NOTICE INVITING TENDER

NIT NO. DGM/ED-MNP/2025-26/04, Dated –27-06-2025

Name of work:- Extension of HT line with UG cable from 132/33/11 KV Mohanpur Sub-Station to Mohanpur ESD and Mohanpur border kiosk to Mohanpur Bazar including repair and maintenance of HT over head for dedicated Border BFL feeder connectivity within the jurisdiction of ESD Mohanpur (Partial Trunkey Basis).

Estimated Cost: **Rs.13, 63,034.00 (Including GST)**
(Rupees Thirteen Lakh Sixty Three Thousand and Thirty Four) only

Earnest money: **Rs.27, 261.00**
(Rupees Twenty Seven Thousand Two Hundred Sixty One) only

Tender Fee: Rs.3000.00
(Rupees Three Thousand) only

Completion Period: 30 (Thirty) days.

This DNIT contains 83 pages excluding Back & coverpage.

Deputy General Manager
Electrical Division-Mohanpur
Mohanpur, Tripura (West)

SECTION-I
TRIPURA STATE ELECTRICITY CORPORATION LIMITED

(A Govt. Of Tripura Enterprise)

Name of Work: - Extension of HT line with UG cable from 132/33/11 KV Mohanpur Sub-Station to Mohanpur ESD and Mohanpur border kiosk to Mohanpur Bazar including repair and maintenance of HT over head for dedicated Border BFL feeder connectivity within the jurisdiction of ESD Mohanpur (Partial Trunkey Basis).

NIT NO. DGM/ED-MNP/2025-26/04, Dated –27-06-2025

INTRODUCTION

The work is revenue expenditure nature related to Extension of HT line with UG cable from 132/33/11 KV Mohanpur Sub-Station to Mohanpur ESD and Mohanpur border kiosk to Mohanpur Bazar including repair and maintenance of HT over head for dedicated Border BFL feeder connectivity within the jurisdiction of ESD Mohanpur (Partial Trunkey Basis). The DNIT is prepared for approval before taking up the work towards wide tendering (Partial Trunkey Basis).

SCOPE OF WORK

Scope of work covered under the package that includes supply of materials, storage, insurance, handling, laying, testing, erection, construction of structural steeland other hardware as per Bidding Schedule and Engineering requirements for total completion of the work underMohanpur Electrical Division.

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.

2.0

1.	Bidding Document last date of selling	:-	04/07/2025 (02:00 PM).
2.	Bid Receipt last date and time	:-	05/07/2025 (02:00 PM).
3.	Bid opening date and time (i) Technical bid (ii) Price bid		:- 05/07/2025 ; 03:00 pm.(if possible) :- 05/07/2025 ; 03:00 pm.(if possible)
4.	Cost of Bidding document	: -	Rs 3000.00 (Cost of bid should be deposit in Demand Draft in favoring of theDy. General Manager, ED -Mohanpur, TSECL)
5.	Estimated Cost	: -	Rs. 13, 63, 034.00(Including GST)
6.	Bid Guarantee (EMD to be deposited With the Bid document)	:-	Rs . 27, 261.00
7.	Dropping places	:-	Office of the Deputy General Manager MohanpurElectrical Division.
8.	Completion Period	: -	30 (thirty) days

Signature of Bidder/ContractorSignature ofDy. General Manager

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 successfully executed at least 1.0 Km HT overhead line, 0.5 Km HT UG line and & 1X100 KVA Substation which must be in satisfactory operation for one year as on the date of bid opening.

2.2 The minimum average annual turnover of the bidder for the last three years shall be not less than 30 % of the estimated cost put to tender.

2.3 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.

2.3.1. 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).

2.3.2. 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.

2.4. 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**.

2.5. 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.

2.6 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.

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

2.8 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.

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

2.10 **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 and Supervisory License**issued by Tripura Electrical Licensing Board

v. **Experience certificate** indicating same nature of work issued by an Engineer not below rank of Executive Engineer/Dy.General Manager/ Divisional Engg. in charge
vi. Photocopy of Valid**GST Registration** certificate

vii. Photocopy of valid professional tax clearance certificate.

2.11 Photocopies of all documents furnished shall be self-authenticated.
2.12 TSECL reserves the right to check the originals, if required.
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, Mohanpur Electrical Division, Mohanpur, west Tripura 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 Concerned **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, Mohanpur Electrical Division, West 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.27, 261.00 (Rupees Twenty Seven Thousand Two Hundred Sixty One) only** in the shape of **demand draft or D-Call** favouring**Dy. General Manager, ED -**Mohanpur**, TSECL,** or any schedule Bank payable at Agartala, 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 favouring TSECL payable** at Agartala, West Tripura or in the shape of Bank guarantee favouring **Tripura State Electricity Corporation Limited, Corporate Office, Bidyut Bhavan**, North Banamalipur, Agartala on any Public Sector / Schedule Indian Bank on award of the contractor 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. 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 Address for Communication / Purchase of Bid Document.

Deputy General Manager,
Mohanpur Electrical Division,
West Tripura District.
Tripura State Electricity Corporation Limited,
Mobile no.-6033131787

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 Executive Engineer/Dy. General Manager/ Divisional Engg. 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& Supervisory License issued by Tripura Electrical Licensing Board
V. Experience certificate indicating same nature of work issued by an Engineer not below rank of Executive Engineer/Dy.General Manager/ Divisional Engg. in charge
VI. Photocopy of **GST Registration certificate**
VII. The minimum average annual turnover of the bidder for the last three years shall be not less than 30 % of the estimated cost put to tender.
VIII. Copy of the balance sheet of the bidder (awaited by the Charter Accountant) with auditor's certificate in support of annual turnover i/e/ IT return certificate for the last 3(three) years of 2020-21, 2021-22 & 2022-23
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 three years for whatever reason and thereby shall stand disqualified automatically at the very pre-qualification stage. Therefore, the bidder submitting the tender documents liable to enclose a "Declaration" to this effect with due certification by "NOTORY" depicting fall name & designation. (As per format, annexed in bid document)
X. Notwithstanding anything stated above, TSECL reserve the right access the bidder's capability and capacity to perform the contract satisfactorily should be circumstance warrant such assessment in the overall interest of TSECL.
XI. Price bid of only those bidders shall be opened who qualified based on the specified qualifying requirement after scrutiny of details/ documents furnished by them and found to be techno-commercial responsive.

