DNIT

SECTION-I

TRIPURA STATE ELECTRICITY CORPORATION LIMITED
(A Govt. Of Tripura Enterprise)

Name of Work :- **Extension of HT line including installation of 63 KVA Distribution Transformer for segregation of 08 nos. of DTW Scheme from Public consumer within the jurisdiction of ED-Jirania.**

DNIT No. DGM/ED-JRN/2025-26/02, Dated – 12.09.2025

INTRODUCTION

This has a reference of Expenditure sanction approval vide **GMR no. 6675, Dated 26.03.2025 of the Corporate Office, TSECL,Agartala** for an amount of Rs 1,92,50,000.00 (Rupees one crore ninety two lakh fifty thousand) only for segregation of DTW scheme from public consumers within the jurisdiction of ED-Jirania. Before taking up the work, DNIT has been framed for approval before wide tendering.

Estimated Cost: Rs.17,39,245.00
Earnest Money: Rs.34,785.00
Tender Fee: Rs. 3,000.00

SCOPE OF WORK

Scope of work covered under this package includes, supply of petty materials, storage, insurance, handling, laying, testing, Erection & construction of Structural Steel & other hardware necessary as per Bidding Schedule and engineering requirements for total completion of the work under Electrical Division-Jirania.

1.0 Scope of work given above is only indicative. The detailed scope has been described in the schedule of Work attached with this bidding document.

Critical Dates:

1	Completion period for the work:	03 (three) Months.
2	**Last date of Bid document selling :**	13.10.2025 upto 1.00PM
3	Bid submission last date	13.10.2025 upto 1.00PM
4	Time and Date of Opening Technical Bid/Bids:	14.10.2025 at 12.30 PM.
5	Time and Date of Opening Price/Financial Bid/Bids :	To be notify later
6	Place of Opening Bids:	Deputy General Manager, ED Jirania, Jirania ,West Tripura
7	Bid Validity:	06(six) month
8	Officer inviting Bids (Employer):	Deputy General Manager, ED Jirania, Jirania ,West Tripura

Scope of Work:

The scope of work under the subject package includes site survey, planning, design, engineering, assembly manufacturing, testing, supply, loading, transportation, unloading, insurance, delivery at site, handling, storage, installation, testing, commissioning and documentation of all items/material required to complete the **Extension of HT line including installation of 63 KVA Distribution Transformer for segregation of 08 nos. of DTW Scheme from Public consumer within the jurisdiction of ED-Jirania on Partial Turn-Key basis**.

Name of Consignee: - DGM,ED-Jirania

2.0 QUALIFYING REQUIREMENTS FOR BIDDERS

To be qualified to bid for the package, the bidder shall have to meet the following minimum criteria:

2.1 The bidder must have done construction and commissioning work of 11KV line or above voltage class including Distribution Transformers of minimum 30% quantity of 11 KV line and Distribution Transformers given in this tender in a single award on turnkey/partial turnkey basis during last 7(seven) years which must be in satisfactory operation for at least 1 (one) year from last date of submission of present bid as per NIeT. Performance certificate from reputed Indian Power Utility not bellow the rank of Executive Engineer / Deputy General Manager / Divisional Engineer or equivalent to be submitted along with technical bid. Experience as Sub contractor will not be considered in this case.

2.2 Bids may be submitted by an individual firm (proprietorship entity) with relevant experience or registered partnership firm or companies registered under companies act or joint ventures of registered firms/companies/ proprietorship entity with two constituents only as one of the following.

2.4.1. A single firm of proprietorship entity or registered partnership firms or companies registered under Companies Act, which meets anyone or both the requirements, indicated in Para 2.1 and 2.2 (Mandatory).

2.4.2. A joint venture of two registered firms/companies/ proprietorship entity, wherein each registered firm/company/ proprietorship entity shall meet any one or both the requirements of Para 2.1 & 2.2 above.

2.5. The figures of average annual turnovers for each registered firm/company/ proprietorship entity shall be added together to determine the bidder's compliance with the minimum average annual turnover requirement for the package as given at Para **2.2 above**.

2.6. In case of joint ventures any of the registered firms/companies/ proprietorship entities shall be authorized to incur liabilities and receive instructions for and on behalf of any and all partners of the joint venture and the entire execution of the contract including receipt of payment shall be done exclusively through him. This authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners.

2.7 All partners of Joint Venture shall be **liable jointly and individually / severally** for the execution of the contract in accordance with the contract terms. A copy of the agreement of joint venture partners having such provision shall be submitted with the bid.

2.8 Notwithstanding anything contained herein above, TSECL reserves the right to assess the "capacity and capability" of the bidder to execute the work.

2.9 In addition to the mandatory requirements as specified in Para 2.1 & 2.2 (mandatory), the following criteria must need to be fulfilled for the Bidder/Lead Partner for this package.

2.10 The bidder shall furnish documentary evidence in support of qualifying requirement stipulated above.

2.11 **The bidder's offer must include the following documents as to make sustainable the qualifying requirement such as**:

i. Successful **completion certificate** issued by an Engineer not below rank of Executive Engineer/Dy. General Manager in charge
ii. Photocopy **of PAN card** issued by Income tax Dept., Govt. of India of bidder / all partners of joint venture.

iii. Photocopy of Valid **Labour license** issued by Licensing Officer, Govt. of Tripura
iv. Photocopy of Valid ***Electrical License*** issued by Tripura Electrical Licensing Board

v. **Experience certificate** indicating same nature of work issued by an Engineer not below rank of Assistant Engineer/Sr. Manager in charge
vi. Photocopy of Valid **GST Registration** certificate
vii. Photocopy of valid professional tax clearance certificate.
viii. Copy of balance sheet of the bidder (audited by Chartered Accountant) with auditor's certificate in support of annual turnover i/c IT Return Certificate for the last 3 (three) years of session 2022-23, 2023-24 & 2024-25.
ix. Any bidder who has been debarred /black listed by any Central (GOI)/State Govt owned Power Utility, for works of similar type during last 3 years for whatever reasons and thereby shall stand disqualified automatically at the very pre-qualification stage. Therefore, the bidder submitting the tender documents is liable to enclose a "Declaration" to this effect with due certification by "NOTARY" depicting full name & designation.(As per Format , annexed in Bid document).

2.12 Photocopies of all documents furnished shall be self-authenticated.

2.13 TSECL reserves the right to check the originals, if required.

2.14. The above stated requirements are minimum and the TSECL reserves the right to request for any additional information and also reserves the right to reject the proposal of any bidder, if in the opinion of the owner, the qualification data is incomplete or the bidder if found not qualified to satisfactorily perform the works.

2.15. Price bid of only those bidders shall be opened who qualify based on the specified qualifying requirements after Scrutiny of details / documents furnished by them and found to be techno- commercial responsive.
The bidder shall furnish documentary evidence in support of the qualifying requirements stipulated above along with their bid. Bid received without such documents shall be summarily rejected.

3.0
The Bid Document complete with **general condition of contract, technical specification, schedule of quantities & drawings of equipment foundation & bill of materials for equipment support structures** etc. may be seen in the office of the Deputy General Manager, Jirania Electrical Division on all working days during office hours up to the date fixed for sale of bid documents.

4.0 The bidder shall bear all **cost and expenses** associated with purchase and submission of its bid including post bid discussions, technical; & other presentation etc., and **TSECL** will in no case be responsible or liable for those cost, regardless of the conduct or outcome of the bidding process.

5.0 The bidder shall furnish documentary evidence in support of the qualifying requirements stipulated above along with their bid. Bid received without such documents shall be summarily rejected.

6.0 Tender will be received only at **Office of the** Concern **Deputy General Manager, TSECL,** up to 1.00 pm. The pre-qualification bid and technical Bid shall be opened at 3.30 pm on the stipulated time if possible; otherwise the pre-qualification shall be opened on the next working day. Only the successful bidders in pre-qualification and technical bid segment shall be allowed for their commercial bid offer. Tender without earnest money (to be deposited in the form of, Bank Draft on any nationalized / schedule Bank payable at Agartala) shall be liable for rejection. No tender submitted or received through post after the fixed date and time will be entertained.
(In case the above scheduled last date for receiving of tender against any N.I.T. is declared holiday by the State Government tender(s) in response to the said N.I.T. will be received up to 1.00 pm on the next working day keeping other clauses of N.I.T. Unchanged)

7.0 The bidder shall bear all cost and expenses associated with purchase and submission of its bid including post bid discussions, technical & other presentation etc., and TSECL will in no case be responsible or liable for those cost,

regardless of the conduct or outcome of the bidding process.

8.0 The bidder shall furnish documentary evidence in support of the qualifying requirements stipulated above along with their bid. Bid received without such documents shall be summarily rejected.

9.0 Tender form can be downloaded from the website www.tsecl.gov.in and the cost of the tender form shall be as in 1.0 of this section which shall be deposited in the form of Demand Draft on any Nationalized/Scheduled bank payable at Agartala in favour of the Deputy General Manager, Jirania Electrical Division ,Tripura.

10.0 The downloaded tender document in undamaged condition shall be signed by the tenderer/ bidder on all pages and will be enclosed with the commercial bid. All corrections to rates and items in the tender should be initialled by the tenderer/bidder. Every pages of the rate schedule be signed in full by the tenderer/bidder. The bidders/tenderers must quote their rates in the prescribed price bidding schedule in the bidding document.

11.0 Canvassing in connection with tenders / uncalled for remarks by the tenderer will lead the tender to summarily reject.

12.0 Power of Attorney, if given to authorized signatory for signing the Contract Agreement, shall be made in an INDIA NON-JUDICIAL STAMP OF Rs.100.00 (Rupees one hundred)only.

13.0 The bidding documents are not transferable and cost of bidding document is not refundable under any circumstances.

14.0 OWNER'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS

TSECL reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to award of contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for such action.

15.0 The bidder shall be required to deposit **earnest money/Bid Guarantee** amounting **Rs 34,785.00 (Rupees thirty four thousand seven hundred & eighty five) only** in the shape of **demand draft or D-Call** favouring **Dy. General Manager, ED -JRN, TSECL,** on any schedule Bank payable at Jirania, West Tripura along with the bid in a separate sealed envelope.

The successful bidder shall be required to furnish a **Contract Performance Guaranty @ 10% of the total contract price in the shape of Demand Draft or D-Call favouring Dy. General Manager, JRN ED, TSECL on any schedule Bank payable** at Jirania, West Tripura or in the shape of Bank guarantee favouring Dy. General Manager, JRN ED, TSECL , Jirania on any Public Sector / Schedule Indian Bank on award of the contract or 50% of Contract Performance Guarantee in the shape of BANK Guarantee as per normal format and the balance 50% amount will be deducted from running bills on pro data basis or minimum 10% of balance amount whichever is higher from each bill till full realization of Contract Performance Guarantee. **EMD deposited during bid will be merged / adjustable with eligible Contract Performance Guarantee.**

BID NOT ACCOMPANIED WITH REQUISITE BID EARNEST MONEY IN A SEPARATE SEALED ENVELOPE SHALL NOT BE ENTERTAINED AND SHALL BE RETURNED TO THE BIDDER WITHOUT BEING OPENED.

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The bidding documents are not transferable and cost of bidding document is not refundable under any circumstances..

16.0. The original Bidding document shall be signed by the bidder(s) on all pages and will be enclosed with the **COMMERCIAL / PRICE** bidding schedule. All corrections to rates and items in the Bid(s) should be initialled by the Bidder(s). Every Page of the **Schedule Price Bidding** shall be signed in full by the Bidder(s).

17.0 **The Bidder(s) shall have to give a DECLARATION** that **he/they have gone** through **the details of the Bidding Document(s) as per format appended with the Bidding Document.**

18.0 **EMPLOYER reserves the right to cancel/withdraw this invitation for bids without assigning any reason and shall bear no liability whatsoever consequent upon such a decision.**

19.0 Address for Communication / Purchase of Bid Document.

Deputy General Manager,
Jirania Electrical Division,
Tripura State Electricity Corporation Limited,
West Tripura District.

SECTION-II

INSTRUCTION TO BIDDERS

1. GENERAL INSTRUCTIONS

The bidders are to satisfy themselves by actual site visit to the site of work as regards the prevailing condition of approaches, transportation facilities, availability of labourers and availability of materials etc. before submission of bid. No claim or excuse on this account will be entertained at any stage later on.

2 COST OF BIDDING

The Bidder shall bear all the costs and expenses associated with preparation and submission of its Bid including post-bid discussions, technical and other presentation etc. and the TSECL shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

3. THE BIDDING DOCUMENT

3.1. CONTENTS OF BIDDING DOCUMENTS

The goods and services required, bidding procedures and contract terms are as prescribed in the Bidding Documents.

4. In addition to the Invitation for Bids, the Bidding Documents is a compilation of the following sections:

a. Instructions to Bidders
b. General Conditions of Contract
c. Price Schedules.

5. UNDERSTANDING OF BIDDING DOCUMENTS

A prospective Bidder is expected to examine all instructions, forms, terms and specifications in the Bidding Documents and fully inform himself as to all the conditions and matters which may in any way affect the scope of work or the cost thereof. Failure to furnish all information required by the Bidding Documents or submission of a Bid not substantially responsive to the Bidding Documents in every respect shall be at the Bidder's risk and may result in the rejection of its Bid.

6. CLARIFICATIONS ON BIDDING DOCUMENTS

6.1. If prospective Bidder finds discrepancies or omissions in the specifications and documents or is in doubt as to the true meaning of any part or requires any clarification on Bidding Documents should make the request / notify the tender inviting authority of TSECL in writing. The concerned authority of TSECL shall respond in writing to any request for such clarification of the Bidding Documents, which it receives not later than fifteen (15) days prior to the deadline for submission of bids stipulated in tender notice. Written copies of the response (including an explanation of the query but without identifying its source) shall be sent to all prospective bidders who purchased the tender document.

7. Verbal clarification and information given from any offices of TSECL or his employee(s) or his representative (s) shall not in any way be binding on TSECL.

8. PREPARATION OF BIDS

8.1. LANGUAGE OF BID

The Bid prepared by the Bidders and all correspondence and documents relating thereto, exchanged by the Bidder and TSECL, shall be written in English language, provided that any printed literature furnished by the bidder may be written in another language so long as accompanied by an English translation of its pertinent passages. Failure to comply with this may disqualify a bid. For purposes of interpretation of the bid, the English translation shall govern.

9. LOCAL CONDITIONS

9.1. It shall be imperative on each bidder to fully inform him of all local conditions and factors, which may have any effects on the execution of the contract covered under these documents and specifications. The Owner shall not entertain any request for clarification from bidders, regarding such local conditions.

9.2. It must be understood and agreed that such factors as above have properly been investigated and considered while submitting the proposals. No claim for financial adjustment to the Contract awarded under these specifications and documents shall be entertained by TSECL. Neither any change in the time schedule of the Contract nor any financial adjustments arising thereof shall be permitted by TSECL.

10. DOCUMENTS COMPRISING THE BID

The Bid shall be submitted in **2 (two) parts** in **separate sealed envelopes** properly **superscripting tender No., name of work** and **bid opening date** as follows:

Part-I: Bid Guarantee

Containing Cost **of Bid in case of download** & Bid earnest money as per the stipulations of the Bid Documents in a separate sealed envelopes along with following as pre qualification (PRE BID) in a separate sealed envelopes.

I. Successful completion certificate issued by an Engineer not below rank of Assistant Engineer/Sr. Manager in charge
II. Photocopy of PAN card issued by Income tax Dept., Govt. of India of bidder / all partners of joint venture.
III. Photocopy of Valid Labour license issued by Licensing Officer, Govt. of Tripura
IV. Photocopy of Valid Electrical License issued by Tripura Electrical Licensing Board
V. Experience certificate indicating same nature of work issued by an Engineer not below rank of Assistant Engineer/Sr. Manager in charge
VI. Photocopy of **GST Registration certificate**

Part-II: Price Bid

I. The price schedule as per the format indicated in the Bid Price Schedule. The price should be quoted both in figures and words. Rate should be quoted including GST.
II. The price should be quoted in the schedule given in the bid document purchased from the owner rate should be quoted in Rs. in amount and also quote total amount.
III. The bid document duly signed by the contractor or persons authorized by the bidder in all pages shall be attached with this part. This will form a part of the agreement with the successful bidder.

11. ALTERNATE PROPOSALS

Based on their experience, capabilities, patented research, and development work etc., the bidder may, in addition to a base proposal, offer alternate proposal(s), for reason of economy or better performance. But in all such case, the base proposal shall be strictly in line with the requirements as stipulated in the Bidding Documents and only such base proposal shall be considered for the purpose of evaluation of the proposals. Should the Bid by the successful Bidder contain such alternate proposal then the Owner, at his discretion, may accept the same at the time of award of Contract.

12. PRICE BASIS AND PAYMENTS

12.1 The bidders shall quote in their proposal price for the entire Scope of Work covered under the Technical Specification as required in the Bid Proposal Sheets on a base price plus adjustment basis as per clause 33.1 & 2 of section – III.

12.2. All price components shall not be subjected to any adjustment, whatsoever, during the execution of the contract other than the price adjustment quoted at the time of tender.

12.3 Bidder shall indicate Bid prices in Indian Rupees only.

13. TAXES AND DUTIES

13.1. **All custom duties, excise duties, sales taxes , service charge and other levies payable by the bidders in respect of the transactions between the bidder and their vendors/sub-suppliers while procuring any components, sub-assemblies, raw materials and equipment shall be included in the bid price and no claim on this behalf shall be entertained by TSECL** .The bid price shall also be inclusive of excise duty and central/ local sales tax and other levies in respect of the transactions solely between TSECL and the bidder under the Contract. The local sale tax as applicable shall be clearly indicated.

13.2. Concessional Sales Tax declaration forms, as admissible, shall be issued to the Contractor, on request, for all items (as identified in the price schedule of the Bid) to be supplied directly by the Contractor as well as for the items to be supplied by the Sub- suppliers as sale-in-transit.

13.3. Sales Tax on goods incorporated in the Works:

The bidder shall include the Sales Tax on Works Contract, Turnover Tax or any other similar taxes under the Sales Tax Act, as applicable in their quoted bid price and TSECL shall not bear any liability on this account. TSECL shall, however, deduct such taxes at source as per rule and issue TDS Certificate to the Contractor.

14. As regards the Income Tax surcharge on Income Tax and other corporate taxes, the Bidder shall be responsible for such payment to the concerned authorities.

14.1. Service tax, as applicable on services rendered shall be responsibility of the bidder. TSECL shall not bear any liability on this account.

15. INSURANCE

The bidder's insurance liabilities pertaining to the Scope of Work is detailed out in clauses titled insurance in General Terms & Conditions of Contract and in Erection Conditions of Contract. Bidder's attention is specifically invited to these clauses. The bid price shall include all the cost in pursuance of fulfilling all the insurance liabilities under the Contract.

16. BID GUARANTEE

16.1 The Bidder shall furnish, as part of its Bid, earnest money for an amount as specified in the Notice Inviting Tender (NIT) in the shape of **demand draft / D-Call** in favoring **Tripura State Electricity Corporation Limited** on any schedule Bank payable at Jirania, West Tripura.

16.2 The earnest money is required to protect TSECL against the risk of Bidder's conduct, which would warrant the earnest money forfeiture pursuant to Para 15.0.

16.3 The earnest money shall be deposited in Indian rupees only.

16.4 Any bid not secured in accordance with para 16.1 & 16.2 above shall be rejected by TSECL as non-responsive.

16.5 The earnest money of the unsuccessful Bidders shall be discharged / returned as promptly as possible as but not later than 60 days after the expiration of the period of bid validity prescribed by the Owner.

16.6 The earnest money of the successful Bidder will be adjusted with the performance guarantee required to be furnished on award of contract as per clause 15.0 of Section – I.

16.7 The earnest money shall be forfeited -

I. If a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the bid form; or

II. In case of a successful Bidder fails:

i) to sign the contract; or ii) to furnish the performance guarantee.

16.8 No interest shall be payable by TSECL on the above earnest money.

17. PERIOD OF VALIDITY OF BIDS

17.1 Bids shall remain valid for 6(six) calendar months after the date of bid opening prescribed by TSECL, unless otherwise specified in this document. A Bid valid for a shorter period shall be rejected by TSECL as non-responsive.

17.2 In exceptional circumstances, TSECL may solicit the Bidder's consent to an extension of the period of Bid validity. The request and the response thereto shall be made in writing (including phone or fax). The Earnest money provided under clause 5.0 of Section – I shall also be retained upto the extended period. No interest shall be payable by TSECL for retaining the earnest money upto the extended period. A Bidder may refuse the request without forfeiting the earnest money deposited by him. A Bidder granting the request shall not be required or permitted to modify his Bid.

SUBMISSION OF BIDS

18. FORMAT OF BID

18.1 The Bidder shall prepare ONE copies of the Bid, clearly marking the "Original Bid"

18.2 The "original" and "copy of bid" shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized by the bidder to sign the bidding document. The letter of authorization shall be indicated by written power-of-attorney accompanying the Bid. All pages of the Bid, except for un-amended printed literature, shall be initialed by the person or persons signing the Bid.

18.3 The Bid shall be submitted in two parts as described in clause No. 10 of Section – II.

18.4 The bid shall contain the bid document purchased from the owner duly singed by the Bidder or persons authorized by the bidder in all pages which will form a part of agreement with the successful bidder.

18.5 The Bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the Bid.

19. SIGNATURE OF BIDS

19.1 The Bid must contain the name, residence and place of business of the person or persons making the Bid and shall be signed and sealed by the Bidder with his usual signature. The names of all persons signing shall also be typed or printed below the signature.

19.2 Bid by a partnership must be furnished with full names of all partners and be signed with the partnership name, followed by the signature(s) and designation(s) of the authorized partner(s) or other authorized representative(s).

19.3 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.

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

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

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

19.7 Bids not conforming to all the above requirements of Para 19 above may be disqualified.

20. SEALING AND MARKING OF BIDS

20.1 The Bidders shall seal the "original" in an inner and an outer envelope, duly marking the envelopes as "Original"

20.2 The inner and outer envelopes shall be:

a) Addressed to TSECL at the following address:

The Deputy General Manager
Jirania Electrical Division,
Jirania, West Tripura.

b) Bear (the NIT No., Name of work & date of opening).

The inner envelope shall indicate the name and address of the Bidder to enable the Bid to be returned unopened in case it is declared "late" or "rejected".

20.3 If the outer envelope is not sealed and marked as required , TSECL shall assume no responsibility for the Bid's misplacement or premature opening.

20.4 The earnest money must be submitted in a separate sealed envelope.

AWARD OF CONTRACT

21. AWARD CRITERIA

21.1 TSECL shall award the Contract to the successful Bidder whose bid has been determined to be substantially responsive and has been determined as technically acceptable and lowest evaluated Bid, provided further that the Bidder is determined to be qualified to perform the Contract satisfactorily. TSECL shall be the sole judge in this regard.

21.2 Further, TSECL reserves the right to award separate Contracts to two or more parties in line with the terms and conditions specified in the accompanying Technical Specifications.

22. OWNER'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS

TSECL reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to award of contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for such action.

23. NOTIFICATION OF AWARD

23.1 Prior to the expiration of the period of bid validity and extended validity period, if any, TSECL shall notify the successful Bidder in writing by registered letter or by telex or FAX, to be confirmed in writing by registered letter, that his Bid has been accepted.

23.2 The Notification of Award/Letter of Award shall constitute the formation of the Contract.

23.3 Upon the successful Bidder's furnishing of Contract Performance Guarantee pursuant to Clause 15.0 of section – I. TSECL shall promptly notify each unsuccessful Bidder and will discharge its bid guarantee, pursuant to Clause 18 (Section – II).

24. SIGNING OF CONTRACT

24.1 At the same time as TSECL notifies the successful Bidder that its bid has been accepted, TSECL shall send the Bidder the detailed Letter of Award.

24.2 Within 15(fifteen) days of receipt of the detailed Letter of Award, the successful Bidder shall convey in writing unconditional acceptance of the Letter of Award and shall attend the respective office of TSECL for signing the contract agreement.

25. CONTRACT PERFORMANCE GUARANTEE

25.1 As a Contract Performance Security, the successful Bidder, to whom the work is awarded, shall be required to furnish a contract Performance Guarantee in the shape of **demand draft** on any schedule Bank payable at Jirania, West Tripura **or Bankers Cheque from any additional Bank** in favour of Tripura State Electricity Corporation Limited on any schedule bank payable at **Dy. General manager, ED-Jirania, West Tripura or** in the shape of **Bank Guarantee** from a Public Sector / Scheduled Indian Bank having paid up capital (net of any accumulated losses) of Rs.100 Crores or above (the latest annual report of the Bank should support compliance of capital adequacy ratio requirement) in the form attached as annexure – I in favour of TRIPURA STATE ELECTRICITY CORPORATION LIMITED. The guarantee amount shall be equal to **ten percent (10%)** of the Contract Price and it shall guarantee the faithful performance of the Contract in accordance with the terms and conditions specified in these documents and specifications. The earnest money deposited at the time of tender shall be adjusted with the contract performance guarantee.

SECTION-III

GENERAL TERMS & CONDITIONS OF CONTRACT

A. INTRODUCTION

1.0 DEFINITION OF TERMS

1.1 **'The Contract'** means the agreement entered into between Tripura State Electricity Corporation Limited and Contractor as per the Contract Agreement signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.

1.2 **'Owner'** shall mean **TRIPURA STATE ELECTRICITY CORPORATION LIMITED (TSECL)** and shall include their legal representatives, successors and assigns.

1.3 **'Contractor'** or 'Manufacturer' shall mean the Bidder whose bid shall be accepted by TSECL for award of the Works and shall include such successful Bidder's legal representatives, successors and permitted assigns.

1.4 **'Sub-contractor'** shall mean the person named in the Contract for any part of the Works or any person to whom any part of the Contract has been sublet by the Contractor with the consent in writing of the owner's Engineer in charge of the work and shall include the legal representatives, successors and permitted assigns of such person.

1.5 **'Consulting Engineer'/'Consultant'** shall mean any firm or person duly appointed as such from time to time by TSECL ..

1.6 The terms **'Equipment', 'Stores'** and **'Materials'** shall mean and include equipment, stores and materials to be provided by the Contractor under the Contract.

