ASSAM ELECTRICITY GRID CORPORATION LIMITED

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CIN: U40101AS2003SGC007238
Ph:- 0361-2739520/Fax:-0361-2739513 Web: www.aegcl.co.in

BID IDENTIFICATION NO: AEGCL/DGM/LAC/TT/TLS-69/2024/725 ; Dated: 02-07-2024

Bidding Document
For

Supply, erection, testing and commissioning of 132kV Circuit Breaker, 132kV CT and 132KV CVT including foundation works for CVT at 132/33 kV Baghjap GSS for 132kV Sonapur Bay-II.

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

SECTION - 1

INSTRUCTION TO BIDDER

1.1.0 INTRODUCTION :-

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 :- **Supply, erection, testing and commissioning of 132kV Circuit Breaker, 132kV CT and 132KV CVT including foundation works for CVT at 132/33 kV Baghjap GSS for 132kV Sonapur Bay-II.**

b) ESTIMATED VALUE FOR THE WORK :- Rs. 20,00,894.00 (Rupees Twenty Lakh Eight Hundred and Ninety Four) only including taxes and F&I.

c) Fund: O&M HQ fund for FY 2024-25

d) Key Dates: Refer to NIT.

e) Bidders may obtain further information from the office of the Deputy General Manager, Lower Assam T&T Circle, AEGCL, Narengi, Guwahati - 781026, Assam.

1.2.0 BIDDING PROCEDURE :-

1.2.1 The bidders must register themselves at https://assamtenders.gov.in as per the guidelines laid on the website.

1.2.2 The bidder shall submit the techno commercial & price bid through the e-tendering portal https://assamtenders.gov.in. All documents as required by this bidding document shall be scanned and uploaded in the portal.

1.2.3 Price schedule should be submitted in the format provided in the online portal. Bidders are also requested to submit the information in the format provided in this bidding document where applicable.

1.2.4 AEGCL has the right to cancel the tender at any moment, without assigning any reason thereof. Bidder will not be entitled to claim any expenses and AEGCL will not be responsible for any costs or expenses incurred on the preparation and submission of the Bids.

1.2.5 In addition to the online bid submission, Bidder should submit , one hour prior to bid submission end date and time, hard copies of the documents mentioned above alongwith - (i) Original copy of EMD BG (or receipt of online payment), (ii) Duly filled and signed Letter of technical bid and (iii) Authorization letter of bid signatory must be submitted in a sealed envelope superscribed with the name of bidder, full address, Bid Identification reference, name of work etc. at the office Deputy General Manager, Lower Assam T&T Circle, AEGCL, Narengi, Guwahati - 781026, Assam

1.3.0 TENDER PAPER COST AND MODE OF PAYMENT:-

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

Bidder has to pay Non-refundable tender processing fee of **Rs.2000.00 (Rupees Two Thousand) only** via e-tender portal www.assamtenders.gov.in.

1.4.0 SCOPE OF WORK :-

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

a. Design, manufacture, supply and erection, testing and commissioning of 132kV gang operated SF6 Circuit Breaker including laying and terminating of LT power and control cable as required at 132/33 kV Baghjap GSS for 132kV Sonapur Bay-II as per BoQ and bid specifications.

b. Design, manufacture, supply and erection, testing and commissioning of 132kV single-phase Current Transformer with terminal connectors and CT ratio 100-200-400/1-1-1 including laying and terminating of LT power and control cable as required at 132/33 kV Baghjap GSS for 132kV Sonapur Bay-II as per BoQ and bid specifications.

c. Design, manufacture and supply of 132kV CVT complete with mounting structure and terminal connectors including laying and terminating of LT power and control cable as required at 132/33 kV Baghjap GSS for 132kV Sonapur Bay-II.as per BoQ and bid specifications.. Erection, testing & commissioning of CVT including marshalling box, erection of mounting structure including construction of foundation and supply of all foundation materials

d. Loading at manufacturer's works, transportation and delivery at the substation site, including unloading at destination site.

e. Freight & Transit Insurance, storage at site and site insurance of all materials at site shall be in the scope of the contractor.

f. Arrangements of any permits required for transportation and movement of supplied materials. However, AEGCL shall assist as far as practicable in the process.

1.4.2 The Bill of Quantities for indicative purposes is furnished in Price Schedules.

1.4.3 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.

1.4.4 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.

1.4.5 No modifications/additions/ deletions shall be made by the bidder to the items and quantities given in these schedules.

1.5.0 TIME SCHEDULE:

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.

1.6.0 ELIGIBILITY CRITERIA OF THE BIDDER:

1.6.1 A Bidder may be a private entity or a government-owned entity or any combination of such entity with the intent to enter into an agreement supported by a letter of intent or under an existing agreement in the form of a joint venture, consortium or association.

1.6.2 In case of a **Joint Venture (JV)** :-

When the bidder is a Joint Venture (JV) of two or more firms as partners, all partners shall be jointly and severally liable. The JV shall legally authorize one of the partners as the lead partner for the purpose of submitting the bid, incur liabilities; receive payments and instructions on behalf of the others. A copy of the notarized JV agreement, executed on non-Judicial stamp paper, shall be submitted with the bid. However, in case of successful bid, the agreement shall be signed by all the partners, so as to be legally binding on all the partners. All the partners of the Joint Venture shall be jointly and severally liable for the execution of the contract in accordance with the contract terms

1.6.2 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.

1.6.3 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.

1.6.4 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.

1.7.0 FINANCIAL CAPABILITY

1.7.1 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.

1.7.2 Average Annual Turnover : Minimum average annual turnover INR 10,45,000.00 calculated as total certified payments received for contracts in progress or completed, within the last 3 (Three) Years.

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

(1) the 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.

1.7.4 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.

1.7.5 The Contractor must furnish recent dated Bank Solvency Certificate to show the bidder's financial position indicating the amount by concerned authority in necessary format as per their banks

1.8.0 EXPERIENCE:

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

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

(a) Three (3) similar completed works costing not less than 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.

1.8.3 **Bidder may be manufacturer of the offered products or a firm/company having authorisation from a manufacturer. In case the bidder is <u>not</u> 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 33kV, 132KV or above rating equipment as specified 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

1.8.4 The Bidder must have experience of executing work of similar nature previously in any Govt. organization/ PSU. The bidder must submit experience and completion certificate for scrutiny by AEGCL. Each of such project/ works should consist of completion certificate.

1.9.0 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.

1.10.0 DOCUMENTS COMPRISING THE BID

1.10.1 The bid submitted by the bidder shall comprise two envelopes submitted simultaneously, one containing only the technical proposal and the other the price proposal.

1.10.2 **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

1.10.3 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 valid Labour License issued by competent authority in the State of Assam or in the State where the bidder's business is registered.*

d) *Copies of valid Electrical License for working in 132kV and above Grid Substations issued by competent authority in the State of Assam or in the State where the bidder's business is registered.*

e) *Copies of PAN, GST Registration Certificate as per Goods & Services Tax laws.*

f) *Total monetary value of similar work performed by the bidder in each of the last three years.*

g) *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.*

h) *Qualifications and experience of key site management and technical personnel proposed for the Contract.*

i) *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.*

j) *Evidence of adequacy of working capital for this contract (access to line (s) of credit and availability of other financial resources).*

k) *Information regarding any litigation, current or during the last five years, in which the Bidder is involved, the parties concerned, and disputed amount.*

1.10.2 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.

1.10.3 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.

1.11.0 DOCUMENTS ESTABLISHING CONFORMITY OF THE GOODS AND SERVICES

1.11.1 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.

1.12.0 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.

1.13.0 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 PRICES

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

1.15.2 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.

1.15.3 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.

1.16.0 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.**

1.17.0 BID VALIDITY

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

1.17.2 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.

1.18.0 CLARIFICATION OF BIDS

To assist in the examination, evaluation, and comparison of the Technical and Price Bids, and qualification of the Bidders, the Purchaser may, at its discretion, ask any Bidder for a clarification of its bid. Any clarification submitted by a Bidder that is not in response to a request by the Purchaser shall not be considered. The Purchaser's request for clarification and the response shall be in writing. No change in the substance of the Technical Bid or prices in the Price Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered

1.19.0 BID SECURITY (EARNEST MONEY)

1.19.1 For participation in bidding procedure, participants must compulsorily pay the Bid Security of **Rs.40,000.00 (Rupees Forty Thousand) only via e-tender portal www.assamtenders.gov.in.**

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

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

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

1.19.5 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.

1.19.6 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 initialed 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 The Purchaser shall conduct the opening of Technical Bids through online process at the address, date and time specified in the BDS. Bidders at their discretion may attend the techno-commercial bid opening. Price bid of those bidders shall only be opened whose techno-commercial bids are found to be responsive to the requirement of the bidding document.

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 The Purchaser shall examine the Techno-commercial Bid to confirm that all documents and technical documentation requested in this bidding document have been provided, and to determine the completeness of each document submitted. If any of these documents or information is missing, the Bid may be rejected.

1.27.2 The Purchaser's determination of a bid's responsiveness is to be based on the contents of the bid itself. A substantially responsive Techno-commercial Bid is one that meets the requirements of the Bidding Document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that, a) if accepted, would: (i). Affect in any substantial way the scope, quality, or performance of the plant and services specified in the Contract; or (ii). Limit in any substantial way, inconsistent with the Bidding Document, the Purchaser's rights or the Bidder's obligations under the proposed Contract; or b) If rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive bids. The Purchaser shall examine the Techno-commercial Proposal, to confirm that the requirement of the bidding document have been met without any material deviation or

reservation. If a bid is not substantially responsive to the requirements of the Bidding Document, it shall be rejected by the Purchaser and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.

