CT. The method adopted for hermetic sealing shall be described in the offer.

10. WINDING

10.1. PRIMARY WINDING

It shall be made of high conductivity rigid copper wire. The primary winding current density shall not exceed the limit of 1.6 Amp per sq. mm for normal rating. The design current density for short circuit current as well as conductivity of metal used for primary winding shall be as per IS 2705. The calculation for the selection of winding cross section shall be furnished by contractor. The primary terminal shall be of standard size of 30 mm dia x 80 mm length of heavily tinned (min. thickness 15 micron) electrolytic copper of 99.9 % conductivity.

10.2 SECONDARY WINDING

Shall be made of insulated copper wire of electrolytic grade. Type of insulation used shall be described in the offer. For multi ratio design, the multi ratio will be achieved by reconnection of the primary winding or secondary winding. The excitation current of the CT shall be as low as possible. The contractor shall furnish the magnetization curves for all the cores.

The terminal box shall be dust free & vermin proof. The size of the terminal box shall be big enough to enable easy access and working space with the use of normal tools.

The secondary terminals studs shall be provided with at least 3 nuts and two plain washers, these shall be made of brass duly nickel plated. The min. stud outer dia shall be 6 mm & length 15 mm. The min spacing between the centres of the adjacent studs shall be 1.5 time the outer dia of the stud.

10.3 POLARITY

The polarity shall be marked on each CT at the primary and secondary terminals.

11. INSULATION OIL

The first filling of oil in CT shall be in contractor's scope. The oil shall be as per IS 335:2018. **To ensure prevention of oil leakage, the manufacturer will give following details supported by drawings:**

- i) Location of emergence of Primary & Secondary terminals
- ii) Interface between porcelain & metal tanks
- iii) Cover of the secondary terminal box

Any nut & bolt and screw used for fixation of the interfacing porcelain bushing for taking out the terminals shall be provided on flanges cemented to the bushings & not on the porcelain.

If gasket joints are used, Nitrite Butyl Rubber gasket shall be used. The grooves shall be machined with adequate space for accommodating gasket under pressure.

The CT shall be vacuum filled with oil after processing. It will be properly sealed to eliminate breathing & to prevent air & moisture from entering the tank. The sealing methods/arrangement shall be described by the contractor & be approved by the owner.

12. OIL LEVEL INDICATOR

The CT shall be fitted with prismatic type oil sight window at suitable location so that the oil level is clearly visible with naked eye to an observer standing at ground level.

To compensate oil volume variation due to temperature variation, Nitrogen cushion or the stainless steel bellows shall be used. Rubber diaphragms are not permitted for this purpose.

13. EARTHING

Two earthing terminals shall be provided on the metallic tank of size 16 mm dia & 30 mm length each with one plain washer & one nut for connection to the station earth mat.

14. JUNCTION BOX

The junction box shall be of MS sheet having thickness of 2mm, synthetic enamel painted as per procedure mentioned in General Technical Requirement (Min. thickness 55 micron). The shade of junction box shall be 697 of IS: 5. Disconnecting type terminal blocks for CT secondary lead shall be provided. The junction boxes shall be weather proof type with gaskets, as per section-I (Introduction and general technical requirements) conforming to IP-55 as per IS-13947 (Part-I).

15. LIFTING & MOUNTING ARRANGEMENT

The CT shall be provided with two lifting eyes to lift the CT. This shall be so positioned so as to avoid any damage to the CT during lifting for installation or transportation purpose. This shall be detailed in General Arrangement drawing.

The CT shall be of pedestal mounting type suitable for outdoor installation on steel/cement concrete structures. All the clamps, bolts, nut and washers etc. required for mounting the CT on the structure shall be supplied along with the CT and shall be galvanized. The contractor shall supply all the terminal connectors etc. required for connection to the CT.

16. TESTING

Type Test:

The Current Transformer design offered in the Bid should have been successfully type tested at NABL laboratories for the tests indicated as follow in line with the relevant standard and technical specification. These Type Tests should have been carried out within five years prior to the date of opening of tender. The bidder shall be required to submit complete set of the type test reports along with the offer.

In case these type tests are conducted earlier than five years, all the type tests as per the relevant standard shall be carried out by the successful bidder at NABL in presence of purchaser's representative free of cost before commencement of

supply. The undertaking to this effect should be furnished along with the offer without which the offer shall be liable for rejection.

If there is any change in the design/ type of old type tested current transformers to be offered against this specification, then the offer is considered for placement of order. However, successful bidders have to carry out the said type tests on offered type equipment before commencement of supply at their own expense.

