

SECTION-I

TRIPURA STATE ELECTRICITY CORPORATION LIMITED (INVITATION OF DOMESTIC COMPETITIVE BIDDING)

NOTICE INVITING TENDER FOR “Extension of HT line through 11 KV UG cable alongwith installation of 1 x 315 KVA DT for providing service connection to DTW at Paschim Bhubanban under ESD – Durjoynagar”.

INTRODUCTION:-

The Executive Engineer, Urban Development Deptt. approached TSECL for Extension of HT line through 11 KV UG cable alongwith installation of 1 x 315 KVA DT for providing service connection to DTW at Paschim Bhubanban under ESD – Durjoynagar.

The work involves supply of XLPE cable, MS Bracket etc., erection works and Civil works as required.

SCOPE OF WORK:

The Scope of work covered under this package includes “Extension of HT line through 11 KV UG cable alongwith installation of 1 x 315 KVA DT for providing service connection to DTW at Paschim Bhubanban under ESD – Durjoynagar”.

Scope of work given above is only indicative. The detailed scope has been described in the **Schedule of Bid** attached with this bidding document.

Bid Receipt time and date	: 29/03/2022 (up to 2:00 p.m.)
Bid opening time and date (Price Bid)	: 29/03/2022 (at 3:30 p.m.)(If possible)
Cost of bidding document	: Rs. 1,000.00
Estimated Cost	: Rs. 10,78,516.00
Earnest Money	: Rs. 21,570.00
Completion Period	: 3 (three) months.

2.0 QUALIFYING REQUIREMENTS FOR BIDDERS :-

2.1 The bidder must have laid and commissioned minimum 100mtr XLPE line in a single award and which is in successful operation for at least 1 (One) year from prior to submission of bid as per NIT.

2.2 The minimum average annual turnover of the bidder for the last three years shall be not



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less than 30% of the estimated cost put to tender and the bidder must have his GST Registration.(proof in respect to GST ID & GSTN address to be provided alongwith Part-I bid).

- 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.
- 2.4** A single firm of proprietorship entity or registered partnership firms or companies registered under Companies Act, which meets the requirements, indicated in para 2.1, 2.2 above.
- 2.5** A joint venture of two registered firms/companies/ proprietorship entity, wherein all registered firm/company/ proprietorship entity shall meet any one, both or all the requirements of para 2.1& 2.2above.
- 2.6** 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 2.3 above.
- 2.7** All partners of Joint Venture shall be **liable jointly and individually / severally** for the execution of the contract in accordance with the contract terms.
- 2.8** The Contractor shall mandatorily obtain the registration under GST Law at Central level and / or in respective state as may be required. Further the Contractor shall mandatorily file returns under GST before their due date & comply with the requirement of the law. TSECL will ensure that the contractor has complied with all the required statutory requirements under GST.
- 2.9** Notwithstanding anything contained herein above, TSECL reserves the right to assess the "capacity and capability" of the bidder to execute the work.
- 2.10**In addition to the mandatory requirements as specified in Para 2.1, &2.2 the following criteria must need to be fulfilled for the Bidder/Lead Partner for this package.
"The bidders who are engaged in TSECL and other Power Utilities in different works or who have completed the works within 5 year or less, they shall submit the performance for each recent ongoing works and work completed within 5 years. The bidder who have done work in TSECL and other Power Utilities before 5 years but they are not doing any similar works within any Power Utilities, they are not eligible for submitting the bid. The bidder must submit the certificate from the respective controlling Officer not below the rank of DGM/ Ex. Engg and submission of which is mandatory along with bid or before Pre bid discussion date. Any unsatisfactory performance report will be treated as disqualification of bid".**Experience certificate of sub-contract work under any contractor shall not be accepted.**
- 2.11**The bidder's offer must include the following documents to be submitted with technical bid,
- (i) Copies of original documents defining the constitution or legal status, place of registration and principal place of business, Authorization / Power of attorney in favour of authorized signatory for signing of documents and submission of bid with the following information:-
- 1 Name & address of authorized signatory.
 - 2 Telephone no / Fax no, Mobile No and E mail ID.
 - 3 Copy of Partnership deed in case of partnership firm, Memorandum and Article of Association in case of limited company, Ownership certificate in case of sole or proprietary firm and Power of Attorney in favour of authorized signatory in case the firm is not a proprietary firm.
- (ii) **Photocopy of Current Income-tax challan/Return, GST registration No; PAN No, Labor License Declaration and EPF Registration no of bidder / all partners of joint venture.**



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- (iii) Successful completion certificate issued by an Engineer not below rank of Executive Engineer/Deputy General Manager in charge along with supporting photocopies of work order /LOA for the work executed in any 1(one) year out of last 5 financial years. Bidders shall provide details of work of similar nature executed or under execution during last 1 year in the following format.

