BID SPECIFICATION

FOR

"Revival of collapsed section of 132kV Srikona-Panchgram Line by introducing Composite Insulated Cross Arms technology"

FUND: "SOPD"

(E-Tender)

https://assamtenders.gov.in

BID IDENTIFICATION NO:

AEGCL/MD/Tech-1054/SOPD-G/SRIKONA-PANCHGRAM/TL/CICA/2022/BID

ASSAM ELECTRICITY GRID CORPORATION LIMITED

Rs. 1000/-

Main Contents

SECTION – 1: INSTRUCTIONS TO BIDDERS

1.1.0. Scope of Bid

1.1.1. The ASSAM ELECTRICITY GRID CORPORATION LIMITED, herein after referred to as AEGCL or Employer will receive bids for the following work on turnkey basis under SOPD-G fund-

"Revival of collapsed section of 132kV Srikona-Panchgram Line by introducing Composite Insulated Cross Arms technology".

a) Earnest Money: 6 Lakh (To be submitted online)

b) Bid document cost: Rs. 1,000.00 (To be submitted online)

c) Scope of Works: - The scope of works briefly covers the following as per the approved design attached with the bid:

I. Supply/ fabrication of 132 KV & 220 KV Galvanized tower materials.

II. Supply of Panther conductor (ACSR), Hardware materials, Composite Insulated Cross Arms including 1 (one) no. of additional Composite Insulated Cross Arm as mandatory spare along with necessary Hardware fittings etc.

III. Construction of Raft foundations for 132 KV A+30 tower and FS foundation for 220 KV DD+9 tower including supply of foundation materials and setting of stubs.

IV. Erection of towers with Composite Insulated Cross Arms/traditional cross arms on the foundations.

V. Strengthening & height raising of existing B+12 tower with Composite Insulated Cross Arms as per design and actual site condition of the tower.

VI. Testing of OPGW materials, tools and tackles transportation for OPGW, OPGW materials testing and transportation.

VII. Stringing of conductor and OPGW complete and commissioning.

VIII. Dismantling of the tower and line materials of existing collapse portion and transportation to store.

IX. Supervision & training from new technology provider/ Manufacturer of Composite Insulated Cross Arms.

X. Providing clearly the details of maintenance procedure for replacement/ repair of cross arm and hardware fittings so that no hurdle is faced during the workmanship.

1.1.2. **Submission of Bid**

1.1.3. **Bidders should bid online for supply, foundation, erection, dismantle and stringing to complete the work.**

1.1.4. The successful bidder will be expected to complete the Works within **Eight (8) months** from the date of issue of work order.

1.2.0. Qualification of the Bidder

1.2.1. To be qualified for award of Contract, bidders:

A. Shall submit a written **notarized power of attorney** authorizing the signatory of the bidder to commit the bid, prior to one hour of the opening of technical bid.

B. The bidder must possess valid electrical contractor license from the concerned Govt. authority. A copy of the license should be submitted with the offer, and

C. Must compulsorily meet each of the following minimum criteria -

(i) **EXPERIENCE:** The bidder should have experience in execution & completion of similar nature of 132kV & above transmission line work involving composite insulated cross arm to qualify for the bid.

(ii) **PERSONNEL CAPABILITY:** The Bidder must have suitably qualified personnel to fill positions required for contract implementations. The Bidder will supply information of the key personnel, design & engineering staff, support staff, field staff giving details of experience in supply and erection of transmission line. (Credentials for the same may be submitted).

(iii) **FINANCIAL CAPABILTY:**

- The Bidder should furnish necessary documents to show that he has access to, or has available, liquid assets, unencumbered real assets, line of credit and other financial means (inter alia including a Guarantee or an undertaking from a Bank or financer/promoter/holding or parent company).
- **The average annual turnover of the bidder for the three best financial years out of the last five financial years at minimum should be Rs. 92 Lakh.**
- **Bidder must submit annual turnover report in a separate sheet with the certification from approved Charter Accountant firm.**
- Bidder shall submit online the scanned copy of complete annual reports together with Audited statement of accounts of the company for last five years.
- The Bidder shall submit online the scanned copy of audited balance sheet and income statement of its own (separate) for the last five years and must demonstrate the soundness of their financial position showing long term profitability. Wherever necessary the Employer may make enquiries with Bidder's bankers.
- The Bidder must meet the following minimum cash flow requirement of Rs. 57,00,000.00, in acceptable format of cash flow statement.

(iv) **EQUIPMENT CAPABILITIES:** The bidder should assure access to supply of fabricated steel structures and other materials and shall furnish necessary proof that he or his supplier has capable of, manufacture & supply of such material. Bidders are further to assume that based on the known commitments the materials will be available for use in the proposed contract.

(v) LITIGATION HISTORY:

- **Bidders shall submit details of all litigation, arbitration or other claims, whether pending, threatened or resolved in the last five years.**
- The Bidder's offer shall include and substantiate data on qualifying requirements such as (in addition to given as above):

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 Electrical Contractor License issued by competent authority in the State of Assam or in the State where the bidder's business is registered.

c. Total monetary value of similar work performed by the bidder in each of the last five years.

d. Experience in works of a similar nature and volume for each of the last five years, and details of works under way or contractually committed; and clients who may be contacted for further information on those contracts.

e. Qualifications and experience of key site management and technical personnel proposed for the Contract.

f. Reports on the financial standing of the Bidder, such as profit and loss statements and auditor's reports for the past five years.

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

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

i. ***The Bidder should also substantiate availability (either owned or leased) of the tools, tackles, spare parts etc. for carrying out the works.***

j. ***Bidder must submit the completion schedule and Declaration of current engagement as per schedule provided along the bid***

1.2.2. Even if 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.

1.2.3. 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.

1.3.0. Joint Venture

1.3.1. Bids submitted by a joint venture of two or more firms as partners shall comply with the following requirements:

a. The Bid, and, in case of successful Bid, the Form of Agreement shall be signed by all the Partners so as to be legally binding on all partners.

b. One of the partners shall be authorized to be as the Lead Partner and submitting a Power of Attorney signed by legally authorized signatories of all the partners shall evidence this authorization.

c. The Lead partner shall be authorized to incur liabilities, receive payments and receive instructions for and on behalf of any or all partners of the joint venture and the entire execution of the Contract;

d. 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 and a relevant statement to this effect shall be included in the authorization mentioned under (b) above as well as in the Bid Form and the Form of Agreement (in case successful bidder).

e. A copy of the agreement entered into by the Joint Venture partners shall be submitted with the Bid.

f. Joint Venture Agreement must be registered in the Court of Law. Notarized Joint venture agreement shall not be acceptable. Original copy of registered Joint Venture Agreement (if any) & Notarized Power of Attorney shall be submitted prior to one hour of the opening of technical bid.

1.3.2. The figures of average annual turnovers and cash flows for each Joint Venture partners shall be added together to determine the bidder's compliance with the minimum financial capability requirements for the package, but the lead partner must meet at least 40% and each of the other partners must meet at least 20% of the minimum average annual turnover criteria given above. However, in case any of the partners is a subsidiary of a company, the parent holding company /promoter must stand guarantor for the financial viability of the subsidiary company as per bid requirement.

1.4.0. Cost for Bidding

1.4.1. The bidder shall bear all costs associated with the preparation and submission of its bid and AEGCL will in no case be responsible or liable for those costs.

1.5.0. Right of Way

1.5.1. Right of way along the corridor of surveyed route for revival shall be arranged by AEGCL in coordination with the contractor and any type of **compensation that may be necessary shall be paid by AEGCL**. 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. However, any arrangement for execution of work such as road, bridges, compensation, if any, for approaching the site shall be made by contractor.

1.6.0. Clarification on Bidding Documents

1.6.1. A prospective bidder may ask AEGCL in writing for any clarification on the bidding documents at the following address within seven (7) days from floating of tender-

Chief General Manager (PP&D)
Assam Electricity Grid Corporation Limited,
Bijulee Bhawan, Paltanbazar, Guwahati-781001.

AEGCL shall arrange for a pre-bid meeting, if deemed necessary, to which bidders designated representative is invited to attend.

1.7.0. Amendment of Bidding Documents

1.7.1. At any time prior to the deadline for submission of bids, the Employer may for any reason modify the bidding documents by issuing addenda which shall be communicated to all purchasers of the bidding documents.

1.7.2. Any addendum thus issued shall be part of the bidding documents.

1.7.3. To give prospective Bidders reasonable time in which to take an addendum into account in preparing their bids, the Purchaser may, at its discretion, extend the deadline for the submission of bids, pursuant to ITB Clause 1.15.6.2.

1.8.0. Language of Bid

1.8.1. The bid, and all correspondence and documents related to the bid, exchanged between the bidder and the Employer shall be in the English language.

1.9.0. Documents Comprising the Bid

1.9.1. The bid submitted **online** by the bidder shall comprise **technical proposal** and the **price proposal separately.**

1.9.2. The Bid submitted online by bidders shall contain the following:

a. Bid Submission Sheet (Refer Section 4).
b. Documentary evidence to establish that the Bidder meet the qualifying requirements in accordance with Clause 1.2.0.
c. Documents to be furnished as per Clause 1.2.1.
d. The Bid Guarantee (Bid Security) in accordance with Clause 1.12.0 & its sub clauses of this Section.
e. All Bidding Schedules (**Section-4**) properly filled up including Price Bid Schedules.

1.10.0. Bid Form and Price Schedules

1.10.1. The Bidder shall complete the Bid Form and the appropriate Price Schedules furnished in the bidding documents in the manner and detail indicated therein, following the requirements of Clauses of bid.

1.10.2. Bid Prices

1.10.3. Bidders shall quote for the entire facilities on a “single responsibility" basis such that the total bid price covers all the Contractor's obligations mentioned in or to be reasonably inferred from the bidding documents in respect of procurement and subcontracting (if any), delivery, construction, installation and completion of the facilities. This includes all requirements under the Contractor's responsibilities for testing and commissioning of the facilities and, where so required by the bidding documents and in accordance with the requirements of the General Conditions of Contract.

1.10.4. Bidders shall use only the items mentioned in the (Price Schedules) while filling up the Price Bidding Schedules. Any other items which are reasonably inferred or necessary for satisfactory completion of the works covered in the Bidding Document, but which are not specifically specified in the above-mentioned Schedule of Items shall deemed to be included in other items of those Schedules. No payment shall be made separately for those items.

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

1.10.6. In the Schedules, Bidders shall give the required details and a breakup of their prices, including all taxes, duties, levies, and charges payable for both supply and erection.

1.10.7. Price Adjustment

Prices quoted by the Bidder shall not be subject to adjustment during performance of the contract to reflect approaches and changes in the cost of labour, fuel, material, equipment and transport components. Duties and Taxes shall not also be adjusted, except there is variation due to changes in legislation of the Country.

1.10.8. Insurance

The Bidder shall insure the Works in accordance with the requirements of General Conditions of Contract. The bid price shall include all costs in pursuance of fulfilling insurance liabilities under the contract**.**

1.11.0. Bid Validity

1.11.1. Bids shall remain valid for a period of 180 (One hundred and eighty) days after the date of opening of Bids.

1.11.2. 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 1.12.0 in all respects.

1.12.0. Bid Security (Earnest Money)

1.12.1. The Bidder shall furnish, as part of its bid Proposal, a bid security **as per bid document clause no 1.1.1**. Bid security must be submitted online.

1.12.2. The bid security shall remain valid for 30 days beyond the original validity period for the bid.

1.12.3. Any bid not accompanied by an acceptable Bid Security shall be rejected as non-responsive.

1.12.4. The bid securities of unsuccessful bidders will be returned as promptly as possible.

1.12.5. The bid security may be forfeited

(a) If the bidder withdraws its bid, except as provided in Sub-Clause 1.17.1;
(b) If the bidder does not accept the correction of its bid price, pursuant to Sub-Clause 1.21.2; or
(c) In the case of a successful bidder, if it fails within the specified time limit to sign the Contract Agreement.

1.12.6. No interest shall be payable by the Employer on bid guarantee.

1.13.0. Alternative Proposals by Bidders

1.13.1. Bidders shall submit online offers, which comply with the Bidding Documents, including the basic Employer's Requirements as indicated in the bidding documents. Alternatives will not be considered.

1.14.0. Format and Signing of Bid

1.14.1. The bidder shall submit the bid proposal **online,** envelope wise separately. In the event of discrepancy between the original and any copy, the original shall prevail. However, AEGCL may ask bidder to submit hard copies of GTP, Drawings, Manufacturers authorization of the major items and **any other document** if deemed necessary.

1.14.2. The original and scanned copies of the bid shall be signed by a person or persons duly authorized to sign on behalf of the bidder, pursuant to Sub-Clauses. All pages of the bid where entries or amendments have been made shall be initiated by the person or persons signing the bid.