Sl.No.	Type test Description
A	Schedule of Type Test for CT
1	Verification of terminal marking and polarity.
2	High voltage power frequency tests on primary windings.
3	High voltage power frequency tests on secondary windings.
4	Over voltage inter turn test.
5	Determination of error according to the requirement of appropriate accuracy class
6	Short time current test.
7	Impulse voltage test.
8	Temperature Rise Test.
9	Instrument Security Factor Test on Both phase of the CT as per Cl. No.7.1.2 of IS-2705 (Part-II).
10	High Voltage Power-frequency Wet withstand voltage test as per Cl. No.9.9 of IS-2705 (Part-I).

Acceptance & Routine Tests:-

All acceptance and routine tests as stipulated in the respective applicable standards amended up-to-date for current transformer shall be carried out by the supplier in the presence of purchaser's representative without any extra cost to the purchaser before dispatch.

17. INSPECTION

- 17.1. The inspection may be carried out by the purchaser at any stage of manufacture. The successful bidder shall grant free access to the purchaser's representative at any reasonable time when the work is in progress. All facilities must be made available by supplier/manufacturer for unrestricted inspection of the works, raw material & manufacture of all the accessories & for conducting necessary tests as declared therein.
- 17.2. No current transformer shall be dispatched from its point of manufacture unless the current transformer has been satisfactorily inspected and tested.
- 17.3. Inspection and acceptance of any current transformer under this specification by the purchaser shall not relieve the supplier of his obligation of furnishing current transformer in accordance with the specification and shall not prevent subsequent rejection, if the current transformer is found to be defective.

18. DOCUMENTATION

18.1 List of Drawings & Documents :-

The bidder shall furnish two sets of the following drawings along with offer.

- a) General outline and assembly drawings of the equipment
- b) Sectional views showing :-
 - i) General Constructional features of Current Transformer, dimensions of conductor, depth of insulation, clearance between paper insulation & the inside of porcelain, grading stages used for primary insulation, whether & how a semi conducting tape is used to cover metal foils etc.
 - ii) The Sectional view shall show the materials / gaskets / sealing used for perfect hermetic sealing and arrangement for compensation of oil volume variation.
 - iii) The insulation, the winding arrangements, method of connection of the primary /secondary winding to the

- primary / secondary terminals etc.
 - iv) Porcelain housing used and its dimensions along with the mechanical and electrical characteristics, as well as volume of oil.
 - c) Arrangement of secondary Terminal box & details of connection studs provided.
 - d) Name Plate
 - e) Schematic drawing
 - f) Type Test reports in case the equipment has already been type tested.
 - g) Test reports, literature, pamphlets of the bought out items, and raw material
 - h) Bill of material and packing list.
 - i) Pressure release device
 - j) Oil level indicator
 - k) Drain plug
 - l) Bushing drawing
- 18.2 The successful bidders shall submit all relevant documents and drawings as applicable **for approval to the Employer which shall be in quadruplicate**. One print of such drawings shall be returned to the Contractor by the Employer marked "approved/approved with corrections". The contractor shall there upon furnish the Employer additional prints as may be required along with one reproducible in original of the drawings after incorporating all corrections.
- 18.3 Adequate copies of acceptance and routine Test Certificates, duly approved by AEGCL shall accompany the dispatched consignment.
- 18.4 The manufacturing of the current transformers shall be strictly in accordance with the approved drawings and no deviation shall be permitted without the written approval of the AEGCL. All manufacturing and fabrication work in connection with the current transformers prior to the approval of the drawing shall be at the supplier's risk.
- 18.5 One set of nicely printed and bound volume of operation, maintenance and erection manuals in English language per Current Transformer of each voltage rating shall be submitted by the supplier to respective consignees along with the dispatch documents of each unit. The manual shall contain all the drawings and information required for erection, operation and maintenance of the Current Transformer. The manual shall also contain a set of all the approved drawings, Type Test reports etc.
- 18.6 Approval of drawings by AEGCL shall not relieve the supplier of his responsibility and liability for ensuring correctness and correct interpretation of the drawings for meeting the requirement of the Technical Specification, latest revision of applicable standards, rules and codes of practices. The equipment shall conform in all respects to high standards of engineering, design, workmanship and latest revisions of relevant standards at the time of ordering and AEGCL shall have the power to reject any work or materials which, in his judgment, is not in full accordance therewith.

19. PACKING & FORWARDING

- 19.1 The current transformers shall be packed in wooden crates of good quality and shall be suitable for vertical / horizontal transportation as the case may be, and suitable to withstand handling during transport and outdoor storage in stores before erecting. 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.
- 19.2 Each consignment shall be accompanied by a detailed packing list containing the following information:
- a) Name of the consignee.
 - b) Details of consignment.
 - c) Destination.
 - d) Total weight of consignment.
 - e) Sign showing upper / lower side of the crate.
 - f) Handling and unpacking instructions.
 - g) Bill of material indicating contents of each package
- 19.3 The supplier shall ensure that the packing list and bill of material are approved by the AEGCL before dispatch.