1.7 **'Works'** shall mean and include the furnishing of equipment, labour and services, as per the Specifications and complete erection, testing and putting into satisfactory operation including all transportation, handling, unloading and storage at the Site (work site) as defined in the Contract.

1.8 '**Specifications' shall mean the Specifications and Bidding Documents forming a part of the Contract and such other schedules and drawings as may be mutually agreed upon.**

1.9 **'Site'** shall mean and include the land and other places on, into or through which the works and the related facilities are to be erected or installed and any adjacent land, paths, street or reservoir which may be allocated or used by TSECL or Contractor in the performance of the Contract.

1.10 The term **'Contract Price'** shall mean the item wise price / lump-sum price quoted by the Contractor in his bid with additions and/or deletions as may be agreed and incorporated in the Letter of Award, for the entire scope of the works.

1.11 The term **'Equipment Portion'** of the Contract price shall mean the ex-works value of the equipment.

1.12 The term **'Erection Portion'** of the Contract price shall mean the value of field activities of the works including erection, testing and putting into satisfactory operation including successful completion of performance and guarantee tests to be performed at Site by the Contractor including cost of insurances.

1.13 **'Manufacturer's Works'** or **'Contractor's Works'**, shall mean the place of work used by the manufacturer, the Contractor, their collaborators/associate or sub-contractors for the performance of the Contract.

1.14 **'Inspector'** shall mean TSECL or any person nominated by TSECL from time to time, to inspect the equipment; stores or Works under the Contract and/or the duly authorized representative of TSECL.

1.15 **'Notification of Award of Contract'/Letter of Award'/Telex of Award'** shall mean the official notice issued by TSECL notifying the Contractor that his bid has been accepted.

1.16 **'Date of Contract'** shall mean the date on which Notification of Award of Contract/Letter of Award/Telex of Award has been issued.

1.17 **'Month'** shall mean the calendar month. 'Day or 'Days', unless herein otherwise expressly defined, shall mean calendar day or days of 24 hours each.

A **'Week'** shall mean continuous period of seven (7) days.

1.18 **"Writing"** shall include any manuscript, type written or printed statement, under or over signature and/or seal as the case may be.

1.19 When the words 'Approved'. Subject to Approval', 'Satisfactory', 'Equal to', 'Proper', 'Requested', 'As Directed', 'Where Directed', 'When Directed', 'Determined by', 'Accepted', 'Permitted', or words and phrases of like importance are used, the approval, judgment, direction etc. is understood to be a function of TSECL.

1.20 **"Test on Completion"** shall mean such tests as prescribed in the Contract to be performed by the Contractor before the work is Taken Over by TSECL.

1.21 **'Start Up'** shall mean the time period required to bring the equipment covered under the Contract from an inactive condition, when construction is essentially complete, to the state ready for trial operation. The startup period shall include preliminary inspection and checkout of equipment and supporting sub-system, initial operation of the complete equipment covered under the Contract to obtain necessary pre-trial operation data, perform calibration and corrective action, shut down, inspection and adjustment prior to the trial operation period.

1.22 **"Initial Operation"** shall mean the first integral operation of the complete equipment covered under the Contract with the sub-system and supporting equipment in service or available for service.

1.23 **'Trial Operation', Reliability Test', 'Trial Run', 'Completion Test'** shall mean the extended period of time after the start up period. During this trial operation period, the unit shall be operated over the full load range. The length of Trial Operation shall be as determined by the Engineer of TSECL unless otherwise specified elsewhere in the Contract.

1.24 **'Performance and Guarantee Test'** shall mean all operational checks and tests required to determine and demonstrate capacity, efficiency and operating characteristics as specified in the Contract Documents.

1.25 The term 'Final Acceptance/Taking Over' shall mean written acceptance of the Works performed under the Contract by TSECL, after successful commissioning/completion of Performance and Guarantee Tests, as specified in the accompanying Technical Specification or otherwise agreed in the Contract.

1.26 **"Commercial Operation"** shall mean the Conditions of Operation in which the complete equipment covered under the Contract is officially declared by TSECL to be available for continuous operation at different loads upto and including rated capacity. Such declaration by TSECL, however, shall not relieve or prejudice the Contractor of any of his obligations under the Contract.

1.27 **'Guarantee period'/'Maintenance Period'** shall mean the period during which the Contractor shall remain liable for repair or replacement of any defective part of the works performed under the contract.

1.28 **'Latent Defects'** shall mean such defects caused by faulty designs, material or work man ship which cannot be detected during inspection, testing etc, based on the technology available for carrying out such tests.

1.29 **'Drawings'**, 'Plans' shall mean all:

a) Drawing furnished by TSECL as a basis for Bid Proposals.

b) Supplementary drawings furnished by TSECL to clarify and define in greater detail the intent of the Contract.

c) Drawings submitted by the Contractor with his Bid provided such drawings are acceptable to TSECL.

d) Drawings furnished by TSECL to the Contractor during the progress of the Work; and

e) Engineering data and drawings submitted by the Contractor during the progress of the Work provided such drawings are acceptable to the owner's Engineer in charge of the work.

1.30 **"Codes"** shall mean the following including the latest amendments and / or replacement, if any:

a) A.S.M.E. Test Codes.

b) A.I.E.E. Test Codes.

c) American Society of Testing Materials Codes.

d) Standards of the Indian Standards Institutions.

e) I.E.E. standards.

f) I.E.C. standards.

g) Other Internationally approved standards and / or Rules and Regulations touching the subject matter of the Contract.

1.31 Words imparting 'Person' shall include firms, companies, corporation and association or bodies of individuals.

1.32 Terms and expressions not herein defined shall have the same meaning as are assigned to them in the Indian Sale of Goods Act (1930), failing that in the Indian Contact Act (1872) and failing that in the General Clauses Act (1897) including amendments thereof if any.

1.33 In addition to the above the following definitions shall also apply.

a) 'All equipment and materials' to be supplied shall also mean 'Goods'.

b) 'Constructed' shall also mean 'erected and installed'

c) 'Contract Performance Guarantee shall also mean 'Contact Performance Security'

2.0 USE OF THE CONTRACT DOCUMENTS AND INFORMATION

The Contractor shall not communicate or use in advertising, publicity, sales releases or in any other medium, photographs or other reproduction of the Works under this contract, or descriptions of the site, dimensions, quantity, quality, or other information, concerning the Works unless prior written permission has been obtained from TSECL.

3.0 JURISDICTION OF CONTRACT

The laws applicable to the Contact shall be the laws in force in India. The Courts of **Agartala** shall have exclusive jurisdiction in all matters arising under this Contract.

4.0 MANNER OF EXECUTION OF CONTRACT

4.1 The contractor should attend the concerned office of TSECL within 15(fifteen) days from the date of issue of the Letter of Award to the Contractor for signing the contract agreement.

4.2 The Contractor shall provide for signing of the Contract, Performance Guarantee, appropriate power of attorney and other requisite materials.

4.3 The Agreement shall be signed in two originals and the Contractor shall be provided with one signed original and the rest shall be retained by TSECL.

4.4 The Contractor shall provide free of cost to TSECL all the engineering data, drawings, and descriptive materials submitted with the Bid, in at least six (6) copies to form a part of the contract immediately after issue of Letter of Award.

5.0 ENFORCEMENT OF TERMS

The failure of either party to enforce at any time any of the provisions of this Contract or any rights in respect thereto or to exercise any option therein provided, shall in no way be construed to be a waiver of such provisions, rights or options or in any way to affect the validity of the Contract. The exercise by either party of any of its rights herein shall not prejudice either party from exercising the same or any other right it may have under the Contract.

6.0 COMPLETION OF CONTRACT

Unless otherwise terminated under the provisions of any other relevant clause, this Contract shall be deemed to have been completed on the date stipulated in the NIT.

7.0 PROGRESS REPORTS AND PHOTOGRAPHS

During the various stages of the Work in the pursuance of the Contract, the Contractor shall at his own cost submit periodic progress reports as may be reasonably required by the owner's Engineer in charge of the work with such materials as, charts, Bar Charts, photographs, test certificates, etc. Such progress reports shall be in the form and size as may be required by the owner's Engineer in charge of the work and shall be submitted in at least three (3) copies.

8.0 TAKING OVER

Upon successful completion of all the tests to be performed at Site on equipment furnished and erected by the Contractor, the owner's Engineer in charge of the work shall issue to the Contractor a **Taking over Certificate** as a proof of the final acceptance of the equipment. Such certificate shall not unreasonably be withheld.

CONTRACT SECURITY AND PAYMENTS

9.0 CONTRACT PERFORMANCE GUARANTEE

The Contractor shall furnish contract performance guarantee as specified in clause 15.0 of Section - I for the proper fulfillment of the Contract. Within fifteen (15) days of "Notice of Award of Contract."

10.0 INSURANCE

The Contractor at his cost shall arrange, secure and maintain all insurance as may be pertinent to the Works and obligatory in terms of law to protect his interest and interests of TSECL against all perils detailed herein. The form and the limit of such insurance as defined herein together with the under-writer in each case shall be acceptable to TSECL. However, irrespective of such acceptance, the responsibility to maintain adequate insurance coverage at all times during the period of Contract shall be of the Contractor alone. The Contractor's failure in this regard shall not relieve him of any of his contractual responsibilities and obligations. The insurance covers to be taken by the Contractor shall be in a joint name of TSECL and the Contractor. The Contractor shall, however, be authorized to deal directly with Insurance Company or Companies and shall be responsible in regard to maintenance of all insurance covers. Further the insurance should be in freely convertible currency.

11.0 DELAYS BY TSECL OR HIS AUTHORISED AGENTS

In case the Contractor's performance is delayed due to any act on the part of TSECL or his authorized agents, then the Contractor shall be given due extension of time for the completion of the Works, to the extent of such act on the part of TSECL has

12.0 **PAYMENT**

12.1 The payment to the Contractor for the performance of the Works under the Contract will be made by TSECL as per the guidelines and conditions specified herein. Payment will be made on completion of all Works and on completion of warranty / guaranty period including fulfilment by the Contractor of all his liabilities under the Contract.

12.2 **Currency of Payment**

All payments under the Contract shall be in Indian Rupees only.

12.3 **Due Dates for Payments**

i) 70% payment will be released after supply of material.

ii) 20% payment will be released after erection of the work.

iii) 10% payment will be released after commisioning of the work.

12.4 **MODE OF PAYMENT**

Payment due on supply / erection of Equipment & materials / services shall be made by the owner's Engineer in charge of the work through account payee Banker's cheque.

13.0 DEDUCTION FROM CONTRACT PRICE

All costs, damages or expenses which TSECL may have paid, for which under the Contract, the Contractor is liable, will be deducted from the progressive bill of the contractor.

Regarding reasonableness or otherwise of the extension of time, the decision of TSECL shall be final.

14.0 LIQUIDATED DAMAGES

14.1 **For Equipment Portion & Erection portion**

14.1.1 If the Contractor fails to successfully complete the commissioning within the time fixed under the Contract, the Contractor shall pay to TSECL as liquidated damages and not as penalty a sum specified for each specified period of delays as below.

14.1.2 Equipment and materials will be deemed to have been delivered only when all its components, parts are also delivered. If certain components are not delivered in time, the equipment and materials will be considered as delayed until such time the missing parts are also delivered.

14.1.3 The liquidated damages for delay in complete the work in all respect and commissioning of all the equipments within the time fixed under the contract shall be 1% (one per cent) of the contract price of the whole work per week or part thereof.

14.1.4 **The total amount of liquidated damages for delay under the Contract will be subject to a maximum of 10% of the Contract price**

All demurrage, wharf age and other expenses incurred due to delayed clearance of the material or any other reason shall be to the account of the Contractor.

15.0 FORCE MEASURE

15.1 Force majeure is herein defined as any cause which is beyond the control of the Contractor or TSECL as the case may be, which they could not foresee or with a reasonable amount of diligence could not have foreseen and which substantially affects the performance of the Contract, such as:

a. Natural phenomena, including but not limited to floods, droughts, earthquakes and epidemics;

b. Acts of any Government including but not limited to war, declared or undeclared, quarantines and embargoes.

Provided the contractor shall within fifteen (15) days from the occurrence of such a cause notify TSECL in writing of such causes, acceptance of which will be given by TSECL after verification.

15.2 The Contractor or TSECL shall not be liable for delays in performing his obligations resulting from any force-majeure cause as referred to and /or defined above.

The date of completion will, subject to hereinafter provided, be extended by a reasonable time. In such case the contractor shall submit to owner's Engineer-in-charge of the work the time extension application as per Performa attached at ANNEXURE –II.

16.0 SUSPENSION OF WORK

TSECL reserves the right to suspend and reinstate execution of the whole or any part of the Works without invalidating the provisions of the Contract. Orders for Suspension or reinstatement of the Works will be issued by TSECL to the Contractor in writing. The time for completion of the works will be extended for a period equal duration of the suspension.

17.0 CONTRACTOR'S DEFAULT

17.1 If the Contractor shall neglect to execute the Works with due diligence and expertise or shall refuse or neglect to comply with any reasonable order given to him, in the Contract by the owner's Engineer in charge of the work in connection with the works or shall contravene the provisions of the Contract, TSECL may give notice in writing to the Contractor to make good the failure, neglect or contravention complained of. Should the Contractor fail to comply with the notice within thirty (30) days from the date of serving the notice, then and in such case TSECL shall be at liberty to employ other workmen and forthwith execute such part of the Works as the Contractor, may have neglected to do or if TSECL shall think fit, without prejudice to any other right he may have under the Contract to take the work wholly or in part out of the Contractor's hands and re-contract with any other person or persons to complete the works or any part thereof and in that event TSECL shall have free use of all Contractor's equipment that may have been at the time on the Site in connection with the works without being responsible to the Contractor for fair wear and tear thereof and to the exclusion of any right of the Contractor over the same, and TSECL shall be entitled to retain and apply any balance which may otherwise be due on the Contract by him to the Contractor, or such part there of as may be necessary, to the payment of the cost of executing the said part of the Work or of completing the Works as the case may be. If the cost of completing of Works or executing a part there of as a foresaid shall exceed the balance due to the Contractor, the Contractor shall pay such excess. Such payment of excess amount shall be independent of the liquidated damages for delay, which the Contractor shall have to pay if the completion of Works is delayed.

17.2 In addition, such action by TSECL as aforesaid shall not relieve the Contractor of his liability to pay liquidated damages for delay in completion of Works as defined in clause 13.0 of this Section.

Such action by TSECL as aforesaid, the termination of the Contract under this clause shall neither entitle the Contractor to reduce the value of the Contract Performance Guarantee nor the time thereof. The Contract Performance Guarantee shall be valid for the full value and for the full period of the Contract including guarantee period.

18.0 TERMINATION OF CONTRACT ON OWNER'S INITIATIVE

18.1 TSECL reserves the right to terminate the Contract either in part or in full due to reasons stipulated in the clause entitled "Contractor's Default." TSECL shall in such an event give fifteen (15) days notice in writing to the Contractor of his decision to do so.

18.2 The Contractor upon receipt of such notice shall discontinue the work on the date and to the extent specified in the notice.

18.3 If the Contractor is an individual or a proprietary concern and the individual or the proprietor dies and if the Contractor is a partnership concern and one of the partners dies then unless TSECL is satisfied that the legal representatives of the individual contractor or of the proprietor of propriety concern and in the case of partnership, the surviving partners, are capable of carrying out and completing the Contract, TSECL shall be entitled

to cancel the Contract as to its uncompleted part without being in any way liable to payment of any compensation to the estate of deceased Contractor and/or to the surviving partners of the Contractor's firm on account of the cancellation of the Contract. The decision of TSECL that the legal representatives of the deceased Contractor or surviving partners of the Contractor's firm cannot carry out and complete the Contract shall be final and binding on the parties.

RESOLUTION OF DISPUTES

19.0 SETTLEMENT OF DISPUTES

19.1 Any dispute(s) or difference (s) arising out of or in connection with the Contract shall, to the extent possible, be settled amicably between the parties.

19.2 If any dispute or difference of any kind whatsoever shall arise between the owner's Engineer in charge of the work and the Contractor, arising out of the Contract for the performance of the Works whether during the progress of the Works or after its completion or whether before or after the termination, abandonment or breach of the Contract, it shall, in the first place, be referred to and settled by the Additional General Manager of the concerned circle /General Manager as the case may be , who, within a period of thirty (30) days after being requested by either party to do so, shall give written notice of his decision to both the parties.

19.3 In the event the Contractor being dissatisfied with any such decision, the matters in dispute shall be referred to arbitration as hereinafter provided.

20.0 ARBITRATION

20.1 All disputes or differences in respect of which the decision, if any, of the Engineer has not become final or binding as aforesaid shall be settled by arbitration in the manner hereinafter provided.

20.1.1 The arbitration shall be conducted by an arbitrator, to be nominated by TSECL and he will be the sole arbitrator to conduct the arbitration.

20.1.2 The arbitration shall be conducted in accordance with the provisions of the Indian Arbitration & Reconciliation Act, 1996 or any statutory modification thereof. The venue of arbitration shall be at Agartala.

20.2 The arbitrators may, from time to time with the consent of all the parties enlarge the time for making the award.

20.3 The arbitrator shall have full powers to review and/or revise any, decision, opinion, direction, certification or valuation of the Engineer in accordance with the Contract and neither party shall be limited in the proceedings before such arbitrators to the condense or arguments out before the Engineer for the purpose of obtaining the said decision.

20.4 During settlement of disputes and arbitration proceedings, both parties shall be obliged to carry out their respective obligations under the Contract

21.0 RECONCILIATION OF ACCOUNTS

The Contractor shall prepare and submit every six months, a statement covering payments claimed and the payments received vis-à-vis the works executed, for reconciliation of accounts with the owner's Engineer in charge of the work. The Contractor shall also prepare and submit a detailed account of Materials received from TSECL and utilized by him for reconciliation purpose.

GUARANTEE & LIABILITIES

22.0 TIME – THE ESSENCE OF CONTRACT

1.1. The time and the date of completion of the Contract as stipulated in the Contract by TSECL without or with modifications, if any, and so incorporated in the Letter of Award, shall be deemed to be the essence of the Contract. The Contractor shall so organize his resources and perform his Work as to complete it not later than the date agreed to.

1.2. The Contractor shall submit a detailed **BAR CHART / PERT NETWORK** consisting of adequate number of activities covering various key phases of the Work such as design, procurement, manufacturing, shipment and field erection activities within fifteen (15) days of the date of Notice of Award of Contract. This Bar Chart shall also indicate the interface facilities to be provided by TSECL and the dates by

1.3. to ensure proper progress without any cost implication to TSECL. The interface facilities to be provided by TSECL in accordance with the agreed Bar Chart shall also be reviewed while reviewing the progress of the Contractor.

1.4. Based on the agreed Bar Chart fortnightly reports shall be submitted by the Contractor as directed by the owner's Engineer in charge of the work.

1.5. Subsequent to the finalization of the Bar Chart, the Contractor shall make available to the owner's Engineer in charge of the work a detailed manufacturing programme in line with the agreed Contract Bar Chart. Such manufacturing programme shall be reviewed, updated and submitted to the owner's Engineer in charge of the work once in every month thereafter.

1.6. The above Bar Charts/manufacturing programme shall be compatible with TSECL computer environment and furnished to TSECL on such media as may be desired by TSECL.

1.7. **GUARANTEE:-** The Contractor shall warrant that the equipment shall be new, unused and in accordance with the contract documents and free from defects in material and workmanship for a period of **twelve (12) calendar months commencing immediately upon the satisfactory commissioning.** The Contractor's liability shall be limited to the replacement of any defective parts in the equipment of his own manufacture or those of his sub-contractors under normal use and arising solely from faulty design, materials and/or workmanship provided always that such defective parts are repairable at the site and are not in the meantime essential in the commercial use of the equipment. Such replaced/defective parts shall be returned to the Contractor unless otherwise arranged. No repairs or replacement shall normally be carried out by owner's Engineer in charge **(Deputy General Manager / Senior Manager)** of the work when the equipment is under the supervision of the Contractor's supervisory engineer.

1.8. In the event of any emergency, where in the judgment of the owner's Engineer in Charge of work, delay would cause serious loss or damages, repairs or adjustment may be made by him or a third party chosen by him without advance notice to the Contractor and the cost of such work shall be paid by the Contractor. In the event such action is taken by the **Deputy General Manager / Senior Manager** in Charge of work, the Contractor shall be notified promptly and he shall assist wherever possible in making necessary corrections. This shall not relieve the Contractor of his liabilities under the terms and conditions of the Contract.

1.9. If it becomes necessary for the Contractor to replace or renew any defective portions of the Works, the provision of this clause shall apply to portion of the Works so replaced or renewed until the **expiry of Twelve (12) months** from the date of such replacement or renewal. If any defects are not remedied within a reasonable time, the **Deputy General Manager / Senior Manager** in Charge of work may proceed to do the work at the Contractor's risk and cost, but without prejudice to any other rights which TSECL may have against the Contractor in respect of such defects.

1.10. The repaired or new parts shall be furnished and erected free of cost by the Contractor. If any repair is carried out on his behalf at the site, the Contractor shall bear the cost of such repairs.

1.11. The cost of any special or general overhaul rendered necessary during the maintenance period due to defects in the equipment or defective work carried out by the Contractor shall be borne by the Contractor.

1.12. The acceptance of the equipment by the **Deputy General Manager / Senior Manager** in **Charge of work** shall in no way relieve the Contractor of his obligation under this clause.

1.13. In the case of those defective parts, which are not repairable at site but are essential for the commercial operation of the equipment, the Contractor and the Owner's Engineer in Charge of work shall mutually agree to a programme of replacement or renewal, which shall minimize interruption to the maximum extent in the operation of the equipment.

1.14. At the end of the guarantee period, the Contractor's liability ceases except for latent defects. For latent defects, the Contractor's liability as mentioned in clause nos. 14.1 through 14.7 above shall remain till the end of 5 years from the date of commissioning.

In respect of goods supplied by sub-contractors to the Contractor, where a longer guarantee (more than 12 months) is provided by such sub-contractor, TSECL shall be entitled to the benefits of such longer guarantee.

1.15. The provisions contained in this clause shall not be applicable:

a) If TSECL has not used the equipment according to the generally approved industrial practice and in accordance with the conditions of operations specified and in accordance with operating manuals, if any.

b) In cases of normal wear and tear of the parts to be specifically mentioned by the Contractor in the offer.

23.0 EXTENSION OF TIME

1.1 TSECL may consider to **grant time extension** for completion of the work if it is felt absolutely essential on fulfilment of following conditions by the Contractor:-

a) The contractor must apply to the Engineer-In-charge in writing for extension of time so required justifying the necessity.

b) Such application must state **the grounds** which hindered the contractor in the execution of the work within the time as stipulated in the contract document.

c) Such application must be made within 30 days of the date on which such hindrance had arisen.

d) The **Engineer-in charge** must be of the opinion that the grounds shown for the extension of time are reasonable and without extension of such time completion of the work is practically impossible.

1.2 **The Engineer-In- Charge(Deputy General Manager)**will have full powers, but the orders on the application of the Contractor accepted by the Authorities higher than the Engineer-In-Charge shall be issued by him only after written approval from the concerned authority higher than Engineer-In-Charge.

1.3 The opinion of the **Engineer- in- charge (Deputy General Manager)**, whether the grounds shown for the time are or are not reasonable, is final. If the **Engineer- in- charge** is of the opinion that the grounds shown by the supplier/ contractor are not reasonable and declines to grant extension to time, the supplier/contractor cannot challenge.

SECTION-IV

ERECTION CONDITIONS OF CONTRACT

1.0 GENERAL

1.1 The following shall supplement the conditions already contained in the other parts of these specifications and document and shall govern the portion of work of this Contract to be performed at Site.

1.2 The Contractor upon signing of the Contract shall, in addition to a Project Coordinator, nominate another responsible officer as his representative at Site suitably designated for the purpose of overall responsibility and co-ordination of the works to be performed at Site. Such person shall function from the Site Office of the Contractor.

2.0 REGULATION OF LOCAL AUTHORITIES

2.1 The Contractor shall comply with all the rules and regulations of local authorities during the performance of his field activities. He shall also comply with the Minimum Wages Act, 1948 and the Payment of Wages Act (both of the Government of India) and the rules made there-under in respect of any employee or workman employed or engaged by him or his Sub-Contractor.

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

2.3 **Comprehensive General Liability Insurance**

2.3.1 This insurance shall protect the Contractor against all claims arising from injuries, disabilities, disease or death of members of public or damage to property of others, due to any act or omission on the part of the Contractor, his agents his employees, his representatives and Sub-contractors or from riots, strikes and civil commotion. This insurance shall also cover all the liabilities of the Contractor arising out of the Clause stipulated in the General Terms and Conditions of Contract.

2.3.2 The hazards to be covered will pertain to all the works and areas where the Contractor, his Sub-contractors, his agents and his employees have to perform work pursuant to the Contract.

2.4 The above are only illustrative list of insurance covers normally required and it shall be the responsibility of the Contractors to maintain all necessary insurance coverage to the extent both in time and amount to take care of all his liabilities either direct or indirect, in pursuance of the Contract.

3.0 UNFAVOURABLE WORKING CONDITIONS

The Contractor shall confine all his field operations to those works which can be performed without subjecting the equipment and materials to adverse effects during inclement weather conditions, like monsoon, storms, etc. and during other unfavorable construction conditions. No field activities shall be performed by the Contractor under conditions which might adversely affect the quality and efficiency thereof, unless special precautions or measures are taken by the Contractor in a proper and satisfactory manner in the performance of such Works and with the concurrence of the site Engineer of TSECL. Such unfavorable construction conditions shall in no way relieve the Contractor of his responsibility to perform the Works as per the Schedule.

4.0 WORK & SAFETY REGULATIONS

4.1 The Contractor shall ensure proper safety of all the workmen, materials plant and equipment belonging to him or to owner or to others, working at the Site. The Contractor shall also be responsible for provision of all safety notices and safety equipment required both by the relevant legislations and also by the site Engineer as he may deem necessary.

4.2 The Contractor shall notify well in advance to the site Engineer of his intention to bring to the Site any container filled with liquid or gaseous fuel or explosive or petroleum substance or such chemicals, which may involve hazards. The site Engineer shall have the right to prescribe the conditions, under which such container is to be stored, handled and used during the performance of the works and the Contractor shall strictly adhere to and comply with such instructions. The site Engineer shall have the right at his sole discretion to inspect any such

container or such construction plant/equipment for which material in the container is required to be used and if in his opinion, its use is not safe, he may forbid its use. No claim due to such prohibition shall be entertained by TSECL.