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.

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 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, 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.

1.30.3 The Purchaser shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be used. To evaluate a Price Bid, the Purchaser shall consider the following:

a) The bid price excluding taxes as quoted in the Price Schedules;

b) Price adjustment for correction of arithmetical errors.

c) 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 statical 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 CRITERIA

1.31.1 AEGCL will award the Contract to the bidder whose bid has been determined to be the lowest substantially responsive bid provided that such bidder has been determined to be qualified in accordance with the provisions of the Bid. However, the AEGCL reserves the right to not award contract to the lowest substantially responsive bidder without thereby incurring any liability to Bidders

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 eighteen (18) 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 and erection 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. Maximum 2(two) Nos. of progressive Invoice/ Bill would be entertained during work.
v. The 1st Progressive Invoice/Bill would be entertained for 80% of the total work value on completion of the supply work and acceptance of materials in full and good condition.
vi. Remaining 20% of total work value would be made after completion of erection, testing and commissioning works.
vii. Final bill must contain the original site register.
viii. Payment shall be released subject to receipt of specific fund. 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, erection, testing and commissioning of 132kV Circuit Breaker, 132kV CT and 132KV CVT including foundation works for CVT at 132/33 kV Baghjap GSS for 132kV Sonapur Bay-II". 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 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

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 DRAWINGS AND DOCUMENTS FOR APPROVAL

2.5.1. All necessary drawings and documents required for completion of the project is to be submitted by the contractor for approval. The drawings provided with bid (if any) are for indicative purpose only and fresh drawings are to be prepared by the contractor as per actual site condition after survey. The drawings and documents are to be approved by AEGCL before procurement or commencement of work.

2.5.2 All drawings submitted by the Contractor including those submitted at the time of Bid shall be with sufficient detail to indicate the type, size, arrangement, dimensions, material description, Bill of Materials, weight of each component break-up for packing and shipment, fixing arrangement required, the dimensions required for installation and any other information specifically requested in these specifications.

2.5.3 Each drawing submitted by the Contractor shall be clearly marked with the name of the Employer, the specification title, the specification number and the name of the Project. All titles, noting, markings and writings on the drawing shall be in English. All the dimensions should be to the scale and in S.I. units.

2.5.4 **The drawings submitted 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.

2.5.5 The Contractor shall perform the work strictly in accordance with these drawings and no deviation shall be permitted without the written approval of the Employer, if so required.

2.5.6 All manufacturing, fabrication and erection work under the scope of Contractor prior to the approval of the drawings shall be at the Contractor's risk. The contractor may make any changes in the design which are necessary to conform to the provisions and intent of the contractor and such changes will again be subject to approval by the Employer.

2.5.7 The approval of the documents and drawings by the Employer shall mean that the Employer is satisfied that:

a) The Contractor has completed the part of the Works covered by the subject document (i.e. confirmation of progress of work).

b) The Works appear to comply with requirements of Specifications.

2.5.8 In no case the approval by the Employer of any document does imply compliance with neither all technical requirements nor the absence of errors in such documents. If errors are discovered any time during the validity of the contract, then the Contractor shall be responsible of their consequences.

2.5.9 For equipment and items in the scope of supply:

a) General arrangement drawing with full dimensions.
b) Electrical schematic diagram, where applicable.
c) Wiring diagram, where applicable.

All Designs/Drawings/Calculations/Data submitted by the contractor, from time to time shall become the property of the Employer and Employer has the right to use or replicate such designs for future contracts / works without the permission of the Contractor. The Employer has all rights to use/ offer above designs/drawings/data sheets to any other authority without prior Permission of the Contractor.

2.6.0 FINAL DRAWINGS AND DOCUMENTS

2.6.1 The successful Contractor shall require to provide following drawings and documents in printed form:

a) All approved drawings (AS BUILD) of equipment in three (3) copies.
b) Instruction manuals of the equipment in three (3) copies. These instruction manuals shall generally consist of-
   i) Operation Manuals,
   ii) Maintenance Manuals and
   iii) Spare Parts Bulletins.
c) Copies of routine test reports (in triplicate) of relevant equipment.
d) Final Guaranteed and Other technical particulars of relevant equipment.
e) In addition to the above the Contractor shall provide five (5) sets of all the drawings and documents to Employer in printed form for his reference and record.

2.7.0 QUALITY ASSURANCE DOCUMENTS

2.7.1 The Contractor shall be required to submit all the Quality Assurance Documents as stipulated in the Quality Plan at the time of Employers inspection of equipment/material.

2.7.2 The Employer or his duly authorized representatives reserves the right to carry out Quality Audit and quality surveillance of the systems and procedures of the Contractors/his vendors Quality Management and Control Activities.

2.8.0 EMPLOYER'S SUPERVISION

2.8.1 To eliminate delays and avoid disputes and litigation it is agreed between the parties to the Contract that all matters and questions shall be resolved in accordance with the provisions of this document.

2.8.2 The manufacturing of the product shall be carried out in accordance with the specifications. The scope of the duties of the Employer, pursuant to the contract, will include but not be limited to the following:-

a) Interpretation of all the terms and conditions of these Documents and Specifications.
b) Review and interpretation of all the Contractors drawings, engineering data etc.
c) Witness or authorize his representative to witness tests at the manufacturer's works or at site, or at any place where work is performed under the contract.
d) Inspect, accept or reject any equipment, material and work under the Contract, in accordance withthe Specifications.
e) Issue certificate of acceptance and/or progressive payment and final payment certificate.
f) Review and suggest modification and improvement in completion schedules from time to time, and
g) Supervise the Quality Assurance Programme implementation at all stages of the works.

2.9.0 INSPECTION AND INSPECTION CERTIFICATE

2.9.1 The Employer, his duly authorized representative and/or outside inspection agency acting on behalf of the Employer shall have, at all reasonable times, access to the premises and works of the Contractor and their sub-contractor(s)/sub-vendors and shall have the right, at the reasonable times, to inspect and examine the materials and workmanship of the product during its manufacture.

2.9.2 All routine and acceptance tests whether at the premises or works of, the Contractor or of any Sub Contractor, the Contractor except where otherwise specified shall carry out such tests free of charge. Items such as labour, materials, electricity, fuel, water, stores apparatus and instruments as may be reasonably demanded by theEmployer/inspector or his authorized representative to carry out effectively such tests in accordance with the Contract shall be provided by the Contractor free of charge.

2.9.3 If desired by the Employer, the Contractor shall also carry out type tests as per applicable Standards for which Employer shall bear the expenses except in cases where such tests have to be carried out. The Contractor is required to quote unit rates of type test charges in a separate Schedule (if such schedule is provided in the Bidding Document) in pursuance to this Clause. However, these type test charges shall not be taken into account in comparing Price Bid.

2.9.4 The inspection by Employer and issue of Inspection Certificate thereon shall in no way limit the liabilities and responsibilities of the Contractor in respect of the agreed Quality Assurance Programme forming a part of the Contract.

2.10.0 TESTS

2.10.1 The type, acceptance and routine tests and tests during manufacture to be carried-out on the material and equipment shall mean as follows:

a) Type Tests shall mean those tests, which are to be carried out to prove the process of manufacture and general conformity of the material to this Specification. These tests shall be carried out on samples prior to commencement of commercial production against the order. The Bidder shall indicate his schedule for carrying out these tests.

b) Acceptance Tests shall mean those tests, which are to be carried out on samples taken from each lot offered for pre-dispatch inspection, for the purposes of acceptance of that lot.

c) Routine Tests shall mean those tests, which are to be carried out on the material to check requirements, which are likely to vary during production.

d) Tests during Manufacture shall mean those tests, which are to be carried out during the process of manufacture and end inspection by the Contractor to ensure the desired quality of the end product to be supplied by him.

e) The norms and procedure of sampling for these tests will be as per the Quality Assurance Programme to be mutually agreed to by the Contractor and the Employer.

2.10.2 The standards and norms to which these tests will be carried out are specified in subsequent Sections of this Specification. Where a particular test is a specific requirement of this Specification, the norms and procedure of the test shall be as specified or as mutually agreed to between the Contractor and the Employer in the Quality Assurance Programme.

2.10.3 For all type and acceptance tests, the acceptance values shall be the values specified in this Specification or guaranteed by the Bidder or applicable Standards, as applicable.

2.11.0 **TYPE TEST REPORTS**

2.11.1 Materials, which have never been tested for critical performance, shall not be accepted. In such cases, a promise or agreement by a bidder to have the equipment tested after award of a contract is not acceptable.

2.11.2 All Bids must be accompanied by the Type Test Certificates of materials offered (refer Clause 3.13.5 below). Such type test certificates shall be acceptable only if:-

a) Tests are conducted in an independent testing laboratory with NABL accreditation, or

b) Tests are conducted in manufacturer's own laboratory.

In case of (a) the laboratory must have NABL accreditation; and

In case of (b) tests have been witnessed by technically qualified representatives of earlier clients or purchaser.

2.11.3 Test reports to be acceptable must be related directly to the equipment offered i.e. it is fully identical in design, rating and construction with the equipment for which the type test certificates have been submitted. Test reports for higher class (by capacity/voltage etc.) of equipment are acceptable with commitment to perform the type tests free of any charge on the particular equipment after the award of contract.

2.11.4 Type Test Reports older than ten (10) years on the date of Technical bid opening shall not be accepted.

2.12.0 GUARANTEED TECHNICAL PARTICULARS

2.12.1 The Guaranteed Technical Particulars of the various items shall be furnished by the Bidders with the Technical Bid in the prescribed Schedules of the bidding document. The Bidder shall also furnish any other information's as in their opinion is needed to give full description and details to judge the item(s) offered by them.