2.10.0 TECHNICAL SPECIFICATION FOR 11 KV OUTDOOR TYPE POTENTIAL TRANSFORMER

1. INTRODUCTION

This chapter covers specification of 11kV Potential Transformer suitable for outdoor service. Any other parts not specifically mentioned in this specification but otherwise required for proper functioning of the equipment should be included by the tender in the offer.

2. APPLICABLE STANDARDS

Unless otherwise modified in this specification, the Potential Transformer shall comply with the latest version of relevant standards (IS 3156, IS 2099, IS 5621, IS 335, IS 13947(Part I), IEC 186, Indian electricity Rules 2003, IEC 815) or better international standards. This list of standards is for guidance only. The contractor shall be solely responsible to design & manufacture the PT suitable for 11kV systems.

3. SERVICE CONDITIONS

The PT supplied against this specification shall be suitable for satisfactory continuous operation under the tropical conditions as detailed for power transformers.

Maximum altitude above sea level	100m
Minimum ambient air temperature	45°C
Maximum daily average ambient air temperature	40° C
Minimum ambient air temperature	2° C
Maximum temperature attainable by an object exposed to the sun	60° C
Maximum yearly weighted average ambient temperature	32° C
Maximum relative humidity	98%
Average number of thunderstorm days per annum (isokeraunic level)	45±50(MV)
Average number of rainy days per annum	120
Average annual rainfall	2200 mm
Maximum annual rainfall	3500 mm
Maximum wind pressure	260Kg/m ²
Seismic level(Horizontal acceleration)	0.24g to 0.48g
Climatic condition Moderately hot and humid tropical climate conducive to rust and fungus growth.	

4. SYSTEM PARTICULARS

a)	Nominal System Voltage	11kV
b)	Highest system Voltage	12kV
c)	Rated Frequency	50Hz
d)	No of phases	Three
e)	System neutral earthing	---Solidly Earthed---
f)	One minute Power Freq. Withstand voltage (rms)	28kV 75kVp
g)	Lighting Impulse withstand Voltage	
h)	System fault level	---25 kA for 3sec---

5. TECHNICAL PARAMETERS OF PT

a) Rated primary Voltage	12 KV
b) Type	Single phase potential transformer
c) Voltage/ Ratio(kV)	11/0.11
d) Rated voltage factor	1.5–30seconds
e) One minute power freq. Withstand voltage for	
Primary Terminals	28 kV
Secondary winding	12 KV
f) Min. Creepage Distance	25 mm/kV of Highest System Voltage
g) Detail of secondaries	Application Metering
Accuracy	0.5
Burden (VA)	100

Note: The ratings indicated for instrument transformer are tentative only and may be changed to meet the requirements.

6. INSULATION

The insulation of the potential transformers shall be so designed that the internal insulation shall have higher electrical withstand capability than the external insulation. The designed dielectrics withstand values of external and internal insulations shall be clearly brought out in the GTP (Guaranteed Technical particulars). The dielectric withstand values specified in this specification are meant for fully assembled instrument transformer. The temperature rise on any part of equipment shall not exceed the maximum temperature rise limits specified in annexure IV under the conditions specified there in.

7. PORCELAIN HOUSING

- 7.1. It shall be single piece of homogeneous, vitreous porcelain of high mechanical & dielectric strength. It will be glazed with uniform Brown or Dark brown colour with smooth surface finish. The creepage distance for the porcelain housing shall be at least 25mm per kV.
- 7.2. The contractor shall clearly detail in his bid the details of attaching the metallic flange to porcelain, pressure release valve and also how primary & secondary terminals shall be brought out.

8. TANK & SURFACE FINISH

- 8.1. The metal tanks shall have bare minimum number of welded joints so as to minimize possible locations of oil leakage. It shall be fabricated of MS steel sheet of min. 3.15 mm for sides & 5 mm for top & bottom. The tank will be finished with min. 2 coats of zinc rich epoxy paint externally. The inner surface shall be painted with oil resistance white enamel paint.
- 8.2. All ferrous hardwares, exposed to atmosphere shall be hot dipped galvanized.

9. GENERAL CONSTRUCTIONAL REQUIREMENTS

- 9.1. The PT shall be vacuum filled with oil after processing and hermetically sealed to eliminate breathing and to prevent air and moisture entering the tanks. Method adopted for hermetic sealing shall be described in the offer and shall

be subject to approval of the purchaser.

- 9.2. The PT shall be so constructed that it can be easily transported to site within the allowable transport limitations, even in horizontal position, if the transport limitations so demand.