4.3 Further, any such decision of the site Engineer shall not, in any way, absolve the Contractor of his responsibilities and in case, use of such a container or entry thereof into the Site area is forbidden by the site Engineer, the Contractor shall use alternative methods with the approval of the Executive Engineer in charge of the work without any cost implication to TSECL or extension of work schedule.

4.4 Where it is necessary to provide and/or store petroleum products or petroleum mixtures and explosives, the Contractor shall be responsible for carrying-out such provision and/or storage in accordance with the rules and regulations laid down in the Petroleum Act 1934, Explosives Act, 1948, and Petroleum and Carbide of Calcium Manual published by the Chief Inspector of Explosives of India. All such storage shall have prior approval of the site Engineer of TSECL. In case, any approvals are necessary from the Chief Inspector (Explosives) or any statutory authorities, the Contractor shall be responsible for obtaining the same.

4.5 All equipment used in construction and erection by Contractor shall meet Indian/International Standards and where such standards do not exist, the Contractor shall ensure these to be absolutely safe. All equipments shall be strictly operated and maintained by the Contractor in accordance with manufacturer's operation Manual and safety instructions and as per Guidelines/Rules of TSECL in this regard.

4.6 Periodical Examinations and all tests for all lifting/hoisting equipment & tackles shall be carried-out in accordance with the relevant provisions of Factories Act 1948, Indian Electricity Act 1910 and associated Laws/Rules in force from time to time. A register of such examinations and tests shall be properly maintained by the Contractor and shall be promptly produced as and when desired by the site Engineer of TSECL or by the person authorized by TSECL.

4.7 The Contractor shall be fully responsible for the safe storage of his and his sub-contractor's radio-active sources in accordance with BARC/DAE Rules and other applicable provisions. All precautionary measures stipulated by BARC/DAE in connection with use, storage and handling of such material shall be taken by Contractor.

4.8 The Contractor shall provide suitable safety equipment of prescribed standard to all employees and workmen according to the need, as may be directed by site Engineer of TSECL who shall also have right to examine these safety equipment to determine their suitability, reliability, acceptability and adaptability.

4.9 Where explosives are to be used, the same shall be used under the direct control and supervision of an expert, experienced, qualified and competent person strictly in accordance with the Code of Practices/Rules framed under the Indian Explosives Act pertaining to handling, storage and use of explosives.

4.10 The Contractor shall provide safe working conditions to all workmen and employees at the Site including safe means of access, railings, stairs, ladders, scaffoldings, etc. The scaffoldings shall be erected under the control and supervision of an experienced and competent person. For erection, good and standard quality material only shall be used by the Contractor.

4.11 The Contractor shall not interfere or disturb electric fuses, wiring and other electrical equipment belonging to TSECL or other contractors under any circumstances, whatsoever, unless expressly permitted in writing by site Engineer of TSECL to handle such fuses, wiring or electrical equipment.

4.12 Before the Contractor connects any electrical appliances to any plug or socket belonging to TSECL, he shall :

a) Satisfy the Site Engineer of TSECL that the appliance is in good working condition :

b) Inform the site Engineer of the maximum current rating, voltage and phases of the appliances;

c) Obtain permission of the site Engineer detailing the sockets to which the appliances may be connected.

4.13 The site Engineer shall not grant permission to connect until he is satisfied that;

a) The appliance is in good condition and is fitted with suitable plug;

b) The appliance is fitted with a suitable cable having two earth conductors, one of which shall be an earthed metal sheath surrounding the cores.

4.14 No electric cable in use by the Contractor/TSECL shall be disturbed without prior permission. No weight of any description shall be imposed on any cable and no ladder or similar equipment shall rest against or attached to it.

4.15 No repair work shall be carried out on any live equipment. The equipment must be declared safe by the site Engineer before any repair work is carried out by the Contractor. While working on electric lines/equipment whether live or dead, suitable type and sufficient quantity of tools shall have to be provided by Contractor to electricians/workmen/officers.

4.16 The Contractors shall employ necessary number of qualified, full time electricians/Electrical Supervisors to maintain his temporary electrical installations.

4.17 In case any accident occurs during the construction/erection or other associated activities undertaken by the Contractor thereby causing any minor or major or fatal injury to his employees due to any reason, whatsoever, it shall be the responsibility of the Contractor to promptly inform the same to the site Engineer of TSECL and also to all the authorities envisaged under the applicable laws.

4.18 The site Engineer of TSECL shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and/or property, and/or equipment. In such cases, the Contractor shall be informed in writing about the nature of hazards and possible injury/accident and he shall comply to remove short-comings promptly. The Contractor after stopping the specific work can, if felt necessary, appeal against the order of stoppage of work to the Executive Engineer in charge of the work within 3 days of such stoppage of work and the decision of the Executive Engineer in charge of the work in this respect shall be conclusive and binding on the Contractor.

4.19 The Contractor shall not be entitled for any damages/compensation for stoppage of work due to safety reasons as provided in Para 27.18 above and the period of such stoppage of work shall not be taken as an extension of time for completion of work and shall not be the ground for waiver of levy of liquidated damages.

4.20 It is mandatory for the Contractor to observe during the execution of the works, the requirements of safety rules which would generally include but not limited to the following :

Safety Rules:

a) Each employee shall be provided with initial indoctrination regarding safety by the Contractor, so as to enable him to conduct his work in a safe manner.

b) No employee shall be given a new assignment of work unfamiliar to him without proper introduction as to the hazards incident thereto, both to himself and his fellow employees.

c) Under no circumstances shall an employee hurry or take unnecessary chance when working under hazardous conditions.

d) Employees must not leave naked fires unattended. Smoking shall not be permitted around fire prone areas and adequate fire fighting equipment shall be provided at crucial locations.

e) Employees under the influence of any intoxicating beverage, even to the slightest degree shall not be permitted to remain at work.

f) There shall be a suitable arrangement at every work site for rendering prompt and sufficient first aid to the injured.

g) The staircases and passageways shall be adequately lighted.

h) The employees when working around moving machinery must not be permitted to wear loose garments. Safety shoes are recommended when working in shops or places where materials or tools are likely to fall. Only experienced workers shall be permitted to go behind guard rails or to clean around energized or moving equipment.

i) The employees must use the standard protection equipment intended for each job. Each piece of equipment shall be inspected before and after it is used.

j) Requirements of ventilation in underwater working to licensed and experienced divers, use of gum boots for working in slushy or in inundated conditions are essential requirements to be fulfilled.

k) In cases or rock excavation blasting shall invariably be done through licensed blasters and other precautions during blasting and storage/transport of charge material shall be observed strictly.

4.21 The Contractor shall follow and comply with all relevant Safety Rules, relevant provisions of applicable laws pertaining to the safety of workmen, employees, plant and equipment as may be prescribed from time to time without any demur, protest or contest or reservation. In case of any discrepancy between statutory requirement and relevant Safety Rules referred above, the later shall be binding on the Contractor unless the statutory provisions are more stringent.

4.22 If the Contractor does not take all safety precautions and/or fails to comply with the Safety Rules as prescribed by Consortium or under the applicable law for the safety of the equipment and plant and for the safety of personnel and the Contractor does not prevent hazardous conditions which cause injury to his own employees or employees of other contractors, or Employees of TSECL or any other person who are at Site or adjacent thereto, the Contractors shall be responsible for payment of compensation to Consortium members as per the compensation order issued by the appropriate authority of Government of Tripura / verdict issued by court.

The compensation mentioned above shall be in addition to the compensation payable to the workmen / employees under the relevant provisions of the Workmen's Compensation Act and rules framed there under or any other applicable laws as applicable from time to time. In case TSECL is made to pay such compensation then the amount of such compensation shall be deducted from the progressive bills / contract performance guaranty of the contractor.

SECTION – V

TECHNICAL SPECIFICATION SECTION

A.STRUCTURAL STEEL: -

The steel for Conductor cross Arms and other requirement as specified in the schedule shall be M.S.Structural Steel conforming to IS: 2062 Gr ASK.

C. **EARTHING AND EARTHING G.I PIPE**

1.0 Scope

GI earthing pipe should be made of 40 mm diameter ISI marked heavy duty A class GI Pipe. 12 mm dia suitable holes on its circumference shall be made as per approved drawing. The pipe should be in one piece. No joints or welding would be allowed on its length. Clamps made of 50x6mm GI flat duly drilled with 12 mm size holes should be welded at the top end for connection of earth conductor. Pipe used shall be 40mm NB diameter, ISI marked Galvanized Mild Steel Tubes continuously welded Electric Resistance Welded ERW/High Frequency Induction welded (HFIW)/Hot finished welded (HFW) type, conforming to IS-554-1985 with latest amendment of Heavy duty quality (Class A).

2.0 MANUFACTURE

GI earth pipe (40 mm diameter & 2.5 meter long) shall be made of tubes which shall be made from tested quality steel manufactured by any approved process as follows:

a) Electric Resistance Welded (ERW).

b) High Frequency Induction Welded (HFIW) and

c) Hot finished Welded (HFW).

Tubes made by manual welding are not acceptable.

3.0 DIMENSIONS

The dimensions and weights of tubes shall be in accordance with Table-I and Table-II of IS: 1239 (Part-I)/1990 with latest amendments, subject to tolerance permitted therein. Necessary 12 mm diameter holes across the circumference shall be provided as per approved drawing. Drawings shall be approved by the owner before start of the manufacturing work. The tube, earthing pipe shall be provided with 50x6mm GS clamps on one end, one clamp is to be welded with the pipe and another is removable to enable measurement of earth resistance of the pit. Other end of the earth pipe should be cut half in slop to make it a sharp.

4.0 GALVANIZING

Tubes shall be galvanized in accordance with IS-4736-1986 with latest amendment for not (hot) dip zinc coating of Mild Steel Tubes. The minimum mass of zinc coating on the tubes shall be in accordance with clause 5.1 of IS-4736-1986 (specification for hot dip zinc) and when determined on a 100mm long test piece in accordance with IS: 6745:1972 shall be 400 g/m2. The zinc coating shall be uniform adherent reasonably smooth and free from such imperfections as flux, ash and dross inclusions, bare patches, black spots, pimples, lumpiness, rust, stains, bulky white deposits and blisters.

5.0 HYDRAULIC TEST

(Before applying holes) Each tube shall withstand a test pressure of 5 M Pa maintained for at least 3 seconds without showing defects of any kind. The pressure shall be applied by approved means and maintained sufficiently long for proof and inspection. The testing apparatus shall be fitted with an accurate pressure indicator.

6.0 TESTS ON FINISHED TUBES AND SOCKETS

The following tests shall be conducted by the manufacturer of finished tubes and sockets.

i. The tensile strength of length of strip cut from selected tubes when tested in accordance with IS-1894-1972, (Method for tensile testing of steel tubes), shall be at least 320N/mm2.

ii. The elongation percentage on a gauge length of 5.65/so (where so is the original cross sectional area of test specimen) shall not be less than 20%.

iii. When tested in accordance with IS-2329-1985 (Method for Bend test on Metallic tubes) the finished tube shall be capable of withstanding the bend test without showing any sign of fracture or failure. Welded tubes shall be bent with the weld at 90 degree to the plane of bending. The tubes shall not be filled for this test.

iv. Galvanized tubes shall be capable of being bent cold without cracking of the steel, through 90 degree round a former having a radius at the bottom of the groove equal to 8 times the outside diameter of tube.

v. Flattening Test on Tubes above 50 mm Nominal Bore: Rings not less than 40 mm in length cut from the ends of selected tubes shall be flattered between parallel plates with the weld, if any, at 90 degree (point of maximum bending) in accordance with IS-2328- 1983. No opening should occur by fracture in the weld unless the distance between the plates is less than 75 percent of the original outside diameter of the pipe and no cracks or breaks in the metal elsewhere than in the weld shall occur, unless the distance between the plates is less than 60% of the original outside diameter. The test rings may have the inner and outer edges rounded.

7.0 GALVANIZING TEST

i. Weight of zinc Coating: For tubes thickness up to 6 mm the minimum weight of zinc coating, when determined on a 100 mm long test piece in accordance with IS-4736-1986 shall be 400 gm/m2.

ii. The weight of the coating expressed in gram/m2 shall be calculated by dividing the total weight of the zinc (inside plus outside) by the total area (inside plus outside) of the coated surface.

iii. Test specimen for this test shall be cut approximately 100 mm in length from opposite ends of the length of tubes selected for testing. Before cutting the test specimen, 50 mm from both ends of the samples shall be discarded.

iv. Free Bore Test: A rod 230mm long and of appropriate diameter shall be passed through relevant nominal bore of the sample tubes to ensure a free bore.

v. Uniformity of Galvanized Coating: The galvanized coating when determined on a 100 mm long test piece [see V (a) (iii)] in accordance with IS-2633-1986 (Method for testing uniformity of coating on zinc coated articles) shall with stand 4 one minute dips.

8.0 WORKMANSHIP

The tubes shall be cleanly finished and reasonably free from injurious defects. They shall be reasonably straight, free from cracks, surface flaws, laminations, and other defects, both internally and externally. The screw tubes and sockets shall be clean and well-cut. The ends shall be cut cleanly and square with the axis of tube.

9.0 MARKING

i. The medium class of tubes shall be distinguished by Blue color bands which shall be applied before the tubes leaves the manufacturers' works.

ii. Tubes shall be marked with the standard mark.

10.0 EARTHING ARRANGEMENT OF DISTRIBUTION TRANSFORMERS

10.1 The earth pits should be located as per REC Construction Standard F-5 (Annexure VI).

10.2 Pipe earth electrodes should be provided in each earth pit as per REC construction standard J-1 and J-2 (Annexure VII & VIII).

10.3 4 mm (8 S.W.G), G.I. wire should be used for earth leads.

10.4 One of the earth electrodes on either side of D.P. structure should be connected with;

(a) One direct connection from the L.T. Lightning arresters and cross-arm.

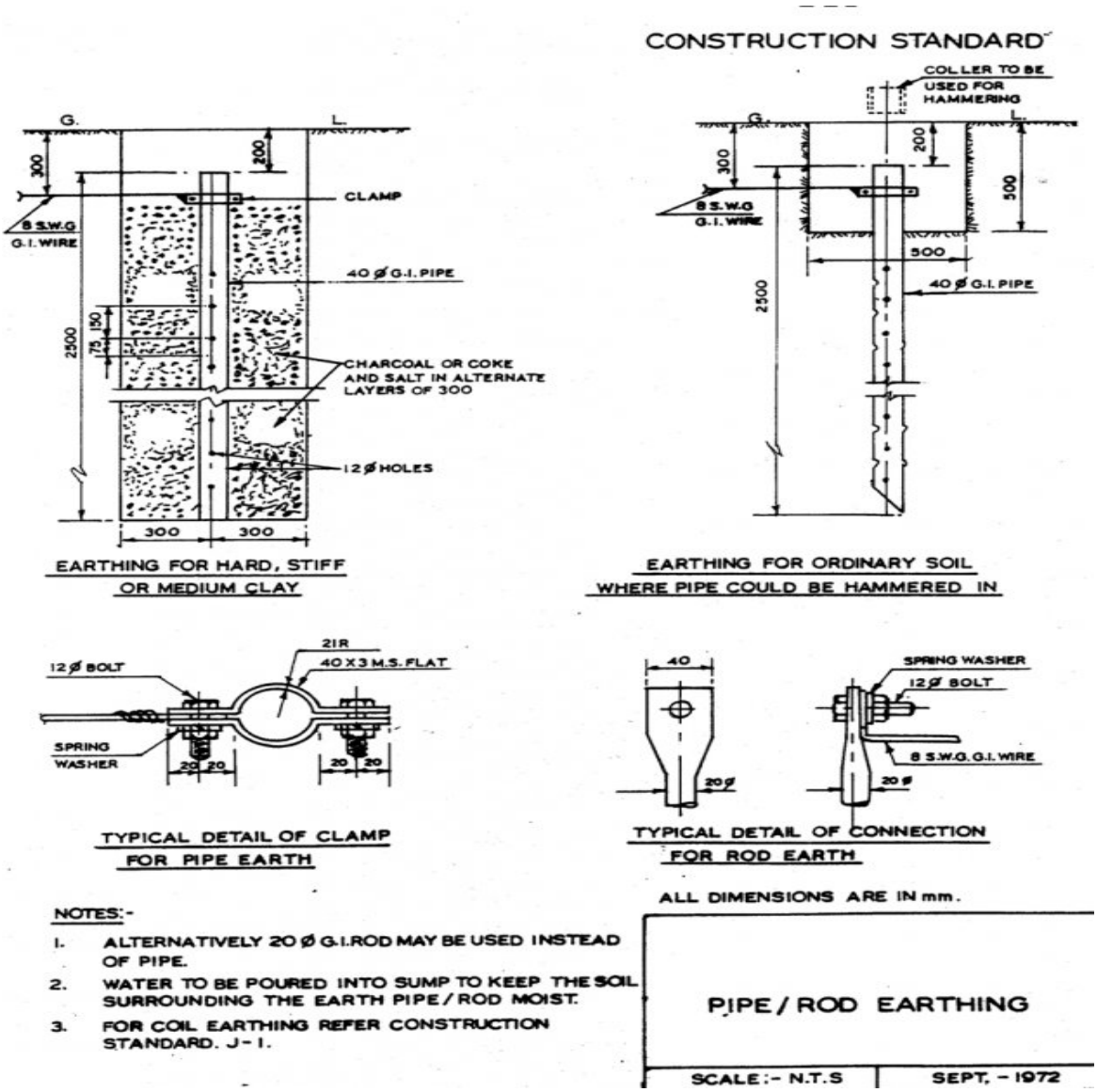
(b) One direct connection with Lightning arrester on H.T. side (11KV) and cross-arm.

10.5 To each of the remaining two earth electrodes, the following should be connected:-

(a) One separate connection from the neutral (on medium voltage side) of the transformer.

(b) One separate connection from the transformer body and the handle of 11KV A.B. switch.

(c) One separate connection from the earthing terminal of the poles.



B.GALVANIZED IRON PIPES

1.0 SCOPE:

The Specification covers the requirements for G.I. Pipes Heavy duty. Unless modified by this specification, requirement of IS 1239 (part-1) -1990 and 2004 shall be valid.

2.0 MATERIAL:

The material used for manufacturing of G.I. Pipes shall confirm to IS 1239 (part-1) -1990 and 2004.

3.0 DIAMENSIONS AND DIMENSIONAL TOLERANCES:

The dimensions and nominal mass of tubes shall be in accordance with Table 2 subject to the tolerances permitted in CL 8.1 and 9 of IS 1239 (Part -1)

4.0 THREADS:

♦ Unless specified otherwise, tubes shall be supplied as plain ends.

♦ External threads shall be tapered and confirmed to ASME B1.20.1 or BS 21.

♦ For checking conformity of threads gauging practice in accordance with ASME B1.20.1 or BS 21

5.0 FREEDOM FROM DEFECTS:

On visual examination the outside and inside surfaces of pipes shall smooth and f ree from defects such as cracks etc.

6.0 GALVANISING:

Pipes shall be galvanized to meet the requirement of IS 4736:1986.

♦ Zinc confirming to any grade specified in IS 4736:1986 shall be used for the purpose of galvanizing.

♦ Galvanizing Bath: The molten metal in the galvanizing bath shall contain not less than 98.5% by mass of zinc.

♦ Coating Requirement: minimum Mass of Zinc coating determined as per IS 6745 - 1972 shall be 400 gms/m2.

♦ Freedom from Defect: The zinc coating shall be uniform adhered, reasonably smooth and free from such imperfections as flux, ash bore patches, black spots, pimples, lumpiness runs, rust strains, bulky white deposits, and blisters.

♦ Criteria for Samplings: All materials of same type in coating bath having uniform coating characteristics shall be grouped together to continue a lot. Each lot shall be tested separately for the various requirements of the specifications. The number of units to be selected from each lot for the testing purpose shall be as per IS: 4736:1986

♦ The sample selected according to clause 6.1 and 6.2 of IS 4736 – 1986.

♦ The sample found confirming to above requirements shall then be tested mass of zinc coating in accordance with clause no 5.1 of IS 4736 -1986.

♦ Criteria for conformity: AS per IS 4736 -1986.

♦ Test procedure as per IS 4736-1986.

♦ Specification for painting of GI pipes

The entire length of the pipeline is to be painted at Contractor works as per following:

a) One coat of Primer application (Appropriate Zinc based primer)

b) Two coats of synthetic enamel paint – canary yellow of minimum of 30 microns per coat of reputed make like Asian, Berger and Nerolac.

7.0 PRESSURE TEST:

Hydrostatic pressure test shall be carried out at pressure of 5 Mpa (50Kgf/ Cm2). Contractor to submit the internal pressure test certificate for the same. If required, TSECL representative or Third Party Inspection agency appointed by TSECL shall witness finished goods testing as per the sample procedure specified in clause no 14 of IS 1239 (part – 1).

8.0 MARKING:

Each pipe shall be EMBOSSED with manufacturers name or trade mark and the size designation at the interval of not more than 2 meters.

Pipe shall be supplied in random length of 4 to 7 meters only.

Each packing containing pipes shall carry the following stamped or written by indelible ink.

a) Manufacturer name and trade mark.

b) Designation of pipe.

c) Lot number.

d) ISI Monogram

Each pipe confirming to this standard shall also be marked with BIS standard mark.

9.0 INSPECTION/ DOCUMENTS:

Inspection shall be carried out as per TSECL specifications.

The manufacturer will engage the Third Party Inspection agency approved by TSECL and the cost of the same will be included in the quoted rates.

TSECL representative or Third Party Inspection agency appointed by TSECL may carry out stage wise inspection during manufacturing / final inspection.

Contractor shall furnish all the material test certificates, proof of approval, license from specified authority as per specified standard, if relevant internal test / inspection reports as per TSECL technical specifications and specified code for 100% material, at the time of final inspection of each supply of each lot.

Even after Third Party Inspection TSECL reserves the rights to select a sample of fittings/ pipes randomly from each manufacturing batch and have these independently tested. Should the result of these testes fall outside the limits specified in TSECL technical specifications, then TSECL reserves the rights to reject all production supplied from the same batch.

C.HEXAGONAL MS BOLTS & NUTS

1.0 SCOPE:

This specification covers the details of black hexagonal MS Bolts & Nuts of various sizes.

2.0 APPLICABLE STANDARDS:

Unless otherwise modified in this specification, the bolts and nuts shall comply with Indian Standard Specifications IS: 1363 - 1967 as amended from time to time or equivalent international standards.

3.0 WORKMANSHIP:

Full threaded bolts shall not be used. The bolts and nuts shall have hexagonal heads, which shall be neatly finished concentric and square with the shank and free from burrs, scale and other defects. Threads in nuts shall not be torn or ragged and shall be of proper contour. The fits of the nuts shall be such that there will be no locking of the nuts. Nuts and bolts of the same size shall be interchangeable. The thread of nuts & bolts shall have coarse pitch screw threads as per IS: 1363 - 1967 or relevant International Standards and shall meet with all applicable technical supply conditions covered under this standard.

2.0 PARTICULARS OF MATERIAL:

5.1 MECHANICAL PROPERTIES:

The mechanical properties of bolts covered in this standard shall conform to the property clause 4.6 and that for nuts shall conform to the property clause 4 specified in IS: 1363-1967 or its latest edition.

6.0 GRADE:

Bolts & nuts covered in this specification shall conform to Black Grade B, specified in IS: 1363-1967.

7.0 DESIGNATION:

Black Bolts & Nuts covered in this specification shall be designated as per table I of IS: 1363-1967.

8.0 DIMENSIONS:

The dimensions for black bolts & nuts shall be as given in table 2 & 3 of IS : 1363-1967.

The bolts and nuts shall have coarse pitch screw threads conforming to IS : 4218-1967 (ISO Metric screw threads) or the relevant International Standards.

Preferred length diameter combinations for black hexagonal bolts are given in table-4 IS : 1363-1967.

9.0 REQUIREMENTS:

9.1 The method of sampling and acceptance criteria of black hexagonal bolts and nuts shall be in accordance with IS: 2614-1964.

9.2 The bolts & nuts conforming to this standard shall comply with the requirements of IS: 1367-1967 in regard to requirements not specified in this standard.

10.0 TESTS:

All types of tests including routine tests shall be carried out according to relevant standards.

11.0 INSPECTION:

Inspection and testing shall be carried out in accordance with the general instructions.

12.0 PLACE OF MANUFACTURE:

The contractor shall state the place of manufacture, testing and name of the manufacturer of the various items included in his inspection offer.

13.0 PACKING AND TRANSPORT:

The contractor shall be responsible for suitable packing of all the material and marking on the consignment, so as to avoid any damage during transport and storage and to ensure correct dispatch. The packing shall be conforming to the requirement laid down in IS: 3256-1965 or its latest amendment.

14.0 DRAWING AND LITERATURE:

Illustrated and descriptive literature on the material must be submitted along with the offer for inspection.

15.0 RAW MATERIAL:

No assistance whatsoever for arranging the raw material for manufacture of bolts & nuts shall be provided by the employer. The delivery shall not be dependent upon availability of raw material.

16.0 MARKING:

The sealed container of bolts & nuts shall be marked with:

a) Manufacturer's name & trade mark.

b) Place of manufacture.

c) The marking shall be stencilled indelible ink on gunny bags.

d) Net weight with description of material.

D.MILD STEEL STRUCTURE

1.0 SCOPE

The materials shall conform, in all respect, to the high standard of design and workmanship and shall be capable of performing duties specified herein. Materials offered shall be complete in all respect. The size of the channel, angle and flat normally used for Distribution transformers structures, 11 KV line structures and LT line structures are as follows;

i) Channel 100x50X50X6 mm/75X40X40X6mm.

ii) Angle a) 50x50x6 mm

b) 65x65x6 mm

iii) Flat a) 50x6 mm

b) 50x8 mm

The above list is merely indicative and not comprehensive.

2.0 STANDARDS

Materials shall conform to the latest applicable Indian standards. In case bidders offer Steel Section and supports conforming to any other international specifications which shall be equivalent or better than IS, the same is also acceptable.