2.12.2 The data furnished in Guaranteed Technical Particulars should be the minimum or maximum value (as per the requirement of the specification) required. A Bidder may guarantee a value more stringent than the specification requirement. However, for testing purpose or from performance point of view, the material shall be considered performed successfully if it achieves the minimum/maximum value required as per the technical specification. No preference what so ever shall be given to the bidder offering better/more stringent values than those required as per specification except where stated otherwise.

2.13.0` MATERIALS HANDLING AND STORAGE

2.13.1 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.

2.13.2 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.

2.13.3 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.

2.13.4 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.

2.13.5 All the materials stored in the open or dusty location must be covered with suitable weather-proof and flameproof covering material wherever applicable.

2.13.6 The Contractor shall be responsible for making suitable indoor storage facilities, to store all items/materials, which require indoor storage.

2.13.7 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.

2.14.0 SERVICE CONDITIONS

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

1. Peak ambient day temperature in still air: 45 ^{0}C
2. Minimum night temperatures : 0 ^{0}C
3. Ground temperatures: 40 ^{0}C
4. Reference ambient day temperature : 45 ^{0}C
5. Relative Humidity : i). Maximum - 100 % ii). Minimum - 10 %
6. Altitude : Below1000 M above MSL
7. Maximum wind pressure : As per IS: 802
8. Seismic Intensity: ZONE-V as per IS 1893.

2.15.0 COMMISSIONING SPARES

2.15.1 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.

2.15.2 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.

2.16.0 TECHNICAL SPECIFICATION FOR 132KV SF6 CIRCUIT BREAKER (AIS)

2.16.1 SCOPE

This section of the Specification intends to cover the design, manufacture, testing at manufacturer's works and of 132kV SF6 Circuit Breakers with all fittings and accessories including mounting structures as specified hereunder.

2.16.2 GENERAL REQUIREMENTS

2.16.2.1 The circuit breaker shall be of three phase unit (gang operated), outdoor**, SF6 gas filled** single pressure puffer type(132kV). The operating mechanism shall be electrically and mechanically trip/free with anti-pumping facility suitable for remote electrical closing, tripping as well as local Operation facility as specified. The CBs are meant for installation with **Transformers & Lines as applicable.**

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

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

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

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

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

2.16.2.7 The support structure of circuit breaker shall be hot dip galvanised. Sufficient galvanising thickness shall be achieved with **900 gm/m² (130 micron).** All other parts shall be painted as per painting specification enclosed separately.

2.16.2.8 All mechanical parts and linkages shall be robust in construction and maintenance free over at least 10,000 switching operations except for lubrication of pins/articulated joints at 5000 operations **and electrical E2 performance**.

2.16.3 OPERATING MECHANISM

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

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

2.16.3.3 Each mechanism shall have an operation counter.

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

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

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

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

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

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

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

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

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

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

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

2.16.3.15 After failure of power supply to the motor, at least **two close-open** operation of the circuit breaker shall be possible from stored energy.

2.16.3.16 Spring charging motor shall be standard single phase universal motor suitable for 220 volts AC supply

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

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

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

2.16.4 OPERATING MECHANISM CONTROL

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

2.16.4.2 Two electrically independent trip circuit including two trip coils per breaker shall be operated from two separate DC sources. First trip coil shall be utilized for tripping the breaker on main protection fault detection. Whereas second trip coil shall be used to trip the breaker when first trip coil fails to trip the breaker and backup protection comes into operation and shall also be used to trip the breaker on command.

2.16.4.3 The trip coils shall be suitable for trip circuit supervision during both **open and close position** of the breaker. Necessary terminals shall be provided in the central control cabinet of the circuit breaker by the supplier.

2.16.4.4 The auxiliary switch with **12NO+12NC** contacts of the breaker shall be positively driven by the breaker operating rod.
A conveniently located manual tripping lever or button shall also be provided for local tripping of the breaker and simultaneously opening the reclosing circuit. A local manual closing device which can be easily operated by one man standing on the ground shall also be provided for maintenance purpose. Direction of motion of handle shall be clearly marked.

2.16.4.5 When the spring get fully charged either through motor or hand cranking, the spring charging motor and the hand cranking **suitable mechanical and electrical indication shall be provided for same. On restoration of electrical supply the mechanical handle shall be automatically disengaged.**

2.16.5 SF6 GAS SYSTEM

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

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

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

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

2.16.5.5 Each pole shall form an enclosure filled with SF6 gas independent of two other poles (145 kV CBs) and the SF6 density of each pole shall be monitored.

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

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

2.16.5.8 SF6 gas shall be as per IEC 60376

2.16.6 BUSHINGS AND INSULATORS

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

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

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

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

2.16.7 FIXED AND MOVING CONTACTS

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

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

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

2.16.8 INTERLOCKS

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

2.16.9 ADDITIONAL DUTY REQUIREMENTS

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

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

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

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

2.16.10 ACCESSORIES

2.16.10.1 **Gas Pressure Detector**

The circuit breaker shall be provided with gas pressure monitor with temperature compensation for initiating alarm and locking the operating mechanism in the event of abnormality. **Gas pressure monitor shall be combined for all three phases for 145kV Circuit Breakers.**

2.16.10.2 **Position Indicator**

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

2.16.10.3 **Terminals**

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

2.16.10.4 **Auxiliary Switches**

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

2.16.10.5 **Terminal Blocks**

All accessories, spare contacts of contactors and control devices shall be completely wired up to terminal block. All wirings which are connected to external circuit shall be terminated on terminal blocks installed in the control cabinet. The terminal blocks provided shall have twenty (20) percent spares. **Each terminal block shall be suitable to receive two conductors of minimum 2.5 sqmm copper.**

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

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

2.16.11 SUPPORT STRUCTURES

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

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

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

2.16.11.4 **The support structures shall be capable to withstand the minimum seismic acceleration of 0.36 g in horizontal direction and 0.6g in vertical direction.**

2.16.12 NAME PLATES

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

2.16.13 EARTHING

2.16.13.1 Two earthing pads shall be provided on each supporting structure. Each operating mechanism control cabinet or terminal box mounted on the supporting structure shall also be connected to an earthing pad. Separately mounted control cabinets shall be provided with two earthing pads adjacent to the base of the cabinet. The earthing connection shall be bolted type and suitable for receiving **75mm x 12mm GS strip.**

2.16.14 TERMINAL CONNECTORS

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

2.16.15 TESTS

2.16.15.1 All routine tests shall be carried out in accordance with relevant IS. All routine/acceptance tests shall be witnessed by the AEGCL's authorised representative. The tests shall include the following:

a) Routine/Acceptance Tests (all units)

i) Mechanical Operation tests
ii) Power frequency voltage withstand test (dry)
iii) Tests on auxiliary & control circuits
iv) Measurement of resistance of the main circuit.
v) Insulation Resistance Test

b) Type Tests:

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

i) Breaking(terminal fault, L90,etc) and making capacity test
ii) Short-time current withstand test
iii) Temperature rise tests
iv) Lightning Impulse voltage test
v) Operating Duty test
vi) Power Frequency withstand test
vii) IP degree of protection of operating mechanism enclosure
viii) RIV/PD test
ix) Contact Resistance of CB
x) IR value test for operating mechanism circuits
xi) Creepage distance test

c) Test Certificates

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

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

2.16.17 PRE-COMMISSIONING TESTS

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

(a) Insulation resistance of each pole.
(b) Check adjustments, if any suggested by manufacturer.
(c) Breaker closing and opening time.
(d) Slow and Power closing operation and opening.
(e) Trip free and anti-pumping operation.
(f) Minimum pick-up voltage of coils.
(g) Contact resistance measurement.
(h) Functional checking of control circuits interlocks, tripping through protective relays and auto reclose operation.
(i) Insulation resistance of control circuits, motor etc.
(j) Resistance of closing and tripping coils.
(k) SF6 gas leakage check.
(l) Dew Point Measurement
(m) Verification of pressure switches and gas density monitor.
(n) Checking of mechanical 'CLOSE' interlock, wherever applicable.
(o) Testing of grading capacitor.
(p) Resistance measurement of main circuit.

(q) Checking of operating mechanisms
(r) Check for annunciations in control room.