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. Price break-up for supply, civil work and erection work should attached as per Annexure, along with the price bid

III. 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.

IV. 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 **Dy. General Manager, ED-Mohanpur, TSECL** on any schedule Bank payable at Agartala, 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 18.7.

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

16.4 Any bid not secured in accordance with Para 18.1 and 18.3 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 8.0 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. 8 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 20 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
Mohanpur Electrical Division,
Mohanpur, 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 by Para 22.2 (b), 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 8.0 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** or any schedule Bank payable at Agartala, West Tripura **or Bankers Cheque from the SBI** Mohanpur in favour of Tripura State Electricity Corporation Limited on any schedule bank payable at Agartala, 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 7.0 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 fulfillment 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 and erection.

ii) TSECL will make 30% payment after successful supply, erection and commissioning

of the total line /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

22.1 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.

22.2 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 which such facilities are needed. The Contractor shall discuss with TSECL for finalization and approval of the Bar Chart by TSECL. The agreed Bar Chart shall form part of the contract documents. During the performance of the Contract, if in the opinion of the owner's Engineer in charge of the work, proper progress is not maintained, suitable changes shall be made in the Contractor's operations 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.

22.3 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.

22.4 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.

22.5 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.

22.6 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.

22.7 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.

22.8 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.

22.9 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.

22.10 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.

22.11 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.

22.12 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 programmed of replacement or renewal, which shall minimize interruption to the maximum extent in the operation of the equipment.

22.13 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.

22.14 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.

23.0INSPECTION AND TESTING OF EQUIPMENTS / MATERIALS

23.1<u>All equipment's / materials shall be dispatched by the contractor only after issuance of 'Materials Inspection Clearance Certificate (MICC)' by the inspecting officer / team of TSECL. Waiver of inspection may be done by TSECL in special circumstances with deduction of inspection cost @3% of value of materials for which inspection to be waived. In that case bidder</u>

should submit the routine Test certificates of Manufacture which shall be the basis for acceptance of such materials by TSECL. No such materials will be accepted without Test Certificate.

23.2 After manufacturing or at the stage of dispatch of equipments / materials the contractor shall give intimation to the owner's Engineer in charge of the work for conducting inspection of equipments / materials at manufacture's works or at recognized testing laboratories to be arranged by the contractor. **The intimation shall be made at least 15(fifteen) days before the equipments / materials become ready for dispatch.**

23.3 Testing of equipments / materials as specified above shall be conducted at the risk and cost of the contractor. **The contractor shall also bear the to and fro travelling, food and lodging charges of the inspecting officer / team of TSECL.**

23.4 Testing of equipment/materials may be waived on request of the contractor/agency, if TSECL authority felt that such waiver of inspection is absolutely necessary for early completion of work subject to submission of test certificate of manufacturer or authorized testing laboratory. In this situation an amount @ 3% of materials cost (inspection to be waived) as inspection charge will be recovered from the bill.

24.0 EXTENSION OF TIME

24.1TSECL may consider to **grant time extension** for completion of the work if it is felt absolutely essential on fulfillment 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.

24.2 **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.

24.3 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

TECHNICAL SPECIFICATION SECTION

Technical Specification

Sl no	Particulars
A	TECHNICAL SPECIFICATION OF 11KV(E) XLPE HT POWER CABLE
B	TECHNICAL SPECIFICATION OF HDPE PIPE
C	TECHNICAL SPECIFICATION OF HEAT SHRINKABLE TYPE END TERMINATIONS FOR XLPE CABLES
D	STEEL TUBULAR POLE
E	MILD STEEL STRUCTURE
F	TECHNICAL SPECIFICATION FOR COMPOSITE PIN INSULATORS
G	TECHNICAL SPECIFICATION FOR 11KV COMPOSITE POLYMERIC DISC INSULATOR (B & S TYPE)
H	EARTHING AND EARTHING G.I PIPE
I	GALVANIZED IRON PIPES
J	HEXAGONAL MS BOLTS & NUTS

A. <u>11KV(E) XLPE HT POWER CABLE</u>:

1.0 SCOPE:

This Section of the Specification covers design, manufacturing, testing, packing, supply & delivery, transportation at site, insurance and laying of 3Core, 11 kV, XLPE, FRLS, Dry gas cured insulated power cable for effectively earthed primary distribution system.

2.0 STANDARDS:

2.1 Unless otherwise specified, the cable shall conform in all respect to IS: 7098 (Part-II)-1985 with latest amendment thereof.

3.0 CLIMATIC CONDITIONS:

Moderately hot and humid tropical climate, conducive to rust and fungus growth.

4.0 PRINCIPAL PARAMETERS:

4.1 11 KV (E) Grade XLPE, 3-Core, power cable shall be of high conductivity, stranded compacted, H.D. aluminum circular shaped conductor with XLPE (cross linked Poly Ethylene) Dry/Gas cured insulation provided with shielding of extruded semi-conducting materials over conductor and XLPE insulation. Each insulated core shall have copper tape screen, laid together and provided with common covering of PVC Inner Sheath (Extruded). Overall galvanized steel strip armour and PVC outer sheath shall be provided. The specification for manufacture of cable shall be conforming to IS: 7098 (Part-II) 1985 (latest edition) for 11KV (E), 3-phase, 50 Hz. Earthed systems. Word "**FRLS" shall also be embossed on it at** every **5 (Five) meter** distance.