S No	Standard No.	Title
1	IS: 2062 Grade	Specification for M.S. Angles, M.S. Channel and M.S. Flat Chemical and Physical Composition
2	IS: 2062	Composition of material Rolling and Cutting Tolerances for Hot Rolled Steel products
3	IS: 1852	'A' Quality

Name of Item	Type to be used as per IS
For channel 100x50	ISMC 100 Grade A
For angle 50x50x5	ISA 5050 Grade A
For angle 65x65x6	ISA 6565 Grade A

3.0 ACCEPTANCE OF OTHER AUTHORITATIVE STANDARDS

All relevant Indian standards specifications have been mentioned. However, the material meeting any other authoritative international standards, which ensures equal or better quality than the standards, mentioned shall also be acceptable. Material for which Indian Standards are not available, the relevant British standards and IEC recommendations will be applicable. The bidder is required to attach photocopy of all such standards according to which the materials have been offered.

4.0 RAW MATERIAL

The Steel Sections shall be re-rolled from the BILLETS/INGOTS of tested quality as per latest version of IS: 2830 or to any equivalent International Standard and shall be arranged by the bidder from their own sources. The Chemical composition and Physical properties of the finished materials shall be as per the relevant standards.

5.0 TEST

Steel Sections shall be tested in IS approved Laboratory or standard Laboratory of the Bidder country having all facilities available for conducting all the tests as prescribed in relevant IS or IEC or to any equivalent International Standard or from any recognized and reputable International laboratory or Institutions.

The Bidders are required to specifically indicate that;

(i) They hold valid IS (or equivalent IEC) License.

(ii) Steel Sections offered are bearing requisite IS certification or equivalent IEC marks. The Bidders are required to submit a copy of the valid IS (or equivalent IEC) License clearly indicating size and range of product against respective ISS or any equivalent International Standards along with their offer.

6.0 CHEMICAL COMPOSITION AND PHYSICAL PROPERTIES OF M.S. ANGLES, M.S. CHANNELS AND M.S. FLAT CONFORMING TO IS: 2062/84

A. Chemical composition:

l N	CHEMICAL COMPOSITION	FOR Fe 410 WA GRADE

o			
	C	0.23%	Max.
	Mn	1.5%	Max.
	S	0.050%	Max.
	P	0.050%	Max.
	SI	0.40%	Max.
	CE(Carbon Equivalent)	0.42%	Max.

B. Mechanical properties:

(i) Tensile strength Kfg/mm2 – 42, N/Min, : 410

(ii) Yield stress Min. for thickness/diameter

< 20 mm	26 kgf/m2 OR 250 N/mm2
20 – 40 mm	24 Kgf/mm2 OR 240 N/mm2
> 40 mm	23 kgf/mm2 OR 230 N/mm2

(iii) Elongation % : 23%

(iv) Bend Test (Internal Dia) : Min-3t

(t – is the thickness of the material)

7.0 TOLERANCE

Rolling and weight tolerances shall be as per latest version of IS: 1852 or to any equivalent International Standard.

8.0 MARKING

It is desirable that the Bidder should put his identification marks on the finished materials. The mark shall be in "legible English letters" given with marking dies of minimum 18 mm size.

9.0 INSPECTION AND TEST CERTIFICATES

The materials to be supplied will be subject to inspection and approval by the owner's representative before dispatch and / or on arrival at the destination. Inspection before dispatch shall not, however, relieve the bidder of his responsibility to supply the Steel Sections strictly in accordance with the specification.

i) The owner's representative shall be entitled at all reasonable time during manufacture to inspect, examine and test at the bidder's premises the materials and workmanship of the Steel Sections to be supplied.

ii) As soon as the Steel Sections are ready for testing, the bidder shall intimate the owner well in advance, so that action may be taken for getting the material inspected. The materials shall not be dispatched unless waiver of inspection is obtained or inspected by the owner's authorized representative.

iii) Test certificates shall be in accordance with latest version of the relevant Indian Standards or any equivalent International Standards.

iv) The acceptance of any batch/lot shall in no way relieve the bidder of any of his responsibilities for meeting all the requirements of the specification and shall not prevent subsequent rejection of any item if the same is later found defective.

10.0 QUALITY ASSURANCE PLAN

The Bidders must establish that he is following a proper quality assurance programme for manufacture of Steel Sections. The Bidders shall invariably furnish following information along with his bid.

i) Statement giving list of important raw materials, names if sub-contractors for the raw material, list of standards according to which the raw material is purchased and copies of test certificates thereof.

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

iii) List of machines and manufacturing facilities available.

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

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

vi) List of testing equipment available with the Bidder for final testing of materials specified and test plant limitation, if any, via-a-vis type, special, acceptance and routine tests specified in the relevant standards. These limitations shall be very clearly brought out in schedule of deviations from specified test equipments.

G. EARTHING SYSTEM: -

1.1 The earthing of the Sub-station Switchyard shall form an earth mat to achieve resistance of 1.50Ω. There shall be sufficient numbers of risers for connection to different equipments, structures, fencing etc. The tenderer shall supply all the materials such as: -

i. Perforated 40 mm. dia. Hot Dip G.I. pipe of length 2.5 mtr. each. The earthing shall be done as per IS: 3043 / 1966.TSECL will supply drawing of earthing as per REC Specification.
ii. Minimum no. of earth pit will be 12 (twelve) nos. and minimum G.I. flat run for underground earth mat will be as per final layout of the Sub-station. Tenderer shall quote unit rate for each of the said items.

E. **Technical Specification of 9 KV, 5 KA Gapless Silicon Polymeric Lightning Arrestors conform to IEC 60099-4 /IS-3070 Part-3 - 1993 with latest amendments**

1. SCOPE:

This specification covers design manufacture assembly, testing at manufacturers works supply and delivery of single phase outdoor type gapless metal oxide, polymeric housed surge arresters for use in effectively earthed system with the transformer neutral effectively earthed with normal voltage of 11 KV for 9 KV Lightning arrestors . The rated voltage of Arrestors shall be 9 KV (rms) for 11KV system.

2. DEFINITIONS

2.1 SURGE ARRESTER

A device designed to protect electrical apparatus from high transient over voltages.

2.2 GAPLESS METAL-OXIDE SURGE ARRESTER

A surge arrester having one or several non-linear metal-oxide resistors with highly non-linear voltage-current characteristics, connected in series, but having no integrated series or parallel spark gaps.

2.3 POLYMERIC HOUSED SURGE ARRESTER

A metal oxide surge arrester with a housing made of polymeric material preferably Silicone rubber, without air voids neither between the housing and the metal –oxide resistors nor the housing itself. Arresters must have directly moulded housings. The surge arresters shall strictly conform to IEC 99-4 / IS-3070 Part-3 - 1993 with latest amendment if any in all respects. Maximum residual voltage shall comply with the requirement given hereunder : The surge arresters meeting any other authoritative standards, which ensure equal or better performance than mentioned above, shall be acceptable.

2.4 POLYMERIC HOUSING MATERIAL

The polymer material which is used for the arrester housing must be tracking and erosion resistant, stabilized against UV radiation and preferably of Silicone Rubber.

3. CLIMATIC CONDITIONS :-

i. Location : At various locations in Tripura.

ii. Max. Ambient air temperature (Deg0 C) : 45

iii. Min.ambient air temperature (Deg0 C) : 4

iv. Max yearly daily ambient air Temperature (Deg0 C) : 40

v. Max average weighted average Ambient temperature (Deg0 C) : 32

vi. Max. Altitude above mean sea level(Meters) : 1000 M.

4. The technical requirement has been detailed out below:

4.1 Required Technical particulars

	Particulars	NIT requirement
1.	Nominal system voltage	9KV
2.	Type of Arrestor	Gap-less (Metal Oxide)
3.	Applicable Standard	IEC 60099/4 IS 3070 Part-III latest Amendment.
4.	Rated Arrestor voltage KV rms	9
5.	Maximum continuous operating voltage KVrms	7.2
6.	Nominal discharge current rating (8/20 micro sec) KA	5.0
7.	Minimum discharge capability (KJ/KV)	NA
8	Long duration discharge class	Distribution Class

9.	Maximum residual voltage at nominal discharge current of 8/20 micro sec. wave, KV peak	32
10.	Maximum steep current impulse residual voltage at nominal discharge current, KV Peak	38
11.	Maximum switching impulse residual voltage at 500 Amp. (Peak)	NA
12.	Minimum prospective symmetrical current (KA)	15
13.	Impulse high current short duration discharge of 4/10 micro sec. wave (KAP)	65
14.	Max. radio interference voltage at 1000 Hz (micro volts)	--
15.	Overall temporary over voltage withstand capacity (KVrms)	
	a) 1.0 Sec.	10
	b) 10.0 Sec.	9.5
	c) 100.0 Sec.	9.0
16.	Impulse withstand voltage (KVP)	75
17.	Current impulse withstand level	18 impulse of long duration Current 75 Amp peak for 1000 micro secs.
18.	Pressure relief device	N.A.
19.	Disconnecting device	As per required specification IS:3070 (Part 2) 1985
20.	Min. creep age distance of Polymer housing (mm)	300
21.	Top & Bottom metal cap	Hot Dip Galvanized
22.	Terminal arrangement	Built in clamping Type, can be adjusted for Horizontal & Vertical take-off to suit conductor Size Weasel to raccoon.
23	Earthing Terminal	The base of L.A. shall be provided with two separate terminal / distinctly marked for connection to earth

4.2 Residual voltage for 8/20 micro sec. wave of nominal discharge current KA are specified above, however, we will prefer still lower residual voltage to ensure better protection.

4.3 Current impulse withstands level - The 9KV arrestors shall withstand 18 impulse of long duration current with a peak level of 75 Amp. & duration 1000 micro secs. 30KV arrestors shall meet the duty prescribed in line discharge Class-II of IEC TC-37.

4.4 Disconnecting Device: -

The arrestor for 11KV system be provided with a suitable disconnecting device. This shall be connected in series with the ground lead and should not effect the sealing system of the arrestor. The disconnecting device shall conform to the requirement specified in IS:3070 (Part-II)1993 & IEC 99 - 4 (1991-II) clause 5.12, 7.6.3.

5. PACKING & MARKING

5.1 PACKING

The Lightning Arrester shall be so packed that they are adequately protected against damage in ordinary handling and transit. To avoid damage of the Lightning Arrester transshipment in between the road transportation must be avoided i.e. each consignment should be transported from factory to DGM(MM), Electrical Stores Division, A.D. Nagar, Agartala through a single carrier.

5.2. MARKING

The following information shall be marked on each Lightning Arrester:

a). Manufacturers' name
b). Manufacturers' Trade mark
c). Rated voltage.
d). Rated frequency
e). Nominal discharge current
f). Year of manufacture
h). ISI certification mark if any

6. DRAWINGS:-

The supplier shall furnish following drawings along with Bid / Qoutation.

i) General outlines drawings of the complete arrester with technical parameters.
ii) Drawings showing clearance from grounded and other live objects and between adjacent poles of surge arresters required at various heights of surge arresters.
iii) Drawings showing details of pressure relief devices.
iv) Mounting clamp details of surge arresters.
v) Details of the terminal and ground terminals.
vi) Volt time characteristics of surge arresters.
vii) The detailed dimensional drawing with labelling of Silicon Polymeric Housing .

7. TESTS & TEST CERTIFICATES:

7.1 Type Test Certificates :- The complete type test certificate from Govt. approved laboratories i.e. CPRI, NFL, NTL, ERDA etc. for the LAs of all the types/rating as per IS 3070 (Part III)/ IEC 99/4 shall compulsorily be submitted in support of evidence of compliance of the specifications & guaranteed particulars. It should cover all the type tests as prescribed in Clause 7.1 of IEC 99/4 and IS-3070 (Part-III).

Note:- Type test report of manufacturer's laboratory shall not be acceptable.

7.2 Type Tests:-

The following TYPE TEST FOR ARRESTERS WITH POLYMERIC HOUSING shall be made in accordance with Clause IEC 60099-4/IS-3070 Part-III latest amendment:-

1. Insulation withstand test.
2. Residual voltage test
3. Long duration current impulse withstand test
4. Operating duty test
5. Partial discharge test.
6. Weather Ageing test for 1000 hrs.
7. Current Distribution Test.

7.3 ACCEPTANCE TESTS:

The following tests as per clause 8.2 of IEC 99/4 and IS-3070 Part-I & Part-II shall be done on the lower whole number of the cube root of the number of arresters to be supplied.

a) Power frequency reference voltage test at reference current on complete arresters.
b) Lightning impulse residual voltage test at nominal discharge current on complete arresters.
c) Partial discharge test.
d) Galvanizing test on exposed steel parts.
e) Visual/dimensional examination.

7.4 ROUTINE TESTS:-

The following routine tests as per Clause 8.1 of IEC 99/4 / IS-3070 Part-1/Part-IIIand IEC 60099-4 ; 2004-05 Standard are to be conducted by the manufacturer on offered lot for pre-despatch inspection. The lot offered without routine test reports shall not be considered & delay in acceptance of the offer will be on firm's account:-

a) Visual / dimensional examination.
- AC Reference Voltage Test (final arrester)
- Partial Discharge Test (final arrester including hardwares/accessories)
- Residual Voltage Test (final arrester or metal-oxide resistors)

The manufacturer shall provide a routine test report including all relevant details with respect to the test limits. On request, the manufacturer shall also provide a routine test protocol including all measuring results

8. INSPECTION

8.1 All tests and inspection shall be made at the place of manufacture unless otherwise especially agreed upon by the manufacturer and purchaser at the time of purchase. The manufacturer shall afford the inspector representing the purchaser all reasonable facilities without charge to satisfy him that the material is being furnished in accordance with specification. The bidder should clearly specify the testing facility available for electrical, mechanical, ceramic and metallurgical tests.

8.2 The purchaser reserves the right to have the tests carried out at the cost of the supplier by an independent agency whenever there is dispute regarding the quantity of supply.

8.3 No material shall be dispatched from its point of manufacture before it has been satisfactorily inspected and tested, unless the inspection is waived off by the purchaser in writing. In the later case also, the equipment/material shall be dispatched only after satisfactory testing for all tests specified herein has been completed.

8.4 The acceptance of any quantity of material shall in no way relieve the supplier of any of his responsibilities for meeting all requirements of the specification, and shall not prevent subsequent rejection if such material is later found to be defective.

8.5 The number of sample selected to carry out the acceptance test shall be as per provision in the respective IS.

8.6. The purchaser has the right to have the tests carried out by an independent Agency subject to recovery of testing expenditure in case of failure, whenever there is dispute regarding the quality of supply.

9.0 GUARANTEED TECHNICAL PARTICULARS

GUARANTEED TEHCNICAL PARTICUARS OF 9 KV 5 KA POLYMER LIGHTNING ARRESTORS

S.No.	Particular	NIT requirement	Bidder's offer
1	Name of manufacturer & place of manufacture		
2	Type	Gap-less (Metal Oxide)	
3	Model		
4	Applicable standard	IEC 60099/4 IS 3070 Part-III latest	

		Amendment.	
5	No. of units		
6	Rated voltage (KV rms)	9	
7	Rated frequency (Hz)		
8	Maximum continuous operating voltage (KV rms)	7.2	
9	Maximum leakage current at continuous operating voltage (micro amps)		
10	Temporary power frequency over voltage capacity (KV rms)		
	a) For 1 sec.		
	b) For 10 secs.		
	c) For 100 secs		
11	Nominal discharge current (KA)(8/20 micro sec wave)	5.0	
12	Energy class		
13	Minimum discharge capability (KJ/KV)	N. A.	
	a) For single impulse energy		
	b) For 2 consecutive discharge with 50/60 sec between them		
14	Maximum Switching Serge protection level at 500A		
15	Maximum equivalent front of wave protection level (KVp)		
16	Maximum residual voltage at nominal discharge current of 8/20 micro sec wave (KVP)	32	
	a) 5 KA		
	b) 10 KA		
	c) 20 KA		
17	Maximum steep current Impulse residual voltage at nominal discharge current(KVP)	38	
18	Maximum switching impulse Residual voltage at 500 Amp. Peak	NA	
19	Minimum prospective symmetrical current (KA)	15	
20	Impulse high current short duration discharge of 4/10 Micro sec wave (KAP).	65	
21	Long duration current impulse withstand:		
	a) Current peak (Amps.)		
	b) Virtual duration (Micro sec.)		
22	Maximum radio interference voltage at 1000 Hz (micro volts / DB)	- -	
23	Protective ratio		
24	Total creepage distance		
25	Impulse withstand voltage	75	
26	Reference current (MAP)		

27	Partial discharge i.e. PICO		
28	Power frequency withstand voltage of arrestor Housing (KV rms)		
	a) Dry		
	b) Wet		
29	Lightning impulse withstand voltage of arrestor housing (KVP)		
30	Current impulse withstand level	18 impulse of long duration Current 75 Amp peak for 1000 micro secs.	
31	Type of dis-connective device	As per required specs IS: 3070 (Part 2) 1985	
32	Dimensions of Arrestor :		
	a) Max. dia of polymer (mm)		
	b) Complete height of arrestor (mm) from base to line side		
	c) Total creepage of distance of arrestor housing (mm)		
	d) Net weight of each arrestor (Kg)		
	e) Housing type		
	f) Housing material		
	g) Colour of Housing		
	h) Void-free Design (State Yes / No.)		
33	Construction of arrester		
	a) Material of valve		
	b) Details of sealing		
	c) Description of pressure relief system		
	d) No. of unit per arrester		
34	Type of bracket		
35	Material of Top & Bottom metal cap		
36	Type of terminal arrangement (Whether as per tender Specification)	Built in clamping Type, can be adjusted for Horizontal & Vertical take-off to suit conductor Size Weasal to raccoon.	
37	Size of line/ground terminals		
38	Minimum recommended spacing between Centre to centre of LA.		
39	Clearance required from ground equipment at various heights of arrester units.		
40	Earthing arrangement provided for earthing side of arrester (whether as per our requirement)	The base of L.A. shall be provided with two separate terminal / distinctly marked for connection to earth	

STEEL MATERIALS FOR 11 KV BUS

This scope covers supply, fabrication and erection of SAIL / TISCO / IISCO make 100 X 50 X 50 X 6 mm. / 75 X40x 40 X 6 mm. M.S. channel, 65 X 65 X 6 mm. / 50 X 50 X 6 mm. angle and 50 X 6 mm. M.S. flat as per renovation requirement of the 11 KV bus approved by the owner.

K. All nuts, bolts etc. shall conform to IS: 1363 / 1960.

F. TECHNICAL SPECIFICATIONS FOR 11KV DROP OUT FUSE ELEMENTS

1.0 SCOPE

This specification covers the design, manufacture, testing at works, supply/delivery & transportation of 11KV Drop Out Fuse Elements conforming to IS: 9385(P-II)/1980.

2.0 STANDARDS

2.1 The 11KV Drop Out Fuse Elements shall conform in all respects to the relevant Indian/ International Standard Specification, with latest amendments.

TECHNICAL SPECIFICATIONS FOR 11KV Drop Out Fuse Elements
AS PER IS: 9385 (P-II)/1980.

1	Rated Current /Capacities for 11KV Drop Out Fuse Elements	i.	3 Amp.
		ii.	5 Amp.
		iii.	10 Amp.
		iv.	15 Amp.
		v.	20 Amp.
		vi.	25 Amp.
		vii.	30 Amp.
2	Rated Voltage	12 KV (Maximum System Voltage).	
3	Material	The Drop Out Fuse Elements shall be made of Copper (Tin-coated) conforming to IS: 9385 (Part-II)/1980.	
4	Total length of each element including stranded wire ends for binding	600 mm.	
5	Elements shall be completed with SRBP Tube of Dimensions	8 mm outer diameter and 140 mm length.	

3.0 SERVICE CONDITIONS

The 11KV Drop Out Fuse Elements shall be supplied as per the Specifications given in this Section and shall be suitable for satisfactory continuous operation under the following climatic conditions as per IS: 9385(P-II)/1980 or latest revisions.

.	Location	At various locations in Tripura.
i.	Maximum Ambient Air Temperature (oC):	50oC.
ii.	Maximum Relative Humidity	95% (sometime approaches Saturation point).

v.	Maximum Altitude above mean Sea Level (Metres):	1000 metres.

4.0 TESTS

4.1 Following tests shall be carried out at the works of the manufacturer as per relevant IS before delivery of each lot.

A. Type Tests:

(a) Dielectric test
(b) Temperature rise test
(c) Breaking test
(d) Test for time / current characteristics.

B. Routine Tests:

(a) Dielectric test
(b) Temperature rise test
(c) Breaking test
(d) Test for time / current characteristics
(e) Dimensional checkup as per specifications on selected samples.

C. Acceptance Tests:

(a) Dimensional checkup as per specifications on selected samples
(b) Breaking test
(c) Test for time / current characteristics.

Samples at random will be selected from the offered lot for the acceptance tests and the lot will be accepted subject to the successful passing of the tests.

Note: Purchaser reserves the right to get all or any type test carried out on one sample per 200 pieces of 11KV Drop Out Fuse Elements at the cost of the Supplier from any recognized laboratory / government test house.

4.2 The supplier shall submit the Type Test Certificates of 11KV Drop Out Fuse Elements along with the Tender.

4.3.0 ACCEPTANCE TESTS

4.3.1 All Acceptance Tests shall be carried out at the Works of the Manufacturer unless otherwise especially agreed upon by the Manufacturer and Purchaser at the time of Purchase. The manufacturer shall afford the inspector representing the purchaser all reasonable facilities without any charge to satisfy him that the material is being furnished in accordance with the specifications.

4.3.2 The purchaser reserves the right to have the tests carried out at the cost of the supplier by an independent agency whenever there is any dispute regarding the quality of the materials.

5.0 PACKING & MARKING

5.1 PACKING

The 11KV Drop Out Fuse Elements shall be so packed that the Fuse Elements are adequately protected against damage in ordinary handling and transit. To avoid damage of the 11KV Drop Out Fuse Elements, transshipment in between the road transportation must be avoided i.e. each consignment shall be transported from factory to DGM(MM), Electrical Stores Division, A.D. Nagar, Agartala through a single carrier.

5.2 MARKING

A. The following informations shall be marked on metal tag attached to each fuse element:

a) Rated Current

6.0 GUARANTEED TECHNICAL PARTICULARS

The Guaranteed Technical Particulars of the 11KV Drop Out Fuse Elements shall be given by the Bidder along with the Tender.

Guaranteed Technical Particulars for 11KV Drop Out Fuse Elements
(To be furnished by the Manufacturer)

l	Description	NIT requirement	Bidder's offer.

no				
	Make & Manufacturer			
	Place of Manufacture			
	Rated Current /Capacities	.	Amp.	
		i.	Amp.	
		ii.	Amp. 0	
		v.	Amp. 5	
		.	Amp. 0	
		i.	Amp. 5	
		ii.	Amp. 0	
	Rated Voltage	12 KV (Maximum System Voltage).		
	Material	The Drop Out Fuse Elements shall be made of Copper (Tin-coated) conforming to IS: 9385 (Part-II)/1980.		
	Total length of each element including stranded wire ends for binding	600 mm.		
	Elements completed with SRBP Tube of Dimensions	8 mm outer diameter and 140 mm length.		
	Markings	The following informations shall be marked on metal tag attached to each fuse element: a) Rated Current b) TSECL/MMD/2018-19.		
	Reference IS Code	IS: 9385(P-II) / 1980.		

7.0. PRE-DESPATCH INSPECTION

7.1. Despatch of material is subjected to pre-despatch inspection / testing by the purchaser's representative/engineers and clearance thereof. All acceptance tests and inspection shall be carried out at the place of manufacture unless otherwise specially agreed upon by the purchaser and the supplier at the time of purchase.

In case of waiver of inspection, the consignee will be at liberty for testing of material in the laboratories of Tripura or outside for acceptance if required, at the cost of the supplier.

7.2. The manufacturer shall offer to the inspectors representing the purchaser all the reasonable testing facilities free of charge for inspection and testing to satisfy that material being supplied is in accordance with the specifications.

7.3. The purchaser's representative/engineer attending above testing will carry out testing of suitable number of items as per the sampling procedure laid down in the corresponding IS as the case may be and shall issue test certificate approvals to the manufacturer and give clearance for dispatch.

However, the Final Acceptance will be given by the Consignee after necessary verifications and tests at destination.

8.0. INSPECTION AFTER RECEIPT OF STORES

8.1. The purchaser shall have option to test the samples selected at random from the supply affected to ensure that the supplies conform in quality and workmanship to the relevant specifications and also conform to the approved sample.

8.2. Fifteen days advance intimation will be given to the suppliers to depute representative to witness the tests. If they fail to be present, the testing will be carried out in absence of their representative on the schedule date. If the materials fail, in above random sample testing, the lot will be rejected.

8.3. No testing charges would be recovered for the first testing. In case the repaired/ replaced supplied item fail again on testing, the charges for testing together with all incidental expenses incurred by the purchaser shall be borne by the suppliers.

8.4. The materials supplied against the order and not conforming to the specifications shall have to be collected by the supplier at his cost, on refunding the amounts paid therefore, within 7 days of intimation of failure of these meters on testing.

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G. TECHNICAL SPECIFICATION FOR COMPOSITE PIN INSULATORS FOR USE IN 11 KV SYSTEM

1.0 SCOPE::

This specification covers design, manufacture, testing and supply of composite Insulators for use in the 11KV overhead transmission lines and substations. The composite Insulators shall be of the following type:

i) Long rod type Pin Insulators intended to be mounted rigidly on a supporting structure to support ACSR/ Rabbit conductors

2.0 APPLICABLE STANDARDS::

2.1 Standards:-

Following Indian/International Standards, which shall mean latest revision, with amendments/changes adopted and published, unless specifically stated otherwise in the Specification, shall be referred while accessing conformity of Insulators with these specifications.

2.1.1 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 Supplier to establish equivalence.