2.16.18 SPECIAL TOOLS AND TACKLES

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

2.16.19 TECHNICAL DATA SHEET FOR CIRCUIT BREAKER

Sl. No.	Particulars	Unit	Data for 132kV CB
I	II	III	IV
1	Type		SF6
2	No of poles		3 (3 Phase Ganged Unit)
3	Service		Outdoor
4	Rated System Voltage	kV	132
5	Highest System Voltage	kV	145
6	System earthing		Solidly earthed system
7	Rated Voltage of Breaker	kV	145
8	Rated Continuous Current	Amps	3150
9	Rated Frequency	Hz	50
10	Rated Short Circuit breaking current (I) 3secs - symmetrical	kA RMS	40
11	Rated Short Circuit making current	kA PEAK	2.5*I
12	Duty cycle		0-0.3 Sec - CO - 3 Min -CO
13	First pole to clear factor		1.3
14	Operating time		
	i) Opening Time	ms	Not exceeding 50 ms
	ii) Closing Time	ms	Not exceeding 100 ms
15	Insulation level i) One minute Power Frequency withstand Voltage (Dry) ii) Full Wave Impulse withstand Voltage (1.2/50 µsec)	 kV RMS kV Peak	 275 650

Sl. No.	Particulars	Unit	Data for 132kV CB
I	II	III	IV
16	Minimum clearance between phases	mm	1300
17	Minimum clearance between phase to earth	mm	1300
18	Minimum Ground clearance (from bottom most live part to plinth level)	mm	4600
19	Minimum clearance from bottom of support insulator to plinth level	mm	2500
20	Minimum Creepage Distance (Total)	mm	4495
	ii) Minimum Creepage Distance (Protected)	mm	2250
21	Operating mechanism a) Type		Spring Charged
	b) Rated 3 Phase, 50Hz Voltage for Drive Motor	V	220AC
	c) Rated voltage of Shunt trip coil & operating range	V. DC	110 [50% -110%]
	d) Rated voltage of Closing coil & operating range	V. DC	110 [80% - 110%]
	e) No. of trip coils	No	2 per CB
	f) No. of closing coils	No	1 per CB
	g) No of spare auxiliary contacts & contact rating	Nos AMPS	12 N/O+12 N/C (per CB) 10 A at 240V AC & 4A at 220V/ 110V DC
	h) Minimum thickness of steel sheet for control cabinet	mm	3
	i) Enclosure Protection		IP55
22	Reclosing		Three Phase auto reclosing
23	Support structure (Painted / Galvanised)		Galvanised
24	All other parts (Painted / Galvanised)		Synthetic enamel shade 631 of IS5 (125 microns)
25	Minimum size of control iring (Copper)	Sq. mm	2.5
26	ITRV and TRV of CB interrupter		IEC

2.16.20 DRAWINGS AND INSTRUCTION MANUALS

Following drawings for the item are to be supplied as part of the contract whichever applicable.

i) General outline drawings, showing dimensions, front and side elevations and plan of the circuit breaker and its local control panel.
ii) Outline drawing of bushings showing dimensions and number of sheds and creepage distance.
iii) Assembly and sub-assembly drawings with numbered parts.
iv) Sectional views showing the general constructional features, operating mechanism and are extinguishing chamber, etc.
v) Dimension and assembly of important auxiliaries.
vi) Detailed drawings of operating mechanism. And inter-phase mechanism.
vii) Test certificates.
viii) Detailed drawings of mounting structure.
ix) Spare parts and catalogue
x) Wiring diagram showing the local and remote control scheme of breaker including alarms indication devices instruments relay and timer wiring.
xi) Write up on working of control schematic of breaker.
xii) Foundation plan including weights of various components and impact loadings for working foundation design. Three copies for each pkg. of the above drawings and instruction manuals covering instructions for installations, operation and maintenance shall be supplied by the contractor(s) without any extra cost.

2.17.0 TECHNICAL SPECIFICATION FOR 132KV CURRENT TRANSFORMERS (AIS)

2.17.1` STANDARDS

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

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

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

(i)	IS: 2705(Part-I)	Current transformers: General requirement.
(ii)	IS: 2705(Part-II)	Current transformers: Measuring Current transformers
(iii)	IS: 2705(Part-III)	Current transformers: Protective Current transformers
(iv)	IS: 2705(Part-IV)	Current transformers: Protective Current transformers for special purpose application.

2.17.2 GENERAL REQUIREMENTS

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

2.17.2.2 Current transformers shall be of Live Tank design.

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

2.17.2.4 The instrument transformers shall be completely filled with oil.

2.17.2.5 A complete leak proof secondary terminal arrangement shall be provided with each instrument transformers, secondary terminal shall be brought into weather, dust and vermin proof terminal box. Secondary terminal boxes shall be provided with facilities for easy earthing, shorting, insulating and testing of secondary circuits. The terminal boxes shall be suitable for the connection of control cable gland. IP rating of terminal box shall be IP 55. Spare terminals shall be provided. The exterior of the secondary terminal box shall be hot dipped galvanized.

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

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

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

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

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

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

2.17.3 INSULATING OIL

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

2.1.4 COMMON MARSHALLING BOXES (shall be supplied by CT manufacturer)

2.17.4.1 The outdoor type common marshalling boxes shall conform to the latest edition of IS 5039 and other general requirements specified hereunder.

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

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

2.174..4 The enclosures of the common marshalling boxes shall provide a degree of protection of not less than IP 55 (As per IS 2147).

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

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

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

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

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

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

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

i) Inside: Glossy White

ii) Outside: Light Grey (Shade No. 697 of IS: 5)

2.17.5 BUSHINGS AND INSULATORS

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

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

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

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

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

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

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

2.17.5.8 Below level indicator shall be present in CT.

2.17.5.9 Nitrite butyl rubber/Neoprene gaskets shall be used.

2.17.6 TESTS

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

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

2.17.6.2 **Type Tests:** The bidder shall furnish type test certificates and results for the all tests as per relevant Standards along with the bid for current and potential transformers of identical design.

Type test certificates so furnished shall not be older than 5 (five) years as on date of Bid opening.

QAP: QAP shall be submitted.

2.17.6.3 At *factory/works tests the Tan Delta shall not exceed 0.3% (at Um/√3). The same shall not exceed 0.7% at the end of warranty period. If tan delta value of CTs exceed prescribed limit of 0.7% within warranty period, it will be considered as failure within warranty period (Tan delta & capacitance test of CTs shall be measured at 10KV at site). The bidder has to replenish failed CTs within guarantee period without any cost implication to AEGCL.*

2.17.7 NAME PLATES

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

2.17.8 MOUNTING STRUCTURES

2.17.8.1 All the equipment covered under this specification shall be suitable for mounting on steel structures. Supply of mounting structures is **not** in the scope of this tender.

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

2.17.9 SAFETY EARTHING

2.17.9.1 The non-current carrying metallic parts and equipment shall be connected to station earthing grid. For these two terminals suitable for 65mm X 12mm GS strip shall be provided on each equipment.

2.17.10 TERMINAL CONNECTORS (Shall be under manufacturer scope)

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

2.17.11 PRE-COMMISSIONING TESTS

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

(a) Current Transformers

(i) Insulation Resistance Test for primary and secondary.
(ii) Polarity test.
(iii) Ratio identification test - checking of all ratios on all cores by primary injection of current.
(iv) Dielectric test of oil (wherever applicable).
(v) Magnetising characteristics test.

Bidder's Signature & Seal

(vi) Tan delta and capacitance measurement
(vii) Secondary winding resistance measurement
(viii) Contact resistance measurement (wherever possible/accessible).

2.17.12 TECHNICAL DATA SHEET FOR CURRENT TRANSFORMER

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

2.17.13 TYPE AND RATING:

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

SL No.	A. Item	Ratings and Particulars
I	II	III
A	Nominal system voltage	132 kV
B	Highest system voltage, kV	145
C	Rated frequency, HZ	50
D	System earthing	Solidly earth
E	Insulation level	
a)	Impulse withstand voltage: kVp	650
b)	One-minute p.f. Withstand voltage, kV (r.m.s.)	275
F	Short time current for 3 seconds, kA	40
G	Minimum creepage distance, mm	4495
H	Temperature rise	As per IS
I	C.T.	
	(i) No. of Cores	3
	(ii) Transformation ratio	100-200-400/1-1-1
	(iii) Rated out put	
	(a) Core-1	30 VA
	(b) Core-2	30 VA
	(c) Core-3	-
	(iv) Accuracy class	
	(a) Core-1	0.2S
	(b) Core-2	5P
	(c) Core-3	PX
	(v) Accuracy limit factor	
	(a) Core-1	-
	(b) Core-2	20
	(c) Core-3	-
	(vi) Instrument security factor	

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	(a) Core-1	**<5**
	(b) Core-2	**-**
	(c) Core-3	**-**
	(vii) Minimum Knee point voltage, Volts	
	(a) Core-1	**-**
	(b) Core-2	**-**
	(c) Core-3	**-**
	(viii) Maximum secondary resistance, ohm	
	(a) Core-1	**-**
	(b) Core-2	**-**
	(c) Core-3	**-**
	(ix) Maximum exciting current, at Vk/4 mA	
	(a) Core-1	**-**
	(b) Core-2	**-**
	(c) Core-3	**-**

Note:

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

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

2.18.0 TECHNICAL SPECIFICATION FOR 132KV CAPACITIVE VOLTAGE TRANSFORMER (CVT)

2.18.1 SCOPE:

2.18.1.1 This specification provides for the design, manufacture, assembly inspection and testing at the manufacturer's works, packing and delivery at site, erection, testing and commissioning of outdoor mounted type, single phase, oil filled, self-cooled, single unit type Capacitive Voltage Transformers for,132KV system to be used for voltage indication, supply of potential to energy meters, relays for feeder protection in Grid Sub- station of AEGCL, Assam. In addition to the above functions the132KV CVTshall be suitable for carrier coupling.

i. Bidders are required to quote for 0.2 accuracy class [metering winding] for 33 KV and 132KV IVTs & 132KV, 220kV, 400kV CVTs in the following manner.

2.18.2 STANDARDS:

2.18.2.1 The CVTs shall conform in all respects to high standards of Engineering, design, workmanship and latest revisions of relevant standards at the time of offer, and the Purchaser shall have the power to reject any work or material which in his judgement is not in full accordance therewith.

2.18.2.2 Except to the extent modified in the specifications, the CVTs shall conform to the latest editions and the amendments of the standards listed hereunder:

Sl. No.	Standard Ref. No.	Title
01	IEC-44(4)	Instrument Transformer – measurement of PDS.
02	IEC-60	High voltage testing techniques.
03	IEC-171	Insulation co-ordination.
04	IEC-186	Voltage Transformers.
05	IEC-186(A)	Voltage Transformers (first supp. to IEC-186)
06	IEC-270	Partial discharge measurement.