1.14.3. The bid shall contain no alterations, omissions or additions, except those to comply with instructions issued by AEGCL, or as necessary to correct errors made by the bidder, in which case such corrections shall be initiated by the person or persons signing the bid.

1.14.4. 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.

1.14.5. 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.

1.14.6. A Bid by a person who affixes to his signature the word 'President', 'Managing Director', 'Secretary', 'Agent', or other designation without disclosing his principal may be rejected.

1.14.7. Satisfactory evidence of authority of the person signing on behalf of the Bidder shall be furnished with the Bid.

1.14.8. The Bidder's name stated on the proposal shall be exact legal name of the firm.

1.14.9. Bids not conforming to the above requirements of signing may be disqualified.

1.15.0. Sealing and Marking of Bids (In case of manual Bidding) (not required for e-tendering)

1.15.1. The bidder shall seal the original copy of the technical proposal, the original copy of the price proposal and each copy of the technical proposal and each copy of the price proposal in separate envelopes clearly marking each one as: "ORIGINAL-TECHNICAL PROPOSAL", "ORIGINAL - PRICE PROPOSAL", "COPY NO. I -TECHNICAL PROPOSAL", "COPY NO. I - PRICE PROPOSAL", etc., as appropriate **Package wise separately**.

1.15.2. The bidder shall seal the envelopes containing the original technical and price bids and copies of the bid and then the originals and copies along with the envelope containing the Bid Security shall be put into a sealed outer envelope.

1.15.3. The inner and outer envelopes shall be addressed to the Employer at the following address:

Chief General Manager (PP&D),
Assam Electricity Grid Corporation Limited
Bijulee Bhawan, Guwahati- 781 001
ASSAM

1.15.4. Submission and Opening of Bids

1.15.5. Submission, Sealing and Marking of Bid

1.15.5.1. Bidders must submit their bid **online**. Procedures for online submission of bid are in accordance with **IFB as given in the portal.**

1.15.5.2. Bidders submitting bids online shall upload scanned copy of the original and each copy of the Bid, the rest of the procedure shall be in accordance with **IFB**.

1.15.6. Deadline for Submission of Bids

1.15.6.1. **Bids must be submitted online on stipulated time and no bid can be accepted by the system after expiry of** closing time.

1.15.6.2. The Purchaser may, at its discretion, extend the deadline for the submission of bids by amending the Bidding Document in accordance with ITB Clause 1.7.0. in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.

1.16.0. Late Bids

1.16.1. Any bid received by AEGCL after the deadline for submission of bids prescribed in Clause shall be rejected and returned unopened to the bidder.

1.17.0. Withdrawal of Bids

1.17.1. 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.

1.17.2. The bidder's withdrawal notice shall be prepared, sealed, marked and delivered in, with the envelopes additionally marked "WITHDRAWAL".

1.17.3. Withdrawal of a bid during the time between the deadlines for submission of bids and bid validity period specified in Sub-Clause 1.11.1 may result in the forfeiture of the bid security.

1.18.0. Opening of Bids

1.18.1. AEGCL will open the technical bids online, in the presence of bidders' representatives who choose to attend; at **12.00 hours on 14.12.2022** at the following location:

O/O Chief General Manager (PP&D),
Assam Electricity Grid Corporation Limited,
Bijulee Bhawan, Paltanbazar, Guwahati-781001.

1.18.2. The bidders' representatives who are present shall sign a register as evidence of their attendance.

1.18.3. The bidders' names, the Bid Prices, the presence or absence of Bid Security, and such other details as AEGCL may consider appropriate, will be announced and recorded by AEGCL at the opening. The bidders' representatives will be required to sign this record.

1.19.0. Process to Be Confidential

1.19.1. 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.

1.20.0. Clarification of Bid Proposals and Contacting AEGCL

1.20.1. 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, 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 detected by AEGCL in the evaluation of the bids. **All clarification or shortfall documents shall be submitted through e-tender portal only**, unless specified otherwise.

1.21.0. Correction of Errors

1.21.1. 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.

1.21.2. If the bidder does not accept the corrected amount of bid, its bid will be rejected, and the bid security may be forfeited.

1.22.0. Evaluation and Comparison of Bid Proposals

1.22.1. AEGCL will evaluate and compare only the bids determined to be substantially responsive.

1.22.2. The comparison shall be on all components and raw material incorporated including the cost of transportation, local taxes and duties, civil works, installation and other services required under the contract with due corrections as per Clause 1.21.0.

1.22.3. AEGCL will carry out a detailed evaluation of the bids in order to determine whether the bidders are qualified and whether the technical aspects are substantially responsive to the requirements set forth in the bidding documents. In order to reach such a determination, AEGCL will examine the information supplied by the Bidders and other requirements in the bidding documents.

1.22.4. **Time Schedule:** The works including the facilities covered by this bidding are required to be completed within a period of **8 month** from the date of order.

1.22.5. **Bidders submitting bids which deviate from the time schedule specified may be rejected.**

1.22.6. AEGCL reserves the right to accept or reject any variation or deviation.

1.22.7. AEGCL will award the Contract to the bidder whose bid has been determined to be substantially responsive to the bidding documents and who has offered the Lowest Evaluated Bid Price, provided that such bidder has been determined to be qualified in accordance with the provisions.

1.23.0. Employer's Right to Accept any Bid and to Reject any or all Bids

1.23.1. Notwithstanding Clause, 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 assigning any reason and liability to the affected bidders.

1.24.0. Notification of Award

1.24.1. Prior to expiry of the period of bid validity prescribed by AEGCL, AEGCL will notify the successful bidder by letter, that its bid has been accepted. This letter ("Letter of Acceptance") shall mention the amount 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 ("the Contract Price").

1.25.0. Performance Security

1.25.1. As a contract performance security, you are to furnish a performance security equal to 10% of the contract price in the form of Bank guarantee from a Nationalized Bank within 15 days of issue Letter of Intent (as the case may be) duly pledged in favour of Managing Director, AEGCL. Performance guarantee shall be valid upto 30 days after the end of warranty period.

1.25.2. The performance guarantee shall cover additionally the following guarantees to the owner: that the material used in the works shall be free from any defect and workmanship. All defects upon written notice from the Owner shall be rectified.

1.25.3. The Contract performance Guarantee will be returned to the Contractor without any interest at the end of warranty period.

1.26.0. Warranty:

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

1.26.2. The Supplier/Manufacturer further warrants that the Goods shall be free from defects arising from any act or omission of the Supplier or arising from design, materials, and workmanship, under normal use in the conditions prevailing in the country of final destination

1.26.3. The warranty shall remain valid for a period of ***sixty (60) months*** *from the date of supply* (the Goods having been delivered to and accepted at the final destination indicated in the Purchaser's Requirement) or ***54 (fifty-four) months*** *from the date of commissioning of the project*, whichever is later.

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

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

1.26.6. As the scope of works is as per the approved design attached with the bid, the Firm preparing & submitting the design is also fully responsible for successful completion of the works under this bid along with satisfactory performance during the warranty period.

1.27.0. Signing of Contract Agreement

1.27.1. A "Contract Agreement" shall be signed between the successful bidder and AEGCL within **15 (fifteen) days** from the date of issuing notification of award.

1.28.0. Forfeiture of Bid Security

1.28.1. Failure of the successful bidder to comply with the requirements shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security

1.29.0. CONTRACTUAL FAILURE

1.29.1. In the event of contractual failure of any respect on the part of the Supplier, the Purchaser shall be entitled to operate security deposit or any deposit or any payment due to supplier irrespective of whether his default relates to the particular orders or not towards the Purchaser's claim for damages arising out of the failure. In addition, the Purchaser may black-list or bans the "Supplier" or pending enquiry, suspend him or take any other steps considered suitable.

1.30.0. Site Visit

1.30.1. The Bidder is advised to visit and examine the sites where the works are to be carried out and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid and entering into a contract for the provision of plant and services. The costs of visiting the sites shall be at the Bidder's own expense.

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

1.31.0. INSPECTION AND TESTING

1.31.1. The Supplier shall at its own expense and at no cost to the Purchaser carry out all tests and/or inspections of the Goods and Related Services as are specified in Sections- 3: Technical Specifications.

1.31.2. The inspections and tests may generally be conducted on the premises of the Supplier/Manufacture. The Supplier shall furnish all reasonable facilities and assistance, including access to drawings and production data to the inspectors at no charge to the Purchaser.

1.31.3. Whenever the Supplier is ready to carry out any such test and/or inspection, the Supplier shall give a reasonable advance notice (not less than 20 days) of such test and/or inspection and of the place and time thereof to the Purchaser.

SECTION-2: SPECIAL CONDITION OF CONTRACT

2.1.0. Introduction

2.1.1. This section, "SCC", is supplementary to the "General Condition of Supply & Erection of AEGCL". Whenever there is a conflict the provisions in this shall prevail over those in the "General Condition of Supply & Erection of AEGCL".

2.1.2. The General Condition of Supply & Erection of AEGCL is available in the official website of AEGCL. The bidder shall download the same from the AEGCL website ***www.aegcl.co.in.***

2.2.0. Contractor to Inform Himself Fully

2.2.1. The contractor should admit that he has examined the general condition of contract, specifications and schedule and has satisfied as to all the conditions and circumstances affecting the contract prices and fixed his price according to his own views on these matters and acknowledge that no additional allowances except as otherwise provided therein will be levied. The purchaser shall not be responsible for any misunderstanding or incorrect information obtained by the contractor other than information given to the contractor in writing by the purchaser.

2.3.0. Extension of Time

2.3.1. If the completion of the work is delayed due to reason beyond the control of the contractor, the contractor should without delay give notice to AEGCL in writing of his claim for an extension of time. The AEGCL may extend the completion date as may be reasonable but without prejudice to other terms and conditions of the contract.

2.4.0. Variations, Additions and Omissions

2.4.1. The contractor shall not modify any of the terms and conditions except as directed in writing by AEGCL.

2.4.2. AEGCL shall have the right during the contract to amend, alter, omit or otherwise vary any of the items by notice in writings. The contractor shall carry out such variations although the said variations shall not exceed (+/-)15% of the contract price. The amount of such variations shall be determined in accordance with rates specified in the contract and where such rates are not available this will be mutually agreed between the purchaser and the contractor.

2.5.0. Taking Over

2.5.1. When entire scope of works is completed by the Contractor and successfully commissioned in accordance with the Contract, the same shall be taken over by AEGCL and a Taking-Over Certificate for the Works shall be issued.

2.5.2. The date of issue of the 'Taking Over Certificate' by AEGCL or its representative shall be the date of taking over the works.

2.6.0. Terms of Payment

2.6.1.0. Progressive payments for supply items:

2.6.1.1. After submission of the invoice against supply, 60% (sixty percent) payment of the total supply amount would be made along with 100% GST on receipt and acceptance of materials in full and good condition subject to availability of fund.

2.6.1.2. In total, 10 (ten) Nos. of progressive supply invoice would be entertained.

2.6.1.3. For payment of 60% (sixty percent) of total supply amount, maximum 6 (six) Nos. of progressive supply invoice would be entertained.

2.6.1.4. Remaining 4 (four) Nos. of supply invoice would be entertained on fulfilment of the following conditions –

(a) 50% of balance supply amount would be paid on completion of 50% of the total erection works or on proportionate basis, of the project subject to availability of fund.

(b) Remaining 50% of the supply amount would be paid on completion of 100% erection, testing and commissioning activities of the project subject to availability of fund.

2.6.2.0. Progressive payments for erection work:

2.6.2.1. After submission of invoice against erection, 30% (thirty percent) payment against foundation & erection of total erection contract would be paid along with 100% GST subject to availability of fund.

2.6.2.2. In total 8 (eight) Nos. of progressive erection invoice/ bill would be entertained.

2.6.2.3. The 1st progressive erection invoice/ bill would be entertained on completion of 30% of total erection cost of the project subject to availability of fund.

2.6.2.4. Thereafter, erection invoice/ bill can be submitted on completion of 10% of the subsequent erection work

2.6.2.5. 6 (six) Nos. of progressive erection invoice/ bill would be entertained in 6 (six) equal instalments @10% or proportionate progressive erection works as deemed fit by the AEGCL.

2.6.2.6. Remaining 10% of the erection value would be paid on completion of 100% erection, testing and commissioning activities of the project subject to availability of fund.