10. WINDING

10.1 PRIMARY WINDING

It shall be made of insulated electrolytic copper wire. The neutral end of the winding shall be brought outside for earthing. The primary terminal shall be of standard size of 30 mm dia x 80 mm length of heavily tinned (min. thickness 15 micron) electrolytic copper of 99.9% conductivity.

10.2 SECONDARY WINDING

It shall be made of insulated copper wire of electrolytic grade. The terminal box shall be dust free & vermin proof. The size of the terminal box shall be big enough to enable easy access and working space with the use of normal tools.

The secondary terminal studs shall be provided with at least 3 nuts and two plain washers. These shall be made of brass duly nickel plated. The min. stud outer dia shall be 10 mm & length 15 mm. The min spacing between the centres of the adjacent studs shall be 1.5 times the outer dia of the stud.

10.3 POLARITY

The polarity shall be marked on each PT at the primary and secondary terminals.

11. INSULATION OIL

The first filling of oil in PT shall be in contractor's scope. The oil shall be as per IS 335. To ensure prevention of oil leakage, the manufacturer will give following details supported by drawings :

- i) Location of emergence of Primary & Secondary terminals
- ii) Interface between porcelain & metal tanks
- iii) Cover of the secondary terminal box

Any nut & bolt and screw used for fixation of the interfacing porcelain bushing for taking out the terminals shall be provided on flanges cemented to the bushings & not on the porcelain.

If gasket joints are used, Nitrile Butyl Rubber gasket shall be used. The grooves shall be machined with adequate space for accommodating gasket under pressure.

The PT shall be vacuum filled with oil after processing. It will be properly sealed to eliminate breathing & to prevent air & moisture from entering the tank. The sealing methods/arrangement shall be described by the contractor & be approved by the owner.

12. OIL LEVEL INDICATOR

The PT shall be fitted with prismatic type oil sight window at suitable location so that the oil level is clearly visible with naked eye to an observer standing at ground level.

To compensate oil volume variation due to temperature variation, Nitrogen cushion or the stainless steel bellows shall be used. Rubber diaphragms are not permitted for this purpose.

13. EARTHING

Two earthing terminals shall be provided on the metallic tank of size 16 mm dia & 30 mm length each with one plain washer & one nut for connection to the station earth mat.

14. JUNCTION BOX

The junction box shall be of MS sheet having thickness of 2mm, synthetic enamel painted as per procedure mentioned in General technical Requirement (Min. thickness 55 micron). The shade of junction box shall be 697 of IS: 5. Disconnecting type terminal blocks for PT secondary lead shall be provided. The junction boxes shall be weather proof type with gaskets as per section-I (Introduction and general technical requirements) conforming to IP-55 as per IS-13947 (Part-I).

One junction box shall be provided for 3 numbers of single phase CT's and PT's.

15. LIFTING & MOUNTING ARRANGEMENT

The PT shall be provided with two lifting eyes to lift the PT. This shall be so positioned so as to avoid any damage to the PT during lifting for installation or transportation purpose. This shall be detailed in General Arrangement drawing.

The PT shall be of pedestal mounting type suitable for outdoor installation on steel/cement concrete structures. All the clamps, bolts, nut and washers etc. required for mounting the PT on the structure shall be supplied along with the PT and shall be galvanized. The contractor shall supply all the terminal connectors etc. required for connection to the PT.

16. TESTING

16.1. Type Tests:

The Potential Transformer offered in the Bid should have been successfully type tested at NABL laboratories for the tests indicated as follow in line with the relevant standard and technical specification. These Type Tests should have been carried out within five years prior to the date of opening of tender. The bidder shall be required to submit complete set of the type test reports along with the offer. In case these type tests are conducted earlier than five years, all the type tests as per the relevant standard shall be carried out by the successful bidder at NABL in presence of purchaser's representative free of cost before commencement of supply. The undertaking to this effect should be furnished along with the offer without which the offer shall be liable for rejection. If there is any change in the design/ type of old type tested Potential transformers to be offered against this specification, then the offer is considered for placement of order. However, successful bidders have to carry out the said type tests on offered type Potential transformers before commencement of supply at their own expense.

Sl.No.	Type test Description
A	Schedule of Type Test for PT
1	Verification of terminal marking and polarity.
2	Power frequency dry withstand test on primary winding.
3	Power frequency dry withstand test on secondary winding.
4	Determination of errors according to the requirement of the appropriate accuracy class.
5	Temperature rise test.
6	Impulse voltage test for voltage transformer for service in electricity exposed installation.
7	High Voltage Power-frequency Wet withstand voltage test as per Cl. No.9.7 of IS-3156(Part-I)

Acceptance & Routine Tests:-

All acceptance and routine tests as stipulated in the respective applicable standards amended up-to-date for potential transformer shall be carried out by the supplier in the presence of purchaser's representative without any extra cost to the purchaser before dispatch.