07	IS-335	Insulating oil for transformers and switchgears.
08	IEC-8263	Method for RIV Test on high voltage insulators.
09	IS-2071	Method of high voltage testing.
10	IS-2099	High Voltage porcelain bushings.
11	IS-2147	Degree of protection provided by enclosures for low voltage switchgear and control.
12	IS-2165	Insulation co-ordination for equipment of 100KV and above.
13	IS-3156 (Part-I to IV).	Voltage transformers.
14	IS-3347	Dimensions of porcelain transformer bushings.
15	IS-4146	Application guide for voltage transformers.
16	IS-5547	Application guide for Capacitor Voltage Transformers.
17	IS-9348	Coupling Capacitor & Capacitor Devices.

2.18.2.3 All the above along with the amendments thereof shall be read and interpreted together. However, in case of a contradiction between the Technical Specification and any other volume, the provisions of this Technical Specification will prevail.

2.18.2.4 The voltage transformers with the requirements of other authoritative standards, which ensure equal or better quality than the standards, mentioned above shall also be acceptable. Where the equipment, offered by the supplier conform to other standards, salient points of difference between the standards shall be brought out in the offer. 4 (four) copies of the reference standards in English language shall be furnished along with the offer.

2.18.2.5 **The supplier is to furnish the standards as mentioned above from Sl. 1 to 17 at their own cost, if required by the** purchaser.

2.18.2.6 Accuracy specified shall be maintained at 25% of rated burden.

2.18.3 CLIMATIC AND SERVICE CONDITIONS:

2.18.3.1 Earthquake Incidence:

The CVT is to be designed to withstand earthquake of intensity, equivalent to minimum of 0.5g in the horizontal and 0.6g in the vertical direction.

2.18.3.2 INSTALLATION:

The **CVT** covered under this specification shall be suitable for outdoor installation without any protection from rain, dust, mist and direct rays of the sun.

2.18.4 GENERAL TECHNICAL REQUIREMENTS FOR 132KV CAPACITIVE VOLTAGE TRANSFORMER:

2.18.4.1 The CVT shall operate satisfactorily in system with high X/R ratio. (Tp=100 ms.).

2.18.4.2 The CVT transformer tanks along with top metallic shall be galvanized and painted to required shade.

2.18.4.3 Impregnation details along with tests and checks to ensure successful completion of impregnation cycle shall be furnished for purchaser's approval.

2.18.4.4 Bellows, if used to cater for expansion of insulating oil, shall be tested in accordance with relevant standards. The details shall be subject to the approval of the purchaser.

2.18.4.5 The CVT shall be capacitor voltage type with electromagnetic units and shall be suitable for carrier coupling.

2.18.4.6 All windings of voltage transformer secondaries shall be protected by HRC cartridge-type fuses. The secondary terminals of the CVTs shall be terminated to stud type non- disconnecting terminal blocks in the individual phase secondary boxes via the fuse. Fuse ratings shall be mentioned.

2.18.4.7 CVTs shall be suitable for high frequency (HF) coupling, required for power line carrier communication. The carrier signal must be prevented from flowing into potential transformer (EMU) circuit by meant of a RF choke/reactor, suitable for effectively blocking the carrier signal over the entire carrier frequency range i.e. 40 to 500 KHZ. Details of the arrangement shall be furnished along with the bid. HF terminal of the CVT shall be brought out through a suitable bushing and shall be easily accessible for connection to the coupling devices of the carrier communication equipment, when utilized. The bushing shall be fully protected against rain and vermin so as to avoid the possibility of short circuits to earth. An earthing link with fastener shall be provided for HF terminal**. Test tap for Tan-delta and capacitance shall be provided.**

2.18.4.8 The electromagnetic unit, comprising compensating reactor, intermediate transformer and protective and damping devices

should have a separate terminal box with all secondary terminals, brought out.

2.18.4.9 The accuracy of the windings (0.2/3P/3P) shall be maintained throughout the entire burden range preferably in the frequency range of 48 HZ to 51.5 HZ on all three windings without any adjustment during operation. Preference will be given to such bidders who can offer for maintaining the above accuracy class in the frequency range i.e. 48 HZ to 51.5 HZ up to the above specified burden

2.18.4.10 **Constructional Features:**

2.18.4.10.1 The 400KV, 220KV & 132KV CVT shall be suitable for mounting on support structure of lattice type structures.

2.18.4.10.2 Access to secondary terminals shall be possible without any danger of access to high voltage circuit.

2.18.4.10.3 CVTs shall be hermetically sealed units.

2.18.4.10.4 **A protective surge Arrester/spark gap shall be provided to prevent break down of insulation by incoming surges and to limit abnormal rise of terminal voltage of shunt capacitor/primary winding, tuning reactor/RF choke etc. due to short circuit in transformer secondaries. Surge arrester shall be provided in the secondary winding also.**

2.18.4.10.5 The CVT secondary terminals shall brought out into a weatherproof terminal box for ease of access. The terminal box shall have an IP rating of not less than IP 55. The terminal box shall be provided with a removable gland plate at the bottom and shall be suitable for accepting the required number of PVC insulated PVC sheathed, 10 core 2.5 mm² standard copper conductor cable.

2.18.4.10.6 All terminals shall be clearly marked to facilitate connection of secondary wiring.

2.18.4.10.7 Secondary fuses or MCBs shall be provided on or adjacent to each CVT, located such that they are accessible while the primary is live and shall be provided with labels indicating their function and their phase colours CVT secondary circuits shall be complete in themselves and shall be earthed at one point only. A separate earth link shall be provided for each secondary winding and shall be situated at the CVT. Primary earthing links should be provided.

2.18.4.10.8 To prevent ferro resonance, suitable damping devices shall provide for connection to the transformer secondaries.

2.18.4.10.9 CVTs shall meet the requirements, given in this section of the specification.

2.18.4.10.10 The creepage and flashover distances of the high voltage insulator shall be suitable for the outdoor service conditions, specified in the schedules.

2.18.4.10.11 The bidder in the offer is to state the suitable precautions/methods, adopted during design stage of the CVT to avoid the undesirable effects due to ferro resonance phenomena.

2.18.4.10.12 It should be stated in the bid offer regarding the steps taken in the design stage for elimination/minimization of the influence of the transient response on the behaviour of high-speed relays.

2.18.4.10.13 It shall be ensured by the bidder in the offer that the connection of carrier, frequency coupling device across the CVT will not affect the designated accuracy class of the CVT windings.

2.18.4.10.14 The capacitor divider unit shall comply to IS: 9348/1979.

2.18.4.10.15 It shall also be complied in the offer through a calculation sheet, proving that the designated accuracy class of the CVT (both metering and protection) are not affected by extreme temperatures, to be encountered in service conditions (Max. ambient temperature 50º C and minimum -0º C).The terminal connectors should be suitable for 'ACSR' Conductor as per site requirement.

2.18.5 TESTS:

2.18.5.1 **Type Tests:**

The offered 132KV Capacitive Voltage Transformer should have been subjected to the following type tests in a Government approved Test Laboratory. The bidder shall furnish four sets of type test reports along with the offer. These tests must not have been conducted earlier than five years from the date of opening of the bid. For any change in the design/type already type tested and to the design/type offered against this specification, the purchaser reserves the right to demand repetition of some or all type tests/special tests without any extra cost to AEGCL in the presence of purchaser's representative at the cost of the supplier.

Type Tests/Special Tests for 132kV CVT:

a) Lightning Impulse voltage test on complete CVT unit.
b) Power frequency over-voltage test on complete CVT unit.
c) Partial discharge test.

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d) Radio interference voltage test.
e) Corona extinction voltage test.
f) Temperature rise test on complete CVT unit.
g) Ferro resonance test on the complete C.V.T. unit.
h) Transient response tests.
i) Determination of Temperature Co-efficient test.
j) High frequency capacitance and equivalent resistance measurement test (as per IEC-358)
k) Stray capacitance and stray conductance test (as per IEC-358).
l) Accuracy tests.
m) Thermal stability test.
n) Thermal Co-efficient test (as per IEC-358)
o) Fast transient test.
p) Seismic withstand test.
q) IP-55 test on secondary Terminal Box.
r) Magnetization and internal burden tests.
s) Effectiveness of sealing tests.
t) Mechanical Terminal load test on Bushing.
u) Dielectric loss angle test (Tan Delta Test).
v) Switching impulse withstand test
w) Critical impulse withstand voltage of insulator housing.

N.B: 1. The dielectric type tests should have been carried out on the same CVT.

2. After the CVT was subjected to the dielectric tests, it should have been subjected to all routine tests as per relevant standards.

3. The ratio errors, phase displacements before, during and after the temperature rise test on complete CVT unit should have been determined with stipulated burdens and the same should comply with the designated accuracy class for each winding of the CVT.

2.18.5.2 Routine Tests:

The following routine tests shall be conducted on each VT in the presence of Purchaser's representative for which no charges will be payable by AEGCL. No sampling is allowed.

(a) Verification of terminal markings.
(b) Power frequency withstand tests on primary windings/capacitor voltage divider for CVT
(c) Partial discharge measurement for 132kV CVT.
(d) Power frequency withstand tests on secondary windings/Low voltage terminal of the capacitor divider for132kV CVT.
(e) Determination of errors on complete CVT.
(f) Measurement of Insulation resistance.
(g) Oil leakage test.
(h) Measurement of capacitance and dielectric dissipation factor before and after dielectric tests (as per IEC-358)
(i) Power frequency tests on electromagnetic unit for 132kV CVT.
(j) Any other test as per relevant national & international standards.
(k) Creepage distance measurement test.

N.B.: Determination of errors shall be performed after the other tests. The standard reference VT to be used during testing for determination of ratio error and phase angle error should of 0.05 accuracy class or better as per standard practice, presently adopted by AEGCL.