Sl.No.	Indian Standard Standard	Title	International Standard
1		Definition, test methods and acceptance criteria for composite Insulators for A.C. overhead lines above 1000V.	IEC:1109
2	IS:2071	Methods of High Voltage Testing.	IEC:60060-1
3	IS:2486	Specification for Insulator fittings for overhead power lines with a nominal voltage greater than 1000V General Requirements and Tests Dimensional Requirements locking devices.	IEC:60120 IEC:60374
		Thermal Mechanical performance test and	IEC:60575

Sl.No.	Indian Standard Standard	Title	International Standard
4		mechanical performance test on string Insulators units	
5		Characteristics of string Insulator units of the long rod type.	IEC:60433
6		Hydrophobicity Clarification Guide.	STRI guide 1.92/1
7		Radio interference characteristics of overhead power lines and high voltage equipment.	CISPRl18-2 Part 2
8	IS:8263	Methods of RI Test of HV Insulators	IEC:60437
9		Standard for Insulators – Composite-Distribution Dead -end type.	ANSI-C29.132-2000
10	IS:4759	Hot dip zinc coatings on structural steel & other allied products.	ISO:1459
11	IS:2629	Recommended practice for Hot Dip galvanization for iron and steel	ISO:1461(E)
12	IS:6745	Determination of weight of zinc coating on zinc coated Iron and steel articles.	ISO:1460
13	IS:3203	Methods of testing of local thickness of electroplated coatings.	ISO:2178
14	IS:2633	Testing of Uniformity of coating of zinc coated articles.	
15		Standard specification for glass fiber standards.	ASTM D 578-05
16		Standard specification for compositional analysis by Thermogravimetry.	ASTM D 578-05
17	IS:4699	Specification for refined secondary zinc	

3.0 Technical Description of Composite Insulators::

3.1 Service condition:-

The polymer Insulators to be supplied shall be suitable for satisfactory continuous operation under condition s as specified below:

(i)	Maximum temperature of air in shed	45oC
(ii)	Minimum temperature of air in shed	4oC
(	Maximum relative humidity	95% (The humidity some

iii)		time approaches saturation point)
(iv)	Minimum relative humidity	10 %
(v)	Average number of dust-storm days per annum	40 days
(vi)	Average number of rainy days per annum	90 days
(vii)	Number of months of tropical monsoon conditions per annum	3 months
(viii)	Average annual rainfall	1250 mm
(ix)	Maximum wind pressure	150 Kg / Sq. mm
(x)	Altitude not exceeding	1000 metres
(The limit of ambient temperature shall be 45oC peak and 35oC average over a period of 24 hours)		

3.2 Composite Insulators long rod type to support conductor for 11KV overhead power lines:-

3.2.1 The Insulators shall be suitable for 3 F, 50 Hz, effectively earthed 11kV O/H distribution system in a moderately polluted atmosphere. Long rod Insulators shall be of Pin type.

3.2.2 Bidder must be an indigenous manufacturer and supplier of composite Insulators of rating 11kV & 33kV or above OR must have developed proven in house technology and manufacturing process for composite Insulators of above rating OR possess technical collaboration/ association with a manufacturer of composite Insulators of rating 11 kV or above. The Bidder shall furnish necessary evidence in support of the above along with the bid, which can be in the form of certification from the utilities concerned, or any other documents to the satisfaction of the owner.

3.2.3 Insulators shall have sheds with good self-cleaning properties. Insulator shed profile, spacing, projection etc, and selection in respect of polluted conditions shall be generally in accordance with the recommendation of IEC-60815/IS: 13134.

3.2.4 The size of Composite insulator, minimum creepage distance and mechanical strength along with hardware fittings shall be as follows:

Type of composite Insulator	Nominal system voltage kV (rms)	Highest system voltage kV (rms)	Visible discharge test voltage kV(rms)	Wet power frequency withstand voltage kV(rms)	Mpulse withstand voltage kV (rms)	Minimm creepage distance (mm)	in. failing load KN
11KV Pin Insulator	11	12	9	35	75	320	5

Note: Creepage distances have been considered in line with IS-13134 (which specifies 20 mm/ kV for moderately polluted environment).

3.3 Dimensional Tolerance of Composite Insulators :-

The tolerances on all dimensions e.g. diameter, length and creepage distance shall be allowed as follows according to lEC 61109:-

± (0.04d+1.5)mm when d ≤ 300mm

± (0.025d+6)mm when d > 300mm

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.

3.4 Interchangeably:-

The composite Insulators including the end fitting connection shall be of standard design suitable for use with the hardware fittings of any make conforming to relevant IEC/IS standards.

3.5 Corona and Rl Performance:-

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 not generate any radio interference beyond specified limit under the operating conditions.

3.6 Maintenance:-

3.6.1 The composite Insulators offered shall be suitable for use of hot line maintenance technique so that usual hot line operation can be carried out with ease, speed and safety.

4. BASIC FEATURES::

4.1 Design and construction:-

The composite Pin insulator shall have a core, housing & weather shed of insulating material and steel/aluminum alloy hardware components for attaching it to the support/conductor.

4.1.1 Core:-

It shall be a glass-fiber reinforced epoxy resin rod of high strength (FRP rod). Glass fibers and resin shall be optimized in the FRP rod. Glass fibers shall be Boron free electrically corrosion resistant (ECR) glass fiber or Boron free E-Glass and shall exhibit both high electrical integrity and high resistance to acid corrosion. The matrix of the FRP rod shall be Hydrolysis resistant. The FRP rod shall be manufactured through Pollution process. The FRP rod shall be void free. The dia of FRP Rod should be 24 mm. (Minimum).

4.1.2 Housing (Sheath):-

The FRP rod shall be covered by a seamless sheath of a silicone electrometric compound or silicone alloy compound of a thickness of 3mm minimum.

It should protect the FRP rod against environmental influences, external pollution and humidity. It shall be extruded or directly molded on the core and shall have chemical bonding with the FRP rod. The strength of the bond shall be greater than the tearing strength of the polymer. Sheath material in the bulk as well as in the sealing/bonding shall be free from voids.

4.1.3 Weather sheds:-

The composite polymer weather sheds made of silicone electrometric compound or silicon alloy shall be firmly bonded to the sheath, vulcanized to the sheath or molded as part of the sheath and shall be free from imperfections. The weather sheds should have silicon content of minimum 30% by weight. The strength of the weather shed to sheath interface shall be greater than the tearing strength of the polymer. The interface, if any, between sheds and sheath (housing] shall be free from voids.

4.1.4 End Fittings:-

End fittings transmit the mechanical load to the core. They shall be made of spheroidal graphite cast Iron, malleable cast iron or forged steel or aluminum alloy. They shall be connected to the rod by means of a controlled compression technique. The gap between fitting and sheath shall be sealed by a flexible silicon electrometric compound or silicon alloy compound sealant. System of attachment of end fitting to the rod shall provide superior sealing performance between housing, i.e. seamless sheath and metal connection. The sealing must be moisture proof. The dimensions of end fittings of Insulators has been shown in the drawing (11KV & 33KV both separately). The details of end fittings for fixing the same with V cross arms and top clamps are given below : -

. N.	Item	Length of end fittings to be fixed	Minimum threaded portion of end fittings	Dia of end fitting rod
	11KV	200mm	150mm	20mm

Upper end fittings shall be suitable to hold suitable Conductor for 11KV. The size of the fitting shall be in such a way that conductor could be bound firmly so that it may not slip from the groove while in service even under the adverse condition.

5.0 Work manship::

5.1 All the materials shall be of latest design and conform to the best engineering practices adopted in the high voltage field. Bidders shall offer only such Insulators as are guaranteed by them to be satisfactory and suitable for continued good service in power transmission lines.

5.2 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.

5.3 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.

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

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

5.6 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 out 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.

5.7 All ferrous parts shall be hot dip galvanized to give a minimum average coating of zinc equivalent to 610 gm/Sq.m, or 87m m thickness and shall be in accordance with the requirement of IS: 4759, The zinc used for galvanizing shall be of purity 99.5% as per IS: 4699, 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 four successive dips each lasting for one H) minute duration under the standard price test. The galvanizing shall be carried out only after any machining.

5.8 INSPECTION

5.8.1. All test and inspection shall be made at the place of manufacture unless otherwise especially agreed upon by the manufacturer and purchaser at the time of purchase. The manufacturer shall afford the inspector representing the purchaser all reasonable facilities without charge to satisfy him that the material is being furnished in accordance with specification.

5.8.2. The purchaser reserves the right to have the test carried at the cost of the supplier by an independent agency whenever there is dispute regarding the quality of supply.

6. Marking::

Each insulator unit shall be legibly and indelibly marked with the following details as per IEC-61109:

(a) Month &Year of manufacture

(b)Min. failing toad/guaranteed mechanical strength in kilo Newton followed by the word 'KN' to facilitate easy identification.

(c) Manufacturer's name/Trade mark

(d) Visible marking 'TSECL/MMD/Year of Manufacture.

7. Bid Drawings::

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

7.2 The Bidder shall furnish along with the bid the outline drawing of each insulator unit including a cross sectional view of the long rod insulator unit. The drawing shall include but not be limited to the following information:

(a) Long rod diameter with manufacturing tolerances

(b) Minimum Creepage distance with positive tolerance

(c) Protected creepage distance

(d) Eccentricity of the long rod unit

(i) Axial run out

(ii) Radial run out

(e) Unit mechanical and electrical characteristics

(f) Size and weight tongue & clevis

(g) Weight of composite long rod unit.

(h) Materials

(i) Identification mark

(ii) Manufacturer's catalogue number

8. Tests and Standards::

Insulators offered shall be manufactured with the same configuration & raw materials as used in the Insulators for which design & type test reports are submitted. The manufacturer shall submit a certificate for the same. The design & type test reports submitted shall not be more than 05 years old.

8.1 Design tests:-

For polymeric insulators, it is essential to carryout design test as per Clause 4.1 of IEC-61109 /92-93 with latest amendments. The design tests are intended to verify the suitability of the design, material and method of manufacture better technology. When a composite insulator is subjected to the design test the result shall be considered valid for the whole class of insulators, which are represented by the one tested and having the following characteristics: -

- Same material for the core and sets and same manufacturing method.
- Same material for the fittings, the same design, the same method of attachment.
- Same or greater layer thickness of the shed material over the core (including a sheath where used)
- Same are smaller ratio of the highest system voltage to insulator length.
- Same are smaller ratio of all mechanical loads to the smallest core diameter between fittings.
- Same are greater diameter of the core.
- the tested composite insulator shall be identified by a drawing giving all the dimensions with the manufacturing tolerances

- Manufacturer should submit test report from CPRI-Bangalore, ERDA, University of Roorkee, IITs, Jadavpur University, Indian Institute of Science or other Govt. Institution or from an NABL Accredited Laboratory or approved by the purchaser.
- for design test as per IEC-61109 (Clause-5) along with the bid . Additionally following tests shall be carried out or reports for the tests shall be submitted after award of contract :- + UV test: The test shall be carried out in line with clause 7.2 of ANSI C29.13

8.2 Type Tests:-

The tenderer shall furnish detailed type test report of the offered composite insulars as per Clause-8.2 of the technical specification at the NABL approved lab to prove that the composite insulators offered meet the requirements of the specifications. These type test should have been carried out within 5years prior to the date of opening of this tender. The following type tests shall be conducted on a suitable number of individual insulator units, components, materials or complete strings and the test reports should invariably be submitted with the bid:

l.No	Description of type test	Ten procedure/standard
	Dry lightning impulse withstand voltage	As per IEC 61109 (clause 6.1)
.	Dry power frequency voltage withstands test-part of Type test.	As per IEC 61109
	Wet power frequency test	As per IEC 61 109 (clause 6.2)
	Mechanical load-time test	As per IEC 61 109 (clause 6.4)

	Radio interference test	As per IEC 61109 (clause 6.4)
.	Recovery of Hydrophobicity test	Annexure-A This test may be repealed every 3 yrs by the
.	Chemical composition test for silicon content	Annexure-A Or any other rest method acceptable to the owner
.	Tests on housing & shed materials-Hardness test	As per ASTM D 2240-2005.
.	Tests on housing & shed materials-Accelerated weathering tests (Test done of 10 KV 5 KA polymer surge arrester, housing material is same in both surge arrester as well as Insulator.	As per IEC 60099
0.	Tests on housing & shed materials-Tracking & Erosion test	As per ASTM D 2303-1997
1.	Tests on housing & shed materials-Flammability test	As per UL 94-02009
	Test on core materials – Dye penetration	As per IEC 61109 / IEC 62217.
3.	Test on core materials – Water diffusion test test	As per IEC 61109 / IEC 62217.
	Brittle fracture resistance test	Annexure - A

NOTE :- The purchaser may like to conduct any other test(s) in addition to above at bidder's cost to establish the performance of the material as per the system requirement.

8.3 It shall be the option of the owner to accept the Insulators based on type test reports submitted by the manufacturer. The owner shall be free to repeat the type test & may witness the same.

8.4 All the type test given in Clause No. 8.2 in addition to routine & acceptance test shall be carried out on insulator along with hardware fittings wherever required.

8.5 Acceptance (sample) Tests

8.5.1 For Composite Insulators

a.Verification of dimensions	Clause 7.2 IEC: 61109,
b.Galvanizing test	IS:2633/IS:6745
c.Verification of the specified mechanical load	Clause 7.4 IEC: 61109,

Routine Tests:-

	Description	Standard
	Identification of marking	As per IEC: 61 109 Clause 8.1
	Visual Inspection	As per IEC 61 109 Clause 8.2
	Mechanical routine test	As per IEC: 61 109 Clause 8.3

8.5 Tests During Manufacture

Following tests shall also be carried out on all components as applicable

a) Chemical analysis of zinc used for galvanizing
b) Chemical analysis, mechanical, metallographic test and magnetic particle inspection for malleable castings.
c) Chemical analysis, hardness tests and magnetic particle inspection for forgings.

8.7 Additional Tests:-

8.7.1 The Owner reserves the right at his own expenses, for carrying out any other test(s) of reasonable nature carried out at Supplier's premises, at site, to in any other place in addition to the aforesaid type, acceptance and routine tests to satisfy himself that the material comply with the Specifications.

8.7.2 The Owner also reserves the right to conduct all the tests mentioned in this specification at his own expense on the samples drawn from the site at Supplier's premises or at any other test center. In case of evidence of non compliance, it shall be binding on the part of the Supplier to prove the compliance of the items to the technical specifications by repeat tests or correction of deficiencies or replacement of defective items, all without any extra cost to the Owner,

8.8 Tests on Insulator Units

8.8.1 RIV Test (Dry):-

The insulator string along with complete hardware fittings shall have a radio interference voltage level below 100 micro volts at one MHz when subjected to 50 Hz AC voltage of 10 kV for 11 kV class insulators and 30 KV for 33KV Class insulators respectively under dry condition. The test procedure shall be in accordance with IS:326B /I EC : 437/CISPfi 18-2.

8.8.2 Brittle Fracture Resistance Test:-

Brittle fracture test shall be carried out on naked rod along with end fittings by applying "1 n HNO3 acid" (63 g cone, HN03 added to 937 g water) to the 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. Test arrangement should ensure continuous wetting of the rod with Nitric acid.

8.8.3 Recovery of Hydrophobicity & Corona test:-

The test shall be carried out on 4mm thick samples of 5cm x 7cm

i) The surface of selected samples shall be cleaned with isopropyl alcohol. Allow the surface to dry and spray with water Record the Hydrophobicity classification in line with STRI guide for Hydrophobicity classification.. Dry the sample surface.

ii) The sample shah subjected to mechanical stress by bending the sample over a ground electrode. Corona is continuously generated by applying 12 kV to a needle like electrode placed 1mm above the sample surface. The test shall be done for 100 hrs.

iii) Immediately after the corona treatment, spray the surface with water and record the HC classification. Dry the surface and repeat the corona treatment as at clause 7 above. Note HC classification. Repeat the cycle for 1000 hrs. or until an HC of 6 or 7 is obtained. Dry the sample surface.

iv) Allow the sample to recover and repeat hydrophobiticiy measurement at several lime 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.

8.8.4 Chemical composition test for Silicon content

The content of silicon in the composite polymer shall be evaluated by EDX (Energy Dispersion X-ray) Analysis or Thermo-gravimetric analysis. The test may be carried out at CPRI or any other NABL accredited laboratory. Test certificate is to be submitted with bid .

9.0 GUARANTEED TECHNICAL PARTICULARS

The guaranteed technical particulars of the 11 KV 5 KN Composite polymeric Pin Insulator offered shall be given by the bidder along with the tender.

Guaranteed Technical Particulars OF 11 KV, 5 KN, Composite Polymer INSULATORS LONG rod type)
(To be filled and kept in envelopes containing Technical Offer)

sl. No.	Description	NIT Requirement	To be filled in by the bidder
1.	Name of Manufacturer		
	Address:		
	(a) registered Office		
	(b) Factory	`	
2.	(a) Type of Insulators	11KV composite polymer pin insulator	
	(b) No of phases	3- phase	
3.	Standard specification to which the Insulators manufactured and tested	IEC-61109 with up to date amendment.	
4.	Name of material used in manufacture of the Insulator (with class / grade)		
a)	Material of core rod	ECR glass fiber or Boron content free E-Glass.	
b)	Material of Housing & weather sheds (silicon content by weight)	Silicon electrometric compound or Silicon Alloy Compound.	
c)	Material of end fittings : tongue/clevis	Spheroidal graphite CI/ Malleable CI/ Forged steel/ Al. Alloy.	
d)	Sealing compound for end fitting	Flexible silicon electrometric compound/ silicon alloy compound sealant.	
1.	Colour Glaze of Insulator		
2.	Electrical Characteristics:		
a)	Nominal system Voltage (KV rms)	11KV	
b)	Highest System Voltage (KV rms)	12KV	
c)	Dry power frequency withstand (KV rms)	>60KV minimum	
d)	Wet power frequency withstand (KV rms)	35KV	
e)	Dry flash over voltage (KV rms)	>60KV	
f)	Wet flash over voltage (KV rms)	>35KV	
g)	Dry lighting impulse withstand voltage	75KV	
	(a) Positive	>75KV	
h)	Dry lighting impulse flashover voltage		
	(a) Positive (KV peak)	>75KV	
i)	RIV at 1 MHz when energized at 10kV/30kV (rms) under dry condition (microvolt)	As per IEC specification & <100µV	
j)	Creepage distance (min) mm	320mm	
3.	Mechanical Characteristics:		
	Minimum failing load (KN)	5KN	
	Dimensions of Insulator:		

sl. No.	Description	NIT Requirement	To be filled in by the bidder
4.			
5.	Weight (Kg.)	0.9kg ±10%	
i.	Dia of FRP rod (mm)	24mm minimum.	
ii.	Length of FRP rod (mm)	200±5mm	
v.	Dia of weather sheds (mm)	100±5mm	
6.	Thickness of housing (mm)	3mm	
i.	Dry arc distance (mm)		
0.	Dimensioned drawings of Insulator (including weight with tolerances in weight) enclosed.		
1.	Method of fixing of sheds to housing specify):- single mould or modular construction (injection molding/compression molding)	Single mould or modular construction (injection molding/ compression molding.	
2.	No. of weather sheds		
3.	Type of sheds		
	(i) Aerodynamic		
	(ii) With under ribs		
4.	Packing details		
	(a) Type of packing.		
	(b) No. of Insulators in each pack		
	(c) Gross weight of package		
5.	The drawing shall include but not be limited to the following information:		
a)	Long rod diameter with manufacturing tolerances		
b)	Minimum Creepage distance with positive tolerance		
	Protected creepage distance		
d)	Eccentricity of the long rod unit		
	(i) Axial run out		
	(ii) Radial run out		
e)	Unit mechanical and electrical characteristics		
f)	Size and weight tongue & clevis		
g)	Weight of composite long rod unit.		
h)	Materials		
	(i) Identification mark		
	(ii) Manufacturer's catalogue number		
6.	Any other particulars which the bidder may like to give.		
7.	NIT clause no-6 : Marking	Should be confirmed as per NIT clause regarding	

sl. No.	Description	NIT Requirement	To be filled in by the bidder
		marking.	

H. TECHNICAL SPECIFICATION FOR 11KV COMPOSITE POLYMERIC DISC INSULATOR (B & S TYPE)

1.0 SCOPE

This specification covers design, manufacture, testing, inspection, packing and supply of composite insulators for use in the 11 KV overhead transmission lines. The composite polymer insulators shall be of following type:

1.1 Long rod insulators ball and socket type for AAAC/ACSR conductors in tension application at dead end/angle / cut point.

1.2 The Bidder should be original manufacturer of the composite insulators and shall have all the facilities to manufacturing and in house testing or their product.

This will be pre-qualifying requirement as a "Bidder".

2.0 STANDARDS

Following Indian/International Standards, which shall mean latest revision, with amendments / changes adopted and published, unless specifically stated otherwise in the Specification, shall be referred while accessing conformity of Insulators with these specifications.

Indian Standard	Title	International Standard
	Definition, test methods and acceptance criteria for composite Insulators for a. c. overhead lines above 1000V.	IEC:61109
IS: 731	Porcelain insulators for overhead power lines with a nominalVoltage greater than 1000V.	IEC: 60383
IS:2071	Methods of High Voltage Testing.	IEC:60060 -1
IS:2486	Specification for Insulator fittings for overhead power lines with a nominal voltage greater than 1000V General Requirements and Tests Dimensional Requirements locking devices.	IEC:60120 IEC:60372
	Thermal Mechanical performance test and mechanicalperformance test on string Insulators units.	IEC:60575
IS: 13134	Guide for the selection of insulators in respect of pollutedcondition.	IEC: 60815
	Characteristics of string insulator units of the long rod type.	IEC: 60433
	Hydrophobicity Classification Guide.	STRIguide 1.92/1
	Radio interference characteristics of overhead power lines andhigh voltage equipment.	CISPR 18.2 Part2
IS:8263	Methods of RI Test of HV Insulators.	IEC:60437
	Standard for Insulators- Composite-Distribution Dead-end Type.	ANSI C 29.13-2000
IS:4759	Hot dip zinc coatings on structural steel & other allied products.	ISO:1459
IS:2629	Recommended practice for Hot Dip galvanization for iron andsteel	ISO:1461(E)
IS:6745	Determination of weight of zinc coating on zinc coated Iron and steel articles.	ISO:1460
IS:3203	Methods of testing of local thickness of	

	electroplated coatings.	ISO:2178
IS:2633	Testing of Uniformity of coating of zinc coated articles.	
	Standard specification for glass fiber standards.	ASTM D578-05
	Standard specification for compositional analysis by Thermogravimetery.	ASTM E 1131-03
IS:4699	Specification for refined secondary zinc	

2.1 The 11KV Disc Insulator / materials shall conform in all respect to the relevant Indian/International Standard Specification, with latest amendments thereof:

SPECIFICATION FOR 11KV COMPOSITE POLYMERIC DISC INSULATOR (B & S TYPE) AS PER IEC:61109

Name	Material
Socket fitting	S. G. Iron as per IS:1865
Security Clip(W Clip)	Phosphor Bronze
Housing	Polymer Silicon
FRP Rod	Fiber Reinforced Plastic
Ball fitting	S. G. Iron as per IS:1865

Sl No.	Description	Min. requirement for 11 KV 45 KN
1	Type of Insulator	Polymeric Composite
2	Standard according to which the insulators manufactured and	IEC 61109:2008
3	Name of material used in manufacture of the insulator with class/grade)	SILICON Wacker-Germany Dow Corning-USA or equivalent Silicon material as per specification.
a)	Material of core(FRP rod) (i) E-glass of ECR-glass. (ii) Boom content	ECR or BORRON FREE
b)	Material of housing & weather sheds (silicon content by weight)	SILICON RUBBER 43 %
c)	Material of end fittings	SGI
	Sealing compound for end fittings	RTV SILICON
	Colour	GREY
	Electrical characteristics	
c)	Nominal system voltage	11 KV
	Highest system voltage	12 KV
	Dry Power frequency withstand	70 KV
d)	Wet Power frequency withstand	45 KV
e)	Dry flashover voltage	80 KV
f)	Wet flash over voltage	50 KV
g)	Dry lighting impulse withstand voltage a) Positive b) Negative	110 KV 110 KV

h)	Dry lighting impulse flashover voltage a) Positive b) Negative.	120 KV 130 KV
i)	RIV at 1 MHz when energized at 10 KV /30kV (rms) under dry condition.	<100 micro volts
i)	Creepage distance (Min.)	320 MM
6	Mechanical characteristics :Minimum failing load.	45 KN
7	Dimensions of insulator	
i)	Weight	1.25 KG(Approx.)
ii)	Dia of FRP rod	16 MM (Min.)
iii)	Length of FRP rod	240 MM (Min.)
iv)	Dia of weathersheds	To be submitted by bidder
v)	Thickness of housing	3 MM
vi)	Dry arc distance Dimensioned drawings of insulator (including weight with tolerances in weight) enclosed.	160+5 MM (+ve tolerance shall be allowed)
8	Method of fixing of sheds to housing specifies). Single mould or Modular construction (injection moulding /compression moulding)	Injection moulding
9	No of weathersheds	3 (min.)
10	Type of sheds	
i)	Aerodynamic	Aerodynamic
ii)	With underribs	
11	Packing details	
a)	Type of packing	Strong corrugated box of minimum 7 ply duly paleted / Wooden Box
b)	No. of insulators in each pack	30 nos.(Maximum)
c)	Gross weight of package.	50 KG. (Maximum)
12	Any other particulars which the bidder may like to give.	
13	The insulators shall have “W” type phosphors Bronze or “R” type Stainless steel security clips for ball sockets portion of insulators confirming to IS-2486	YES
14	Length of Crimping dye for crimping at both end of FRP Rod should be minimum	25 MM

3.0 SERVICE CONDITIONS

The 11KV Composite Polymeric Disc Insulator to be supplied against this Specification Shall be suitable for satisfactory continuous operation under the following climatic Conditions as per IEC: 61109 or latest revision.

.	Location	At various locations in Tripura.
i.	Maximum Ambient Air Temperature (oC):	50oC.
ii.	Maximum Relative Humidity	95% (sometime approaches Saturation point).
v.	Maximum Altitude above mean Sea Level (Metres):	1000 metres.

4.0 TEST AND INSPECTION

Insulators offered shall be manufactured with the same configuration & raw materials as used in the insulators for which design & type test reports are submitted. The manufacturer shall submit a certificate for the same. The design & type test reports submitted shall not be more than five years old.

4.1 DESIGN TESTS :

For polymeric insulators it is essential to carry out design test as per clause 4.1 of IEC 61109 / 92-93 with latest amendments. The design tests are intended to verify the suitability of the design, materials and method of manufacture (technology). When a composite insulator is submitted to the design tests, the result shall be consideredvalid for the whole class of insulators, which are represented by the one tested and having following characteristics:

- Same materials for the core, and sheds and same manufacturing method;
- Same material of the fittings, the same design, the same method of attachment;
- Same or greater layer thickness of the shed material over the core (including a Sheath where used);
- Same or smaller ratio of the highest system voltage to insulation length;
- Same or smaller ratio of all mechanical loads to the smallest core diameter between fittings
- Same or greater diameter of the core.