17. INSPECTION

- 17.1. The inspection may be carried out by the purchaser at any stage of manufacture. The successful bidder shall grant free access to the purchaser's representative at any reasonable time when the work is in progress. All facilities must be made available by supplier/ manufacturer for unrestricted inspection of the works, raw material & manufacture of all the accessories & for conducting necessary tests as declared therein.
- 17.2. No potential transformer shall be dispatched from its point of manufacture unless the potential transformer has been satisfactorily inspected and tested.
- 17.3. Inspection and acceptance of any potential transformer under this specification by the purchaser shall not relieve the supplier of his obligation of furnishing potential transformer in accordance with the specification and shall not prevent subsequent rejection, if the potential transformer is found to be defective.

18. DOCUMENTATION

- 18.1 List of Drawings & Documents :-
The bidder shall furnish a set of the following drawings along with offer.
- a) General outline and assembly drawings of the equipment
 - b) Sectional views showing :-
 - i) General Constructional features of Potential transformer, dimensions of conductor, depth of insulation, clearance between paper insulation & the inside of porcelain, grading stages used for primary insulation, whether & how a semi conducting tape is used to cover metal foils etc.
 - ii) The Sectional view shall show the materials / gaskets / sealing used for perfect hermetic sealing and arrangement for compensation of oil volume variation.
 - iii) The insulation, the winding arrangements, method of connection of the primary /secondary winding to the primary / secondary terminals etc.
 - iv) Porcelain housing used and its dimensions along with the mechanical and electrical characteristics, as well as volume of oil.
 - c) Arrangement of secondary Terminal box & details of connection studs provided.
 - d) Name Plate
 - e) Schematic drawing
 - f) Type Test reports in case the equipment has already been type tested.
 - g) Test reports, literature, pamphlets of the bought out items, and raw material
 - h) Bill of material and packing list.
 - i) Pressure release device
 - j) Oil level indicator
 - k) Drain plug
 - l) Bushing drawing
- 18.2 The successful bidders shall submit all relevant documents and drawings as applicable **for approval to the Employer which shall be in quadruplicate**. One print of such drawings shall be returned to the Contractor by the Employer marked "approved/approved with corrections". The contractor shall there upon furnish the Employer additional prints as may be required along with one reproducible in original of the drawings after incorporating all corrections
- 18.3 Adequate copies of acceptance and routine Test Certificates, duly approved by AEGCL shall accompany the dispatched consignment.
- 18.4 The manufacturing of the potential transformers shall be strictly in accordance with the approved drawings and no deviation shall be permitted without the written approval of the AEGCL. All manufacturing and fabrication work in connection with the potential transformers prior to the approval of the drawing shall be at the supplier's risk.
- 18.5 One set of nicely printed and bound volume of operation, maintenance and erection manuals in English language per Potential transformer of each voltage rating shall be submitted by the supplier to respective consignees along with the dispatch documents of each unit. The manual shall contain all the drawings and information required for erection,

operation and maintenance of the Potential transformer. The manual shall also contain a set of all the approved drawings, Type Test reports etc.

- 18.6 Approval of drawings by AEGCL shall not relieve the supplier of his responsibility and liability for ensuring correctness and correct interpretation of the drawings for meeting the requirement of the Technical Specification, latest revision of applicable standards, rules and codes of practices. The equipment shall conform in all respects to high standards of engineering, design, workmanship and latest revisions of relevant standards at the time of ordering and AEGCL shall have the power to reject any work or materials which, in his judgment, is not in full accordance therewith.

19 PACKING & FORWARDING

- 19.1 The potential transformers shall be packed in wooden crates of good quality and shall be suitable for vertical / horizontal transportation as the case may be, and suitable to withstand handling during transport and outdoor found short inside the packing cases shall be supplied by supplier without any extra cost.
- 19.2 Each consignment shall be accompanied by a detailed packing list containing the following information:
- i) Name of the consignee.
 - ii) Details of consignment.
 - iii) Destination.
 - iv) Total weight of consignment.
 - v) Sign showing upper / lower side of the crate.
 - vi) Handling and unpacking instructions.
 - vii) Bill of material indicating contents of each package
- 19.3 The supplier shall ensure that the packing list and bill of material are approved by the AEGCL before dispatch.

2.11.0 TECHNICAL SPECIFICATION OF 11KV 10KA LIGHTNING (SURGE) ARRESTOR (STATION TYPE)

1. SCOPE

This section covers the specification of 11kV voltage station Lightning (Surge) Arrestors for installation on outdoor type 11kV switchgear, transmission lines, transformers etc..