FRLS properties – All cable shall be Flame Retardant, Low Smoke (FRLS) type. Outer sheath shall have the following properties -

Oxygen Index – Min 29	(As per ASTMD 2863)
Acid Gas Generation	Max 20% (as per IEC 7541)
Smoke Density Rating	60% (as per ASTMD 2843)
Flammability Test –	As per Swedish chimney test F3 (as per SEN 4241475) As per IEC 332 Part-3 (Category-B)

Minimum bending radius shall be 15 D

Repaired cables shall not be acceptable

4.2 Outer sheath shall be designed to afford high degree of mechanical protection and shall also be heat, oil, chemical and weather resistant, Common acid, alkalis and sealing solution shall not have adverse effect on material of PVC sheath.

4.3 Cable shall be suitable for laying in covered trenches and / or buried under-ground in outdoor.

4.4 Cable Parameters :

(i) Voltage grade (Uo / U) kV	: 6.35 / 11
(ii) Cores (Nos)	: 3
(iii) Nominal system voltage kV	: 11
(iv) Highest system voltage kV	: 12
(v) System frequency Hz	: 50
(vi) Variation in frequency %	: ± 3
(vii) (a) Maximum allowable temp. of conductor during continuous normal operation at rated full load current. ºC	: 90
(b) Maximum allowable temp. under short circuit condition ºC	:250
(viii) 1.2/50 microsecond lightning impulse withstand voltage wave value. kVp	: 75
(ix) 5 Min, Power frequency withstand voltage kV rms	: 17
(x) System earthling	: Effectively earthed.

5.0 GENERAL TECHNICAL REQUIREMENTS:

5.1 **Conductor:** The cable conductor shall be made from high conductivity stranded High Density aluminum to form compacted circular shaped conductor having resistance within limits specified in IS: 8130/1984 and any latest amendment to it.

5.2 **Conductor shield:** The conductor having semi-conducting screen shall ensure perfectly smooth profile & avoid concentration of stress. The conductor screen shall be extruded in the same operation as the insulation. The semi-conducting polymer shall be cross linked.

5.3 **Insulation:** The XLPE insulation shall be suitable for 11 kV system voltage and should be manufactured with Dry / Gas curing process. The bidder shall submit the description of dry / gas curing process, with the clear inclusion of equipments / parameters involved. The manufacturing process shall ensure that the insulation shall be free of voids. The insulation shall withstand mechanical and thermal stress under steady state and transient operating conditions. The extrusion method should give very smooth interface between semi-conducting screen and insulation. The insulation of the cable shall be of high standard quality generally conforming to IS: 7098 (Part – II) – 1985 and any latest amendment to it.

5.4 **Insulation shield:** Non-metallic semi-conducting shield shall be provided over the insulation to confine electrical field to the insulation. The insulation shield shall be extruded in the same operation as the conductor shield and the insulation by suitable extrusion process. The XLPE insulation shield shall be of tended type. The copper metallic overlapped tape shield shall be provided.

5.5 **Filler and Inner-Sheath:** The sheath shall be suitable to withstand the site conditions and the desired temperature. It shall be of adequate thickness, consistent quality and free from all defects. The PVC sheath shall be extruded. The material of fillers and inner-sheath shall be compatible with the temperature ratings of the cable and shall have no deterious effect on any other component of the cable. Central PVC filler shall also, be provided with other peripheral PVC fillers to have proper circular section.

5.6 **Armour:** Armouring of galvanized steel strip shall be provided. The dimensions of steel strips shall be as per latest edition of IS: 3975 – 1979.

5.7 **Outer-Sheath:** Extruded type ST-2 PVC outer-sheath, conforming to IS: 5831- (1984) (latest edition) over armouring with suitable additives (to prevent attack by redents& termites), shall be provided.

5.8 Construction:

5.8.1 The cable shall have suitable PVC fillers laid up with insulation cores to have subsequently circular cross-section before the inner sheath is applied. The fillers shall be suitable for operating temperature of the cable.

5.8.2 All materials used in manufacturing of cable shall be new, unused and of finest quality. All materials should comply with the requirements / tests as per applicable IS / IEC specification, Indian Electricity Rules and any other statutory provision of rules & regulations.

5.8.3 The PVC material used in the manufacture of cable shall be of reputed manufacturer. No recycling of PVC is permitted. The Owner reserves the right to ask for documentary evidence of the purchase of various materials, (to be used for the manufacture of cable) as per checking of quality control.

5.9 Current Ratings:

5.9.1 The value of Normal current carrying capacities of the various sizes of the cables are given below:

Sl. No	**Size of 3 Core Cable (Sq.mm)**	**Current Carrying Capacity in Amp**		
		In Ground	In Duct	In Air
1	50	130	115	150
2	**70**	**160**	**140**	**190**
3	95	190	165	230
4	120	220	190	260
5	150	245	210	295
6	185	275	240	335
7	240	315	275	395
8	300	355	310	450

5.9.2 Short circuit ratings of various sizes of 3 core cable calculated for duration of 1(one) second are given below:

Sl. No	Size of 3 Core Cable (Sq.mm)	Conductor short circuit rating in kA (rms)
1	50	4.70
2	**70**	**6.58**
3	95	8.93
4	120	11.28
5	150	14.10
6	185	17.39
7	240	22.56
8	300	28.20

5.9.3 The current rating shall be based on maximum permissible temperature of 90 degree C for XLPE insulation with ambient site condition specified for continuous operation at the rated current.