2.6.3.0. Documents to be submitted with the invoice

2.6.3.1. Payment of invoice would be entertained subject to submission of the following documents with the invoice (as per AEGCL Circular No. AEGCL/MD/TECH-856/DGM(PP&D)/Corr/Part File/6 dated:26.07.2022)-

1. Administrative Approval of the Work (wherever applicable).
2. Financial Clearance for the work (wherever applicable).
3. TPC/ZPC resolution/Board Approval (where necessary)
4. Copy of Work order.
5. Copy of Bank Guarantee (if BG has to be submitted as per agreement)
6. Measurement Books* & Joint Measurement Sheet (in case of erection work and civil work)
7. Copy of Challans in original (Duly verified and signed by both parties)
8. Invoices in details (Three Copies under GST)
9. Good Receipts Sheets (In case of Capital and O&M goods)
10. Materials Received Vouchers (MRV) & Materials Handing over Vouchers (MHOV) (in case of supply invoices, wherever necessary, with specific date in case of Turnkey projects/contracts)
11. Statement of bill of Contractor/ Suppliers for payment.
12. Work-in-progress certificate in case of Running bill.
13. Completion Certificate in case of Final Bill.
14. Handing over and taking over certificate and successful testing/operational acceptance certificate from the project authority for final bill.
15. Journal Entries (whether it has been made or not).
16. Lorry Receipt (in case of F&I bill)/ E-way bill.
17. Certificate of insurance as per contract (Where necessary).
18. Original copy of Challans for reimbursement of any taxes/Duties.
19. Verified copies of photographs, duly signed by contractor and concerned AGM and countersigned by DGM.
20. Dispatch Clearance/Instruction to be attached alongwith supply invoices.
21. Physical Verification of site by concerned site officers is to be endorsed by AGM and countersigned by DGM.

2.6.3.2. Payments would be made subject to fulfilment of the following conditions-

I. Advance copy of invoices in duplicate with documents/ information as stated under clause 2.6.3.1 are to be furnished sufficiently in advance.

II. Any demurrage charges on account of late intimation and/or delivery of documents by the Bank is to be borne by the supplier.

III. The supplier should intimate the dispatch of each and every consignment to the Purchaser and the Consignee.

IV. All Bank charges are to be borne by the supplier.

V. Payment through Bank for supply of equipment/ materials, dispatched by Rail would be allowed if required, however the equipment/ materials have to reach at destination/ project site in full and good condition and additional expenditure in any form for this is to be borne by the supplier. A prior approval from appropriate authority of the AEGCL is to be taken in this respect.

VI. Payment through Bank for supply of equipment/ materials, dispatched by road transport would be allowed if required, provided that, the transport agency is approved by the Banking Association and prior approval thereof is given by the AEGCL's appropriate authority.

2.6.3.3. Further, Performance Guarantee of 10% of total contract value for turnkey execution of the project in the form of Bank Guarantee (BG) from a nationalized or scheduled Bank of RBI for a period of 60 (sixty) months from the date of supply or 54 (fifty-four) months from the date of commissioning of the project, whichever is later is to be submitted with acceptance of LOI and before signing of the Contract Agreement. Moreover, before one month (i.e., 30 days) of expiry of the BG, renewal is to be done by the contractor if required, otherwise revocation would be done by AEGCL within claim period. BG is to be submitted strictly as per prescribed format of the AEGCL. BG should remain valid up to 30 (sixty) days beyond warranty/ Performance Guarantee Period.

2.7.0. **Liability *for Accidents and Damage***

2.7.1. The contractor shall indemnify the AEGCL against any loss, damage, and injury to any person or to any property and against any other liability or obligation and against all actions, suits, claims demand costs, charges and expenses arising in connection with such damage, injury, liability or obligation resulting from: -

(a) the negligence of the contractor and his workers, agents, subcontractors; and/or

(b) the lack of or inadequacy of safety devices on equipment supplied under this contract.

2.8.0. Use of Materials Arranged by the Board

2.8.1. If any materials supplied by AEGCL are found to be misused or wasted due to negligence by the contractor comes to the notice of the Corporation then the contractor shall be liable to pay compensation to the Corporation as may be decided by the Corporation.

2.9.0. Penalty for Delayed Execution

2.9.1. In the event of delay in completing the work extending beyond the date of completion or beyond any extension, permitted by AEGCL, the contractor shall pay as agreed liquidated damage and not as a penalty a sum equal to 0.5 % 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.

2.9.2. AEGCL is at liberty to cancel the contract wholly or in part and to purchase materials/equipments and execute the erection work at the full risk and cost of the supplier and forfeit the security deposit. However, any assessment if need to be carried out regarding partial completion of the project, will be confirmed by AEGCL.

2.10.0. Settlement of the Dispute & Arbitration

2.10.1. Any dispute arising out of the contract will first be discussed and settled bilaterally between the AEGCL 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 Assam Electricity Grid Corporation Limited, 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.

2.11.0. Force Majeure

2.11.1. Normally, force majeure shall cover only act of God, fire, war, riots and act of Government etc. Any constraints other than those specified above, will not constitute a force majeure condition. In view of other constraints beyond the control of the contractor, primarily due to statutory compulsion, extension of time may be considered on merit of individual case. In case of a force majeure condition, the contractor shall notify the purchaser in writing of such condition within 10 days from the beginning of such delay in writing for consideration and acceptance.

2.12.0. Progress Report

2.12.1. The contractor shall submit to AEGCL monthly progress report within the first week of every month giving the status of the contract work.

2.13.0. Age Limit of Labour

2.13.1. The contractor shall not employ persons below the age of 18 years.

2.14.0. Safety & Precautions

2.14.1. The contractor shall provide adequate safety devices like head protective gears, belt etc, to his labours while executing the erection work.

2.14.2. Any other point not specifically mentioned will be as per General conditions of supply and erection 2009 of AEGCL for the whole tender

2.15.0. ALB clause

2.15.1. In the interest of the smooth execution and completion of the projects of AEGCL, following methodology is to be adopted in the tendering process of AEGCL in pursuance to the advisory of the Board of Directors of AEGCL vide resolution no. 17 dated 22nd January 2021:

1. **Provision of automatic exclusion of bid which is 15% below the estimated cost as stipulated in the Delegation of Financial and Administrative Power 2018 is annulled** and following methodology is advised to be practiced **for Identification and Treatment of the Abnormally Low Bids (ALB)** in the procurement process of AEGCL in line with the guidelines of International Funding Institutions like AIIB, World Bank and ADB etc.:

A. Identification:

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

i. **Absolute approach** is to be considered when there are fewer than 5 (five) substantially responsive bidders and the Bid price is 20% or more below AEGCL's cost estimate.

In this case, AEGCL's Tender Evaluation Committee should clarify the Bid price with the Bidder to determine whether the Bid is Abnormally Low.

ii. **Relative approach** is to be considered when there are at least 5 (five) nos. of substantially responsive bids and the lowest Bid price is 20% or more below AEGCL's cost estimate.

In this approach, first the Average bid price is determined and then by deducting the standard deviation from the Average bid price, potentially ALB may be determined.

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

i. To identify ALB as per the steps mentioned in Sl. no. 2.A (i) and 2.A.(ii) whichever is applicable.

ii. To seek and analyse the clarifications from the abnormally low Bidder in terms of resource inputs and pricing, including overheads, contingencies and profit margins. In that respect, the committee may refer to the guideline of World Bank, AIIB, ADB etc., prescribed for ALB.

iii. To decide whether to accept or reject the bid.

iv. On acceptance of the bid, whether Additional Performance Security is to be imposed on the bidder supplemented by adequate justification.

C. In case of acceptance of ALB with Additional Performance Security:

i. If any abnormally low bid is accepted under point no. 2(B)(iii) with additional performance security, it is to be noted that the total performance security should not 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 similar to that applicable for defect liability period of the contract.

iii. Non submission of the additional performance security shall constitute sufficient ground for rejection of the bid and similar assessment shall then be initiated for next ranked bidder if that bidder is also identified as ALB.

2.16.0. Employer's Supervision

2.16.1. 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.

2.16.2. 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 with the 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.

2.17.0. Construction Tools, Equipment Etc.

2.17.1. The Contractor shall provide all the construction equipment, tools, tackle and scaffoldings required for construction, erection, testing and commissioning of the works covered under the Contract. He shall submit a list of all such materials to the Employer before the commencement of work at site. These tools and tackle shall not be removed from the site without the written permission of the Employer.

2.18.0. Materials Handling and Storage

2.18.1. 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.

2.18.2. 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.

2.18.3. 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.

2.18.4. 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.

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

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

2.18.7. 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.

2.19.0. Contractor's Materials brought on to Site

2.19.1. The Contractor shall bring to Site all equipment, components, parts, materials, including construction equipment, tools and tackles for the purpose of the work under intimation to the Engineer. All such goods shall, from the time of their being brought vest in the Employer, but may be used for the purpose of the Works only and shall not on any account be removed or taken away by the Contractor without the written permission of the Engineer. The Contractor shall nevertheless be solely liable and responsible for any loss, or destruction thereof and damage thereto.

2.19.2. The Employers shall have a lien on such goods for any sum or sums, which may at any time, be due or owing to him by the Contractor, under in respect of or by reasons of the Contract. After giving a fifteen (15)

days' notice in writing of his intention to do so, the Employer shall be at liberty to sell and dispose of any such goods, in such manner, as he shall think fit including public auction or private treaty.

2.19.3. After the completion of the Works, the Contractor shall remove from the Site under the direction of the Employer's site representative, the materials such as construction equipment, erection tools and tackles, scaffolding etc. with the written permission of the Employer's site representative. If the Contractor fails to remove such materials within fifteen (15) days of issue of a notice by the Employer's site representative, the Employer's site representative shall have the liberty to dispose of such materials as detailed under clause **3.19.2** above and credit the proceeds thereto to the account of the Contractor.

2.20.0. Commissioning Spares

2.20.1. 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.

2.20.2. These spares shall be received and stored by the Contractor at least 1month 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.

SECTION-3: TECHNICAL SPECIFICATIONS

3.1.0. Qualifying Requirement for Tender and Offered Composite Insulated Cross Arms:

3.1.1. Bidder or if the Bidder is not a manufacturer, offered product's manufacturer must have at least 2(two) years of experience in design, manufacture and supply of 1 (one) 132 KV tower with composite insulated cross arm technology in India. The bidder shall submit filled up "Declaration of current/completed project" along with the past order copy of eligibility.

3.1.2. In case the bidder is not the manufacturer of Insulated Cross-Arms, the bidder should submit manufacturing's authorization from a manufacturer with their bid.

3.1.3. In case the Supplier/Manufacturer of Insulated Cross Arm is a wholly owned subsidiary or a joint venture company or special purpose vehicle (SPV) including overseas promoters, the financial capabilities, technical capabilities and experience and financials of its Parent/ Parent Subsidiaries or associate / Promoter Company/ affiliate shall be acceptable.

3.1.4. The bidder including the manufacturer of Insulated Cross Arm should list its record of executing similar works as mentioned in Clause 3.1.1 along with PO/Performance Certificate/Work Completion from a Power Utility Company in India.

3.1.5. A Tenderer shall not have a conflict of interest. However, this does not limit participation of a tenderer as a subcontractor in more than one bid in the bidding process.

3.2.0. BRIEF SCOPE FOR TRANSMISSION LINE

The brief scope of work covered under the Transmission Lines:

I. Provision of one new tower with insulated Cross Arm for River crossing span of 600m and one additional 220 KV tower.

II. Strengthening & height raising of existing B+12 tower with Composite Insulated Cross Arms as per design and actual site condition of the tower.

III. Check survey including route alignment, tower spotting/ optimization of new tower location, profiling, single line diagram.

IV. Construction of Raft foundations for 132 KV A+30 tower and FS foundation for 220 KV DD+9 tower including supply of foundation materials and setting of stubs.

V. Restoring the existing 132kV S/C line with two new towers one with Insulated Cross-Arm and another with normal cross arm including strengthening of one tower with insulated cross arm so that the required Navigable River Clearance can be achieved easily.

VI. Fabrication and Supply of the new 132kV &220 KV transmission line tower for River crossing portion as per approved drawing including fasteners, anti-theft fasteners, step bolts, hangers, D-shackles etc.

VII. Supply of Tower accessories viz., phase plate, circuit plate (Wherever applicable), number plate, danger plate, anti-climbing device and Bird guard (Wherever applicable).

VIII. Supply of Composite Insulated Cross-Arm including 1 (one) number of additional Composite Insulated Cross-Arm as mandatory spare with necessary Hardware fittings, Hardware/accessories, line materials etc.

IX. Supply of Conductor, Hardware Fittings and Conductor accessories & Earth wire Accessories required for the restoration of the existing line.

X. Erection of towers, tack welding of bolts and nuts including supply and application of zinc rich primer & two coats of enamel paint, tower earthing, fixing of insulator strings and insulated cross-arm.

XI. Testing of OPGW materials, tools and tackles transportation for OPGW, OPGW materials testing and transportation.

XII. Stringing of conductor and OPGW complete and commissioning.

XIII. Dismantling of the tower and line materials of existing collapse portion and transportation to store.

XIV. Supervision & training from new technology provider/ Manufacturer of Composite Insulated Cross Arms.

XV. Providing clearly the details of maintenance procedure for replacement/ repair of cross arm and hardware fittings so that no hurdle is faced during the workmanship.

XVI. Supply of Spares as may be required and other items not specifically mentioned in this Specification and / or BPS but are required for the successful completion and commissioning of the transmission line, unless specifically excluded in the Specification.