2.18.6 INSPECTION:

2.18.6.1 The Purchaser shall have access at all times to the works and all other places of manufacture, where CVTs are being manufactured and the supplier shall provide all facilities for unrestricted inspection of the supplier's works, raw materials, manufacturer of all the accessories and for conducting the necessary tests.

2.18.6.2 The Supplier shall keep the Purchaser informed in advance of the time of starting and of the progress of manufacture of equipment in its various stages so that arrangement could be made for inspection at the discretion of the Purchaser.

2.18.6.3 No material shall be dispatched from its manufacture unless the material has been satisfactorily inspected, tested and dispatch clearance issued. However, the Purchaser reserves the right to alter the despatch schedule attached to this Specification.

2.18.6.4 The acceptance of any quantity of equipment shall in no way relieve the supplier of his responsibility for meeting all the requirements of this Specification and shall not prevent subsequent rejection, if such equipments are found to be defective.

2.18.6.5 Clear 15 (Fifteen) days' notice shall be given to this office for deputing officer(s) for inspection. The VoltageTransformers shall be dispatched only after the inspection is conducted by a representative of AEGCL and release order, issued from this office after approval of Routine Test Certificates. The shop routine test certificates in triplicate for all the Voltage Transformers along with the calibration certificates of all the meters and equipment to be used during testingshould be furnished along with the Inspection Offer. The Inspecting Officer will be authorised for inspection of the Voltage Transformers subject to the condition that the routine test certificates and calibration certificates of the testing equipment/ meters will be found to be in order.

2.18.7 QUALITY ASSURANCE PLAN:

2.18.7.1 The Bidder shall invariably furnish following information along with his offer.

(i) Statement giving list of important raw materials, names of sub-suppliers for the raw materials, list of standards, according to which the raw materials are tested, list of tests, normally carried out on raw materials in presence of Bidder's representative, copies of test certificates.

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

(iii) List of manufacturing facilities available.

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

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

(vi) Special features provided in the equipment to make it maintenance free.

(vii) List of testing equipments, meters and test plant limitation, if any, vis-à-vis the type, acceptance and routine tests, specified in the relevant standards. These limitations shall be very clearly brought out in the offer.

(viii) All the testing equipments, meters etc. should have been calibrated in a Government approved laboratory. The Bidder must submit the list of testing equipments and meters test as per the Technical Specification.

(ix) QAP shall include acceptance criteria against all parameters with relevant clause of standards

2.18.7.4 The Supplier shall within 30 days of placement of order submit the following information to the Purchaser.

(i) List of raw materials as well as bought out accessories and the names of the materials as well as bought out accessories and the name of Sub-suppliers selected from those, furnished along with the offer.

(ii) Type test certificates of the raw materials and bought out accessories.

(iii) Quality Assurance Plan (QAP) with hold points for the Purchaser's possible inspection. The QAP and hold points shall be discussed between the Purchaser and the Supplier before the QAP if finalised.

2.18.7.3. The Supplier shall submit the routine test certificates of bought out items and raw materials at the time of acceptance testing of the fully assembled equipment.

2.18.8 DOCUMENT:

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

(a) General outline and assembly drawings of the Inductive Voltage Transformers/ Capacitive Voltage Transformers.

(b) Sectional views showing:

i) General constructional features.

ii) Materials/gaskets/sealing used.

iii) The insulation of the winding arrangements, method of connection of primary/ secondary winding to the primary/secondary terminals etc.

(c) Schematic drawing.

(d) Rating & diagram plate as per relevant IEC/ISS

(e) Secondary Terminal Box.

(f) Assembly Sectional view of Primary terminal/capacitor voltage divider

(g) Assembly drawing for secondary terminal

(h) The detailed dimensional drawing of Porcelain Housing such as ID, OD, thickness and insulator details such as height,

profile of petticoats, angle of inclination and gap between successive petticoats, total creepage distance etc.
(i) Sectional view of pressure release device.
(j) Drawing showing details of Oil level.
(k) All type test reports relating to the tests as specified in Clause-2.18.5 of the above.
(l) Ratio and phase angle error curves for CVTs
(m) EMU unit of CVT.
(n) Sectional view of EMU unit of 220KV&132KV CVT.
(o) Schematic diagram showing the working of CVT in PLCC.

2.18.9 TEST REPORTS:

(i) Four copies of type test/special test reports shall be furnished to the Purchaser with the tender offer.

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

(iii) All records of routine test reports shall be maintained by the supplier at his works for periodic inspection by the Purchaser.

(iv) All test reports of tests conducted during manufacture shall be maintained by the supplier. These shall be produced for verification as and when required for by the purchaser.

(v) The necessary galvanized flanges, bolts etc. for the base of the Inductive/Capacitive Voltage Transformers shall be supplied without any extra cost to the purchaser.

2.18.10 APPENDIX – I.

TECHNICAL REQUIREMENTS FOR 132kV CAPACITIVE VOLTAGE TRANSFORMER.

Sl. No	Particulars	132kV CVT
I	II	III
1	Type	Single phase, 50Hz, oil Filled, self-cooled, Hermetically sealed, Outdoor porcelain type.
2	Nominal system voltage.	132kV
3	Highest system voltage.	145kV
4	Frequency.	50Hz ± 5%
5	System	Effectively
	earthing.	solidly earthed.
6	Number of phases.	3 [single phase]
7	(i) Number of secondary windings. (ii) Purpose of windings.	3 [three] Protection & metering.
8	Rated primary voltage.	132/1.732 kV
9	Rated secondary voltage.	Winding-I- 110/1.732 V Winding-II- 110/1.732 V Winding-III- 110/1.732 V

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10	Ratio	132kV/1.732: 110V/1.732 110V/1.732
11	Rated burden.	Winding-I (M)- 30VA
		Winding-II (P)- 30VA Winding-III(P)- 30VA
12	Accuracy class	0.2/3P/3P
13	Rated voltage factor at rated frequency.	1.2 continuous. 1.5 for 30 seconds.
14	Temperature rise at 1.2 times the rated primary voltage, rated frequency & rated burdens.	As per IEC- 186/61869
15	Temperature rise at 1.5 times the rated primary voltage for 30 seconds, rated frequency & rated burden.	As per IEC- 186/61869
16	One-minute power frequency dry/wet withstands test voltage for primary winding.	275kV[rms]
17	withstand test voltage for primary winding	650kV[peak]
18 (i) (ii)	One-minute power frequency withstands test voltage for Secondary winding Between LV(HF) terminal & earth terminal	3kV[rms] 10kV[rms] for exposed terminals & 4kV[rms] for terminals, enclosed in a weatherproof box.
19	Class of insulation.	B
20	Material of the conductor of primary and secondary windings.	Copper for EMU
21	Fault level	40 kA [rms] for 3 second.
22	Minimum creepage distance.	4495 mm
23	Quality of oil.	EHV Grade As per IS- 335.
24	Radio interference voltage at 1.1 times maximum rated voltage at 1.0 MHZ.	500 micro volts.
25	Partial discharge level.	Less than 10 Piccocoulombs.
26	Seismic acceleration Horizontal – Vertical –	0.5g. 0.6g.
27	Accuracy class of standard V.T. to be used during testing towards determination of ratio errors and phase angle errors for metering windings.	0.05 or better.
28.	Capacitance (Pf)	4400 + 10%, -5%

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2.19.0 FOUNDATION AND RCC CONSTRUCTION

2.19.1 General

2.19.1.1 Work covered under this Clause of the Specification comprises the design and construction of foundations and other RCC constructions for switchyard structures, equipment supports required to complete the work (wherever applicable as per BOQ).

2.19.1.2 Concrete shall conform to the requirements mentioned in IS: 456 and all the tests shall be conducted as per relevant Indian Standard Codes as mentioned in Standard field quality plan appended with the specification.

A minimum grade of M20 concrete shall be used for all structural/load bearing members as per latest IS 456.

2.19.1.3 If the site is sloppy, the foundation height will be adjusted to maintain the exact level of the top of the structures to compensate for such slopes.

2.19.1.4 The switchyard foundation's plinths and building plinths shall be minimum 300 mm and 500 mm above finished ground level respectively.

2.19.1.5 Minimum 75 mm thick lean concrete (1:4:8) shall be provided below all underground structures, foundations, trenches, etc., to provide a base for construction.

2.19.1.6 Concrete made with Portland slag cement shall be carefully cured and special importance shall be given during the placing of concrete and removal of shuttering.

2.19.1.7 The design and detailing of foundations shall be done based on the approved soil data and subsoil conditions as well as for all possible critical loads and the combinations thereof. The Spread footings foundation or pile foundation as may be required based on soil/sub-soil conditions and superimposed loads shall be provided.

2.19.1.8 If pile foundations are adopted, the same shall be cast-in-situ driven/bored or precast or under reamed type as per relevant parts of IS Code 2911. Only RCC piles shall be provided. Suitability of the adopted pile foundations shall be justified by way of full design calculations. Detailed design calculations shall be submitted by the bidder showing complete details of piles/pile groups proposed to be used. Necessary initial load test shall also be carried out by the bidder at their cost to establish the piles design capacity. Only after the design capacity of piles has been established, the Contractor shall take up the job of piling. Routine tests for the piles shall also be conducted. All the work (design & testing) shall be planned in such a way that these shall not cause any delay in project completion.

2.19.2 Design

2.19.2.1 All foundation shall be of reinforced cement concrete. The design and construction of RCC structures shall be carried out as per IS: 456 and minimum grade of concrete shall be M-20.
Higher grade of concrete than specified above may be used at the discretion of Contractor without any additional financial implication to the Employer.