2. STANDARDS

The design, manufacture and performance of Surge Arrestors shall comply with IS: 3070 Part-3 and other specific requirements stipulated in the specification. Unless otherwise specified, the equipment, material & processes shall conform to the latest amendments of the following:

IS:2071-1993 (Part-1)	Methods of High Voltage Testing General Definitions & Test Requirements.
IS:2071-1974 (Part-2)	Test Procedures.
IS: 2629-1985	Recommended Practice for hot dip galvanizing on Iron & Steel.
IS: 2633-1986	Method for Testing uniformity of coating of zinc coated Articles.
IS:3070-1993 (Part -3)	Specification for surge arrester for alternating current systems. Metal-Oxide lightning Arrestors without gaps.
IS: 4759-1996	Specification for hot dip zinc coating on structural steel and other allied products.
IS: 5621-1980	Hollow Insulators for use in Electrical Equipment.
IS: 6209-1982	Methods of Partial discharge measurement.
IS: 6745	Method for determination of mass of zinc coating on zinc coated iron and steel articles.
ANSI/IEEE-C.62.11	Metal oxide, Surge Arrester for AC Power Circuits.
IEC -60099-4	Surge Arrestors.

The equipment complying with any other internationally accepted standards shall also be considered if it ensures performance equivalent to or superior to the Indian Standards.

3. GENERAL REQUIREMENT

- 3.1. The metal oxide gap less Surge Arrester without any series or shunt gap shall be suitable for protection of 11 kV side of power transformers, associated equipment and 11kV lines from voltage surges resulting from natural disturbance like lightning as well as system disturbances.
- 3.2. The surge arrester shall draw negligible current at operating voltage and at the same time offer least resistance during the flow of surge current.
- 3.3. The surge arrester shall consist of non-linear resistor elements placed in series and housed in electrical grade porcelain housing / silicon polymeric of specified Creepage distance.
- 3.4. The assembly shall be hermetically sealed with suitable rubber gaskets with effective sealing system arrangement to prevent ingress of moisture.
- 3.5. The surge arrester shall be provided with line and earth terminals of suitable size. The ground side terminal of surge arrester shall be connected with 25x6 mm galvanized strip, one end connected to the surge arrester and second end to a separate ground electrode. The bidder shall also recommend the procedure which shall be followed in providing the earthing system to the Surge Arrester.
- 3.6. The surge arrester shall not operate under power frequency and temporary over voltage conditions but under surge conditions, the surge arrester shall change over to the conducting mode.

- 3.7. The surge arrester shall be suitable for circuit breaker performing 0-0.3 min-CO-3 min-CO- duty in the system.
- 3.8. 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 arrester failure.
- 3.9. The reference current of the arrester shall be high enough to eliminate the influence of grading and stray capacitance on the measured reference voltage.
- 3.10. The Surge Arrester shall be thermally stable and the bidder shall furnish a copy of thermal stability test with the bid.
- 3.11. The arrester shall be capable of handling terminal energy for high surges, external pollution and transient over voltage and have low losses at operating voltages.

3.12. ARRESTOR HOUSING

- 3.12.1. The arrester housing shall be made up of **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 **Grey (for silicon polymeric)** colour, free from blisters, burrs and other similar defects. Arrestors shall be complete with insulating bases, fasteners for stacking units together and terminal connectors.
- 3.12.2. The housing shall be so coordinated that external flashover shall not occur due to application of any impulse or switching surge voltage upto the maximum design value for arrester. The arrestors shall not fail due to contamination. The 11kV arrestors housing shall be designed for pressure relief class as given in Technical Parameters of the specification.
- 3.12.3. Sealed housings shall exhibit no measurable leakage.

3.13. ARRESTOR MOUNTING

The arrestors shall be suitable for mounting on 4 pole/2 pole structure used for pole/plinth mounted transformer and for incoming and outgoing lines. Arrester may also be required to be mounted on a bracket provided in the Transformers.

3.14. FITTINGS & ACCESSORIES

- 3.14.1. The surge arrester shall be complete with fasteners and terminal connectors.
- 3.14.2. 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 arrester shall be galvanized. The line terminal shall have a built in clamping device which can be adjusted for both horizontal and vertical takeoff.

4. TECHNICAL PARTICULARS:

The surge arrestors shall conform to the following standard technical requirements. The Insulation values shall be enhanced considering the altitude of operation & other atmospheric conditions.