3.3.0. TECHNICAL DESCRIPTION OF COMPOSITE INSULATORS FOR INSULATED CROSS-ARM

3.3.1.0. General Requirements of Composite Insulators

3.3.1.1. The Insulated cross-arm shall consist of Post Insulator and Line Insulator along with all the required hardware fittings, which shall be suitability modified to install on the existing 132kV towers.

3.3.1.2. Composite Insulators (FRP Insulators) need to be light in weight as specified in clause 3.3.1.4, and suitable for highly polluted/ saline and wet environments. They should be practically unbreakable and have superior anti-tracking properties by way of the exterior composite material insulation. It should not accumulate solid pollutants with retention of water which leads to flash over of the insulators and breakdown. Composite insulators must have good hydrophobic properties & should be most consistent in highly polluted atmospheres.

3.3.1.3. The specially designed FRP material used in these Insulators needs to have a self-cleaning property, achieved by molecular migration making it possible to maintain anti-tracking performance over an extended period. Tests as per Annexure A for Surface hydrophobicity as well as Aging test results as per type tests like “Accelerated aging tests” should be submitted along with the bid proving long lifetime period of more than 20 years and proving suitability in a polluted & wet environment.

3.3.1.4. The composite Insulator weights needs to be 25-30% less than that of an equivalent ceramic/porcelain Insulator ensuring easy installation. These Insulators should be able to be used at temperatures ranging from -50 deg C to +60 deg C.

3.3.1.5. The insulators of the strings shall consist of composite materials for a three phase, 50 Hz, effectively earthed 132kV transmission system application in a polluted environment. Couplings shall be ball and socket type.

3.3.1.6. Bidder shall quote composite insulators which have proven use under foggy/humid operational conditions in polluted industrial environment combined with smoke and dust particles. The Bidder shall furnish evidence in the form of certification from the power utilities that the similar type of product supplied to them had been performing satisfactorily. The Bidder shall also submit certified test report for an accelerated ageing test of 5000 hours such as that described in Appendix-C of IEC-61109.

3.3.1.7. Insulators shall have sheds of the "open aerodynamic profile without any under ribs" with good self-cleaning properties. Insulator shed profile, spacing projection etc. shall be strictly in accordance with the recommendation of IEC-60815.

3.3.1.8. The size of composite insulators, minimum creepage distance, the number to be used in different type of strings, their electromechanical strength and mechanical strength of insulator string along with hardware fittings shall be as follows:

PARTICULARS OF COMPOSITE INSULATORS FOR INSULATED CROSS-ARM

Sl. No.	Type	Size of Composite Insulator (mm)	Min. Creepage Distance (mm)	No. of Individual units per string (Nos.)	EM strength of Insulator Unit (kN)	Mechanical strength of Insulator string along with Hardware fittings (kN)
1	Post Insulators	70X2050	4495	1X1	120	120
2	Line Insulators	18X1910	4495	1X1	70	70

Note: ***The core dia. of composite insulators mentioned at column No.1 is minimum requirement**. The bidder shall offer composite insulators of suitable core dia. to meet specified E&M strength requirements. However, the overall string length shall be within the limits specified in the drawing.

3.3.2.0. Pin and Cap

3.3.2.1. Pin and cap shall be designed to transmit the mechanical stress and develop uniform mechanical strength in the insulator. The cap shall be circular with the inner and outer surfaces concentric of such design that it will not yield or distort under load conditions.

3.3.2.2. The design shall be such as to permit easy removal of replacement of either insulator units or fittings under the live line conditions.

3.3.3.0. Ball and Socket Designation

3.3.3.1. The dimensions of the Ball and Socket shall be of 20mm for 120kN Insulators in accordance with the standard dimensions stated in IEC:120/ IS:2486 (Part-II).

3.3.4.0. Dimensional Tolerance of Composite Insulators

3.3.4.1. The tolerances on all dimensions e.g., diameter, length and creepage distance shall be allowed as follows:

± (0.04d+1.5) mm when d≤300 mm.

± (0.025d+6) mm when d>300 mm.

Where, d being the dimensions in millimeters for diameter, length or creepage distance as the case may be. However, no negative tolerance shall be applicable to creepage distance.

3.3.5.0. Interchangeability

3.3.5.1. The composite insulators inclusive of the ball & socket connection shall be standard design suitable for use with the hardware fittings of any make conforming to relevant IEC standards.

3.3.6.0. Corona and RI Performance

3.3.6.1. All surfaces shall be clean, smooth, without cuts, abrasions or projections. No part shall be subjected to excessive localized pressure. The insulator and metal parts shall be so designed and manufactured that it shall avoid local corona formation and shall not generate any radio interference beyond specified limit under the operating conditions.

3.3.7.0. Maintenance

3.3.7.1. The composite insulators offered barely need any maintenance due to their advantage of material properties over its lifetime. However, they shall be suitable for employment of hot line maintenance technique so that usual hot line operation shall be carried out with ease, speed and safety if required. with above, one aluminium

ladder for O&M works of this CICA should be provided with provision of fitting & fixing of this ladder with every CICA should be kept.

3.3.8.0. Materials

3.3.8.1. Core

- It shall be a Fibre Reinforced Composite (FRP rod) excellent anti-bending & anti-seismic resistance. The rod shall be electrical grade corrosion resistant (ECR), boron free glass and shall exhibit both high electrical integrity and high resistance to acid corrosion.

3.3.8.2. Housing & Weather sheds

- The FRP rod shall be covered by a seamless sheath of a High Temperature Vulcanized (HTV) silicone rubber compound of a thickness of minimum 3mm. The housing & weather sheds should have silicon content of minimum 30% by weight. It should protect the FRP rod against environmental influences, external pollution, and humidity. It shall be extruded or directly moulded on the core. The interface between the housing and the core must be uniform and without voids. The strength of the bond shall be greater than the tearing strength of the composite. The manufacturer shall follow non-destructive technique (N.D.T.) to check the quality of jointing of the housing interface with the core. The technique being followed with detailed procedure and sampling shall be furnished along with the bid. The details for this shall be finalized during detailed engineering and finalization of MQP.
- The weather sheds of the insulators shall be of alternate shed profile. The weather sheds shall be vulcanized to the sheath (extrusion process) or molded as part of the sheath (injection moulding process) and free from imperfections. The vulcanization for extrusion process shall be at high temperature and for injection moulding shall be at high temperature & high pressure. Any seams / burrs protruding axially along the insulator, resulting from the injection moulding process shall be removed completely without causing any damage to the housing. The track resistance of housing and shed material shall be class 1A4.5. according to IEC:60587. The strength of the weather shed to sheath interface shall be greater than the tearing strength of the composite. The composite insulator shall be capable of high pressure washing.

3.3.8.3. End Fittings

- End fittings transmit the mechanical load to the core. They shall be made of malleable cast iron spheroidal graphite or forged steel. They shall be connected to the rod by means of a controlled compression technique. The manufacturer shall have in-process Acoustic emission arrangement or some other arrangement to ensure that there is no damage to the core during crimping. This verification shall be in-process and done on each insulator. The gap between fitting and sheath shall be sealed by a flexible silicone rubber compound. The system of attachment of end fitting to the rod shall provide superior sealing performance between housing and metal connection. The sealing must be humidity proof and durable with time.

3.3.8.4. Grading Rings

- Grading rings shall be used at both ends of each composite insulator unit for reducing the voltage gradient on and within the insulator and to reduce radio and TV noise to acceptable levels. The size and placement of the metallic grading rings shall be designed to eliminate dry band arcing/corona cutting/ exceeding of permissible electrical stress of material. The bidder shall furnish calculations along with the proposed placement and design of corona ring in support of the above. Grading rings shall be capable of installation and removal with hot line tools without disassembling any other part of the insulator assembly. The bidder should supply the grading rings also.

3.3.9.0. Workmanship

3.3.9.1. All the materials shall be of latest design and conform to the best modern practices adopted in the extra high voltage field. Bidders shall offer only such insulators as are guaranteed by him to be satisfactory and suitable for transmission lines specified and will give continued good service.

3.3.9.2. The design, manufacturing process and material control at various stages shall be such as to give maximum working load, highest mobility, best resistance to corrosion, good finish and elimination of sharp edges and corners to limit corona and radio interference.

3.3.9.3. The design of the insulators shall be such that stresses due to expansion and contraction in any part of the insulator shall not lead to deterioration.

3.3.9.4. The core shall be sound and free of cracks and voids that may adversely affect the insulators.

3.3.9.5. Weather sheds shall be uniform in quality. They shall be clean, sound, smooth and free from gross defects and excessive flashing at parting lines.

3.3.9.6. End fittings shall be free from cracks, seams, shrinks, air holes and rough edges. End fittings should be effectively, sealed to prevent moisture ingress, effectiveness of sealing system must be supported by test documents. All surfaces of the metal parts shall be perfectly smooth with the projecting points or irregularities which may cause corona. All load bearing surfaces shall be smooth and uniform so as to distribute the loading stresses uniformly.

3.3.9.7. All ferrous parts should be hot dip galvanized to give a minimum average coating of zinc equivalent to 600 gm/sq.m. and shall be in accordance with the requirement of ISO:1461 (E) and shall satisfy the tests mentioned in ISO:1460 (E). The zinc used for galvanizing shall be of purity of 99.95%. The zinc coating shall be uniform, adherent, smooth, reasonably bright continuous and free from imperfections such as flux, ash rust stains, bulky white deposits and blisters. The galvanized metal parts shall be guaranteed to withstand at least six successive dips each lasting for one (1) minute duration under the standard preece test. The galvanizing shall be carried out only after any machining.

3.3.10.0. Equipment Marking

3.3.10.1. Each composite unit shall be legibly and indelibly marked with the trademark of the manufacturer, month & year of manufacture. The guaranteed combined mechanical and electrical strength shall be indicated in kilo Newton followed by the word 'kN' to facilitate easy identification and to ensure proper use.

3.3.10.2. One 10 mm thick ring or 20 mm thick spot of suitable quality of paint shall be marked on the cap/end fitting of each composite insulator of particular strength for easy identification of the type of insulator. The paint shall not have any deteriorating effect on the insulator performance.

3.3.11.0. Bid Drawings

3.3.11.1. The Bidder shall furnish full description and illustration of the material offered.

3.3.11.2. The Bidder shall furnish along with the bid the outline drawing (6 copies) of each insulator unit including a cross sectional view of the insulator unit. The drawing shall include but not limited to the following information:

a) Rod diameter and ball to ball spacing with manufacturing tolerances
b) Minimum Creepage distance with positive tolerance
c) Protected creepage distance
d) Eccentricity of the FRP rod unit
   i. Axial run out
   ii. Radial run out
e) Unit mechanical and electrical characteristics
f) Size and weight of ball and socket parts
g) Weight of composite units
h) Materials
   iii. Identification mark
   iv. Manufacturer's catalogue number

3.3.11.3. After placement of award, the bidder shall submit full dimensioned insulator drawings containing all the details as given in the clause above, in six (6) copies to AEGCL for approval.

3.3.11.4. After placement of award the Bidder shall also submit fully dimensioned insulator crate drawing for different type of insulators.

3.3.11.5. After placement of award, the Bidder shall submit full dimensioned manufacturing drawing of composite insulator unit in six (6) copies to AEGCL for reference and record.

3.3.12.0. Tests and Standards

3.3.12.1. Type Tests

The bidder shall submit type test reports for all the Type Tests that have been specified in the specifications and that have previously been performed. The type test should have been performed on equipment or material that are identical or have higher parameters than the equipment being offered. Test reports should not be more than seven years old reckoned from the date of bid opening and should have been performed in any CPRI/NABL/International accredited laboratory. The list of tests is specified below: -

3.3.12.1.1. **On the complete specified composite Insulated Cross Arm design with Hardware Fittings**

a)	Power frequency voltage withstand test with corona control rings/grading ring and arcing horns under wet condition	IEC:383-1993/ Annexure A
b)	Switching surge voltage withstand test under wet condition Um>300	IEC:383-1993
c)	Impulse voltage withstand test under dry condition	IEC:383-1993
d)	Corona and RIV test under dry condition	Annexure-A
e)	Mechanical Strength test	Annexure-A
f)	Vibration test	Annexure-A
g)	Salt-fog pollution withstand test	Annexure-A

3.3.12.1.2. **On Composite Insulator Units**

a)	Tests on interfaces and connections of metal fittings (Tests to be performed on the same samples in the sequence given below) i. Dry power frequency voltage test ii. Sudden load release test iii. Thermal mechanical test iv. Water immersion test v. Steep front impulse voltage test vi. Dry power frequency voltage test	IEC: 61109
b)	Assembled core load time test i. Determination of the average failing load of the core of the assembled MAV ii. Verification of the 96 hours withstand load	IEC: 61109
c)	Brittle fracture resistance test	Annexure-A
d)	Test of housing, Tracking and erosion test	IEC: 61109
e)	Tests for the core material i. Dye penetration test ii. Water diffusion test	IEC: 61109
f)	Flammability test	IEC:61109
g)	Recovery of Hydrophobicity test	Annexure-A
h)	Damage limit proof test and test of tightness of interface between end fittings and insulator housing	IEC:61109
i)	Silicone content test	Annexure-A
j)	High Pressure washing test	Annexure-A

3.3.12.1.3. All the type tests mentioned in Clause No. 3.3.12.1.1 shall be conducted on Single Post insulator, Single Tension line insulator string along with hardware fittings.