2.19.2.2 Limit state method of design shall be adopted unless specified otherwise in the specification.

2.19.2.3 For detailing of reinforcement IS: 2502 and SP: 34 shall be followed. Cold twisted deformed bars (Fe- 415 N/mm2) conforming to IS: 1786 shall be used as reinforcement. However, in specific areas, mild steel (Grade-I) conforming to IS: 432 can also be used. Two layers of reinforcement (on inner and outer face) shall be provided for wall and slab sections having thickness of 150 mm and above. Clear cover to reinforcement towards the earth face shall be minimum 40 mm.

2.19.2.4 RCC water retaining structures like storage tanks, etc., shall be designed as uncracked section in accordance with IS: 3370 (Part I to IV) by working stress method. However, water channels shall be designed as cracked section with limited steel stresses as per IS: 3370 (Part I to IV) by working stress method.

2.19.2.5 The procedure used for the design of the foundations shall be the most critical loading combination of the steel structure and or equipment and or superstructure and other conditions, which produces the maximum stresses in the foundation or the foundation component and as per the relevant IS Codes of foundation design. Detailed design calculations shall be submitted by the bidder showing complete details of piles/pile groups proposed to be used.

2.19.2.6 Design shall consider any sub-soil water pressure that may be encountered following relevant standard strictly.

2.19.2.7 Necessary protection to the foundation work, if required shall be provided to take care of any special requirements for aggressive alkaline soil, black cotton soil or any other type of soil which is detrimental/ harmful to the concrete foundations.

2.19.2.8 RCC columns shall be provided with rigid connection at the base.

2.19.2.9 All sub-structures shall be checked for sliding and overturning stability during both construction and operating conditions for various combinations of loads. Factors of safety for these cases shall be taken as mentioned in relevant IS Codes or as stipulated elsewhere in the Specifications. For checking against overturning, weight of soil vertically above footing shall be taken and inverted frustum of pyramid of earth on the foundation should not be considered.

2.19.2.10 Earth pressure for all underground structures shall be calculated using coefficient of earth pressure at rest, co-efficient of active or passive earth pressure (whichever is applicable). However, for the design of sub-structures of any underground enclosures, earth pressure at rest shall be considered.

2.19.2.11 In addition to earth pressure and ground water pressure etc., a surcharge load of 2T/Sq.m shall also be considered for the design of all underground structures including channels, sumps, tanks, trenches, sub-structure of any underground hollow enclosure, etc., for the vehicular traffic in the vicinity of the structure.

2.19.2.12 Following conditions shall be considered for the design of water tank in pumps house, channels, sumps, trenches and other underground structures: a)Full water pressure from inside and no earth pressure and ground water pressure and surcharge pressure from outside (application only to structures, which are liable to be filled up with water or any other liquid). b)Full earth pressure, surcharge pressure and ground water pressure from outside and no water pressure from inside. c)Design shall also be checked against buoyancy due to the ground water during construction and maintenance stages. Minimum factor of safety of 1.5 against buoyancy shall be ensured ignoring the superimposed loadings.

2.19.2.13 The foundations shall be proportioned so that the estimated total and differential movements of the foundations are not greater than the movements that the structure or equipment is designed to accommodate.

2.19.2.14 The foundations of transformer and circuit breaker shall be of block type foundation. Minimum reinforcement shall be governed by IS: 2974 and IS: 456.

2.19.2.15 The equipment foundations shall be checked for a factor of safety of 2.0 for normal condition and 1.50 for short circuit conditions against sliding, overturning and pull out. The same factors shall be used as partial safety factor overloads in limit state design also.

2.19.3 Admixtures & Additives

2.19.3.1 Only approved admixtures shall be used in the concrete for the Works. When more than one admixture is to be used, each admixture shall be batched in its own batch and added to the mixing water separately before discharging into the mixer. Admixtures shall be delivered in suitably labelled containers to enable identification.

2.19.3.2 Admixtures in concrete shall conform to IS: 9103. The water proofing cement additives shall conform to IS: 2645. Employer shall approve concrete Admixtures/Additives.

2.19.3.3 The Contractor may propose and the Employer may approve the use of a waterreducing set retarding admixture in some of the concrete. The use of such an admixture will not be approved to overcome problems associated with inadequate concrete plant capacity or improperly planned placing operations and shall only be approved as an aid to overcoming unusual circumstances and placing conditions.

2.19.3.4 The water reducing set-retarding admixture shall be an approved brand of Ligno- sulphonatetype admixture.

2.19.3.5 The water proofing cement additives shall be used as required/advised by the Employer.

2.19.4 SUBMISSION

2.19.4.1 The following information shall be submitted for review and approval to the Employer as far as Civil Works are concerned:

(a) Design criteria shall comprise the codes and standards used, applicable climatic data including wind loads, earthquake factors maximum and minimum temperatures applicable to the building locations, assumptions of dead and live loads, including equipment loads, impact factors, safety factors and other relevant information.

(b) Structural design calculations and drawing (including constructions / fabrication) for all reinforced concrete and structural steel structures.

(c) Any other data, drawings and information required to be submitted as per various clauses of the specification. Approval of the above information shall be obtained before ordering materials or starting fabrication or construction as applicable

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2.20.0 SPECIFICATION FOR DESIGN AND FABRICATION OF SUBSTATION STEEL STRUCTURES

2.20.1 SCOPE

2.20.1.1 The scope of this section covers specifications for fabrication, proto-assembly, supply and erection of galvanised steel structures for equipment support structures (wherever applicable as per BOQ). All equipment support structures shall be fabricated from GI pipe conforming to YST 22 or of higher grade as per IS 806.

2.20.1.2 Support structure for Circuit breaker and Isolators is not standardized and shall be designed by the Contractor and approved by the Employer. Any other structures of 132kV class necessary to complete the substation to complete the work in all respects shall be designed by the contractor.

2.20.1.3 The scope shall include supply and erection of all types of structures including bolts, nuts, washers, hangers, shackles, clamps ant-climbing devices, bird guards, step bolts, inserts in concrete, gusset plates, equipment mounting bolts, structure earthing bolts, foundation bolts, spring washers, fixing plates, ground mounted marshaling boxes (AC/DC Marshaling box & equipment control cabinets), structure mounted marshaling boxes and any other items as required to complete the job.

2.20.1.4 The connection of all structures to their foundations shall be by base plates and embedded anchor/foundation bolts. All steel structures and anchor/foundation bolts shall be fully galvanized. The weight of the zinc coating shall be at least 0.610 kg/m2 for anchor bolts / foundation bolts and for structural members. One additional nut shall be provided below the base plate which may be used for the purpose of levelling.

2.20.1.5 In case of equipment support structure, Contractor may require to change the dimensions to match the equipment bus bar height and to match the mounting arrangement of a particular equipment. Further suitable modification shall be carried out in the drawings of equipment support structures by the Contractor in order to suit fixation of accessories such as marshalling boxes, MOM boxes, Control Cabinets, Junction box, surge counter, etc. in the standard structure fabrication drawings. The Contractor will make these changes without any price implication. The final drawings of mounting structures shall be submitted to Employer for approval.

2.20.2 MATERIALS

2.20.2.1 Structural Steel

The structures shall be of structural steel conforming to any of the grade, as appropriate, of IS 2062 (latest edition) Steel conforming IS 8500 may also be used.

Medium and high strength structural steels with known properties conforming to any other national or international standards may also be used.

2.20.2.2 Bolts

Bolts used shall conform to IS12427 or bolts of property class 4.6 conforming to IS 6639 may also be used.

High strength bolts, if used (only with steel conforming to IS 8500) shall conform to property class 8.8 of IS 3757. Foundation Bolts shall conform to IS 5624.

Step bolts shall conform to IS 10238

2.20.2.3 Galvanisation

Structural members, plain and heavy washers shall be galvanized in accordance with the provisions of IS 4759.

Spring washers shall be hot dip galvanized as per service grade 4 of IS 4759 or IS 1537.

2.20.2.4 Other Materials

Other materials used in the construction of the supporting structures shall conform to appropriate Indian Standards wherever available.

2.21.0 DESIGN REQUIREMENTS FOR STRUCTURES

2.21.1 This clause and sub-clauses shall be referred only for structures for which design is in the scope of Contractor.

2.21.2 For design of steel structures loads such as dead loads, live loads, wind loads etc. shall be based on IS:875,Parts I to V.

2.21.3 For materials and permissible stresses IS:802, Part-I, Section-2 shall be followed in general. However, additional requirements given in following paragraphs shall be also considered.

2.21.4 Minimum thickness of galvanized tower member shall be as follows:

ITEM	Minimum thickness in mm
Leg members, Ground wire Peak members/ other load carrying members	6
Other Members and Redundant members	5

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2.21.5 Maximum slenderness ratios for leg members, other stressed members and redundant members for compression force shall be as per IS-802.

2.21.6 Minimum distance from hole center to edge shall be 1.5 x bolt diameter. Minimum distance between center to center of holes shall be 2.5 x bolt diameter.

2.21.7 All bolts shall be M16 or higher as per design requirement.

2.21.8 **Step Bolts:** In order to facilitate inspection and maintenance, the structures shall be provided with climbing devices. Each tower shall be provided with M16 step bolts 175mm long spaced not more than 450mm apart, staggered on faces on one leg extending from about 0.5 meters above plinth level to the top of the tower. The step bolt shall conform to IS: 10238.

2.22.0 DESIGN DRAWINGS AND DOCUMENTS

2.22.1 As and where asked for the relevant drawings for all the equipment mounting structures shall be furnished by the Contractor to the Employer which shall include structural/erection drawings, shop fabrication drawings, Bill of Materials, foundation working drawings.