The tested composite insulators shall be identified by a drawing giving all the dimensions with the manufacturing tolerances

Manufacturer should submit test reports for Design Tests as per IEC – 61109 (clause –5) along with the bid. Additionally following tests shall be carried out or reports for the tests shall be submitted after award of contract :

UV test: the test shall be carried out in line with clause 7.2 of ANSI C29.13.

4.2 TYPE TESTS :

The type tests are intended to verify the main characteristics of a composite insulator. The type tests shall be applied to composite insulators, the class of which has passed the design tests.

4.2.1 Following Type test shall be conducted on a suitable number of individual insulator units, components, materials or complete strings:

Sl no	Description of type test	Test procedure / standard
	Dry lightning impulse withstand voltage test	As per IEC 61109(Clause 6.1)

	Wet power frequency test	As per IEC 61109(Clause 6.2)
	Mechanical load-time test	As per IEC 61109(Clause 6.4)
	Radio interference test	As per IEC 61109(Clause 6.5) revised
	Recovery of Hydrophobicity test	Annexure – B This test may be repeated every 3 yrs by the manufacturer
	Chemical composition test for silicon content	Annexure – B Or any other test method acceptable to the owner
	Brittle fracture resistance test	Annexure – B

The bidder shall submit type test reports as per IEC 61109 along with the bid. Additional type tests required if any shall be carried out by the manufacturer, after award of contract for which no additional charges shall be payable. In case, the tests have already been carried out, the manufacturer shall submit reports for the same.

4.3 ACCEPTANCE TESTS :

The test samples after having withstood the routine test shall be subject to the Following acceptance tests in order indicated below:

a)	Verification of dimensions	Clause 7.2 IEC: 61109
b)	Verification of the locking system (if applicable)	Clause 7.3 IEC: 61109,
	Verification of tightness of the interface Between end fittings & Insulator housing	Clause 7.4 IEC: 61109 amendment 1of 1995
d)	Verification of the specified mechanical load	Clause 7.4 IEC: 61109, amendment1of 1995
)	Galvanizing test	IS:2633/IS:6745

4.4 ROUTINE TESTS:

Sl no	Description	Standard
1	Identification of marking	As per IEC: 61109 Clause 8.1
2	Visual Inspection	As per IEC: 61109 Clause 8.2
3	Mechanical routine test	As per IEC: 61109 Clause 8.3

Every polymeric insulator shall withstand mechanical routine test at ambient Temperature tensile load at RTL corresponding to at least 50 % of the SML for at least 10 sec.

4.5 TESTS DURING MANUFACTURE:

Following tests shall also be carried out on all components as applicable

a)	Chemical analysis of zinc used for galvanizing
b)	Chemical analysis, mechanical, metallographic test and magnetic particle inspection for malleable castings.
	Chemical analysis, hardness tests and magnetic particle inspection for forgings.

4.6 QUALITY ASSURANCE PLAN :

4.6.1 The successful bidder shall submit following information along with the bid:

4.6.2 Test certificates of the raw materials and bought out accessories.

4.6.3 Statement giving list of important raw material, their grades along with names of sub-Suppliers for raw materials, list of standards according to which the raw materials are

tested. List of tests normally carried out on raw materials in presence of bidder's representative.

4.6.4 List of manufacturing facilities available.

4.6.5 Level of automation achieved and lists of areas where manual processing exists.

4.6.6 List of areas in manufacturing process, where stage inspections are normally carried Out for quality control and details of such tests and inspections.

4.6.7 List of testing equipments available with the bidder for final testing of equipment Along with valid calibration reports.

4.6.8 The manufacturer shall submit Manufacturing Quality Assurance Plan (QAP) for Approval & the same shall be followed during manufacture and testing.

4.6.9 The successful bidder shall submit the routine test certificates of bought out raw materials / accessories and central excise passes for raw material at the time of inspection.

4.6.10 The Owner's representative shall at all times be entitled to have access to the works and all places of manufacture, where insulator, and its component parts shall be manufactured and the representatives shall have full facilities for unrestricted inspection of the Supplier's and sub-Supplier's works, raw materials, manufacture of the material and for conducting necessary test as detailed herein.

4.6.11 The material for final inspection shall be offered by the Supplier only under packed condition. The owner shall select samples at random from the packed lot for carrying out acceptance tests. The lot offered for inspection shall be homogeneous and shall contain insulators manufactured in 3-4 consecutive weeks.

4.6.12

The Supplier shall keep the Owner informed in advance of the time of starting and could progress of manufacture of material in their various stages so that arrangements be made for inspection.

4.6.13 No material shall be dispatched from its point of manufacture before it has been satisfactorily inspected and tested unless the owner in writing waives off the inspection.
In the later case also the material shall be dispatched only after satisfactory testing Specified herein has been completed.

4.6.14 The acceptance of any quantity of material shall in no way relieve the Supplier of his responsibility for meeting all the requirements of the specification and shall not prevent subsequent rejection, if such material are later found to be defective.

4.7 RETEST AND REJECTION:

4.7.1 Sample Procedure for testing of insulators shall be as per clause 7.1 to 7.6 of IEC 61109 for Acceptance & Routine Tests.
For the sampling tests, two samples are used, E1and E2. The sizes of these samples Are indicated in the table below.

Lot Size (N)	Sample Size	
	E1	E2
N < 300	Subject to agreement	
300 < N < 2000	4	3

2000 < N < 5000	8	4
5000 < N < 10000	12	6

If more than 10000 insulators are concerned, they shall be divided into an optimum Number of lots comprising between 2000 and 10000 insulators. The results of the tests shall be evaluated separately for each lot.

The insulators shall be selected by the purchaser's representative from the lot at random.

The samples shall be subjected to the applicable sampling tests.

The sampling tests are:

Verification of dimensions - (E1 + E2)
Verification of the locking system - (E2)
Verification of tightness of the interface between end fittings & Insulator housing - (E2)
Verification of the specified mechanical load SML - (E1)
Galvanizing test - (E2)

In the event of a failure of the sample to satisfy a test, the retesting procedure shall be As follows :

If only one insulator or metal part fails to comply with the sampling tests, a new sample equal to twice the quantity originally submitted to the tests shall be subjected to retesting. The retesting shall comprise the test in which failure occurs. If two or more insulator or metal parts fail to comply with any of the sampling tests or if any failure occurs during the retesting, the complete lot is considered as not complying with this standard and shall be withdrawn by the manufacturer.

Provided the cause of the failure can be clearly identified, the manufacturer may sort the lot to eliminate all the insulators with these defects. The sorted lot then be resubmitted for testing. The number then selected shall be three times the first chosen quantity for tests. If any insulators fail during this retesting, the complete lotConsidered as not complying with this standard and shall be withdrawn by the manufacturer.

4.7.2 Verification of dimensions (E1 + E2)

The dimensions given in the drawings shall be verified. The tolerances given in the Drawing are valid. If no tolerances are given in the drawings the values mentioned in This specification shall hold good.

4.7.3 Verification of the locking system (E2)

This test applies only to the insulators equipped with socket coupling as specified by IEC 120 and is performed according to IEC 383.

4.7.4 Verification of tightness of the interface between end fittings & Insulator housing (E2)

One insulator selected randomly from the sample E2, shall be subjected to crack indication by dye penetration, in accordance with ISO 3452,on the housing in the zone embracing the complete length of the interface between the housing and metal fitting and including an additional area, sufficiently extended beyond the end of the metal part.

The indication shall be performed in the following way.

- the surface shall be properly pre-cleaned with the cleaner ;
- the penetrate, which shall act during 20 minutes, shall be applied on the Cleaned surface;
- within 5 minutes after the application of the penetrant, the insulator shall be subjected, at the ambient temperature, to a tensile load of 70 % of the SML, applied between the metal fittings; the tensile load shall be increased rapidly but smoothly from zero up to 70 % of the SML, and then maintained at this value for 1 minute;

- the surface shall be cleaned with the excess penetrant removed, and dried;
- the developer shall be applied if necessary;
- the surface shall be inspected.

Some housing materials may be penetrated by the penetrant. In such cases evidence

shall be provided to validate the interpretation of the results.
After the 1 min. test at 70 % of the SML, if any cracks occur, the housing and, if necessary, the metal fittings and the core shall be cut, perpendicularly to the crack in the middle of the widest of the indicated cracks, into two halves. The surface of the two halves shall then be investigated for the depth of the cracks.

4.7.5 Verification of the specified mechanical load SML

The insulators of the sample E1 shall be subjected at ambient temperature to at tensile load, applied between the couplings. The tensile load shall be increased rapidly but smoothly from zero to approximately 75 % of the SML, and then be gradually increased to the SML in a time between 30 sec. to 90 sec.
If 100 % of the SML is reached in less than 90 s, the load (100 % of the SML) shall be maintained for the remainder of the 90 s. (This test is considered to be equivalent to 1 min withstand test at the SML.)
The insulators have passed the test at 4.7.4 & 4.7.5 above if:

- No failure (breakage or complete pull out of the core, or fracture of the metal fitting) occurs either during the 1 min. 70 % withstand test (a) or during the 1min.100 % withstand test (b).
- No cracks are indicated after the dye penetration method described in 4.7.4 above.
- The investigation of the halves described in 4.7.4 above shows clearly that the Cracks do not reach the core.

4.7.6 Galvanizing test
This test shall be performed according to IS: 2633/IS: 6745 on galvanized parts.

I. ACSR – WEASEL (6/1/3.35sqmm).The Conductor (ACSR) shall be subjected to all routine tests as per relevant ISS at the MANUFACTURERS' WORKS.

U Structure, Insulators and Other Sundry Materials: -

1.1 Scope: -
This work shall be on turnkey nature, as such while quoting rates Contractor should take in to account all sorts of auxiliary materials required for erection and commissioning of the transformer and other equipments.

1.2 Structure: -
The steel for structures for Substation Gantry towers, Shielding Tower, Equipment Support and Post Insulator etc. shall conform to IS: 2062 and galvanizing shall be made as per IS: 2633 / 1972, 6745 / 1972 and 4759 / 1968. The Contractor shall furnish necessary design, drawing and bill of materials. The structure shall be completed with GI nuts, bolts, washer and striper bolts etc. Testing shall be done as per IS: 2633 / 1972.

1.3 Post Insulators: -
The post insulators shall be of out door type and shall conform to IS: 2544 / 1963. The minimum power frequency and impulse withstand value shall be as follows: -

i. Rated voltage : - 36 KV.
ii. Dry one minute power frequency withstand value : - 95 KV.
iii. Wet one minute power frequency withstand value : - 75 KV.

iv. Impulse voltage withstands value 270 KV. The minimum creepage distance for 33 KV insulators shall be 550 mm. The insulators are subjected to routine, type and sample tests.

1.4 Hardware of Insulators: -

The insulators shall be provided with clamp of suitable size for connection of ACSR-DOG conductor including necessary nuts, bolts and washers etc. All nuts, bolts and washers shall be galvanized steel in accordance with IS: 2633 / 1964.

V TENSION CLAMP: -

Single insulator tension fittings (Ball & socket type) for 11 KV 70 KN disc insulator to accommodate ACSR conductor (DOG) in the 33 KV Switchyard Bus as per specification, drawing and conforming to relevant IS.

W. REQUIRED GUARANTEED TECHNICAL PARTICULARS FOR ACSR CONDUCTOR (RABBIT)

SL. NO	DESCRIPTION	UNIT	RABIT	WEASEL
1.0	Particulars of Raw Materials		EC Grade Aluminium wire Rod, Core Wire, Alloy Rod, Aluminium wire, Alloy Rode etc.	
1.1	Aluminium			
a.	Minimum Purity of Aluminium.	%	99.5	99.5
b.	Maximum Copper content	%	0.04	0.04
1.2	Steel Wires/Rods			
a.	Carbon	%	0.50 to 0.85	0.50 to 0.85
b.	Manganese	%	0.50 to 1.10	0.50 to 1.10
c.	Phosphorus	%	Max to 0.035	Max to 0.035
d.	Sulphur	%	Max to 0.045	Max to 0.045
e.	Silicon	%	0.10 to 0.35	0.10 to 0.35
1.3	Zinc			
a.	Minimum Puriyy of Zinc	%	99.95	99.95
2.0	Minimum Strands after stranding.			
2.1	Diameter			
a.	Nominal	Mm	3.35	2.59
b.	Maximum	Mm	3.38	2.62
c.	Minimum	Mm	3.32	2.56
2.2	Minium breaking Load of strand	KN	1.36	0.85
2.3	Maximum Resistance of 1 m. length	Ohm	0.003265	0.005490
3.0	Steel Strands after stranding			
3.1	Diameter			
a.	Nominal	Mm	3.35	2.59
b.	Maximum	Mm	3.42	2.64
c.	Minium	Mm	3.28	2.54
4.0	Galvanizing (After stranding)			
a.	Minium weight of Zinc conting per uncoated wire surface	gm/m^2		
b.	Minimum number of one minute dips galvaized strand can withstand in the test.	Nos	2 dip 1 min & 1 dip ½ min	Two dip 1 min
c.	Minimum number of twists in a guage length times dia of wire which the strand can withstand in the torsion	Nos	16	16

	test (after stranding)			
5.0	ACSR Stranded Conductor			
5.1	UTS of Conductor	KN	18.25	11.12
5.2	Lay ratio of conductor	Max	14	14
a.	Outer Steel Layer		N.A	N.A
b.	12 wire Aluminium Layer		N.A	N.A
c.	18 wire Aluminium Layer		N.A	N.A
d.	24 wire Aluminium Layer		N.A	N.A
5.3	D.C. resistance of Conductor at 20ºC	Ohm /Km	0.5524	0.9289
5.4	Strandard length of conductor.	M	2000	2000
5.5	Maximum single length of conductor that can be manufactured if required for single strength.	Mete r	2000	4000
5.6	Tolerance on strandard length of conductor.	%	+/- 5%	+/- 5%
6.0	Direction of lay for outside layer.	Kg/K m	Right hand	Right hand
6.1	Liner mass of the conductor.			
a.	Standard.	Kg/K m	214	128
b.	Minimum	Kg/K m	211.17	126.31
c.	Maximum.	Kg/K m	216.83	129.69
7.0	No. of cold pressure butt welding available at works.	Nos	Two	Two

J. TECHNICAL SPECIFICATION FOR PVC INSULATED LT POWER CABLE.

PVC Insulated Aluminum Conductor as specified in the BIDDING SCHEDULE shall be of Single Core (1Core) 1100 Volts grade and as per IS: 1554 (Part-I)1988. The various electrical properties of such CABLES are specified below:

Nominal Conductor area. Sq.mm.	DC Resistance of conductor at 20 degree Centigrade (Ohm/Km.)	Reactance Of cable at 50 Hz. (Ohm/Km.)	Capacitance Of cable. (Microfarad/ Km.)	Short Circuit rating of cable for 1 sec. (KA)
70	0.443	0.104	1.14	5.322
95	0.320	0.101	1.17	7.223
120	0.253	0.0956	1.30	9.124
185	0.164	0.0919	1.33	14.07
240	0.125	0.0899	1.40	18.25

Routine Tests of cables shall have to be conducted at manufacturers' works as per provisions of the relevant ISS.

1. SCOPE

This specification covers details of solid G.I. Wires for use in rural distribution system.

2. APPLICABLE STANDARDS

Except when they conflict with the specific requirements of this specification, the G.I. wires shall comply with the provisions of IS:280-1978 and IS:7887-1975 or the latest version thereof.

3. APPLICATION & SIZES

G.I. wires covered in this Specification are intended for thefollowing applications :

Application	Sizes (nominal dia)
Bearer wire for service	3.15mm (for single phase cables services) 4 mm (for three phase services)
Earthing of Transformers, poles & Fittings.	4 mm
Continuous Earthwire for. 11 KV lines	4 mm
Protective guarding at the crossing of over-head power lines with roads, railway tracts and telecommunication lines	3.15, 4 and 5 mm

4. MATERIAL

4.1 The wires shall be drawn from the wire rods conforming to IS:7887-1975 or the latest version thereof.

4.2 The requirements for chemical composition for the wires shall conform to IS:7887.

4.3 The wires shall be sound, free from split surface flaws, rough jagged and imperfect edges and other detrimental defects on the surface of the wires.

5. GALVANISING

The wires shall be galvanised with 'Heavy Coating' as per IS:4826-1979 or the latest version thereof.

6. GRADES

GI wires shall be classified into two grades based on their tensile strength :

Grade	Tensile Strength (MPa)
Annealed	300-550
Hard	550-900

7. TOLERANCE IN DIAMETER

The tolerance on nominal diameter at any section of wire shall not exceed (±)2.5%. Further, the maximum difference between the diameters at any two cross-sections of wires shall not exceed 2.5%.

8. TESTS

The following tests shall be carried out in accordance with IS:280-1978 or the latest version thereof as per sampling criteria stipulated therein :

i) Dimensional check (dia) - refer clause 7 above.
ii) Visual inspection regarding freedom from defects refer clause 4.3 above.
iii) Tensile test
iv) Wrapping test (for wire diameters smaller than 5mm)
v) Bend test (for wire diameters 5mm only)
vi) Coating test - refer clause 5 above
vii) Chemical composition

9. PACKING

The wires shall be supplied in 50-70 kg. coils, each coil having single continuous length. Each coil of wire shall be suitably bound and fastened compactly and shall be protected by suitable wrapping.

10. MARKING

Each coil shall be provided with a label fixed firmly on the inner part of the coil bearing the following information :

a) Manufacturer's name or trade mark
b) Lot number and coil number
c) Size
d) Grade (Annealed or Hard)
e) Mass
f) Length
g) ISI Certification mark, if any

K.TECHNICAL SPECIFICATION FOR 11 KV AIR BREAK GANG OPERATED SWITCH (ROCKING TYPE: 2 POSTS, 200 A RATING) (FOR 11 KV A.C. SYSTEM

(VERTICAL)

1. SCOPE:- This specification covers the design, manufacture, testing at works, supply/ delivery & transportation of outdoor, manual Gang Operated, Rocking Type, single break switch consisting of hot dip galvanized channel iron base, two Nos. post type HT insulators per Pole, electrolytic copper (with silver plating) contacts, hot dip galvanized iron arcing horns capable of breaking the magnetising current complete with horizontal connecting bar, G.I. Pipe, down rod, levers, couplings, operating handle with locking arrangement, marking of 'ON' & 'OFF' position conforming to IS:9921(P-I -IV)
/1981-1985 or its latest amendment including all standard accessories (Fittings) as per specification.

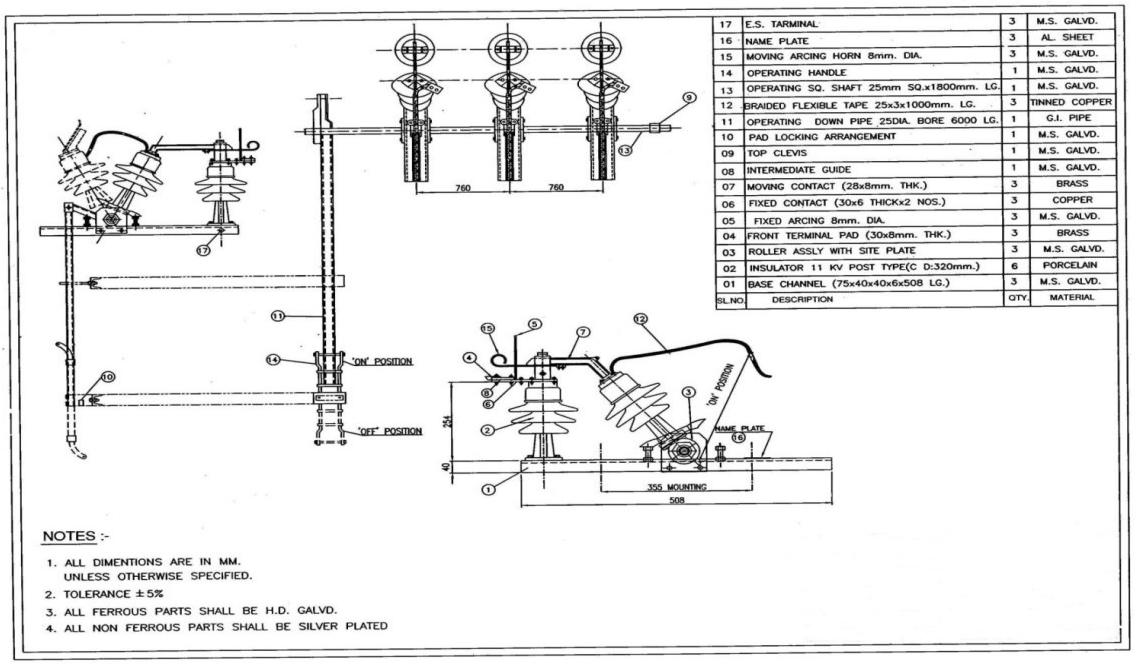
2. **APPLICABLE STANDARD**:- Unless otherwise stipulated in this specifications, the A.B. switches shall conform to IS:1818/1972 & IS:9921(P-I -IV)/1981-85 or its latest amendment.

SPECIFICATION FOR G.O.A.B. SWITCH CONFORMING TO IS:9921(P-I to IV))/1981-1985 (ROCKING TYPE:2 POST,200 KVA RATING)

Sl. No.	PARTICULARS
1	Rated voltage :- 12KV
2	Rated normal current: - 200 Amps.
3	Rated short time current for 1 sec. :-16 KA
4	Frequency :- 50 Hz (±3%)
5	Standard of G.O.A.B.Switch:- **IS:1818/1972 & IS:9921(P-I to IV)/1981-1985,** 9921(P-4 & 5)/1985
6	Phase to phase distance :- 760mm
7	Minimum Isolating Distance:- 300mm
8	**G.I. Pipe conforming to IS:1239/79 shall be heavy duty with nominal bore 25mm and 34.2mm O.D.,4.05mm thick,6000mm long Galvanized as per IS:4736/1968 or relevantIS.**
9	Post Insulator :- Conforming to IS:2544/1973
10	Galvanization of other steel accessories: - Nuts and bolts, insulator top and exposed part of insulator base shall be of galvanized by hot dip method as per IS: 4736/1968.
11	Galvanization tests to be as per IS: 2633/1972.
12	Fixed contact support shall be phosphor bronze for proper surface contact.
13	Number of break / phase :- Single
14	Number of poles :- three poles
15	Number of post insulator /phase(Pole) :- 02(two) Nos.
16	Type (mounting):- Vertical pole mounting.
17	Type of Insulator :- Post type
18	Number of unit / Stack :- Single stack
19	Number of Units per Set :- 3(three) Units per Set.
	POST INSULATORconforming to IS:2544/1973
20	Height of post insulator :- 254mm

21	Diameter of post insulator :- 152mm
22	Creepage distance :- 320mm
23	Cap & Pedestal Diameter:-81mm
24	PCD Hole:-57mm
25	Tensile Strength, Kg :- 2050
26	Flash over voltage :- Dry 50 C/S :- 70KV Wet 50 C/S :- 45KV
27	One minute power frequency withstand voltageTo earth & between poles :- 28 KV (r.m.s.) Across the isolating distance :- 32 KV (r.m.s.)
28	Impulse 1 x 50 micro sec. (Peak) positive wave :- 90KVp
29	Puncture voltage of unit :- 110KV
30	Net Weight of Post Insulator, Kg (Minimum) :- 4.2
31	Base Channel :- 75 x 40x40x6mm x 508mm Long
32	Dimension of Square Bar made of M.S. Galv. Iron:- 25mm.Sq.side, 1800mm long.
33	Operating handle Of M.S.Galvanized :- 1No
34	Pad Locking Arrangement of M.S.Galv.:- 1No
35	Braided Flexible tape: - 25x3x1000mm Long.
36	Dimension of rivet: - 25x25x1mm thick rivet in each side of Braided Flexible tape with 10mm dia. hole right in the middle portion of the rivet leaving a length of 7.5mm in each side.
37	Weight of Braided Flexible Tape including strip of rivet: - Not less than **360gms.**
38	**Materials of Braided Flexible tape and rivet:-Tinned Copper**
	Moving Contact:
39	Length of Moving contact blade:-170mm
40	Width of Moving contact blade:-28mm
41	Length of Moving contact Base :-75mm
42	Thickness of Moving contact blade& base:-8mm
43	Centre to Centre distance between holes:-57mm
44	Dimension of Moving Arcing Horn:- **8mm dia.wire, 190mm long (Minimum) excluding** **60mm inner diameter circular portion.**
45	Materials:- a. Moving Arcing Horn:-Mild Steel Galvanized,
	b. Moving contact blade& Base:-Brass.
	Fixed Contact Assembly:
46	(i). Height of Fixed contact strip :- 68mm.
47	(ii). Dimension of Fixed contact strip:-30 x 6mm.thick.
48	(iii).Total Length of Base including Front Terminal Pad:- 150mm.
49	(iv). Thickness of Front Terminal Pad & Base:-8mm.
50	**(v).** Fixed arcing Horn:- **8mm dia.wire, 200mm high x2 Nos.**
51	(vi). Centre to Centre distance between holes:-57mm
52	(vii). Materials: a. Contact strip & flexible strip:- Copper,

	b. Front Terminal Pad:- Brass,
	c. Contact Guard & Contact Spring:-M.S. Galvanized.



SL.NO	DESCRIPTION	QTY.	MATERIAL
17	E.S. TARMINAL	3	M.S. GALVD.
16	NAME PLATE	3	AL. SHEET
15	MOVING ARCING HORN 8mm. DIA.	3	M.S. GALVD.
14	OPERATING HANDLE	1	M.S. GALVD.
13	OPERATING SQ. SHAFT 25mm SQ.x1800mm. LG.	1	M.S. GALVD.
12	BRAIDED FLEXIBLE TAPE 25x3x1000mm. LG.	3	TINNED COPPER
11	OPERATING DOWN PIPE 25DIA. BORE 6000 LG.	1	G.I. PIPE
10	PAD LOCKING ARRANGEMENT	1	M.S. GALVD.
09	TOP CLEVIS	1	M.S. GALVD.
08	INTERMEDIATE GUIDE	1	M.S. GALVD.
07	MOVING CONTACT (28x8mm. THK.)	3	BRASS
06	FIXED CONTACT (30x6 THICKx2 NOS.)	3	COPPER
05	FIXED ARCING 8mm. DIA.	3	M.S. GALVD.
04	FRONT TERMINAL PAD (30x8mm. THK.)	3	BRASS
03	ROLLER ASSLY WITH SITE PLATE	3	M.S. GALVD.
02	INSULATOR 11 KV POST TYPE(C D:320mm.)	6	PORCELAIN
01	BASE CHANNEL (75x40x40x6x508 LG.)	3	M.S. GALVD.