4.1. System Parameters

i)	Nominal system voltage	11kV
ii)	Highest system voltage	12 kV
iii)	System earthing	Effectively earthed
	system	
iv)	Frequency (Hz)	50
v)	Lightning Impulse withstand	75 Voltage (kVP)
vi)	Power frequency withstand	28 Voltage (kV rms)
vii)	Arrester duty	

-- Connection to system	Phase to earth
-- Type of equipment to be protected	transformers & switchgear

4.2. Surge Arrestors

i)	Type	Gapless Metal oxide outdoor
ii)	Arrestor rating (kV rms)	9
iii)	Continuous Operating voltage	7.65 (kV rms)
iv)	Standard Nominal Discharge Current shape)	10 Rating (kA) (8x20 microimpulse
v)	Degree of protection	IP 67
vi)	Line discharge Class	2
vii)	Steep current at 10 kA	45
viii)	Lightning Impulse at 10 kA	40
ix)	Energy capability corresponding to	
	a) Arrestor rating (kj/kV)	4.5
	b) COV (kj/kV)	4.9
x)	Peak current for high current impulse operating duty of Standard TS for arrestor classification 10kA	100

4.3. Insulator Housing

i)	Power frequency withstand test voltage (Wet) (kV rms)	28
ii)	Lightning impulse withstand/tests voltage (kVP)	75

4.4. Galvanisation

i)	Fabricated Steel Articles	
	a) 5 mm thick cover	610 g/m ²
	b) Under 5 mm but not less than 2 mm thickness	460 g/m ²
	c) Under 2 mm but not less than 1.2 mm thickness	340 g/m ²
ii)	Castings	
	Grey Iron, malleable iron	610 g/m ²
iii)	Threaded works other than tubes & tube fittings	
	a) Under 10 mm dia	270 g/m ²
	b) 10 mm dia & above	300 g/m ²

NOTE : Surge Monitor shall have to be provided if covered in BPS.

5. TESTS

5.1. 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 : 3070 (Part-3)-/IEC:600994. In addition, the suitability of the surge arresters shall also be established for the following:

- i) Acceptance tests :**
- a) Measurement of power frequency reference voltage of arrester units.
 - b) Lightning impulse residual voltage on arrester units (IEC clause 6.3.2).
 - c) Internal ionization or partial discharge test
- ii) Special Acceptance tests :**
- a) Thermal stability test (IEC clause 7.2.2).
 - b) Watt loss test.
- iii) Routine tests :**
- a) Measurement of reference voltage.
 - b) Residual voltage test of arrester unit.
 - c) Internal ionization or partial discharge test.
 - d) Sealing test.
 - e) Verticality check on completely assembled surge arresters as a sample teston each lot if applicable.

iv) Type Tests :

Following shall be type test as per IS 3070 (Part 3): 1993 or its latest amendment :

SN	Description of test
1	Insulation Withstand test
	a) Lightning Impulse
	b) Power Frequency (Dry/Wet)
2	Residual Voltage Test
	a) Steep current impulse residual voltage test
	b) Lightning impulse residual voltage test
	c) Switching Impulse Residual voltage test
3	Long duration current impulse withstand test
4	Switching surge operating duty test
5	Power frequency voltage Vs. Time characteristics
6	Accelerated Ageing test
7	Pressure relief test
	a) High Current
	b) Low Current
8	Artificial pollution test (for porcelain housing)
9	Seismic Test
10	Partial Discharge test
11	Bending test
12	a) Temperature cycle test (for porcelain housing)
	b) Porosity test (for porcelain housing)
13	Galvanising test on metal parts
14	Seal Leakage test (for porcelain housing)
15	Seal leak test and operation tests (for surgemonitor)
16	Weather ageing test (for polymer housing)

- 5.2. The maximum residual voltages corresponding to nominal discharge current of 10 kA for steep current, impulse residual voltage test, lightning impulse protection level and switching impulse level shall generally conform to Annex-K of IEC-99-4.
- 5.3. The contractor shall furnish the copies of the type tests and the characteristics curves between the residual voltage and nominal discharge current of the offered surge arrester and power frequency voltage v/s time characteristic of the surge arrester subsequent to impulse energy consumption as per clause 6.6 of IS:3070 (Part-3) offered along with the bid.
- 5.4. The surge arrester housing shall also be type tested and shall be subjected to routine and acceptance tests in accordance with IS :5621.
- 5.5. **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.

6. NAME PLATE

- 6.1. The name plate attached to the arrester shall carry the following information:
- Rated Voltage
 - Continuous Operation Voltage
 - Normal discharge current
 - Pressure relief rated current
 - Manufacturers Trade Mark
 - Name of Sub-station
 - Year of Manufacturer
 - Name of the manufacture
 - Name of Client
 - Purchase Order Number along with date

7. DRAWINGS AND INSTRUCTION MANUALS

- 7.1. The successful bidder shall submit **for approval to the Employer shall be in quadruplicate**. One print of such drawings shall be returned to the Contractor by the Employer marked "approved/approved with corrections". The contractor shall there upon furnish the Employer additional prints as may be required along with one reproducible in original of the drawings after incorporating all corrections
- (i) Outline dimensional drawings of Surge Arrester and all accessories.
 - (ii) Assembly drawings and weights of main component parts.
 - (iii) Drawings of terminal clamps.
 - (iv) Arrangement of earthing lead.
 - (v) Minimum air clearance to be maintained of line components to ground.
 - (vi) Name plate.
 - (vii) Surge monitor, if applicable.
 - (viii) Instructions manual.
 - (ix) Drawing showing details of pressure relief valve.
 - (x) Volt-time characteristics of surge arrestors.
 - (xi) Detailed dimensional drawing of porcelain housing/Silicon polymeric i.e. internal diameter, external diameter, thickness, height, profile, creepage distance, dry arcing distance etc.