5.10 Operation :

5.10.1 Cable shall be suitable for operation under frequency variation of +3% and voltage variation of +10% to -15% and combined frequency - voltage variation of 10% (absolute sum).

5.10.2 Cable shall be suitable for laying in duct or buried underground.

5.10.3 Cable shall have heat & moisture resistance properties. These shall be of type & design with proven record on distribution network service.

5.10.4 Length: The cable shall be supplied in standard drum length of 500 mtrs. 5% tolerance

for all the sizes of cable except for 3 C x 240 mm² and 3 C x 300 mm² size cable. The drum length for 3 C x 240 mm² and 3C x 300 mm² cable shall be 250 mtrs. Over all tolerance in total quantity of ordered cables shall be + 2%.

5.10.5 Identification Mark :

(i) The cable drum shall be printed with information as per cl. 21; 2 of IS and ISI Certification mark. Bidder shall submit xerox copy of valid ISI Licenses with technical bid.

(ii) For identification of cores, colored strip of Red, Yellow and Blue colors shall be used for identification of phases.

Following details of identification shall be embossed at intervals of length of one meter of cable outer sheath.

(iii) (a) Name of manufacturer (b) year of manufacture (c) voltage grade (d) Name of Owner "TSECL".

6.0 TESTS:

6.1(A) Type Tests:

All the cable sizes i.e. items offered should have been fully type tested as per the relevant standards at any Govt. recognized Laboratory. The bidder shall furnish three sets of type test reports along with the offer. The Type test reports shall not be older than FIVE years and shall be valid upto the expiry of validity of offer.

For any change in design/type, already type tested and the design / type offered against this specification, the Owner reserves the right to demand reputation of type tests without any extra cost.

The Owner also reserves the right to have tests carried out at his own cost by an independent agency, whenever there is a dispute regarding the quality of supply.

6.1(B) The following type test reports shall be furnished with the offer:

(a) Tests on conductor :

(i) Tensile test:

(ii) Resistance test:

(b) Tests for armouring strips / wires. :

(c) Tests for thickness of insulation and sheath. :

(d) Physical tests for insulation. :

(i) Tensile strength and elongation at break:

(ii) Ageing in air oven:

(iii) Hot set:

(iv) Shrinkage test:

(v) Water absorption:

(e) Physical tests on outer seath :

(i) Tensile strength and elongation at break:

(ii) Ageing in air oven:

(iii) Shrinkage test:

(iv) Hot deformation:

(v) Bleeding and blooming test:

(f) Partial discharge test:

(g) Bending test:

(h) Dielectric power factor test:

i) as a function of voltage:

ii) as a function of temperature:

(i) Insulation resistance test (volume resistivity):

(j) Heating cycle test:

(k) Impulse withstand test:

(l) High voltage test:

(m) Flammability test:

6.2 Acceptance Test:

6.2.1 The selection of sample pieces for acceptance test shall be from 10% drums of each lot offered for inspection or part thereof. The minimum shall be one drum.

6.2.2 The following acceptance tests shall be carried cut on the selected samples as per IS: 7098 (Part-II) – 1985.

(a) Annealing test (for copper)

(b) Tensile test (for aluminum)

(c) Wrapping test (for aluminum)

(d) Conductor resistance test.

(e) Test for thickness of insulation and sheath

(f) Hot set test for insulation

(g) Tensile strength and elongation at break test for insulation and sheath.

(h) Partial discharge test (for screened cables only)

(i) High voltage test for 4 hours (as per cl. No. 19.7.1)

(j) Insulation resistance (volume resistivity) test.

6.2.3 All the acceptance tests shall be carried out by the contractor, in the presence of Owner's representative at their works. The contractor shall give atleast 15 days' advance notice to the Owner to enable him to depute the engineer for witnessing the tests. The test certificates for acceptance tests witnessed by inspecting officer/ engineer shall be submitted for approval before dispatch of material.

6.3 Tests:

6.3.1 The bidder shall have to submit, well in advance, the test certificates for the following routine test for approval prior to inspection of the materials for the complete lot offered for inspection at a time.

(a) Conductor resistance test

(b) Partial discharge test

(c) High-voltage test for 5 minutes [as per Clause 19.7.2 of IS: 7098 (Part-II) –1985].

7.0 INSPECTION:

Inspection shall be guided as per **Clause No. 27.0 , Section -III**

8.0 DOCUMENTATION:

8.1 The bidder shall furnish following documents along with his offer.

8.1.1 Sectional view, showing the General constructional feature with conductor / conductor screen / insulation / armouring / inner and outer sheath etc.

8.1.2 Drawing of cable drums with details of material dimension and paint etc shall be submitted.

8.1.3 All the required type test reports for offered items tested at any Government recognized Laboratory.

8.1.4 Literature, pamphlets for the record items.

9.0 PACKING AND FORWARDING:

9.1 The cable shall be wound on wooden drums as per IS: 10418 – 1972 and packed in drums suitable for vertical / horizontal transport, as the case may be and shall be suitable to withstand rough handling during transport and outer storage. The outer surface of the drum shall be painted with white aluminum pint. Similarly, the inside surface of drum shall have the protective layer of varnish / paint to protect it from white ants.

9.2 The wooden drums shall be reinforced with steel bends and strips for better protection.

9.3 The ends of the cable shall be sealed by means of non-hygroscopic sealing materials.

9.4 The following information may be stenciled on the drum with either water proof ink or oil paint:

i. Reference of IS / IEC standard.

ii. Manufacturer’s name or trademark.

iii. Type of cable and voltage grade.

iv. No. of cores.

v. Nominal cross-sectional area of conductor.

vi. Cable code.

vii. Length of cable on the drum

viii. No. of lengths on the drum (if more than one)

ix. Direction of rotation of drum (by means of an arrow)

x. Position of outer end of cable

xi. Gross weight

xii. Country of manufacture

xiii. Year of manufacture

xiv. Reference of A/T No. & date

xv. Property of TSECL

xvi. Name of consignee and the destination.