Figure-1, Rocking Type, 2 Post G.O.A.B.Switch

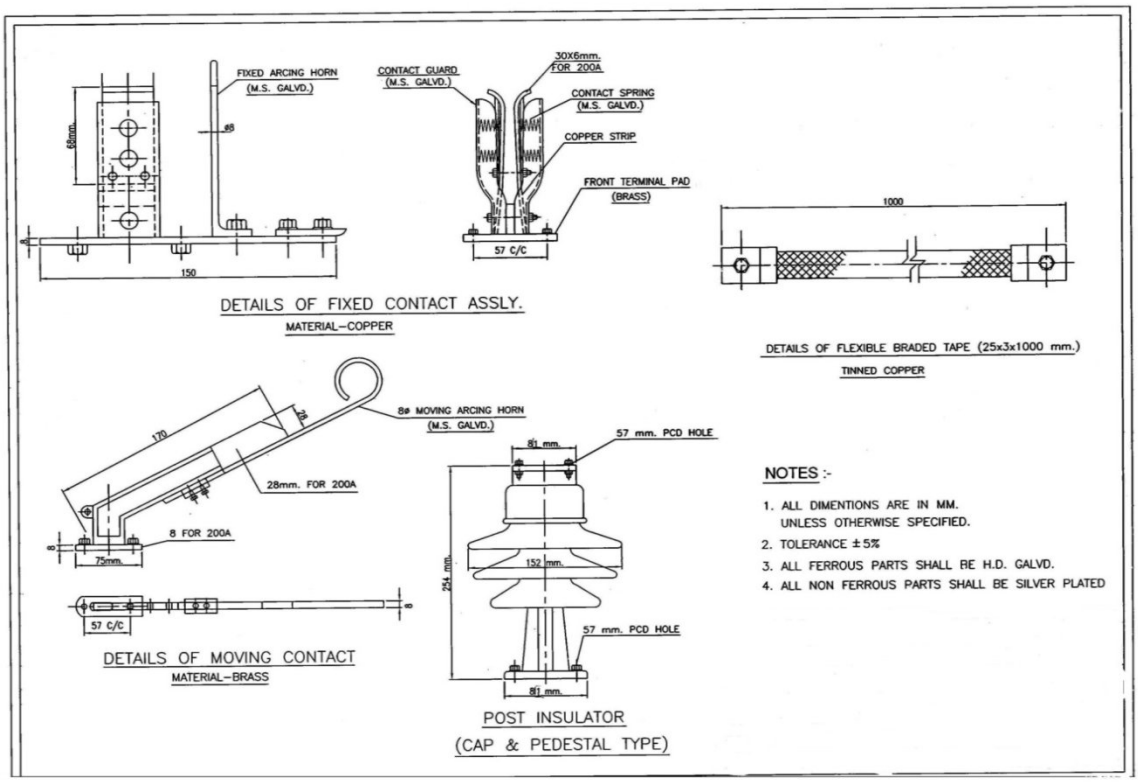


Fig-2, Details of G.O.A.B.Switch

L. Technical specification for 8 S.W.G, M.S. Heavy coating Galvanised Iron Wire conforming to IS:280 / 2006 as amended latest, Type of zinc coating Heavily coated wire (soft)

galvanization shall conform to IS : 4826 / 1979as amended latest.

1.0 **SCOPE:-** This specification covers the design, manufacture, testing at works, supply / deliverytransportation of 8 SWG M.S. heavy coating galvanized Iron Wire conforming to IS:280 / 2006and as amended latest. Type of zinc coating, heavily coated wire (soft) galvanization shallconform to IS: 4826 / 1979 and as amended latest.

2.0 STANDARDS

2.1 The 8 SWG M.S. heavy coating galvanized Iron Wire shall conform in all respect to the relevant Indian /International Standard Specification, with latest amendments.

The standards listed below contain provisions, which through reference in this text constitute provisions of this standard. At the-time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility ofapplying the most recent editions of the standards indicated below:

I. S.	Title.
228 (All parts)	Methods for chemical analysis of steels.
1387:1993	General requirements for the supply of metallurgical materials (second revision).
1608:2005	Metallic materials — Tensile testing at ambient temperature (third revision).
1755:1983	Method for wrapping test for metallic wire (First revision).
1956 (Part 5): 1975	Glossary of terms relating to iron and steel: Part 5 Bright steel bar and steel wire.
4826:1979	Hot-dipped galvanized coatings on round steel wires (First revision).
4905:1968	Methods for random sampling.
7887:1992	Mild steel wire rods for general engineering purposes (First revision).
12753:1989	Electro galvanized coatings on round steel wire.

SPECIFICATION FOR 8 SWG M.S. HEAVY COATING GALVANIZED IRON WireAS PER IS:280/1978AND IS: 4826 / 1979 AS AMENDED LATEST.

1	Type of Wire	**:**	8 SWG M.S. heavy coating galvanized Iron Wire.
2	Diameter	**:**	8 SWG (4.06 mm).
3	Tolerance in Diameter	**:**	± 2.5%.
			(i) Carbon % =0.08 to 0.13 ,
			(ii) Mn % = 0.30 to 0.60,

4	Chemical Composition	**:**	(iii) S % = 0.05 and
			(iv) Phosphorus % = 0.05.
			(As per IS: 7887 / 1992 and as amended latest).
5	Tensile Strength	**:**	8 SWG = 45 - 55 Kgf /mm2.
6	Mass of Coating	**:**	8 SWG = 290 g/ m2 (minimum).
7	Number of dips	**:**	1minute, 3dips / ½ minute, 1dip.
8	Weight of wire in each coil	**:**	50 Kg to 70 Kg.
9	Number of wire in each coil	**:**	Single continuous length.

M. TECHNICAL SPECIFICATION FOR GI STAY WIRE SIZE 7/2.50 MM

1.1 **SCOPE:-** This specification covers design, engineering, manufacture, assembly, inspection, testing at manufacturer's workshop before dispatch, packing, supply, delivery and transportation upto destination of the 7/2.50mm Stranded wire.

1.2 **STANDARDS :-**The G.I. Stranded wires shall comply with the specific requirement of IS-2141/1992, IS-4826/1979.

1.3 **MATERIAL :-** The wires shall be drawn from steel made by the open hearth basic oxygen or electric furnace process and of such quality that when drawn to the size of wire specified and coated with zinc, the finished strand and the individual wires shall be of uniform quality and have the properties and characteristics as specified in this specification. The wires shall not contain Sulphur and Phosphorus exceeding 0.060 percent each.

1.4 **TENSILE GRADE :-** The wires shall be grade 4 having minimum tensile strength of 700 N/mm2 Confirming to IS-2141/1992.

1.5 **GENERAL REQUIREMENT :-**The lay length of wire strands shall be 12 to 18 times the strand diameter.

1.6 **MINIMUM BREAKING LOAD :-** The minimum breaking load of the wires before and after stranding shall be as follows.

No. of wires andConst.	Wire Dia (mm)	Min. breaking load of Single Wire before Stranding (KN)	Min. breakingload of the stranded wire (KN).
7 (6/1)	2.50mm	3.44	22.86

1.7 ___CONSTRUCTION.

a) The stay wire shall be of 7 wire construction. The wires shall be so stranded together that when as even distributed pull is applied at the end of completed stand, each wire shall take an equal share of the pull.

b) Joints are permitted in the individual wires during stranding but such joints shall not be less than 15 meters part in the finished strands.

c) The wire shall be circular and free from scale, irregularities, imperfection, flows, splits and other defect. The zinc coating shall confirm to IS: 4826/1979.

1.8 **TOLERANCE : -**A tolerance of + or - 2.5 % on the diameter of wires before stranding shall be permitted.

1.9 **SAMPLING CRITERIA :**The sampling criteria shall be in accordance with Table-3 Annexure-A IS: 2141/1992.

1.10 TESTS ON WIRES BEFORE MANUFACTURE:

The wire shall be subjected to the following tests in accordance with Is : 2141/1992.

(1)Ductility test.
(2)Tolerance on wire diameter.

1.11 **TESTS ON COMPLETED STRAND:** The samples shall be tested for the following tests in accordance with IS: 2141/1992 in addition to other acceptance tests.

a) Tensile and Elongation test.

The percentage elongation of the stranded wire shall not be less than 6 % (Grade-4D)

b) Chemical Analysis:

The manufacturer shall have to submit test certificate with every lot for the chemical composition ofthe steel rods from which the wires are drawn.

c) Galvanizing test.

The **z**inc coating shall confirm to "heavy coating" as laid down in IS 4826/1979.

1.12 PACKING. :

The G. I. Stay wire shall be supplied in coils. Each coil should be weighing 50 to 70 Kgs. Each coil shall be wrapped in hessian to avoid surface damage to wire during transport and for protection against pollution. Each coil shall be supplied with a metallic tag with on the following particulars shall be printed with water-proof ink/itched.

1) Name of Manufacturer.
2) Size of G. I. Stay wire.
3) Coil Serial No.
4) Weight of Coil (approx.)
5) Tensile designation.
6) Coating.
7) A/T No. & Date.
8) ISI Mark if any.

1.13 **SEALING.:-**The manufacturer shall keep all the coils ready with seal wire and lead seal so as to enable the Company's inspectors to seal the inspected material immediately. Coils shall then be wrapped with hessian before dispatch.

1.14 **GUARANTEED TECHNICAL PARTICULAR (G.T.P.)**The bidders shall submit guaranteed Technical particulars along with the offer as per enclosed format.

1.15 **DEVIATION FROM SPECIFICATION :**No. deviation in the above specification shall be allowed.

N. TECHNICAL SPECIFICATION OFMILD STEEL, PAINTED, STAY SET.

1.1 SCOPE

This specification covers design, engineering, manufacture, assembly, inspection, testing at manufacturer's workshop before dispatch, packing, supply, delivery and transportation upto destination of Painted Stay Set for H.T./L.T. line conforming to relevant ISS and Tolerance in the dimensions as per IS:1852/1985 or as amended latest.

1.2 STANDARDS

The Painted Stay Set for H.T./L.T. line shall conform in all respect to the relevant Indian/ InternationalStandard Specification, with latest amendments.

SPECIFICATION FOR PAINTED STAY SET FOR H.T./L.T.LINE:

1) Type of Stay Set: -16mm.dia Painted Stay Set for H.T. /L.T. line.

SPECIFICATION FOR PAINTED STAY SET FOR H.T./L.T.LINE:

1) Type of Stay Set: -16mm.dia Painted Stay Set for H.T. /L.T. line.

2) Standard: -IS: 1852/1985 or as amended latest in respect of tolerance in dimensions.

3) Anchor Rod:

a. Size: - 16mmφ.

b. Length: - 1800mm.exclusive of circular point.
c. Thread length: - 50mm.
d. Nut:-Hexagonal nut 12mm thick to match the thread of anchor rod.
e. Washer: - 40x40x2mm M.S. washer.
f. Circular Point: - 40mmφ.

- Anchor Plate:

a. Dimension: - 300x300x8mm M.S.Plate.
b. The hole at the centre of the M.S. Plate:-18mmΦ.

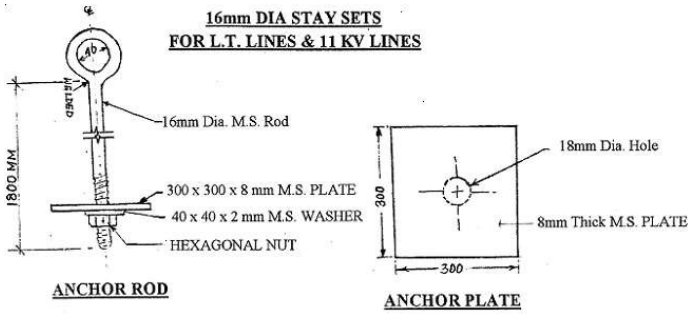
a. Number of M.S. Rods including Strain rod:-3(three).
b. Diameter of Each rod:- 16mm.dia.
c. Length of each rod:- 300mm.exclusive of circular point in case of strain rod and excluding the portion to be driven into the solid trapezoidal Caps on both the sides for having forged in case of other two rods.
d. Thread length of Strain Rod:-250mm.
e. Diameter of each circular points: - 40mmφ.
f. Number of solid trapezoidal Cap made from Square bar:- 2(two).
g. Dimension of each Square bar (cap):i). Length of large side:- 72mm.

h. Length of small side:- 30mm. iii).Height:- 28mm.

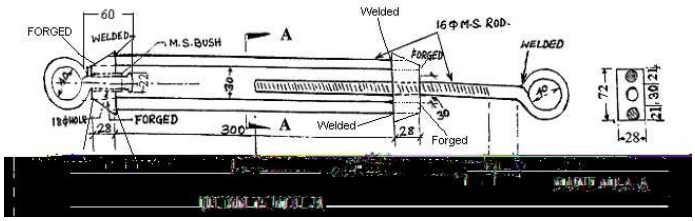
i. Material: - Mild Steel.
j. Painting:-Two coatings of Red Oxide Paint after brushing, scrubbing, Cleaning etc.
k. Dimensions as per Drawing (shown below):-

1.1 Diagram of PaintedStay Set

16mm DIA STAY SETS
FOR L.T. LINES & 11 KV LINES



ANCHOR ROD **ANCHOR PLATE**



O. SPECIFIC TECHNICAL REQUIREMENTS FOR TUBULAR STEEL POLES:Full galvanized TYPE

	9meters long	11 meters long	13 meters long	12 meters long
1)Standard	IS:2713(Pat-I andIII): 1980asamendeduptodate			
2)TypeofPole	SwagedType			
3)Designation	540SP28	540SP52	540SP72	410SP60
4)OverallLength	9meters	11meters	13meters	12meters
5)Plantingdepth	1.5meters	1.8meters	2.0meters	2.0meters
6)Heightaboveground	7.5meters	9.2meters	11.0meters	10.0meters
7)EffectivelengthofEach section.				
a)Bottom	5.0meters	5.6meters	5.80meters	5.80meters
b)Middle	2.0meters	2.7meters	3.60meters	3.10meters
c)Top	2.0meters	2.7meters	3.60meters	3.10meters
8)Outsidediameterand ThicknessofeachSection.				
a)Bottom	139.7x4.50mm	165.1x4.50mm	219.1x5.90mm	165.1x5.40mm
b)Middle	114.3x3.65mm	139.7x4.50mm	193.7x4.85mm	139.7x4.50mm
c)Top	88.9x3.25mm	114.3x3.65mm	165.1x4.50mm	114.3x3.65mm
9)JointLength(in cm.):				
a)Bottom(J2)	30cm.	35cm.	45cm.	35cm.
b)Top(J1)	23cm.	30cm.	40cm.	30cm.
10)Approximateweight ofPole	113Kg.	175Kg.	343Kg.	208Kg.
11)Pointofapplicationof loadbelow/top(mtr.)	0.3mtr.	0.6mtr.	0.6mtr	0.6mtr
12)Breakingload(inKgf)	478	567	1084	469
13)Workingloadwithfactorof Safety:2.5(inKgf)	191	227	435	188
14)Cripplingload(inKgf)	339	403	770	333
15)Loadforpermanentset Notexceeding13mm(inKgf)	232	276	527	228
16)LoadforTemporary Deflectionof157.5mm(inKgf)	76	74	121	61
17)Tolerance	AsperIS : 2713(Part-I&Part-III):1980			
18)Finish	-do-			
19)Manufacturingclause	-do-			

Tubular Steel Poles for OverheadLines

1 **SCOPE :**This specification covers the general requirements towards design, manufacture, testingat manufacturersworks, supply and delivery for tubular steel poles of circular crosssection (swaged type) for overheadlines.

2 STANDARD:

ThetubularsteelpolesshallconformtothelatesteditionofIndianStandardspecificationIS:2713 (Part–I, III): 1980 or any otherauthoritative standards (as amended up-to- date) except where specifiedotherwiseinthisspecification.

3 Topography and Climatic Condition:

The materials offered, shall be suitable for operation in tropical climate and will be subjected to the sun andinclement weather and shall be able to withstand wide range of temperature variation. For the purpose ofdesign,averageatmospherictemperaturemaybeconsideredtobe50ºCwithhumiditynearing saturation.

4 Materials:

4.1 The materials used in construction of tubular steel poles shall be of the tested quality of steels of minimumtensilestrength540MPa(: 55Kgf/mm^2).

4.2 The materials, when analysed in accordance with IS: 228 (Part-III: 1972) and IS : 228 (Part-IX) shall notshowsulpherandphosphorouscontentsofmorethan 0.060percent each.

5 Types,Size and construction:

5.1 TubularSteelPolesshallbeswagedtype.

5.2 Swaged poles shall be made of seamless or welded tubes of suitable lengths swaged and jointed together.No circumferential joints shall be permitted in the individual tube lengths of the poles. If welded tubes areused they shall have one longitudinal weld seam only: and the longitudinal welds shall be staggered at eachswagedjoint.

5.3 Swaging may be done by any mechanical process. The upper edge of each joint shall be chamfered if at anangle of about 45º. The upper edge need not be chamfered if a circumferential weld is to be deposited inaccordancewithclauseNo.5.32ofIS: 2713(Part-I):1980.

5.4 Thelengthofjointson swagedpolesshallbeinaccordancewithclauseNo.5.4ofIS:2713(Par-I):1980.

5.5. Poles shall be well-finished, clean and free from harmful surface defects. Ends of the polesshall be cutsquare. Poles shall be straight, smooth and culindrical. The weld joints, if any, shall be of good quality, freefromscale,surface defects,cracks,etc.

5.6. Tolerances for outside diameter, thickness, length, weight and straightness shall be inaccordance with IS:2713(Part-I): 1980.

5.7. The poles shall be coated with black bituminous paint conforming to IS: 158-1968 throughout, internallyand externally, upto the level which goes inside the earth. The remaining portion of the exterior shall bepaintedwithone coatofred oxide primerasspecifiedinIS:2074-1979.

6 Earthing Arrangements:

Forearthingarrangementathroughholeof14mmdiametershallbeprovidedineachpoleataheight of300mmabovethe planting depth.

7 Tests and Test Certificates:

7.1 The following tests shall be conducted on finished poles:

A. Tensile test and chemical analysis for sulphur and phosphorous,
B. Def location test,
C. Permanent set test, and
D. Drop test.

7.2 In addition to above verification of dimensions as per IS: 2713 (Part-III) : 1980 shall be carried out duringacceptancelots.

7.3 Number of poles selected for conducting different tests shall be in accordance to clause No. 10.1.1 andNo.10.1.12: ofIS: 2713(Part-I)1980.

7.4 Tests shall be carried out before supply of each consignment at the manufacturers woks andtest certificates should be submitted to the purchaser for approval priorto delivery.

7.5 Re-tests,if any,shallbemadeinaccordancewithIS:2713(Part-I)1980.

7.6 Purchaser reserves the right to inspect during manufacturing and depute his representative to inspect/test at the works.

7.7 If any extra cost is required for carrying out the above specified tests, the same shall be borne by the manufacturer.

8 Marking:

8.1 The poles shall be marked with designation, manufacturer's identification, year of manufacture and name ofthepurchaser:EmployerName;RDSS

8.2 ThepolesmayalsobemarkedwiththeISI certificationmark.

9 Guaranteedtechnicalparticulars:

9.1 The manufacturer shall furnish all necessary guaranteed technical particulars in the prescribed Performaenclosedhereinafter.

10 Performance:-

10.1 The manufacturer shall furnish a list of the major supplies effected during the last 3 (three) years indicatingthevolume ofsupplyandactualdelivery dates.

10.2 Manufacturer may not be considered if the past manufacturing experience is found to be less that 3(three)years.

11 Deviation:-

Any deviation in technical specification shall be clearly indicated with sufficient reasons thereof. Purchasershall however reserve the right to accept and/or reject the same without assigning any reasons what-so-ever.

P. TECHNICAL SPECIFICATION FOR KIT-KAT FUSE UNITS

1.0 SCOPE

This specification covers the design, manufacture, testing at works, supply/ delivery & transportation of Single core, General Lighting Service Lamps conforming to ISS:2086/1993(3rd revision) or latest amendments.

3.0 STANDARDS

2.1 The Kit-Kat Fuse Unit shall conform in all respect to the relevant Indian/ International Standard Specification, with latest amendments.

SPECIFICATION FOR 63A, 100A 200A & 300A KIT-KAT FUSE UNITS AS PER IS: 2086/1993 (3rd revision).

1. Type of Fuse Units :- Single circuit re-wireable 63A,100A,200A & 300A extended type porcelain Kit-Kat Fuse Units.
2. Standard :- Conforming to IS:2086/1993(3rd revision)
3. All metal parts of the Kit Kat Fuse Unit including washer for fuse wire fixing screws shall be copper alloy / Brass except Nuts & Bolts & other washers.
4. The hole for the bolts in the extended terminal shall be threaded.
5. Nuts, Bolts & Washers etc. shall be of Mild Steel with proper metallization / galvanization.
6. The bolts in the extended terminal shall be provided with two hexagonal nuts to be with matching height with flat washer & spring washer as mentioned in Sl. No.13.
7. Porcelain potion of the Kit Kat Fuse Units shall be milky white glazed and free from spots and roughness.
8. 300 Amps & 200Amps Kit Kat Fuse Units shall be open base type while 63 Amps & 100 Amps ones to be conventional type.
9. One metal block complete with reversed loop female contact as per drawing shall be fitted on a porcelain block and two such blocks shall be fitted on two ends of a sheet metal channel for 200 Amps Kit Kat Fuse Units.
10. Dimension of porcelain base & carrier for 63Amps , 100 Amps , 200 Amps & 300Amp Kit Kat Fuse Units shall be not less than the following figures (all dimensions are in mm):

sl. No.	Rating	Base			Carrier		
		L	B	h	L	B	H
	63A	105	40	35	105	40	25
	100A	135	50	45	135	50	30
	200A	55 (In two pieces)	32	23	175	55	47

10. Porcelain carrier of 200 Amps Kit Kat Fuse Unit shall have thorough hole for hand gripping.

11. Dimension of channel for base of 300 Amps Kit Kat Fuse Unit shall not be less than the following figures (all dimensions are in mm):

sl. No.	Rating	Length	Breadth	Height	Thickness of Sheet	Hole dia. & No.
	300 A	205	65	12	1.5	8d x 6

12. Dimension of Metalized / G.I. Nuts & Bolts (full threaded) and Washers etc., shall not be lesser than following (all dimensions are in mm).

SL. No.	Rating	Length of the bolt	Dia of the bolts	Thickness of flat & Spring washer	Outside dia of flat washer
1	2	3	4	5	6
(c)	63A	20	8	1.00	16
(d)	100A	25	8	1.50	19
(e)	200A	30	10	2.00	22
(f)	300A	35	12	2.00	27

13. Number & minimum dimension of fuse fixing screws & washers shall be as below (all dimensions are in mm).

(a) 63 Amps : 1No. x2, 3.50 'd' with 0.75 thick, 4 'd' hole and 10 'od' Washer (2nos.)

(b) 100 Amps : 1No. x2, 5.00 'd' with 1.00 thick, 6 'd' hole and 13 'od' Washer (2nos.)

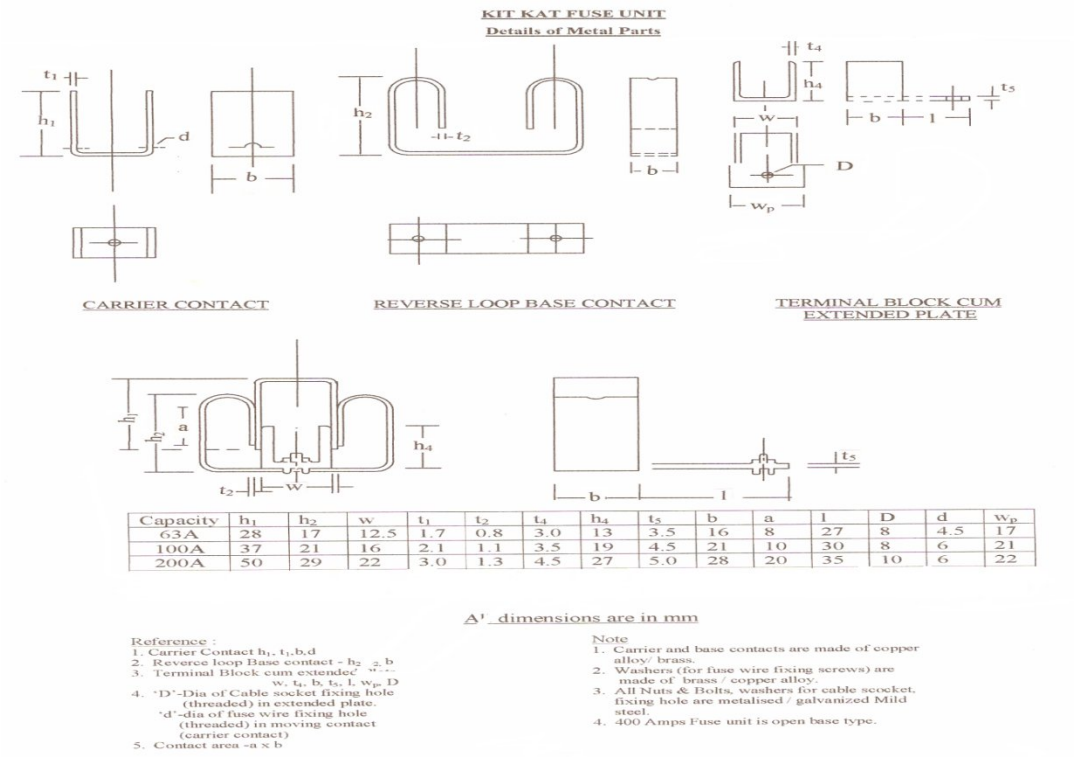
(c) 200 Amps : 2No. x2, 6.00 'd' with 1.25 thick, 7 'd' hole and 15 'od' Washer (4nos.)