SECTION – 3

BID SUBMISSION SHEET, BID FORMS AND SCHEDULES

1. Bid Submission Sheet

(To be submitted in Bidder's Letterhead)

Name of contract:

To,

The Deputy General Manager,
Lower Assam, T&T Circle, AEGCL,
Narengi, Guwahati-26

Sir:

We have examined the General Conditions of Contract, Technical Specification, Schedules, and Addenda Nos _____(if any). We have understood and checked these documents and have not found any errors in them. We accordingly offer to execute and complete the said Works and remedy any defects fit for purpose in conformity with these documents and the enclosed Proposal (Price Offer)

We accept your suggestions for the appointment of the Dispute Adjudication Board, as set out in the Bidding Document.

We agree to abide by this Bid until _____ and it shall remain binding upon us and may be accepted at any time before that date.

If our bid is accepted, we will provide the specified performance security, commence the Works as soon as reasonably possible after receiving the notice to commence, and complete the Works in accordance with the above-named documents within the time stated in the Bidding Document.

Unless and until a formal Agreement is prepared and executed this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.

We understand that you are not bound to accept the lowest or any bid you may receive.

Commissions or gratuities, if any, paid or to be paid by us to agents relating to this Bid, and to contract execution if we are awarded the contract, are listed below:

Yours faithfully

Signature _____ in the capacity of _____ duly authorized to sign bids for and on behalf of

Address

2. Form-BG

Form of Bid Security (Bank Guarantee)

WHEREAS, _____ [Name of Bidder] (hereinafter called "the Bidder") has submitted his bid dated _____ [Date] for the construction of _____ [Name of Contract] (hereinafter called "the Bid").

KNOW ALL MEN by these presents that We _____ [Name of Bank] of _____ [Name of Country] having our registered office at _____ (hereinafter called "the Bank") are bound unto _____ [Name of Employer] (hereinafter called "the Employer") in the sum of _____ for which payment will and truly to be made to the said Employer 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 his Bid during the period of bid validity specified in the Form of Bid; 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 Employer up to the above amount upon receipt of its first written demand, without the Employer having to substantiate its demand, provided that in its demand the Employer 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 180 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 Employer, 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)

3. Form-MA

**Form of Manufacturer's Authorization
(To be submitted in Manufacturer's Letterhead)**

Bid No.:

To,

The Deputy General Manager,
Lower Assam, T&T Circle, AEGCL,
Narengi.Guwahati-26

WE *[insert: name of Manufacturer]* who are established and reputable manufacturers of *[insert: name and/or description of the Goods]* having production facilities at *[insert: address of factory]* do hereby authorize *[insert: name & address of Bidder]* (hereinafter, the "Bidder") to submit a bid the purpose of which is to provide the following goods, manufactured by us, and to subsequently negotiate and sign the Contract:

1. _____
 2. _____
- _____

We hereby extend our full guarantee and warranty in accordance with **Clause 2.9.0** of the Special Conditions of Contract, for the above specified Goods supporting the Supply of specified Goods and fulfilling the Related Services by the Bidder against this Bidding Documents, and duly authorize said Bidder to act on our behalf in fulfilling these guarantee and warranty obligations. We also hereby declare that, we will furnish the Performance Guarantee in accordance with **SCC Clause 2.6.0**.

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.

For and on behalf of the Manufacturer

Common Seal and Signature of the authorised
person: Name:

Designation:

NOTE:

This MA should be signed by a person having either of the following-

- 1) Valid Power of attorney
- 2) Authorised by Managing Director
- 3) Member of Board of Directors

4. Guarantee Declaration

We declare that the ratings, specifications and performance figures of the various plants and equipments /material furnished by us in the Bid are guaranteed. We further declare that in the event of any deficiencies in meeting the guarantees in respect of the characteristics mentioned in Guaranteed Technical Particulars, of Technical Bid as established after conducting the factory test, you may at your discretion, reject or accept the equipment/material after assessing the liquidated damages as specified in relevant clause of Bid Document.

Date: (Signature).....
Place: (Printed Name).....
(Designation).....
(Common Seal).....