3.3.12.2. Acceptance Tests

3.3.12.2.1. **For Composite Insulators**

a)	Verification of dimensions	IEC: 61109
b)	Galvanising test	IEC : 60383
c)	Verification of locking system	IEC : 60383
d)	Verification of tightness of interface between end fittings and insulator housing and of specified mechanical load	IEC: 61109
e)	Recovery of Hydrophobicity	Annexure-A
f)	Tests on interfaces and connections of metal fittings (Tests to be performed on) the same samples in the sequence given below	IEC:61109
	i. Dry power frequency voltage test	
	ii. Sudden load release test	
	iii. Thermal mechanical test	
	iv. Water immersion test	
	v. Steep front impulse voltage test	
g)	Recovery of Hydrophobicity test	Annexure-A
h)	Silicone content test	Annexure-A

3.3.12.2.2. The test 3.3.12.2.1.(e) & (f) shall be done against one sample of each order or against every 500 nos. of insulators whichever is less.

3.3.12.2.3. In the event of failure of the sample to satisfy the acceptance test(s) specified in 3.3.12.2 above, the retest procedure shall be as per clause 7.6 of IEC 61109.

3.3.12.3. Routine Tests:

3.3.12.3.1. **For Composite Insulators**

a) Visual Inspection As per IEC:61109
b) Mechanical routine test As per IEC:61109

3.3.12.4. Tests During Manufacture

3.3.12.4.1. **On all components as applicable**

a)	Chemical analysis of zinc used for galvanising	As per Annexure-A
b)	Chemical analysis, mechanical, metallographic test and magnetic particle inspection for malleable castings	As per Annexure-A
c)	Chemical analysis hardness tests and magnetic particle inspection for forgings	As per Annexure-A
d)	Tracking and erosion test on insulating material	IEC 60587

3.3.12.5. Standards

3.3.12.5.1. The insulator strings and its components shall conform to the following Indian/ International Standards which shall mean latest revision, with amendments/ changes adopted and published, unless specifically stated otherwise in the Specification.

3.3.12.5.2. In the event of supply of insulators conforming to standards other than specified, the Bidder shall confirm in his bid that these standards are equivalent or better to those specified. In case of award, salient features of comparison between the standards proposed by the Bidder and those specified in this document will be provided by the Bidder to establish equivalence.

Sl. No.	Indian Standard	Title	International Standard
1.	IS:209-1992	Specification for zinc	BS:3436
2.	IS:406-1991	Method of Chemical Analysis of Slab Zinc	BS:3436
3.	IS:2071 Part (I)-1993 (Part(II)-1991 Part(III)-1991	Methods of High Voltage Testing	IEC:60060-1
4.	IS:2486 Part-I-1993 Part-II-1989 Part-III-1991	Specification for Insulator fittings for Overhead Power Lines with a nominal voltage greater than 1000V General Requirements and Tests Dimensional Requirements Locking Devices	BS:3288 IEC:60120 IEC:60372
5.	IS:2629-1990	Recommended Practice for Hot, Dip Galvanisation for iron and steel	ISO-1461(E)
6.	IS:2633-1992	Testing of Uniformity of Coating of zinc coated articles	
7.	IS:3188-1988	Dimensions for Disc Insulators	IEC:60305
8.	IS:6745-1990	Determination of Weight of Zinc Coating on Zinc coated iron and steel articles	BS:433-1969 ISO:1460-1973
9.	IS:8263-1990	Methods of RI Test of HV insulators	IEC:60437 NEMA Publication No.07/ 1964/ CISPR
10.	IS:8269-1990	Methods for Switching Impulse test on HV insulators	IEC:60506
11.		Thermal Mechanical Performance test and mechanical performance test on string insulator units	IEC: 60575
12.		Salt Fog Pollution Voltage Withstand Test	IEC:60507
13.		Composite insulators for A.C. Overhead lines with nominal voltage greater than 1000V – Definitions, test methods and acceptance criteria	IEC:61109
14.		Guide for the selection of insulators in respect of polluted conditions	IEC:60815
15.		Tests on insulators of Ceramic material or glass or glass for overhead lines with a nominal voltage greater than 1000V	IEC:60383
16.		Characteristics of string insulator units of the long rod type	IEC:60433

3.3.13.0. Packing and Marking

3.3.13.1. Bidders should ensure in packing the insulators in suitable PVC/ plastic tubes/any other suitable packing along with temporary wrap-on shields/shrouds for each insulator unit. The packing shall provide protection against rodent. The shields/shrouds shall be for protection during transport and for preventing bird pecking during erection. Further, the shields/shrouds shall be made of opaque, weatherproof material of adequate strength and shall be colour coded. The shields/shrouds shall have smaller diameter than the insulator to stay in place against

winds & weather and shall be designed so as to leave only the end fittings exposed for attachment of insulator to tower and line hardware until line construction is complete.

The shield/shroud shall have suitable pull off loop for easy detachment just prior to charging of the line without causing any damage to the insulator. The bidder shall furnish detailed design of the packing and shield/shroud along with attachment and detachment procedure in this regard. For marine transportation, crates shall be palleted.

3.3.13.2. The packing shall be of sufficient strength to withstand rough handling during transit, storage at site and subsequent handling in the field.

3.3.13.3. Suitable cushioning, protective padding, or dunnage or spacers shall be provided to prevent damage or deformation during transit and handling.

3.3.13.4. The Bidder shall guarantee the adequacy of the packing and shall be responsible for any loss or damage during transportation, handling, storage and installation due to improper packing.

3.3.13.5. All packing cases shall be marked legibly and correctly so as to ensure safe arrival at their destination and to avoid the possibility of goods being lost or wrongly dispatched on account of faulty packing and faulty or illegible markings. Each case/crate shall have all the markings stencilled on it in indelible ink.

ANNEXURE-A

A). Tests on Complete Strings with Hardware Fittings

A). 1. Corona Extinction Voltage Test (Dry)

The sample assembly when subjected to power frequency voltage shall have a corona extinction voltage of not less than 320 kV (rms) line to ground under dry condition. There shall be no evidence of corona on any part of the sample. The atmospheric condition during testing shall be recorded and the test results shall be accordingly corrected with suitable correction factor as stipulated in IEC: 383.

A). 2. RIV Test (Dry)

Under the conditions as specified under (A.1) above, the insulator string along with complete hardware fittings shall have a radio interference voltage level below 1000 micro volts at one MHz when subjected to 50 Hz AC voltage of 305 kV line to ground under dry condition. The test procedure shall be in accordance with IS:8263 /IEC:60437.

A). 3. Mechanical Strength Test

The complete insulator string along with its hardware fitting excluding arcing horn, corona control ring, grading ring and suspension assembly/dead end assembly shall be subjected to a load equal to 50% of the specified minimum ultimate tensile strength (UTS) which shall be increased at a steady rate to 67% of the minimum UTS specified. The load shall be held for five minutes and then removed. After removal of the load, the string components shall not show any visual deformation and it shall be possible to disassemble them by hand. Hand tools may be used to, remove cotter pins and loosen the nuts initially. The string shall then be reassembled and loaded to 50% of UTS and the load shall be further increased at a steady rate till the specified minimum UTS and held for one minute. No fracture should occur during this period. The applied load shall then be increased until the failing load is reached, and the value recorded.

A). 4. Vibration Test

The suspension string shall be tested in suspension mode, and tension string in tension mode itself in laboratory span of minimum 30 metres. In the case of suspension string, a load equal to 600 kg shall be applied along the axis of the suspension string by means of turn buckle. The insulator string along with hardware fittings and the sub-conductors each tensioned at 43 kN shall be secured with clamps. The system shall be suitable to maintain constant tension on each sub-conductors throughout the duration of the test. Vibration dampers shall not be used on the test span. All the sub-conductors shall be vertically vibrated simultaneously at one of the resonance frequencies of the insulators string (more than 10 Hz) by means of vibration inducing equipment. The peak-to-peak displacement in mm of vibration at the antinode point, nearest to the string, shall be measured and the same shall not be less than 1000/f1.8 where f is the frequency of vibration in cycles/sec. The insulator string shall be vibrated for not less than 10 million cycles without any failure. After the test the insulators shall be examined for looseness of pins and cap or any crack in the cement. The hardware shall be examined for looseness, fatigue failure and mechanical strength test. There shall be no deterioration of properties of hardware components and insulators after the vibration test. The insulators shall be subjected to the Mechanical performance test followed by mechanical strength test as per relevant standards.

A). 5. Salt-fog pollution withstand test

This test shall be carried out in accordance with IEC: 60507. The salinity level for composite insulators shall be 160 Kg/m3 NACL.

B). Composite Line Insulator Units

B). 1. Brittle Fracture Resistance Test

Assembled core load time test with container that contains1n-HNO_3 concentric acid that is applied at the naked rod. The rod should be held at 80% of SML for the duration of the test.

The rod should not fail within the 96-hour test duration.

B). 2. Recovery of Hydrophobicity Test

1) The surface of selected samples shall be cleaned with isopropyl alcohol. Allow the surface to dry and spray with water. Record the HC classification. Dry the sample surface.
2) Treat the surface with corona discharges to destroy the hydrophobicity. This shall be done utilizing a high frequency corona tester, Holding the electrode approximately 3mm from the sample surface, slowly move the electrode over an area approximately 1" x 1". Continue treating this area for 2 – 3 minutes, operating the tester at maximum output.

3) Immediately after the corona treatment, spray the surface with water and record the HC classification. The surface should be hydrophilic, with an HC value of 6 or 7. If not, dry the surface and repeat the corona treatment for a longer time until an HC of 6 or 7 is obtained. Dry the sample surface.
4) Allow the sample to recover and repeat the hydrophobicity measurement at several time intervals. Silicone rubber should recover to HC 1 – HC 2 within 24 to 48 hours, depending on the material and the intensity of the corona treatment.

B). 3. Silicone content test

Minimum content of silicone as guaranteed by bidder shall be verified through FTIR spectroscopy & TGA analysis or any other suitable method mutually agreed between Employer & Bidder in Quality Assurance Programme.

B). 4. High Pressure washing test

The test is to be carried out at 3800 kPa with nozzles of 6 mm diameter at a distance of 3m from nozzles to the insulator, followed by a dry power frequency voltage test as per IEC 61109.

C). Tests on All Components (As Applicable)

C). 1. Chemical Analysis of Zinc used for Galvanizing

Samples taken from the zinc ingot shall be chemically analysed as per IS:209-1979. The purity of zinc shall not be less than 99.95%.

C). 2. Tests for Forgings

The chemical analysis hardness tests and magnetic particle inspection for forgings, will be as per the internationally recognised procedures for these tests. The sampling will be based on heat number and heat treatment batch. The details regarding test will be as discussed and mutually agreed to by the Bidder and Employer in Quality Assurance Programme.

C). 3. Tests on Castings

The chemical analysis, mechanical and metallographic tests and magnetic, particle inspection for castings will be as per the internationally recognised procedures for these tests. The samplings will be based on heat number and heat treatment batch. The details regarding test will be as discussed and mutually agreed to by the Bidder and Employer in Quality Assurance Programme.