(d) 300 Amps : 2No. x2, 7.00 'd' with 1.25 thick, 8 'd' hole and 16 'od' Washer (4nos.)

14. Contact Area between male and female metal parts shall not be less than the followings:
(a). 16 x 15 x 4 Sq.mm -for 63 Amps
(b). 21 x 20 x 4 Sq.mm - " 100 "
(c). 28 x 30 x 4 Sq.mm - " 200 "
(d) 36x35x4 Sq.mm- '' 300 ''

15. Dimensions of male and female metal parts and extended terminal blocks, etc. shall be as per drawings / specification enclosed.

3.0 SERVICE CONDITIONS:-



Capacity	h_1	h_2	w	t_1	t_2	t_4	h_4	t_5	b	a	l	D	d	w_p
63A	28	17	12.5	1.7	0.8	3.0	13	3.5	16	8	27	8	4.5	17
100A	37	21	16	2.1	1.1	3.5	19	4.5	21	10	30	8	6	21
200A	50	29	22	3.0	1.3	4.5	27	5.0	28	20	35	10	6	22

'A' dimensions are in mm

Reference :
1. Carrier Contact h_1, t_1,b,d
2. Reverce loop Base contact - h_2, t_2, b
3. Terminal Block cum extended plate - w, t_4, b, t_5, l, w_p, D
4. 'D'-Dia of Cable socket fixing hole (threaded) in extended plate.
'd'-dia of fuse wire fixing hole (threaded) in moving contact (carrier contact)
5. Contact area -a x b

Note
1. Carrier and base contacts are made of copper alloy/ brass.
2. Washers (for fuse wire fixing screws) are made of brass / copper alloy.
3. All Nuts & Bolts, washers for cable scocket, fixing hole are metalised / galvanized Mild steel.
4. 400 Amps Fuse unit is open base type.

The Kit Kat Fuse Units to be supplied against this Specification shall be suitable for satisfactory continuous operation under the following climatic conditions as per IS: 2086/1993(3rd revision) or latest revision.

i. Location: At various locations in Tripura.

ii. Max. ambient air temperature (Deg0 C): 500C

iii) Maximum relative humidity 95% (sometime approaches Saturation point)

vi. Max. Altitude above mean sea level(Meters): 1000 M.

4.0 TEST AND INSPECTION

4.1 Following tests shall be carried out at the works of the manufacturer as per relevant ISS before delivery of each lot in presence of the representative of purchaser:

A. Type Tests:

(a) Visual examination,
(b) Test for dimensions,
(c) Test for mechanical endurance,
(d) Test for mechanical Strength,
(e) Test for withdrawal force,
(f) Test for temperature-rise,
(g) Insulation resistance test,
(h) High voltage test,
(i) Test for breaking capacity,
(j) Test for water absorption (ceramic),

(k) Test on ceramic material,
(l) Ignition test.

B. Acceptance Tests:

(a) Visual examination,
(b) Test for dimensions,
(c) Test for mechanical endurance,
(d) Test for withdrawal force,
(e) Test for temperature-rise,
(f) Insulation resistance test,
(g) High voltage test,
(h) Test for water absorption (ceramic),
(i) Temperature cycle test (for ceramic material).

C. Routine Tests:

(a) High voltage test.

Sample at random will be selected from the offered lot for the above testing as per IS.

Note : Purchaser reserves the right to get all or any type test carried out on one sample per 1000 Kit-Kat Fuse Units at the cost of supplier from any recognized laboratory / government test house.

4.2 The supplier shall furnish the type test / the routine test certificates as part of the condition for supply of Kit-Kat Fuse Units in bulk quantity at the discretion of the purchaser.

4.3.0 INSPECTION

4.3.1 All tests and inspection shall be made at the place of manufacture unless otherwise especially agreed upon by the manufacturer and purchaser at the time of purchase. The manufacturer shall afford the inspector representing the purchaser all reasonable facilities without charge to satisfy him that the material is being furnished in accordance with specification.

4.3.2 The purchaser reserves the right to have the tests carried out at the cost of the supplier by an independent agency whenever there is dispute regarding the quality of supply.

Q. LT Panel Board 400 Amp (Outdoor type)

1.1 Outdoor type 400 Amp, 4pole , Fixed capacity, MCCB Panel board (Out-door type feeder pillar)

1.2 The cubical should be with LED type Phase indication lamp, Amps & Volt meter with facility to connect 300 sqmm 3½ Core XLPE cable [as in-comer] & Outgoing facility of 185 sqmm XLPE L.T cable through cable gland

1.3 The L.T distribution cubical shall be suitable for double door & both side opening facility and to be fabricated with 2mm CRCA sheet and Tropical, totally enclosed, metal-clad, weather-proof, vermin and dust proof with following incoming & outgoing MCCBs.

1.4 A. 400 A, 4 Pole, 35 KA, thermal magnetic protection MCCB with O/L & S/C protection - 02 no. (As incomer) with change over provision B. 100 A, TPN, 35KA MCCB - 4 nos.(As outgoing)

R. LT Panel Board 100 Amp (Outdoor type)

1.1 Outdoor type 100 Amp, 4pole , Fixed capacity, MCCB Panel board (Out-door type feeder pillar).

1.2 The cubical should be with LED type Phase indication lamp, Amps & Volt meter with facility to connect 185 sqmm 3½ Core XLPE cable [as in-comer] & Outgoing facility of 120 sqmm XLPE L.T cable through cable gland.

1.3 The L.T distribution cubical shall be suitable for double door & both side opening facility and to be fabricated with 2mm CRCA sheet and Tropical, totally enclosed, metal-clad, weather-proof, vermin and dust proof.with following incoming & outgoing MCCBs.

1.4 A. 100 A, 4 Pole, 35 KA, thermal magnetic protection release MCCB with O/L & S/C protection - 1 no. (As incomer) B. 40 A, TPN, 35KA MCCB - 4 nos |(As outgoing) (Adjustable thermal & fixed magnetic setting)

S. Outdoor type Distribution Board

Out Door type Distribution board with 40 A, TPN MCCB and Aluminium Bus Bar indicating lamp with all accessories.

SECTION-VI

Special Instructions to Bidder(s)

i) The Bidder(s), before submitting of Bid(s), are advised to invariably visit the site of the work and satisfy himself/themselves about physical volume of works to be carried out, acquaint him / themselves with the environment, take into consideration details of all **minor & major Technical requirements so as to** ensure successful completion of the work with ease & comfort on award.

ii) The Contractor shall be fully responsible for total commissioning of all **Equipment & associated controls** as per standard & requirement of the owner. The Contractor shall give due importance to each & every details of the work. He shall be liable to take care of and arrange for even any petty but integral component (**not considered in the scope of the work**) for total completion of the work.

iii) The work shall be carried out as per direction of the Engineer in charge following guide line and specification of the Agreement.

iv) The validity of the offer shall be 180 days from the date of submission of offer.

v) The rate should be inclusive of GST, no other tax shall be paid extra.

vi) Every page of Tender is to be signed by the contractor.

vii) Materials to be supplied as per TSECL Specification, as per direction of Engineer-In-Charge.

Section VII

TERMS & CONDITIONS

1. The bidder must provide

a. Successful completion certificate issued by an Engineer not below rank of Executive Engineer/Dy. General Manager in charge.

b. Photocopy of PAN card issued by Income tax Dept., Govt. of India of bidder / all partners of joint venture.

c. Photocopy of Valid Labour license issued by Licensing Officer, Govt. of Tripura.

d. Photocopy of Valid Electrical License issued by Tripura Electrical Licensing Board .

e. Experience certificate indicating same nature of work issued by an Engineer not below rank of Assistant Engineer/Sr. Manager in charge.

f. Photocopy of Valid GST Registration certificate.

g. The bidder shall be required to deposit **earnest money /Bid Grantee of Rs .....00 (Rupees .....) only** in the shape of **demand draft or D-Call** favouring **Dy. General Manager, ED -JRN, TSECL,** on any schedule Bank payable at Agartala, West Tripura along with the bid in a separate sealed envelope .Cost **of Bid in case of download** in a separate sealed envelope in the shape of **demand draft** favouring **Dy. General Manager, ED -JRN, TSECL.**

Photocopies of all documents furnished shall be self-authenticated.

2. The bidder must have successfully executed at least supply, erection, commissioning of at least 1.0Km of HT & 1X63 KVA Substation which must be in satisfactory operation for one and half years as on the date of bid opening.

3. The Bidding document shall be signed by the bidder(s) on all pages. The Bidder(s) should initial all corrections to rates and items in the Bid(s). The Bidder(s) shall also sign every page of the Schedule Price Bidding in full**.**

4. Bids shall remain valid for 3 (month) calendar months from the last due date of bid. A bid valid for a shorter period shall be rejected by TSECL as non-responsive.

5. The bidder should submit bid in sealed envelope inscribing name of work along with Restricted NIT Number on the top. Each bidder should enclose earnest money as specified in the shape of Demand Draft, failing which bid shall be rejected summarily.

6. Bidders should quote rate(s) inclusive of GST. **No Taxes & Duties will be paid extra**.

7. The bidders should drop their bids in the of office of the Dy. General Manager Electrical Division, Jirania, Tripura (W).

8. TSECL will not be liable for any delay by post / courier in receiving any bid for the work. Bids received within the schedule date & time shall only be considered.

9. The rates shall be valid for 1 (one) year from the date of acceptance. If necessary, it may extend for further period at same rate(s), terms & conditions as may be decided by the authority.

10. TSECL reserves the right to reject or accept any bid without assigning any reasons.

11. TSECL reserves the right to accept rate of two or more bidders in line with the terms and conditions specified. TSECL shall accept the rates of the Bidder(s) whose bid has been determined to be substantially responsive and has been determined as technically acceptable.

12. The successful bidder(s) will have to execute the work as per Technical Specification and General Condition of TSECL. Separate order will be placed time-to-time as per accepted rates and Terms & Conditions.

13. General condition of contract and other related information etc. may be seen at the Technical Section of Electrical Division, Jirania, Tripura (W) .on all working days during office hours up to the date fixed for providing of Tender form.

14. The agency shall be penalized for negligence in performance / delay in executing job. Unsatisfactory performance / delay in executing job by the agency shall be liable for the contract performance guaranty money to be forfeited.

15. Taxes as applicable shall be deducted from bill of the agency as per standing order of the Government

16. The Bidder(s) shall have to give a DECLARATION that he/they have gone through the details of the Bidding Document(s) as per format appended with the Bidding Document.

17. Notwithstanding anything contained herein above, TSECL reserve the right to assess the "capacity and capability" of the bidder to execute the work.

Dy. General Manager
Electrical Division Jirania

Annexure – VIII

MAKERS LIST OF MATERIALS

Sl. No.	Items	Manufacturer
1.	Power Transformer	BHEL / ALSTOM / CGL / Siemens / Bharat Bijlee / ABB / Transformers & Rectifiers (India) Ltd./ Volt Amp / Prolec GE.
2.	132 KV SF_6 Breaker	Alstom / CGL / Siemens / ABB / BHEL
3.	33 KV SF_6 Breaker	CGL / ABB / Schneider
4.	132 KV Isolator	Siemens / ABB / CGL / Alstom / Hivelm / M/s Raychem RPG Pvt. Ltd., / GR Power / Project Electricals (PEI)
5.	33 KV Isolator	Switchgear & Control Pvt. Ltd. / JK Electricals / Bharat Electrical Industries / Hivelm / Project Electricals (PEI) / Siemens / GR Power / Electrolities (Power) Pvt. Ltd.
6.	132 KV CT	Alstom / CGL / Siemens / ABB / Vidyut Control System Pvt. Ltd.
7.	33 KV CT	Vidyut Control System Pvt. Ltd. / Switchgear & Control Pvt. Ltd. / Schneider / CGL / ABB
8.	132 KV PT	Alstom / CGL / Siemens / ABB
9.	33 KV PT	Vidyut Control System Pvt. Ltd. / Switchgear & Control Pvt. Ltd. / Schneider / CGL / ABB
10.	LA	Alstom / CGL / Oblum / Raychem RPG / Lamco Ltd.
11.	CVT	Alstom / CGL / BHEL / ABB / Siemens
12.	Hardware Fittings / Clamps, Connectors etc	EMI / Rashtraudyog Ltd. / Electromech&Transtech / EMC LTD / IAC / Klemmen / Megha / IPS / TLP / TM POWER.
13.	Power cable	Havells / Polycab / KEI / Gloster / Torrent / GEMSCAB / CCI
14.	Control Cable	Havells / Polycab / KEI / Gloster / Torrent / GEMSCAB / CCI
15.	Relay & Control Panel	Siemens / ABB / ALSTOM / L & T / Schneider Electric / PASCAL SWITCHGEAR / AMARARAJA
16.	Nuts & Bolts and other hardwares	Reputed manufacturer having credentials of supplying to different Central / State power utilities.
17.	Relays	SIEMENS / ABB / GE ALSTOM
18.	11 KV VCB	Crompton Greaves / Siemens / ABB / L & T / PASCAL
19.	Energy Meter	L & T (ER 300P)
20.	Battery & Battery Charger	Exide / Amara Raja / Chabbi Electricals Pvt. Ltd. / Caldyne
21.	Oil Filter Plant	John Fowler (NIRMAL BRAND) / CEE DEE Vacuum / AR ENGINEERING.
23.	Sub-Station Lighting Equipments	Philips / Havells / CGL / Bajaj.
24.	Marshaling Kiosk / box, Junction box.	Electro Allied Products / VikasEngg. Associates / Bose Corporation / Control & Switchgear / Maktel.
25.	Structural Steel	Re-rollers shall purchase Billets from SAIL / TISCO / RINL / ISCO / VIZAG / Other reputed manufacturer having credentials of supplying to different Central / State power utilities.

Sl. No.	Items	Manufacturer
26.	Nuts & bolts and other hardwares	Reputed manufacturer having credentials of supplying to different Central / State power utilities.
27.	ACSR PANTHER conductor of size 30/7/3.0 mm	APAR Industries / Saravathi Conductor / Sterlite Industries / Smita Conductor / Cabcon India Pvt. Ltd./ Lumino Industries Ltd / Reputed manufacturer having credentials of supplying to different Central / State power utilities.
28.	7/3.15 mm galvanized Steel Stranded Wire of Gr. – III conforming to ISS: 2141 of 1979 of as amended latest	Reputed manufacturer having credentials of supplying to different Central / State power utilities.
29.	Hardware fittings	EMI / Rashtraudyog Ltd. / Electromech&Transtech / EMC LTD / IAC / Klemmen / Megha / IPS / TLP
30.	Disc Insulator (11 KV Disc Insulator of size 255 mm X 145 mm Ball & Socket type EMS 120 KN)	Aditya Birla Insulators Ltd. / BHEL / IEC / WSI / Reputed manufacturer having credentials of supplying to different Central / State power utilities.
31.	40 mm dia G.I. Pipe	TATA / BANSAL / BMW / JINDAL.

All materials should be embossed/engraved with TSECL-IPDS for identification.

ANNEXURE – I

APPLICATION FOR EXTENSION OF TIME

(Part – I)

1. Name of Contractor _____
2. Name of work (as given in the contract) :-
   _____
   _____
   _____
3. Agreement of _____
4. Estimate amount put to tender _____
5. Date of Commencement of work _____
6. Period allowed for completion of work (as per agreement) _____
7. Date of completion stipulated in the agreement _____
8. Period for which extension of time has been given previously if any _____

a) 1st extension vide No. _____

b) 2nd extension vide No._____

c) 3rd extension vide No. _____

d) 4th extension vide No. _____

9. Period for which extension have been previously given (Copies of the previous application should be attached).
10. Hindrances on account of which extension is applied for with date on which hindrances occurred.

Sl. No.	Nature of hindrances	Date of occurrence	Period of which hindrances is likely to last	Extension of time applied for by the contractor	Overlapping period, if any, giving reference to items which overlap	Period for which extension is applied for.	Remarks as to why the hindrances occurred and justification for extension of time

11. Total period for which extension is now applied for on account of hindrances mentioned above.
12. Extension of time required for extra work: - _____ Months. _____ days.
13. Detailed for extra work and the amount involved: -
14.
    a) Total value of extra work: -
    b) Proportionate period of extension of time based on estimated amount put to tender on account of extra work: -
15. Total extension of time required for 11 & 12: -

Signature of Contractor

APPLICATION FOR EXTENSION OF TIME
(Part – II)

(To be filled in by TSECL)

1. Date of receipt of application from _____ contractor for the work of _____
   _____ in the Sub-Divisional _____.
2. Acknowledgement issued by the Sr. Manager, vide his No. _____ _____ Dated _____.
3. Recommendation of Sr. Manager, in – charge of the Sub-Division is to whether the reasons given by the Contractor are correct and what extension, if any, recommended by him, if he does not recommended the extension, reasons for rejection should be given

Dated …….. Signature of the Sr. Manager in-charge of Sub-Division.

APPLICATION FOR EXTENSION OF TIME

(Part – III)
(To be filled in by TSECL)

1. Date of receipt in the Divisional office: _____
2. Report of DGM, in-charge of the Division regarding hindrances mentioned by the contractor _____

Sl. No.	Nature of hindrances	Date of occurrence	Period for which hindrances is likely to last	Extension of time applied for by the contractor	Overlapping period, if any, giving reference to items which overlap	Net extension applied for	Remarks as to why the hindrances occurred and justification for extension recommended

3. Recommendation / Approval of the DGM, in-charge of the Division: -

(The present progress of work should be stated and whether the work is likely to be completed by the date upto which extension is applied for, if extension of time is not recommended, what compensation is proposed to be levied under clause 13 of section - III.

Signature of DGM

4. Recommendation / Approval of the AGM, in-charge of the Circle: -

Signature of AGM

5. Recommendation / Approval of the GM (Technical): -

Signature of GM (Technical)

6. Recommendation / Approval of the CMD:

-

Signature of CMD

Annexure-II

(Non Judicial Stamp of Rs.30/-)
BEFORE THE NOTARY PUBLIC
_____: TRIPURA

INDIMNITY BOND

THIS INDEMNITY BOND IS EXECUTED ON THE _____ DAY OF _____ 2008 A.D. BY SRI _____, S/O Shri/Late _____, Vill _____ P.S _____, District _____, aged about _____ years, a citizen of India (Here-in-after called the Contractor indemnifier) in favour of the Tripura State Electricity Corporation Ltd. (TSECL) (Here-in-after called the Corporation) under the terms and conditions here-in-after mentioned:-
WHEREAS, I am a class _____ Government Contractor and the Corporation awarded me to execute the work namely _____

I agree to indemnify the Corporation that in the event of any accident of any workman, arising out of and in course of employment, during execution of the work I shall be liable to pay full compensation to the workmen employed by me for execution of the work.

I also agree to indemnify and save harmless the corporation that the lives & bodies of any workman(s), employed by me for execution of this work, are duly insured with the _____ Insurance Company _____ Branch under _____Act/Scheme.

I further agree to indemnify and save harmless the corporation or any of its Director(s) or Officer(s) or Manager(s) shall not be made liable to pay any compensation to any workman in the event of death of bodily injured, arising out of & in course of employment under me, employed by me for execution of the work namely _____.

IN WITNESS WHERE OF I SIGNE THIS INDEMNITY BOND TODAY, THE DAY,MONTH,YEAR FIRST ABOVE WRITTEN IN PRESENCE OF FOLLOWING WITNESS.

Witnesses:- _____

1.
Full Signature of Contractor
(INDEMNIFIER)
2.

Identified by me
_____
Advocate

Annexure-III

DECLARATION

I / We hereby declare that I/we have personally gone through the Bid- Document containing General terms and conditions, Other Instructions etc. incorporated in the Bidding Document for the works /supply and I/we do agree to abide by all the rules and regulations of TSECL, Agartala, Tripura.

Signature of Bidder

WORKING SCHEDULE

Name of work :- Extension of HT line including installation of 63 KVA Distribution Transformer for segregation of 08 nos. of DTW Scheme from Public consumer within the jurisdiction of ED-Jirania.

Ch.to:- Deposit work with PWD(DWS)

Sl No.	Description of item	Unit	Qty	Rate	Amount
1	Supply of 9 Mtr Long Full Galvanised Pole	No	24.000		
2	Supply of Stay Set (Complete)	Set	32.000		
3	Supply of 11 KV Stay insulator	No	32.000		
4	Supply of Stay Wire 7/2.5 mm	MT	0.160		
5	Supply of MS. Channel.(100x50x50x6mm)Galvanised	MT	0.080		
6	Supply of MS. Angle.(75x40x40x6mm)Galvanised	MT	1.144		
7	Supply of MS. Channel.(65x65x6mm)Galvanised	MT	0.144		
8	Supply of 11KV Polymeric Pin Insulators	Nos	96.000		
9	Supply of 11 KV Disc fittings	No	48.000		
10	Supply of 11 KV Polimeric Disc Insulator	No	48.000		
11	Supply of ACSR 6/1/2.59 sqmm (Weasel conductor)	Km	3.800		
12	Supply of GI Wire 8 SWG	MT	0.373		
13	Supply of 11 KV GOS three nos (Polymeric type)	Set	8.000		
14	Supply of 11 KV DOF three nos (Polymeric type)	Set	8.000		
15	Supply of 11 KV Polymeric LA	No	24.000		
16	Supply of N/B (assorted size)	MT	0.040		
17	Supply of Cut Out 100 Amp	No	48.000		
18	Supply of Al Lugs 70 sqmm - 10	No	112.000		
19	Supply of PVC 16 Sqmm	KM	1.000		
20	Supply of PVC 70 Sqmm	KM	0.120		
21	Supply of Danger Plate HT	No	24.000		
22	Supply of GI Barbed Wire	KG	36.000		
23	Supply of Febricated MS Clamp (50x6 mm)	No	100.000		

24	Supply of 2.5 mtr long, 40 mm dia GI Pipe	No	32.000		
25	Supply of 60 Kg salt & 55 Kg Charcoal (For 1 Pit)	No	32.000		
26	Supply of 1/2 inch dia polithene pipe	Mt	120.000		
27	Erection of 9 mtrs length of Galvanised Steel Tubular Pole at any kind of soil upto a depth of 1/6th of pole height, including excavation of earth, refilling the pit with soil upto the ground level, ramming and making complete in all respect.	No	24.000		
28	Erection of stay set direct in earth complete with 19mm x 1800mm long stay rod, anchor plate of size 300 x 300 x 8mm, thimble, turn buckle, 7/3.15mm dia GI standed stay wire and stain insulator etc. with supply of M.S. clamp, Nuts & Bolts, etc. as required and making complete in all respect.	No	32.000		
29	Erection of MS Channel Cross Arm , 0.3 to 1.6 mtr long 75x40x40x6 mm (Excluding the cost of Back clamp, nuts & Bolts)	No	32.000		
30	Erection of MS Channel Cross Arm , 2.2 to 2.8 mtr long 75x40x40x6 mm (Excluding the cost of Back clamp, nuts & Bolts)	No	48.000		
31	Erection of MS Channel Cross Arm , 1.0 to 2.5 mtr long 65x65x6 mm (Excluding the cost of Back clamp, nuts & Bolts)	No	16.000		
32	Erection of MS Channel Cross Arm , 0.6 to 2.8 mtr long 100x50x50x6 mm (Excluding the cost of Back clamp, nuts & Bolts)	No	40.000		
33	Erection of 11 KV Pin insulator alomg with Pin	No.	96.000		
34	Erection of 11 KV Disc insulator set along with necesary fittings.	No.	48.000		
35	Earthing with GI pipe 2.5 mtr long and 40 mm dia i/c excavation, refilling with alternate layers of salt & charcoal as per drawing (excluding supply of GI pipe, salt & charcoal, GI wire, nuts & bolts etc as reqd)	No.	32.000		
36	Laying of 8 SWG GI wire at 300 mm below the ground level for earthing of sub-station equipments from the earth electrode	No	32.000		
37	Erection of 11 KV Protective Guarding by GI wire 8 SWG as per technical specification across road/ River/ Telecom line etc. in horizontal formation complete.	No.	96.000		
38	Laying & stringing of 1KM (single conductor) ACSR 6/1/2.59mm dia 'WEASEL' including hoisting & binding etc. Complete as required.	Km	4.000		
39	Laying & stringing of 1KM (single conductor) 8/10 SWG GI wire including hoisting & binding etc. Complete as required.	Km	2.400		

40	Erection of 9KV, 5KVsingle pole metal oxide gapless type LA, including necessary connection complete as per technical specification.	No	24.000		
41	Erection of 11KV DOF unit set of three nos, including necessary connection complete as per technical specification. (Excluding the cost of Back clamp, Nuts & Bolts)	Set	8.000		
42	Erection of 11KV 200 Amp. GOS unit set of three nos, including necessary connection complete as per technical specification. (Excluding the cost of Back clamp, Nuts & Bolts)	Set	8.000		
43	Installation/ Positioning Of 11/0.430KV, 3-Phase 63KVA Distribution Transformer (supply by TSECL) on Pole with necessary connection & fitting fixing of all allied accessories components as required for making completein all respect for energizing.	No	8.000		
44	Fitting, fixing of Cut Outs (Set of 3 nos) with Wooden Plank supply	Set	16.000		
45	Grouting of steel tubular poles of ratio 1:2:4 (1 cement, 2 river sand, 4 jhama brick) aggregate of complete with excavation , refilling of earth, ramming alongwith centering & shuttering as reqd. @ 0.273 Cum per pole.	Cum	7.000		
46	Erection of Danger Plate on OH lines (11KV/415Volt)	No	24.000		
47	Erection of Barbed Wire (Anti climbing device) per pole	No	24.000		
48	Providing Sub-Station Fencing of area 4.5Mx3.5M with 13 nos. 2.3 mtr. Long 35x35x5mm Angle posts 1 mtr. Apart and having grouting of volume 0.03125 cum (0.5mx0.25x0.25m ratio 1:2:4, 1 cement : 2 river sand : 4 stone/brick chips) with grade size 1.5 mtr. x 1.6 mtr. in/c hinge.	No	8.000		
49	Carriage of 11/0.430, 3-Phase 63 KVA DT by Mechanical transport from store to work side beyond 25 Km upto 50 Km including loading, unloading and placing on base as required.	No	8.000		
				Total	
				Say	
(Rupees.....) only					

Dy. General Manager
ED-Jirania, TSECL