The drum may also be marked with ISI Certification Mark. Over and above, name plate of aluminum of suitable size and thickness, containing all the above information, shall be fixed on the drum in addition to the painting.

9.5 The contractor shall be responsible for any damage to the cables during transit due to improper and inadequate packing. Wherever necessary, proper arrangement for lifting, such as lifting hooks, shall be provided. Any cable found short inside the packing cases shall be supplied by the contractor, without any extra cost.

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

(a) Name of consignee

(b) Details of consignment

(c) Destination

(d) Total weight of consignment

(e) Handling and unpacking instruction

(f) Bill of materials, indicating contents of each package.

B. HDPE PIPE:

STANDARD: -

A. TYPE

(i)The HDPE pipe shall be of PE-100 Grade, PN-8(SDR17) of standard make suitable for laying 3-core, XLPE insulated power cable.

(ii)The HDPE pipe shall be ISI marked and complying to technical requirement of IS 4984 / IS 14333.

(a). Size: -

The HDPE pipe shall be of following size:

Sl. No.	Outer diameter	Wall thickness	Standard length
1	63 mm	minimum- **3.7 mm** and maximum- **4.2 mm**	6 m

(b.) Non-flame propagating properties.

The HDPE pipe shall be of non-flame propagating type.

C.HEAT SHRINKABLE TYPE END TERMINATIONS FOR XLPE CABLES:

(I) Heat Shrinkable Type End Terminations for11 KV Grade XLPE Cables

1.0 SCOPE:

This section covers the standard technical requirements of design, manufacturing, testing at works, and transportation to site, insurance, storage, erection and commissioning of heat shrinkable type terminations suitable for 11 KV 3-core XLPE insulated, screened, armored, with aluminum conductor cables suitable for earthed system and conforming to IS:7098 (Part-II)-1985 with latest amendment or the equivalent International Standards.

2.0 STANDARD:

The performance as well as type test requirements of all type of kits referred under scope shall conform to stipulations of IS:13573/1992 or the equivalent International Standards with latest amendments. All the electrical & physical parameters of terminations should also conform to the corresponding parameters of XLPE cables referred under 'SCOPE' of this specification, as per IS: 7098 (Part-II)-1985 (with latest amendments, if any) or equivalent international standards

3.0 CLIMATIC CONDITIONS:

Maximum ambient temperature in open air(°C)	: 50	
b. Maximum ambient temperature in shade (°C)		: 45
c. Minimum temperature in shade(°C)	: 3	
d. Relative humidity (%)		: 10 to 100
e. Maximum annual rainfall (mm)		: 1450
f. Maximum wind pressure (Kg/ Sqmtr.)		: 150
g. Maximum altitude above mean sea level (Mtrs)		: 1000
h. Isoceraunic level (days/year)		: 50
i. Seismic level (Horizontal acceleration)		: 0.3 g.
j. General nature of climate		Moderately hot and humid tropical climate, conducive to rust and fungus growth.

4.0 REQUIREMENT:

The heat shrinkable / push on type terminations offered shall be of proven design and make, which have already been extensively used and fully type tested.

5.0 GENERAL REQUIREMENT:

The purpose of this specification is to specify the performance requirements of termination kits for the use on 50 c/s 3 phase system with earthed neutral for working voltage of 11 kV up to 33kV. Earthing arrangement shall be as per relevant standard and details of earthing arrangement offered shall be submitted along with the inspection offer. The material to be used should be inert and capable of resisting degradation during the service of cable system. The kit shall be provided with protection against rodents and termite attack.

5.1 Heat Shrinkable Type (Terminations) :

The term heat shrinkable refers to extruded or moulded polymeric materials which are cross-linked to develop elastic memory and supplied in expanded or otherwise deformed size / shape, subsequently heated in an un-constrained state to a temperature above the shrink temperature resulting in the material recovering or shrinking to its original shape.

5.1.1 Since the sealant or adhesives (to be used for environment sealing) between the heat shrinkable materials and XLPE cables shall be exposed to high electrical stresses, they must be track resistant.

5.1.2 The heat shrinkable polymer materials being used for external leakage insulation between the high voltage of conductors and grounds should be weather resistant.

5.1.3 All cuts/nicks inadvertently occurred to XLPE insulation must be rendered discharge free by using suitable discharge suppression compound.

5.1.4 The heat shrinkable tubing may be either extruded or moulded type.

5.1.5 Higher thickness of heat shrinkable sleeves shall be preferable to counter erosion due to pollution.

5.2 Other Requirements:

5.2.1 Proper stress control, stress grading and non-tracking arrangement in the terminations shall be offered by means of proven methods, details of which shall be elaborated in the bid. Detailed sectional view of assemblies shall be submitted along with the bid.

5.2.2 The kits offered shall provide the total environment sealing, the details of which shall be offered along with the bid.

5.2.3 Provision for effective screening over each core be made and contractors shall categorically conform this aspect in their bid.

5.2.4 The material and components not specifically stated in the specification, but which are essential for satisfactory operation of the equipments shall be included without any extra cost.

5.2.5 The terminations shall be of good tracking resistant properties and fully reliable earthing system to maintain continuous contact with screening / armouring as the case may be.

5.2.6 The armour earthing arrangement shall form part of the termination.

5.2.7 Terminations shall have provision for shield connections and earthing.

5.2.8 The kits shall be suitable for storage without deterioration at a temperature up to 50oC for more than 5 years.

5.2.9 The fault level (as well as duration) withstand capability of terminations should be strictly matching with these parameters of cables for which the kits are intended to be used.