ANNEXURE-B

SYSTEM PARTICULARS

Electrical System Data

132kV LINE

A.	System Voltage	132 kV
B.	Maximum Voltage	145 kV
C.	BIL (Max.)	650 kVp
D.	Power frequency withstand voltage (wet)	275 kV rms

3.4.0. GTPs OF COMPOSITE POST INSULATORS FOR 132kV TRANSMISSION LINE

Sl. No.	Description	Unit	**Minimum Requirement**
1.	Type of Insulator		Composite
2.	Reference Standard		IEC 61952
3.	Material of Core Rod		FRP Rod
4.	Material of sheds		Silicon Rubber
5.	Type of metal end fittings		Flange
6.	Weight of single unit	Kg	50
7.	Size and designation of ball & socket assembly	mm	/
8.	Core diameter	mm	Φ70
9.	Tolerance on core diameter	±mm	0.15
10.	Nominal length (section length)	mm	2050
11.	Tolerance on Nominal length	±mm	2
12.	Dry arcing distance	mm	1300(minimum)
13.	Number of sheds	Nos.	20
14.	Sheds profile (type)		Big-small-big
15.	Shed spacing	mm	72
16.	Sheds profile (regular alternating)		Alternate sheds
17.	Shed diameter	mm	-
18.	Tolerance on shed diameter	±mm	3
19.	Minimum creepage distance	mm	>4495
20.	Tolerance on Creepage distance	mm	(1%)
21.	Guaranteed mechanical strength Compression Strength Tension Strength	kN	 120 80
22.	Routine mechanical load Compression Strength Tension Strength	kN	 60 40
23.	Material a) FRP rod b) Weather sheds with % contents of silicon c) Housing d) End fittings e) Grading rings		 a) FRP b) 30% c) HTV d) Q345 Steel e) Galvanized aluminum
24.	Minimum thickness of sheath covering over the core	mm	4
25.	Power frequency withstand voltage of single unit a) Dry b) Wet	 KV (rms) KV (rms)	 / /
26.	Power frequency flashover voltage of single unit a) Dry b) Wet	 KV (rms) KV (rms)	 / /
27.	Impulse withstand voltage of single unit (dry) a) Positive b) Negative	 KV (peak) KV (peak)	 / /

Sl. No.	Description	Unit	**Minimum Requirement**
28.	Impulse flashover voltage of single unit (dry) a) Positive b) Negative	 KV (peak) KV (peak)	 / /
29.	Purity of zinc used for galvanizing end fittings	%	99.95
30.	Number of dips which the end fittings can withstand in standard preece test	Nos.	2
31.	Certified test report of accelerated ageing test of 5000 hours (enclosed) (appendix-C of IEC-61109)	Yes/No.	Yes
32.	Drawing enclosed	Yes/No.	/
33.	Warranty Period	>=3 years	

3.5.0. GTPs OF COMPOSITE LINE INSULATORS FOR 132kV TRANSMISSION LINE

Sl. No.	Description	Unit	**Minimum Requirement**
1.	Type of Insulator		Composite
2.	Reference Standard		IEC 61109
3.	Material of Core Rod		FRP Rod
4.	Material of sheds		Silicon Rubber
5.	Type of metal end fittings		Ball & Socket
6.	Weight of single unit	Kg	10
7.	Size and designation of ball & socket assembly	mm	
8.	Core diameter	mm	18
9.	Tolerance on core diameter	±mm	2
10.	Nominal length (section length)	mm	1910
11.	Tolerance on Nominal length	±mm	10
12.	Dry arcing distance	mm	1620 (minimum)
13.	Number of sheds	Nos.	20
14.	Sheds profile (type)		Big-small-big
15.	Shed spacing	mm	72
16.	Sheds profile (regular alternating)		Alternate sheds
17.	Shed diameter	mm	-
18.	Tolerance on shed diameter	±mm	3
19.	Minimum creepage distance	mm	>4495
20.	Tolerance on Creepage distance	mm	(1%)
21.	Guaranteed mechanical strength	kN	70
22.	Routine mechanical load	kN	35
23.	Material a) FRP rod b) Weather sheds with % contents of silicon		 a) FRP b) 30% c) HTV

Sl. No.	Description	Unit	**Minimum Requirement**
	c) Housing d) End fittings e) Grading rings		d) Q345 Steel e) Galvanized aluminum
24.	Minimum thickness of sheath covering over the core	mm	5
25.	Power frequency withstand voltage of single unit a) Dry b) Wet	 KV (rms) KV (rms)	 / /
26.	Power frequency flashover voltage of single unit a) Dry b) Wet	 KV (rms) KV (rms)	 / /
27.	Impulse withstand voltage of single unit (dry) a) Positive b) Negative	 KV (peak) KV (peak)	 / /
28.	Impulse flashover voltage of single unit (dry) a) Positive b) Negative	 KV (peak) KV (peak)	 / /
29.	Purity of zinc used for galvanizing end fittings	%	99.95
30.	Number of dips which the end fittings can withstand in standard preece test	Nos.	2
31.	Certified test report of accelerated ageing test of 5000 hours (enclosed) (appendix-C of IEC-61109)	Yes/No.	Yes
32.	Drawing enclosed	Yes/No.	/
33.	Warranty Period	>=3 years	

3.6.0. Requirements for supply, erection, testing & commissioning of following equipments and materials.

3.6.1. This Section is intended to cover the requirements for supply, erection, testing & commissioning of following equipments and materials:

i) Towers with all accessories.
ii) Power Conductors and Ground Wires.
iii) Disc Insulators, Insulator String Hardware, Tension & Suspension Clamps and conductor and earth wire accessories.
iv) Transmission line foundations
v) Erection, testing and commissioning.

Bidders are required to submit the GTP of all the materials and equipment to be supplied and also the name of the firms from where the materials shall be procured including tower materials with proper authorization from the concerned manufacturer.

3.6.2. General

3.6.2.1. The details specifications given below are intended for general description of quality, workmanship etc for the items given above but do not cover minutes details of the work. In the absence of relevance details

in the specifications the work shall be execute according to the prevailing practices and to the discretion of the site engineer.

3.6.2.2. This Section shall have precedence in case anything contrary to this is stated anywhere in this contract document. The contractor shall get clarified any doubts about the specifications etc. before tendering in respect pf interpretation of any portion of this document.

3.6.2.3. The code referred to in this specification correspond to the latest revision.

3.6.3. Special Conditions of Contract

3.6.3.1. The Bidder should note that the fabrication of tower materials and construction of tower foundations shall be carried out as per design. The drawings related to the design shall be handed over to only the successful Bidder. However, intending Bidder, if so wishes may inspect the drawings at the office of the MD, Assam Electricity Grid Corporation Limited.

3.6.3.2. The Bidder should also note that the towers and foundations of the line was designed with ACSR Panther conductors as per IS: 802, 1977, IS: 5613, 1980 and CBIP Publication No 2, 1977.

3.6.4. Towers with all Accessories

3.6.4.1. GENERAL

3.6.4.2. The AEGCL shall provide drawings for proposed G.I. towers to the successful bidder at the time of award of contract. The Contractor has to regenerate three copies of drawings for approval.

3.6.4.3. DRAWING TO BE PREPARED BY CONTRACTOR

3.6.4.4. The contractor shall prepare fresh drawings of the tower structures based on the drawings furnished by AEGCL and shall submit the same along with the detail bill of materials for AEGCL's approval/reference. The fabrication work shall be started only after the approval of detail bill of materials and shall strictly conform to the approved drawings supplied by AEGCL. It is the responsibility of the Contractor to reproduce the drawings and The Site Engineer reserves the right to make changes to drawings supplied to the contractor for revisions to reflect more updated requirements. Revisions to drawings and any new drawings made to include additional works by the contractors shall be considered as a part of this specification and AEGCL shall entertain no extra claim on this account.

3.6.4.5. In the case of variations in drawings and specifications the decisions of the site Engineer shall be final. If the contractor found discrepancies in the execution of his work, he shall refer such discrepancies to the site Engineer before proceedings with such works.

3.6.4.6. MATERIALS

3.6.4.7. Materials for steel structure including bolts, anchor bolts, washers etc shall be of tested quality and shall conform to IS: 226 and IS: 2062 (for plates over 20mm thick) Dimensions of all bolts and nuts shall conform to IS 6639 and their mechanical properties shall conform to property class 4.6 and class 4 of IS: 1367 for bolts and nuts respectively. Dimensions and mechanical properties of all washers shall conform to IS: 6610 and IS: 3063 respectively. Other materials used in the construction of steel structure shall conform to appropriate IS specification for the materials wherever they exist. All members of the steel structures, bolts, nuts and washers shall be galvanized.

3.6.4.8. FABRICATION

3.6.4.9. The workmanship shall conform to the best practice in modern structural shops and to the provisions of IS: 802 (Part-II) and IS: 800 as applicable.

3.6.4.10. CONNECTIONS

3.6.4.11. All connections shall be designed for the full strength and properties of the members. The fabrication, in general shall be bolted type. Bolts shall also be used for field connections unless otherwise specified in

the drawings or permitted by the site engineer for any special circumstances. Bolting shall be conforming to IS: 802 (Part-I & II) and IS: 800 as applicable.

3.6.4.12. Welding where required shall be generally done in accordance with the relevant IS standards. Selection of electrodes shall conform to IS: 815. MS electrodes for welding shall conform to IS 814. Welding procedure shall conform to IS: 816 and IS 823.

3.6.4.13. TOLERANCES

3.6.4.14. Fabrications tolerances shall conform to IS: 802 (Part-II) and IS: 800 as applicable.

3.6.4.15. MARKING

3.6.4.16. The marking procedure shall conform to IS: 802 and IS: 800 as applicable.

3.6.4.17. SHOP ASSEMBLY

3.6.4.18. All steelworks (one in each type) shall be temporarily shop assembled complete or as directed by the site engineer before commencing mass fabrication to ensure proper field erections. Reaming of untrue holes will not be allowed. A reasonable amount of drifting will be allowed in assembling. Shop assembled parts shall be dismantled for shipment.

3.6.4.19. Galvanizing Bolts and other fasteners shall be galvanized in accordance with IS: 5358. Galvanizing members of structures shall conform to IS: 4759 and spring washers shall be galvanized in accordance IS; 1573.

3.6.4.20. The recommendation given in IS: 2629 and IS: 6159 shall be complied with in respect of surface preparations, safety and applications of coating.

3.6.4.21. INSPECTION AND PACKING

3.6.4.22. The recommendation given in IS: 802 (Part-II) and IS 800 for inspection and packing shall be complied with.

3.6.4.23. TESTING

3.6.4.24. The material used for fabrication of towers shall be tested for quality.

3.6.4.25. FIELD ERECTION

3.6.4.26. Erection work shall be done strictly according to the provisions of IS: 802.

3.6.5. Power Conductor (ACSR Panther)

3.6.5.1. GENERAL

The Power Conductor (Panther) shall conform to IS:398 Part-II

3.6.5.2. CONDUCTOR PARTICULARS: The Power Conductor (Panther) properties shall conform to IS:398 Part-II, IS:398 Part-IV, IS:1778, IS:5484

Aluminium conductor steel-reinforced conductor (ACSR) shall satisfy all the parameters as furnished in Technical Data sheet as under:

STANDARD TECHNICAL PARTICULARS OF ACSR PANTHER CONDUCTOR

Sl.	Description	Unit	Technical Particular Values
1.0	**Raw Materials**		
1.1	Steel Wire/Rods		
1.1	**Aluminium**		
a)	Minimum purity of Aluminium	%	99.50
b)	Maximum copper content	%	0.04
1.2	**Steel Wire/Rods**		
a)	Carbon	%	0.50 to 0.85
b)	Manganese	%	0.50 to 1.10
c)	Phosphorous	%	Not more than 0.035
d)	Sulphur	%	Not more than 0.045
e)	Silicon	%	0.10 to 0.35(Max)
1.3	**Zinc**		
a)	Minimum purity of Zinc	%	99.95
2.0	**Aluminium strands after stranding**		
2.1	Diameter		
a)	Nominal	mm	3.00
b)	Maximum	mm	3.03
c)	Minimum	mm	2.97
2.2	Minimum breaking load of strand		
a)	Before stranding	KN	1.17
b)	After stranding	KN	1.11
2.3	Maximum resistance of 1 m length of strand at 20 deg. C	Ohm	0.004079
3.0	**Steel strand after stranding**		
3.1	Diameter		
a)	Nominal	mm	3.00
b)	Maximum	mm	3.06
c)	Minimum	mm	2.94
3.2	Minimum breaking load of strand		
a)	Before stranding	KN	9.29
b)	After stranding	KN	8.83
3.3	Galvanising		
a)	Minimum weight of Zinc coating per sq.m.	gm	230
b)	Minimum number of dips that the galvanised strand can withstand in standard preece test	Nos.	2 dips of one minute & 1 dip of half minute.

c)	Min. No. of twists in guage length equal 100 times the dia. Of wire which the strand can withstand in the torsion test (after stranding)	Nos.	16	
4.0	**ACSR PANTHER Conductor**			
4.1	UTS of the conductor	KN	89.67 (Min.)	
4.2	Lay length of outer steel layer	mm	Max	Min
a)	Outer Steel layer	mm	28	16
b)	12 wire Aluminium layer	mm	16	10
c)	18 wire Aluminium layer	mm	14	10
4.3	DC resistance of the conductor at 20 deg. C	ohm/km	0.139	
4.4	Standard length of the conductor	m	1800	
4.5	Tolerance on Standard length	%	(+/-) 5	
4.6	Direction of lay of outer layer		Right Hand	
4.7	**Linear mass of the conductor**			
a)	Standard	kg/km	974	
b)	Minimum	kg/km	954	
c)	Maximum	kg/km	993	

3.6.6. Insulators and Hardware

3.6.6.1. STANDARDS

The tension string assemblies, insulator discs and hardware offered, material and processes adopted in the manufacture of insulator discs and hardware shall conform to the provision of the following standards or equivalent other international standards:

(1) IS: 731 Specification of porcelain insulators for overhead power lines.
(2) IS: 2486 Specification of insulator fittings for overhead power lines.
(3) IS: 2026 Specification for recommended practice for hot dip galvanising of steel
(4) IS: 2633 Specification for method for testing uniformity of coating on zinc coated articles.
(5) IS: 2107 Specification for white hearth malleable iron castings.
(6) IS: 2108 Specification for black hearth malleable iron castings.