2.22.2 The structural/erection drawings, Bill of materials and shop fabrication drawings for all the structures shall be submitted in four copies and will be finally approved by the Employer. The fabrication shall be taken up from the approved shop drawings. The overall responsibility of fabricating structure members correctly lies with the Contractor only and the Contractor shall ensure that all the members can be fitted while erecting without any undue strain on them.

2.22.3 The Contractor shall furnish design, drawing and Bill of Materials and shop manufacturing drawings for every member to the Employer for approval after award of the Contract. The design drawing should indicate not only profile, but section, numbers and sizes of bolts and details of typical joints. In case Employer feels that any design drawing, BOM are to be modified even after its approval, Contractor shall modify the designs & drawings and resubmit the design drawing, BOM as required in the specification.

2.22.4 The fabrication drawings to be prepared and furnished by the Contractor shall be based on the design approved by the Employer. These fabrication drawings shall indicate complete details of fabrication and erection including all erection splicing details and typical fabrication splicing details, lacing details, weld sizes and lengths. Bolt details and all customary details in accordance with standard structural engineering practice whether or not given by the Employer. The fabrication drawings shall be submitted to the Employer. Proto shall be made only after approval of fabrication drawings.

2.22.5 Such approval shall, however, not relieve the Contractor of his responsibility for the safety of the structure and good connections and any loss or damage occurring due to defective fabrication, design or workmanship shall be borne by the Contractor.

2.22.6 The Mass fabrication work shall start only after the final approval to the proto corrected Fabrication drawing is accorded by the Employer.

2.23.0 ACCESSORIES

2.23.1 **Step Bolts**

Each column/tower shall be provided with step bolts conforming to IS: 10238 of not less than 16mm diameter and 175mm long spaced not more than 450mm apart and extending from 0.5 meters above the plinth level to the top. Each step bolt shall be provided with two nuts on one end to fasten the bolt securely to the tower and button head at the other end to prevent the feet from slipping away. The step bolts shall be capable of withstanding a vertical load not less than 1.5 KN.

2.23.2 **Insulator Strings and Conductor Clamps Attachments**

i) Double suspension and tension insulator string assemblies (for 400kV, 220kV and 132kV) and Single suspension and tension insulator string assemblies (for 33kV) shall be used for jumpering and connection between the equipments.For the attachment of Suspension Insulator string, a suitable strain plate of sufficient thickness for transferring the load to the tower body shall be provided. To achieve requisite clearances, if the design calls for providing extra D- shackles, link plate etc. before connecting the insulator string the insulator string the same shall be supplied by the Contractor.

ii) At tension points strain plates of suitable dimensions placed on the beams, shall be provided for taking the hooks or D-shackles of the tension insulator strings. To achieve requisite clearances, if the design calls for providing extra D-shackles, link plate etc. before connecting the insulator string the same shall be supplied by the Contractor.

2.23.3 **Earthwire Clamps Attachment**

i. Suspension Clamp

The detailed drawing shall be submitted by the Contractor for Employer's approval. The Contractor shall also supply U- bolts, and D-shackles wherever required.

ii. Tension Clamps

Earth-wire peaks of tension towers shall be provided with suitable plates to accommodate the shackle of tension clamps. The contractor shall also supply the U-bolts wherever required and take Employer's approval for details of the attachments before the mass fabrication.

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2.24.0 FABRICATION

2.24.1 **The fabrication of substation steel structures shall be in conformity with the following:**

(i). Except where hereinafter modified, details of fabrication shall conform to IS: 802 (Part-II) or the relevant international standards.

(ii). The structures shall be accurately fabricated to connect together easily at site without any undue strain on the bolts.

(iii). No angle member shall have the two leg flanges brought together by closing the angle.

(iv). The diameter of the hole shall be equal to the diameter of bolt plus 1.5mm.

(v). The structure shall be designed so that all parts shall be accessible for inspection and cleaning. Drain holes shall be provided at all points where pockets of depression are likely to hold water.

(vi). All identical parts shall be made strictly inter-changeable. All steel sections before any work are done on them shall be carefully levelled, straightened and made true to detailed drawings by methods which will not injure the materials so that when assembled, the adjacent matching surfaces are in close contact throughout. No rough edges shall be permitted in the entire structure.

2.24.2 Drilling and Punching

(i) Before any cutting work is started, all steel sections shall be carefully strengthened and trued by pressure and not by hammering. They shall again be trued after being punched and drilled.

(ii) Holes for bolts shall be' drilled or punched with a jig but drilled holes shall he preferred. The punching may be adopted for thickness up to 16mm. Tolerances regarding punch holes are as follows:

(iii) Holes must be perfectly circular and no tolerances in this respect are permissible.

(iv) The maximum allowable difference in diameter of the holes on the two sides of plates or angle is 0.8mm. i.e. the allowable taper in a punched hole should not exceed 0.8 mm on diameter.

(v) Holes must be square with the plates or angles and have their walls parallel.

(vi) All burrs left by drills or punch shall be removed completely.

2.24.3 Erection mark

Each individual member shall have erection mark conforming to the component number given to it in the fabrication drawings. The mark shall be marked with marking dies of 16mm size before galvanizing and shall be legible after galvanizing.

2.25.0 FOUNDATION BOLTS

2.25.1 Foundation bolts for the equipment supporting structures and elsewhere shall be embedded in first stage concrete while the foundation is cast. The Contractor shall ensure the proper alignment of these bolts to match the holes in the base plate.

2.25.2 The Contractor shall be responsible for the correct alignment and levelling of all steel work on site to ensure that the structures are plumb.

2.25.3 All foundation bolts for lattice structure, pipe structure is to be supplied by the Contractor.

2.25.4 All foundation bolts shall be fully galvanised so as to achieve 0.61 kg. per Sq.m. of Zinc Coating as per specifications.

2.25.5 All foundation bolts shall conform to IS 5624 but the material, however shall be MS conforming to IS: 2062.

2.26.0 GALVANIZING AND PAINTING

2.26.1 Galvanising of the various members of the structures shall be done only after all works of sawing, shearing, drilling, filing, bending and matching are completed. Galvanising shall be done by the hot dip process as recommended in IS: 2629 or other such authoritative international standards and shall produce a smooth, clean and uniform coating of not less than 610 gm per square meter. The preparation for galvanising and the galvanising process itself must not affect adversely the mechanical properties of the treated materials.

2.26.2 All assembly bolts shall be thoroughly hot dip galvanized after threading. Threads shall be of a depth sufficient to allow for the galvanized coating, which must not be excessive at the root of the threads, so that the nut shall turn easily on the completed bolts without excessive looseness. The nut threads shall not be galvanized, but oiled only.

2.26.3 The outside surface shall be galvanised. Sample of galvanised materials shall be supplied to the galvanising test set out in IS 729 or other such authoritative international standards.

2.27.0 EARTHING

To keep provision in the structures for earthing, holes shall be drilled on two diagonally opposite legs of the mounting structures. The holes shall be suitable for bolting GI strips of size mentioned elsewhere in this specification (Vol II) and shall be such that the lower hole is about 350 mm above the ground level, clear of the concrete muffing, for connecting the earthing strip.

2.28.0 TEST AND TEST CERTIFICATE

2.28.1 Each consignment ready for transportation shall be offered to AEGCL for inspection before dispatch giving a minimum time of not less than 30 days. Samples of fabricated structure materials shall be subjected to following tests: -

Bidder's Signature & Seal

a) Steel: The structural steel shall conform to IS 226 and IS 8500, BS 4360-1068 or ISO / R 630 other such authoritative international standards. Manufacturer's test certificate shall be submitted for all used steel.

b) Galvanising: The galvanising shall be as per IS 2633 or BS 729 other such authoritative international standards. Zinc coating over the galvanised surfaces shall not be less than 610 gm per square meter.

c) Bolts and nuts: Manufacturer's test certificate as per standard practice shall be submitted.

2.28.2 **Test at Contractor's Premises**

2.28.2.1 The contractor shall fabricate one specimen structure of each type as soon as possible after placement of order and before starting the bulk fabrication of the structures ordered. It shall be assembled on a foundation as nearly similar as practicable to site and tested with suitable test loads as per specified broken wire condition, multiplied by the corresponding factor of safety to ensure that the design and fabrication complies with the requirements. Each structure shall be capable of withstanding the above-mentioned tests without any injury or any permanent deflection at any part. If any member is found to be weak or damaged the design should be suitably modified and re-tested.

2.28.2.2 After the first lot of the structures manufactured, the members forming one structure of each type shall be selected at random from the lots of similar member and assembled in exactly the same manner as to be done at site. The structure then shall be set on foundation as nearly similar as practicable to site and tested with equivalent test load for which the structure has been designed.

2.28.2.3 No structure or any member thereof, which failed under the test shall be supplied.

2.29.0 MODE OF MEASUREMENT

The measurement of all lattice/ pipe structures for equipment support structure etc. shall be made in numbers for each type of structures. This will include foundation bolts and nuts and therefore no separate payment shall be made for the same. The unit rate quoted for each type of structure shall be inclusive of supply, fabrication, galvanizing, erection, nuts, bolts, wastages etc. complete. Nothing extra shall be payable for substitution necessitated due to non-availability of section. Nothing extra shall be payable for modifications or steel added to suit the contractors fixing arrangements for accessories etc.

Bidder's Signature & Seal

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

_____

_____

Bidder's Signature & Seal

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 1.35.0*** 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 1.36.0.***

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

Bidder's Signature & Seal

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:

Place:

(Signature).....

(Printed Name).....

(Designation).....

(Common Seal).....