5.2.10 The words 'TSECL' along with trade name of manufacturer, month/year of manufacturer, size etc. shall be embossed/engraved or suitably marked with indelible ink/paint for the purpose of identification.

5.2.11 Suitable creepage extension/rain protection sheds for outdoor termination shall be provided.

5.2.12 The adequate provisions for eliminating the chances of entrapment of air at the steps formed by semicon screen shall be made.

5.2.13 The gripping tubing (termination boot) for the cable where trifurcation takes place, shall also be part of kit and covered under scope of supply of this specification.

5.2.14 Name of sub-supplier for the raw material and standard according to which their raw material are tested, must be furnished along with the bid.

5.2.15 Detailed kit contents, whether manufactured by the contractor or bought from outside (with name of sub Contractor) for each component must be indicated in the bid.

5.2.16 The terminations shall be supplied in kit forms. All insulating and sealing materials, consumable items, conductor fittings, earthing arrangements and lugs etc. shall be included in the individual kit.

5.2.17 An instruction manual in English indicating the complete method/procedure to be adopted for installation of kits, preferably with more and more diagrams/pictorial presentation shall be supplied with each kit. Various items/ quantity thereof against each kit must be indicated in the instruction manual.

6.0 GUARANTEED TECHNICAL PARTICULARS:

The terminations shall have same electrical and thermal characteristics as those of cables with which these are intended to be used. The bidders must furnish the guaranteed technical particulars for each type/size of kit.

7. **DRAWINGS:** Complete detailed dimensional drawings showing all details of kit contents/bill of material for each size type.

8.0 **TESTS :-**

8.1 **Type tests:** The termination kits offered shall be fully type tested as per the standards certified by an accredited laboratory

8.2 **Acceptance Tests:**

Initially the following tests shall constitute as acceptance tests :-

i) Dimensional checking as per approved drawings.

ii) Volume resistivity test for various components.

iii) AC High voltage test after installation of terminations (as per IS : 13573/1992 or VDE-0278) on appropriate cable.

iv) Dielectric strength of major components.

v) D.C. High voltage test.

vi) Tracking resistance.

vii) Ultimate elongation.

The scope to include more type tests as acceptance tests shall be decided after processing the offers of various contractors/after knowing the details of testing facilities for type tests available with various bids

8.3 **ROUTINE TESTS :-**The following tests shall constitute routine test :

i) Dielectric strength.

ii) Density.

iii) Heat shock.

iv)Shrinkage ratio.

The contractor must specify the details of routine tests (being conducted at their works) along with the standard applicable, in their offer. The routine test certificates shall be furnished along with the inspection call for each offered lot.

9.0 INSPECTION:

Inspection shall be guided as per **Clause No. 27.0 , Section -III**

10.0 PACKING AND TRANSPORT: The supplier shall be responsible for suitable packing of all the kits of material and marking on the consignment, so as to avoid any damage during transport and storage and to ensure correct dispatch to the destination.

D STEEL TUBULAR POLE: -

1.0 SCOPE:-

This covers the manufacturing, testing at the manufacturer's works, supply, delivery and erection of 11 Mtr and 9 Mtr steel tubular pole of designation 410 SP-54 & 410 SP-32 respectively conforming to ISS : 2713 (P – I & II) / 1980 With Cast iron Base plate and welded cap. The poles shall be manufactured covering the requirements as laid down in ISS : 2713 (P - I & II) / 1980 for tubular steel poles of circular cross section for overhead power lines made of steels of minimum tensile strength 410 Mpa.

2.0 TERMINOLOGY

For the purpose of testing as per the above standard, following definitions shall apply.

2.1 Breaking load: - The theoretical load which would produce at ground level a stress equal to the tensile strength in the material. This is only of theoretical interest. In reality, the elastic limit of the material would be exceeded and considerable deformation would occur before this the oretical load could be applied.

2.2 Load for permanent set - The maximum load which may be applied without producing at the gripping and a permanent set higher than specified in the standard. The permanent set measured at the point of application of this load shall not exceed 13mm.

2.3 Load for Temporary deflection: - The maximum load which may be applied without producing at the point of applications of this load a temporary deflection exceeding 157.5 mm

2.4 Point of application of load: - For the purpose of definitions from 2.1 to 2.3, the load should be applied at right angles to the axis of the pole at a point 30cm below the top for poles of length upto and including 9m and at a point 60 cm below the top for poles longer than 9m. The pole should also be considered planted to specified depth.

2.5 Crippling load: - The load which is just sufficient to cause crippling of the pole.

2.6 Lot: - A collection of poles of one designation manufactured by the same process under similar conditions of production and offered for inspection at a time.

2.7 Lot size: - Number of poles in a lot.

3 TYPES

Tubular steel poles shall be of Swaged type.

4 TUBES FOR THE MANUFACTURE OF POLES: -

The tubes for making poles shall conform to grade YSt 240 of IS: 1161-1979.

5 FREEDOM FROM DEFECTS

Poles shall be well-finished, clean and free from harmful surface defects. Ends of the poles shall be cut square. Poles shall be straight, smooth and cylindrical.

6 TOLERANCES

The tolerance in respect of thickness, outside diameter, length, weight and straightness of the poles shall be guided as per provisions laid down in ISS: 2713-1980.

7 TEST FOR POLES-

The following tests shall be conducted on finished poles:

a) Tensile test and chemical analysis for sulphur and phosphorus,

b) Deflection test,

c) Permanent set test, and

d) Drop test

8 PROTECTION AGAINST CORROSION:-

Unless otherwise specified, the poles shall be coated with black bituminous paint conforming to IS: 158-1968 throughout, internally and externally; upto the level which goes inside the earth. The portion of the exterior shall be painted with one coat of red oxide primer as specified in IS:2074-1979.

9 EARTHING ARRANGEMENTS:-

Earthing arrangements shall be provided through a hole of 14mm diameter in each pole at a height of 300mm above the planting depth.