3.6.6.2. SUSPENSION CLAMP

The suspension clamps shall be made of malleable iron or aluminium alloy, hot dip galvanised and shall be suitable to accommodate the conductor together with one set of preformed armour rods. Suitable sheet aluminium liners shall be provided. The suspension clamps shall be designed to avoid any possibility of deforming or damaging the conductor. The lips shall be rounded off and the seating and the bell mouths shall be smooth to avoid corona and radio interference noises. The suspension clamps shall be suitable to carry the bottom part of the arcing horn and to receive the fittings of the insulator string.

The suspension clamps shall be such that the conductor should not slip at a load of 25% of the breaking load of the conductor. The ultimate strength of the clamp for vertical load shall not be less than the failing load of the Disc Insulators.

3.6.6.3. STRAIN CLAMP

3.3.6.1. The bolted strain clamps shall also be made of malleable iron or aluminium alloy; hot dip galvanised, lined with sheet aluminium liners and shall be suitable to accommodate the conductor with necessary binding tapes etc. The lips shall be rounded off carefully and conductor seating and the ball mouth shall be smooth to avoid corona and radio interference noises. Suitable attachment for receiving one side of arcing horns and for connecting to the insulator strings shall be provided.

The strain clamps shall be such that the conductor should not slip at a load of 90% of the breaking load of the conductor. The ultimate strength of the clamp for horizontal load shall not be less than the ultimate strength of the conductor.

Arcing horns of approved size and dimensions shall be provided for every string of insulators. The performance data for arcing horns to be supplied shall be made available to the Employer.

3.6.7. ERECTION PART

3.6.7.1. General

3.6.7.2. The details specifications given below are intended for general description of quality, workmanship etc for the items above but do not cover minutes details of the work. In the absence of relevance details in the specifications the work shall be executed according to the prevailing practices and to the discretion of the site engineer.

3.6.7.3. Type of Foundation:

3.6.7.4. Both PCC and RCC shall be involved in the proposed foundations and tenderer shall quote item wise rate for casting the foundations which will include all the related costs not specifically mentioned in the schedule of rates. The foundation drawings may be collected from the consignee of this work.

3.6.7.5. Tower Erection

3.6.7.6. The towers must be truly vertical after erection and no straining will be permitted to bring them to a vertical position. Tolerance limit for vertical shall be one in 360 of the tower height. All nuts shall be tightened properly. Before tightening it is ensured that filler washers and plates are placed in relevant gaps between members, bolts of proper size and length are inspected and one spring washer is inserted under each nut. The tightening shall be progressively carried on from the top downwards, care being taken that all bolts at every level are tightened simultaneously. The threads of bolts projecting outside nuts shall be punched at three positions on the diameter to ensure that the nuts are not loosened in course of time. If during tightening a nut is found to be slipping or running over the bolt threads, the bolt together with the nut shall be replaced.

3.6.7.7. The tenderer shall arrange for tack welding of all nuts and bolts up to the bottom cross arm level of the towers, if so desired by the Employer. So, the tenderer shall quote separately for such tack welding for each type of tower on per tower basis. The quoted rates for erection of towers shall, therefore, be exclusive of the cost of above tack welding.

3.6.7.8. Stringing of Conductor and OPGW

3.6.7.9. The stringing of the conductors and earth-wires/OPGW shall be done in a most standard method used for such lines, which shall be indicated in the tender. The tenderer shall give complete details of the stringing method they propose to follow and indicate its adaptability and advantages. They shall also indicate the tools and equipment required for stringing by the method proposed by them. The contractor shall use his own stringing and erection tools and other equipment.

3.6.7.10. The contractor shall be entirely responsible for any damage to the towers or the conductors during stringing.

3.6.7.11. Pulling Operation:

3.6.7.12. The earth wire shall be strung and securely clamped to the towers before the conductors are drawn up in order of the top conductor first.

3.6.7.13. The pulling of the conductor into the travellers (comprising of aerial and ground rollers) shall be carried out in such a manner that the conductor is not damaged or contaminated with any foreign substance and that it may not be rubbed with rough ground surface. The traveler surface in contact with aluminium

surface of conductor is not damaged. These shall be equipped with high quality ball and roller bearings for minimum friction.

3.6.7.14. During pulling out operation the tension in each conductor and earth wire shall not exceed the design working tension of the conductor at the actual prevailing temperature. After being pulled the conductor and the earth wire shall not be allowed to hang in the stringing blocks for more than 96 hours, before being pulled to the specified sag. It shall be ensured that the conductors and earth wire are not damaged due to wind, vibration or other cause.

3.6.7.15. **Sagging in Operation**:

3.6.7.16. The conductors shall be pulled up to desired sag and left in travellers for at least one hour after which the sag shall be rechecked and adjusted. The conductors shall be clamped within 36 hours for sagging in. The sags shall also be checked when the conductors have been drawn up and transferred to the insulator clamps.

3.6.7.17. At sharp vertical angles the sags and tensions shall be checked on both sides of the angle. Sagging operations shall not be carried out under wind, extremely low temperature or other adverse weather conditions, which prevent satisfactory sagging.

3.6.7.18. **Jointing:**

3.4.1 All the joints of the conductor or the earth wire shall be compression type in accordance with the recommendations of the manufacturers, for which the necessary tools and equipment like compressors and dies, grease guns, presses shall have to be arranged by the contractor.

3.4.2 All joints and splices shall be made at least 30 meters away from the structures. No joint or splices shall be made in span crossing over main roads, railways, small rivers or in tension spans. Not more than one joint shall be allowed in one span.

3.6.7.19. After pressing the joint the aluminum sleeve shall have all corners rounded, burrs and sharp edges removed and smoothened.

3.6.7.20. **Insulator Hoisting**:

3.6.7.21. Suspension insulator strings shall be used up to deviation of 2 degrees on all 'A' type towers in the line and strain insulators on all 'B' , C and D' type towers. Except on approaching towers, all suspension strings will consist of the specified number of insulator discs per string with arching horns on line side only and tension string of specified number of insulator discs per string with arcing horns on both line and tower sides.

3.6.7.22. Insulator strings shall be assembled on the ground. These shall be cleaned and examined before hoisting. Insulators with hair cracks or clips or those having glazing defects exceeding half centimeter square will not be used. No separate rates shall be quoted for insulator hoisting. The charges shall be included in the rates of string of conductors.

3.6.7.23. **Accessories**:

Accessories like vibration dampers; armour rods etc. for the conductor shall also be fitted on the line. Armour rods shall be provided at all suspension support of the conductors and vibration dampers shall be provided at both ends of each span at suitable distances from the supporting points for each phase conductor. All accessories shall be clean, smooth and in perfect condition before fitting.

3.6.7.24. **Grounding**

3.6.7.25. The Contractor shall measure the tower footing resistance (TFR) of each tower in the diverted section of the line after it has been erected and before the stringing of the earth wire during dry weather. Each tower shall be earthed and the tower footing resistance shall not exceed 10 ohms. Generally, pipe type earthing shall be done in accordance with the latest additions and revisions of:

IS: 3043 : Code of practice for Earthing.

IS: 5613 : Code of practice for Design, Installation and maintenance (Part-II/Section-2) of overhead power lines.

3.6.7.26. The earthing will be effected by burying 3 meters long GI pipe in a 300 mm diameter and 3750 mm deep pit at a distance of not less than 3650 mm diagonally away from the stubs and filling in the pit with finely broken coke having the granule sizes not less than 25 mm and salt in such a way that a minimum cover of 125 mm thick salt mixed coke shall be maintained from the pipe on all sides and that the top edge of the pipe shall be at least 600 mm below the ground level. A 45 X 6 mm-galvanized steel flat shall be used to connect the tower with the pipe. The galvanizing steel strip shall be buried not less than 600 mm deep from the ground level. The tenderer will quote the erection charges for each earthing inclusive of the cost of coke and salt, excavation and back filling etc.

3.6.7.27. Final Checking, Testing & Commissioning

3.6.7.28. After completion of the works, final checking of the line shall be done by the contractor to ensure that all the foundation work; tower erection and stringing have been done strictly according to the specifications and as approved by the Employer. All the works shall be thoroughly inspected keeping in view the following main points:

1. Sufficient back filled earth is layed over each foundation pit and it is adequately compacted.
2. All the tower members are correctly used strictly according to final approved drawings are free of any defect or damage whatsoever.
3. All the bolts are fully tightened and they are properly punched.
4. The stringing of the conductors and earth wire done to maintain proper sag.

3.6.7.29. The contractor shall submit a report to the above effect. After final checking the line shall be tested for insulation and any defect found shall be rectified by the contractor.

3.6.7.30. After satisfactory tests on the line and on approval by the Employer the line shall be energized at full operating voltage before handing over.

Schedule-1: Supply of Plants and Equipments

Schedule-1: Supply of Plants and Equipments					
Sl. No.	**Item Description**	**Unit**	**Qty.**	**Rate**	**Amount**
1	2	3	4	5	6
1	**Fabricated Tower Superstructures 220KV D Type 9Mtr Extension: 1 No**				
1.1	Galvanized steel works including hangers, gussets, strain plates etc. (For D Type) (HT Steel: 5140.590Kg, MS: 3398.430Kg)	MT	8.539		
1.2	Galvanized iron nuts & bolts, D Shackle, Pack Washer, spring Washer, Step bolts etc. (For D Type)	MT	3.94		
1.3	Galvanized steel works including hangers, gussets, strain plates etc. (For +9Mtr) (HT Steel: 1226.120Kg, MS: 2062.200Kg)	MT	3.288		
1.4	(ii) Galvanized iron nuts & bolts, spring washers, step bolts etc. (For +9Mtr)	MT	0.107		
1.5	Partially galvanized stub & cleat including Nut, Bolts etc (One set consist of 4 stub)	MT	0.509		
1.6	Stub Setting Template MS: 1364.925 Kg	MT	1.365		
2	**Fabricated Tower Superstructures Special Suspension Tower A+30Mtr Extn.: 1 No**				
2.1	Galvanized steel Fabricated members HT: 8187.16 KG & MS: 9729.36 KG	MT	17.92		
2.2	Galvanized iron nuts & bolts, spring washers etc.	MT	0.758		
2.3	Galvanized stub & cleat including Nut, Bolts etc (one set consist of 4 stub)	MT	1.098		
2.4	Stub Setting Template including Nut, Bolts etc	MT	1.457		
3	**Fabricated Tower Superstructures for existing B+12 strengthend Tower.**				
3.1	Galvanized steel Fabricated members HT: 4731.92 KG & MS: 1812.04 KG	MT	6.544		
3.2	Galvanized iron nuts & bolts, spring washers etc.	MT	0.431		
4	**Composite Insulated Cross Arm (For Suspension Tower)** including Hardware's, connecting steel angle, suspension fittings, bolts & nuts etc. in complete including Freight & Insurance. Suspension type tower - 2 towers X 3 each = 6 Nos (New A+30 Mtr Tower, Strengthen existing B+12 tower).	No	6		
5	**Composite Insulated Cross Arm (For Suspension Tower) as Mandatory Spare** including Hardware's, connecting steel angle, suspension fittings, bolts & nuts etc. in complete including Freight & Insurance.	No	1		
6	**ACSR Panther Conductor** (Existing Gantry - New D+9 - New A+30 - Spl B+12 strengthen tower - Existing C+0 tension tower) Total Span Length: 1358 Mtr. Considering 8% additional for Sag & Wastage = 1358 + (8% of 1358) X 3 Phase = 4399.92 Mtr Say 4.4 KM	KM	4.4		
7	Porcelain Disc Insulator 90KN	No	120		
8	Single Tension hardware fittings for Panther Conductor (Disc insulator accessories)	No	12		
9	Stock bridge type Vibration Damper for ACSR Panther conductor.	No	24		
10	Supply of Danger plates.	Nos	3		
11	Supply of Phase plates.	Set	3		
12	Supply of Number plates.	Nos	5		