10 DIMENSIONS AND STRUCTURAL PROPERTIES

Sl.	Particular	9 mtr long steel tubular pole (410 SP-32)	11 mtr long steel tubular pole (410 SP- 54)
A	B	C	D
1	Planting length (m)	1.5	1.8
2	Height above ground (m)	7.5	9.20
3	Length of sections		
i)	Bottom(m)	5	5.6
ii)	Middle(m)	2	2.7
iii)	Top(m)	2	2.7
4	Outside diameter and thickness of sections		
i)	Bottom(m)	165.1x4.85	165.1x5.4
ii)	Middle(m)	139.7x4.5	139.7x4.5
iii)	Top(m)	114.3x3.65	114.3x3.65
5	Approx. weight of pole (Kg)	154	194
6	Breaking load N(kgf)	5430 (554)	5030 (513)
7	Crippling load N(kgf)	3850 (393)	3570 (364)
8	Load for permanent set not exceeding 13mm	2640 (269)	2440(249)
9	Load for temporary deflection of 157.5mm	1430 (146)	814(83)

E 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 and flat normally used for Distribution transformers structures & 11 KV line structures are as follows;

i) Channel:100x50x50x6 mm, 75x40x40x6 mm and Angle: 65x65x6 mm,50x50x6 mm

ii) 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.

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

Name of Item	**Type to be used as per IS**
For channel 100x50 mm &75x40 mm	ISMC 100 Grade A and ISMC 75 Grade A
For Angle 65x65x6 mm & 50x50x6 mm	ISA 6565 Grade A and ISA 5050 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:

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

Inspection shall be guided as per **Clause No. 23.1 , Section –III**

F TECHNICAL SPECIFICATION FOR COMPOSITE POLYMERIC 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
4		Thermal Mechanical performance test and mechanical performance test on string Insulators units	IEC:60575
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

Sl.No.	Indian Standard Standard	Title	International Standard
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
(iii)	Maximum relative humidity	95% (The humidity some 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 Φ, 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 dischare test voltage kV(rms)	Wet power frequeny withstad 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 : -

S. N.	Item	Length of end fittings to be fixed	Minimum threaded portion of end fittings	Dia of end fitting rod
1	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 87μ 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 Cree page distance with positive tolerance

(c) Protected cree page 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:

Sl.No.	Description of type test	Ten procedure/standard
1.	Dry lightning impulse withstand voltage test	As per IEC 61109 (clause 6.1)
2.	Dry power frequency voltage withstands test-part of Type test.	As per IEC 61109
3.	Wet power frequency test	As per IEC 61 109 (clause 6.2)
4.	Mechanical load-time test	As per IEC 61 109 (clause 6.4)
5.	Radio interference test	As per IEC 61109 (clause 6.4)
6.	Recovery of Hydrophobicity test	Annexure-A This test may be repealed every 3 yrs by the manufacturer
7.	Chemical composition test for silicon content	Annexure-A Or any other rest method acceptable to the owner
8.	Tests on housing & shed materials-Hardness test	As per ASTM D 2240-2005.
9.	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
10.	Tests on housing & shed materials-Tracking & Erosion test	As per ASTM D 2303-1997
11.	Tests on housing & shed materials-Flammability test	As per UL 94-02009
12.	Test on core materials – Dye penetration test	As per IEC 61109 / IEC 62217.
13.	Test on core materials – Water diffusion test test	As per IEC 61109 / IEC 62217.
14.	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) a.Verification of dimensions : Clause 7.2 IEC: 61109,

(b) b.Galvanizing test : IS:2633/IS:6745

(d. c.Verification of the specified mechanical load : Clause 7.4 IEC: 61109,

Routine Tests:-

Sl.No.	Description	Standard
1	Identification of marking	As per IEC: 61 109 Clause 8.1
2	Visual Inspection	As per IEC 61 109 Clause 8.2
3	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)

Ssl. 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	

Ssl. No.	Description	NIT Requirement	To be filled in by the bidder
	(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.	
61.	Colour Glaze of Insulator		
72.	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	

Signature of Bidder/ContractorSignature ofDy. General Manager

Ssl. No.	Description	NIT Requirement	To be filled in by the bidder
83.	Mechanical Characteristics:		
	Minimum failing load (KN)	5KN	
94.	Dimensions of Insulator:		
I5.	Weight (Kg.)	0.9kg ±10%	
ii.	Dia of FRP rod (mm)	24mm minimum.	
iii.	Length of FRP rod (mm)	200±5mm	
iv.	Dia of weather sheds (mm)	100±5mm	
V6.	Thickness of housing (mm)	3mm	
vi.	Dry arc distance (mm)		
10.	Dimensioned drawings of Insulator (including weight with tolerances in weight) enclosed.		
11.	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.	
12.	No. of weather sheds		
13.	Type of sheds		
	(i) Aerodynamic		
	(ii) With under ribs		
14.	Packing details		
	(a) Type of packing.		
	(b) No. of Insulators in each pack		
	(c) Gross weight of package		
15.	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		

Signature of Bidder/ContractorSignature ofDy. General Manager

Ssl. No.	Description	NIT Requirement	To be filled in by the bidder
©	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		
16.	Any other particulars which the bidder may like to give.		
17.	NIT clause no-6 : Marking	Should be confirmed as per NIT clause regarding marking.	