13	Supply of anti-climbing device	Set	3		
14	Total Material Cost	-	-	-	

Schedule-2: Freight & Insurance

Schedule-2: Freight & Insurance

Sl. No.	Item Description	Unit	Qty.	Rate	Amount
1	2	3	4	5	6
1	**Fabricated Tower Superstructures 220KV D Type 9Mtr Extension: 1 No**				
1.1	Galvanized steel works including hangers, gussets, strain plates etc. (For D Type) (HT Steel: 5140.590Kg, MS: 3398.430Kg)	MT	8.539		
1.2	Galvanized iron nuts & bolts, D Shackle, Pack Washer, spring Washer, Step bolts etc. (For D Type)	MT	3.94		
1.3	Galvanized steel works including hangers, gussets, strain plates etc. (For +9Mtr) (HT Steel: 1226.120Kg, MS: 2062.200Kg)	MT	3.288		
1.4	(ii) Galvanized iron nuts & bolts, spring washers, step bolts etc. (For +9Mtr)	MT	0.107		
1.5	Partially galvanized stub & cleat including Nut, Bolts etc (One set consist of 4 stubs)	MT	0.509		
1.6	Stub Setting Template MS: 1364.925 Kg	MT	1.365		
2	**Fabricated Tower Superstructures Special Suspension Tower A+30Mtr Extn.: 1 No**				
2.1	Galvanized steel Fabricated members HT: 8187.16 KG & MS: 9729.36 KG	MT	17.92		
2.2	Galvanized iron nuts & bolts, spring washers etc.	MT	0.758		
2.3	Galvanized stub & cleat including Nut, Bolts etc (One set consist of 4 stub)	MT	1.098		
2.4	Stub Setting Template including Nut, Bolts etc	MT	1.457		
3	**Fabricated Tower Superstructures for existing B+12 strengthened Tower.**				
3.1	Galvanized steel Fabricated members HT: 4731.92 KG & MS: 1812.04 KG	MT	6.544		
3.2	Galvanized iron nuts & bolts, spring washers etc.	MT	0.431		
4	**ACSR Panther Conductor** **(Existing Gantry - New D+9 - New A+30 - Spl B+12 strengthen tower - Existing C+0 tension tower)** **Total Span Length: 1358 Mtr.** **Considering 8% additional for Sag & Wastage = 1358 + (8% of 1358) X 3 Phase = 4399.92 Mtr Say 4.4 KM**	KM	4.4		
5	Porcelain Disc Insulator 90KN	No	120		
6	Single Tension hardware fittings for Panther Conductor (Disc insulator accessories)	No	12		
7	Stock bridge type Vibration Damper for ACSR Panther conductor.	No	24		
8	Supply of Danger plates.	Nos	3		
9	Supply of Phase plates.	Set	3		
10	Supply of Number plates.	Nos	5		

11	Supply of anti-climbing device	Set	3		
12	**Total F&I**	-	-	-	

Schedule-3: Installation and Other Services Including Civil Works

Schedule-3: Installation and Other Services Including Civil Works					
Sl. No.	**Item Description**	**Unit**	**Qty.**	**Rate**	**Amount**
1	2	3	4	5	6
1	Check Survey as per Specification	Route Km	1.3		
2.1	Construction of PCC/RCC (M20) foundation including all labour, materials, equipments, excavation, shuttering, head loading, back filling etc., complete for handling, transportation, batching, mixing, placing, levelling, curing etc complete inclusive of cost of Cement & Reinforcement Steel, etc., 220KV **DD+9 Type (FS) TMT-IS 1786 (Fe-500 D) Primary Producer (TATA/SAIL/Esser Steel/Jindal Panther Steel/Shyam steel or equivalent) (As per approved drawing)**				
2.1(a)	Concteating	CUM	52.489		
2.1(b)	Reinforcement	MT	4.876		
2.2	Construction of PCC/RCC (M30) foundation including all labour, materials, equipments, excavation, shuttering, head loading, back filling etc complete for handling, transportation, batching, mixing, placing, levelling, curing etc complete inclusive of cost of Cement & Reinforcement Steel etc. **Special Suspension Tower A+30 Mtr Extension (Raft Foundation) TMT-IS 1786 (Fe-500 D) Primary Producer (TATA/SAIL/Esser Steel/Jindal Panther Steel/Shyam steel or equivalent) (As per approved drawing)**			-	
2.2(a)	Concteating (M30: 247.22CuM, M15: 32.40 CuM)	CUM	279.62		
2.2(b)	Reinforcement	MT	18.464		
3	Setting of stubs (sets of four) including transportation and distribution of stubs and accessories from store to site.	Set	2		
4.1	Super structure erection including transportation of structures by any means and distribution of structure and accessories from stores to site as per direction of site Engineer. **220KV DD+9 Type**	MT	15.874		
4.2	Super structure erection including transportation of structures by any means and distribution of structure and accessories from stores to site, including erection of Composite Insulated Cross Arm as per direction of site Engineer/ Manufacturer/ Designer **Special Suspension Tower A+30 Mtr Extension**	MT	18.675		
4.3	Super structure erection/modification/fabrication etc (if necessary, as per site condition) for strengthening including transportation of structures by any means and distribution of structure and accessories from stores to site including erection of Composite Insulated Cross Arm as per direction of site Engineer/Manufacturer/Designer.	MT	6.975		

	Tower Superstructures for strengthening of existing B+12 Tower.				
5	Erection of Composite Insulated Cross Arm (for suspension tower) in complete including supervision for the complete scope of work under this bid and training charges (in Assam) from Manufacturer of Composite Insulated Cross Arm	No	6		
6	Stringing of power conductor including transportation from stores and distribution of conductors and accessories to sites and laying, stringing, tensioning, clamping, jointing, jumpering and hoisting of insulators complete including cost of all fittings and accessories not specifically mentioned eleswhere to make ready to charge.	RKM	1.358		
7	Grounding of towers with 3 metre long 25 mm dia G I pipe, including cost of all materials, such as GI pipes, GI bolts & nuts and washer, salt, coke etc as per Specification.	Per Tower.	3		
8	Painting of towers with bituminous paints of approved quality up to 3 metres from ground level including the cost of paints.	Per Tower	3		
9	Welding of all nuts & bolts up to the bottom cross arm level including all charges of transportation, materials etc.	Per Tower	3		
10	Erection of Danger Plates (1 no per tower)	Nos	3		
11	Erection of Phase Plates	Set	3		
12	Erection of Number Plates (1 no per tower)	Nos	5		
13	Erection of anti-climbing device (1set per tower)	Set	3		
15	Total Installation and Other Services including civil works	-	-	-	

Schedule-4: OPGW Installation between 132KV Panchgram Gantry to next tower having Joint Box to replace the damaged OPGW span

Schedule-4: OPGW Installation between 132KV Panchgram Gantry to next tower having Joint Box to replace the damaged OPGW span					
Sl. No.	**Item Description**	**Unit**	**Qty.**	**Rate**	**Amount**
1	2	3	4	5	6
1	Installation of 24F DWSM OPGW	KM	4		
2	Installation of Joint Box and splicing works	No	2		
3	OTDR LSPM Test	Lot	1		
4	Tools and Tackles transportation	Lot	1		
5	OPGW Drum Testing	Lot	1		
6	OPGW Drum Transport from Guwahati	Lot	1		
7	Total Installation of OPGW	-	-	-	

Schedule-5: Dismantling

Schedule-5: Dismantling					
Sl. No.	Item Description	Unit	Qty.	Rate	Amount
1	2	3	4	5	6
1	Dismantling of tower without damaging the members, transportation to the store and proper staking.	Nos	2		
2	Opening and lowering of OPGW from the portation of the line to be dismantled and transportation to the store.	R. KM	1.358		
3	Opening and lowering of the conductor from the portation of the line to be dismantled and transportation to the store.	R. KM	1.358		
4	**Total Dismantling**	-	-	-	

Price Schedule Grand Summery

Schedule No	Item Description	Total Amount in Rs. (Excluding GST)
Schedule No.1	Total amount against Supply of Plants & Equipments.	
Schedule No.2	Total amount against Freight & Insurance.	
Schedule No.3	Total amount against Installation and other services including Civil Works.	
Schedule No 4	OPGW work (Installation)	
Schedule No.5	Total amount against Dismantling.	
Total	Schedule (1+2+3+4+5)	

Section – 4: BID SUBMISSION SHEET, BID FORMS AND SCHEDULES

4.1. Bid Submission Sheet (In Bidder's letterhead)

Bid Submission Sheet

Name of Contract: _____

To:

The CGM (PP&D),
Assam Electricity Grid Corporation Ltd,
Bijulee Bhawan, Paltanbazar, Guwahati-781001

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

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

_____

_____

4.2. Work Completion Schedule

Work Completion Schedule

We hereby declare that the following Work Completion Schedule shall be followed by us in executing the works covered under the Scope of this Bid.

Sl No	Description of Work	Period in Days (from the date of W.O)
1	Procurement of Material (Including submission of GTP/Drawings for approval)	
2	Foundation	
3	Erection	
4	Stringing of OPGW/ Conductor including fitting fixing of Insulators/Hardware etc. including de-stringing of existing and transportation to store (if required).	
5	Final Checking & Commissioning	

Date:
Place:

(Signature) .....
(Printed Name) .....
(Designation).....
(Seal).....

4.3. Declaration of Current/Completed project

Declaration of Current/Completed project

Sl No	Name of the Project	Tendering Department	Contract Value (Rs)	Completion Time (as per W.O.)	Completion Time (as per actual)

Date:
Place:

(Signature) .....
(Printed Name) .....
(Designation).....
(Seal).....

4.4. Form LIT - Pending Litigation

Form LIT - Pending Litigation

Each Bidder must fill in this form

❑ **No pending litigation in accordance with Criteria of ITB (Evaluation and Qualification Criteria)**

❑ **Pending litigation in accordance with Criteria of ITB (Evaluation and Qualification Criteria)**

Year	Matter in Dispute	Value of Pending Claim in Rupees	Value of Pending Claim as a Percentage of Net Worth

4.5. Form FIN - 1: Financial Situation

Form FIN - 1: Financial Situation

Each Bidder must fill in this form

Year 1:	**Year 2:**	**Year 3:**

Information from Balance Sheet

Total Assets			
Total Liabilities			
Net Worth			
Current Assets			
Current Liabilities			

Information from Income Statement

Total Revenues			
Profits Before Taxes			
Profits After Taxes			

❑ Attached are copies of financial statements (balance sheets including all related notes, and income statements) for the last three years, as indicated above, complying with the following conditions.

- All such documents reflect the financial situation of the Bidder, and not sister or parent companies.
- Historic financial statements must be audited by a certified accountant.
- Historic financial statements must be complete, including all notes to the financial statements.
- Historic financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted).

4.6. Form FIN - 2: Average Annual Turnover

Form FIN – 3: Financial Resources

Each Bidder must fill in this form

Year	Amount (Rupees)
Average Annual Turnover	

The information supplied should be the Annual Turnover of the Bidder in terms of the amounts billed to clients for each year for contracts in progress or completed.

4.7. Form FIN – 3: Financial Resources

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total cash flow demands of the subject contract or contracts as indicated with necessary supporting documents.

No.	Source of financing	Amount (Rupees)
1		
2		
3		

4.8. Manufacturer's Authorization

Manufacturer's Authorization (Form M-1)

[***The Bidder, in pursuant to ECQ Clause 2.1.2 (if applicable) shall require the Manufacturer to fill in this Form in accordance with the instructions indicated. This letter of authorization should be signed by a person with the proper authority to sign documents that are binding on the Manufacturer. Please refer to notes at bottom]***

(Manufacturer's Letterhead)

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

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

To: [Insert: full name of Purchaser]

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 1.26.0*** *of Section-1 (ITB),* 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 ***ITB Clause 1.25.0.*** 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

Signed: _____

Date: _____

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

Date: .....

Place: .....

(Signature).....….....……

….

(Printed Name)

.....…….

(Designation).....……..... ...

(Common Seal)…….....….....

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

*2. **Above undertaking shall be registered or notarized so as to be legally enforceable.***

4.9. Document checklist

Sl. No.	Document to be submitted	Submitted (Yes/No)	Name of uploaded pdf
1.	Bid submission sheet		
2.	Notarised Power of attorney for the person signing the tender		
3.	Bank Guarantee for EMD (if not paid online)		
4.	Joint Venture agreement (if applicable)		
5.	GST registration		
6.	Manufacturer's authorization (Form M-1) for all materials to be supplied including composite insulated cross arm.		
7.	GTP for all materials to be supplied including composite insulated cross arm.		
8.	Type test reports for all materials to be supplied including the specified composite insulated cross arm design performed in any CPRI/NABL/International accredited laboratory.		
9.	Drawings for composite insulated cross arm.		
10.	Form LIT		
11.	Form FIN-1		
12.	Form FIN-2		
13.	Form FIN-3		
14.	Audited Balance sheet for last three years		
15.	Bank solvency certificate		
16.	Declaration of current/completed projects		
17.	Work Completion schedule (bar chart) for executing the works covered under the Scope of this Bid		

Note: Bidders are requested to submit all required documents in e-tender portal and hard copies of i) Letter of technical bid, ii) EMD BG & Bid document cost (if not paid online), iii) Joint Venture agreement (if applicable), and iv) Power of Attorney(notarized) for bid signatory. AEGCL at its discretion may not ask for shortfall document.