G. 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 nominal Voltage 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 mechanical performance test on string Insulators units.	IEC:60575
IS: 13134	Guide for the selection of insulators in respect of polluted condition.	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 and high 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.	ECR or BORRON FREE
b)	Material of housing & weather sheds (silicon content by weight)	SILICON RUBBER 42 %
c)	Material of end fittings	SGI
d)	Sealing compound for end fittings	RTV SILICON
4	Colour	GREY
5	Electrical characteristics	

a)	Nominal system voltage	11 KV
b)	Highest system voltage	12 KV
c)	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	110 KV
h)	Dry lighting impulse flashover voltage a) Positive	120 KV
i)	RIV at 1 MHz when energized at 10 KV /30kV (rms) under dry condition.	<100 micro volts
j)	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	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.

i.	Location	At various locations in Tripura.
ii.	Maximum Ambient Air Temperature (oC):	50oC.
iii.	Maximum Relative Humidity	95% (sometime approaches Saturation point).
iv.	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
1	Dry lightning impulse withstand voltage test	As per IEC 61109(Clause 6.1)
2	Wet power frequency test	As per IEC 61109(Clause 6.2)
3	Mechanical load-time test	As per IEC 61109(Clause 6.4)
4	Radio interference test	As per IEC 61109(Clause 6.5) revised
5	Recovery of Hydrophobicity test	Annexure – B This test may be repeated every 3 yrs by the manufacturer
6	Chemical composition test for silicon content	Annexure – B Or any other test method acceptable to the owner
7	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
e)	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 - (E2)
end fittings & Insulator housing

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.

H 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.

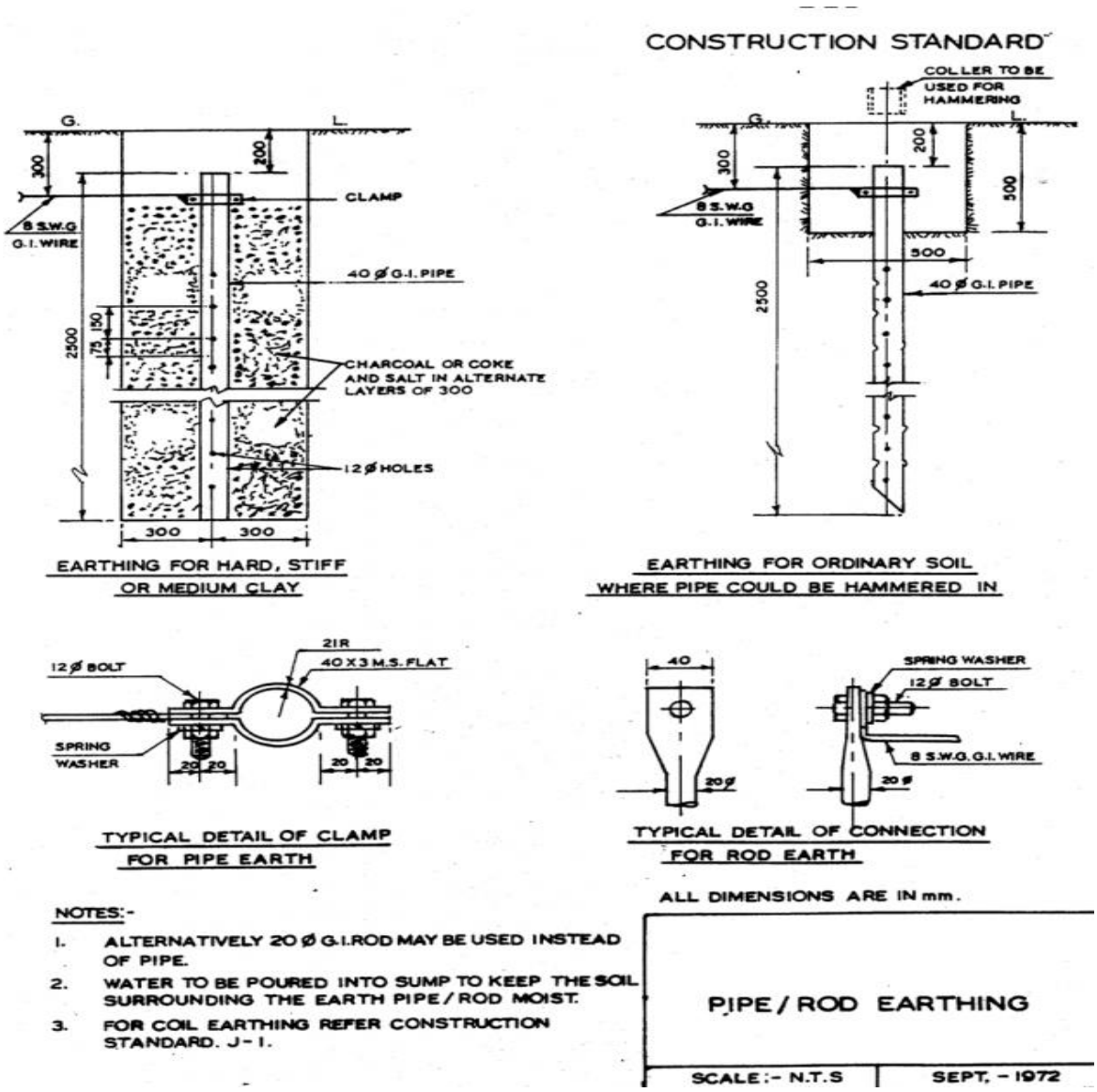
(b) One direct connection with Lightning arrester on H.T. side (11KV) and cross-arm.

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.



I. 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.

J. 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.

SECTION-V

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 90 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 VI

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. 27,261.00(**Rupees Twenty Seven Thousand Two Hundred Sixty One**)** only in the shape of **demand draft or D-Call** favouring **Dy. General Manager, ED -Mohanpur, 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 - Mohanpur, 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 & 1X100 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, Mohanpur,West,Tripura.

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 Sub Division, Mohanpur, West, Tripura.

.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 Mohanpur

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

Signature of Bidder/ContractorSignature ofDy. General Manager

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

Signature of Bidder/ContractorSignature ofDy. General Manager