Sl.	Description of work of similar nature	Client Name with LOA Ref. No. & Date	LOA Value (in Lakhs)	Amount obtained till date (in Lakhs)	Schedule completion time	Actual Completion time	Brief Reason of delay

- (iv) Major items of construction equipment proposed to carry out the contract.
- (v) Details of proposed manufacturer's of material/equipment and erection agencies are to be submitted with the bid.
- (vi) Qualifications and experience of key site management and technical personal proposed for the contract.
- (vii) Reports on the financial standing of the bidder, such as Profit and loss account & balance sheets and Auditor's reports etc. for the financial years **2019-20, 2020-21**.
- (viii) Evidence of adequacy of working capital and access to line(s) of credit and availability of other financial resources from the scheduled commercial Bank.
- (ix) Authority to seek reference from the Bidder's Bankers (as per format enclosed).
- (x) Financial Turnover should be as per the published audited annual report of the company/bidder/partners of joint venture along with PAN card (individual / organization).
- (xi) Contractor's license & supervisory certificate of competency for requisite parts.
- (xii) The bidder shall not have been debarred from business by any PSU /GovtDeptt during the last 3 years. Self declaration in this regard to be provided along with the bid.
- (xiii) Bidder shall be liable to follow the terms and condition of the NIT otherwise the bid shall be summarily rejected.
- (xiv) Photocopies of all documents furnished shall be self-authenticated and duly stamped.

2.12TSECL 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, Capital Complex Electrical Division, 79 tilla, Agartala, Tripura (W)**, on all working days during office hours upto 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.



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6.0 The bidder shall be required to deposit earnest money @ **2.0 %** of the estimated cost put to tender subject to maximum of **Rs.5.00 lakh** in the shape of **demand draft** or Banker Cheque from any scheduled bank guaranteed by Reserve Bank of India favoring **TRIPURA STATE ELECTRICITY CORPORATION LIMITED** payable at **Agartala** along with the bid in a separate sealed envelope. The earnest money deposited is adjustable with **Contract Performance Guaranty**.

The successful bidder on award of work shall have to deposit a **Contract Performance Guaranty** equivalent to **10% of LOA** value, from any scheduled bank guaranteed by Reserve Bank of India payable at Agartala or **in the shape of Bank Guarantee (BG)** from a **Public Sector / Scheduled Indian Bank guaranteed by Reserve Bank of India as per normal format** in favour of **TRIPURA STATE ELECTRICITY CORPORATION LIMITED** in the shape of **Bank 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.

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

8.0 The original Bidding document shall be signed by the bidder(s) on all pages and will be enclosed with the Price bid containing "Schedule of Quantity & Prices" (**Schedule-A**). All corrections to rates and items in the Bid(s) should be initialed by the Bidder(s).

9.0 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.

10.0 Address for Communication / Purchase of Bid Document.

Deputy General Manager
Capital Complex Electrical Division
79 tilla, Agartala, Tripura (W)

SECTION-II

INSTRUCTION TO BIDDERS

1.0 GENERAL INSTRUCTIONS

"The bidders are to satisfy themselves by visiting to the 'sites of work' as regards the prevailing condition of the existing 11KV primary distribution network, LT secondary distribution network proposed for bifurcation, conversion into AB Cable lines, and Distribution Substations require augmentation, construction of new DT(s) for system strengthening and renovation & reorientation of existing DT(s) and their approaches, transportation facilities, availability of laborers and availability of sundry materials, tools and tackles etc. before submission of bid. No claim or excuse on this account will be entertained at any stage later on.

The location of the work falls within the jurisdiction of **Capital Complex Electrical Division**.



2.0 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 TSECL shall, in no case, be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

3.0 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.

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. **Erection Conditions of Contract**
- d. **Standard Technical Specification & Guaranteed Technical Particulars.**
- e. **Schedule of Bid.**
- f.

3.2 UNDERSTANDING OF BIDDING DOCUMENTS:-A prospective Bidder is expected to examine all instructions, forms, terms and conditions, 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.**

4.0 CLARIFICATIONS ON BIDDING DOCUMENTS

4.1. 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.

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

5.0 AMENDMENT TO BIDDING DOCUMENTS

5.1. At any time prior to the deadline for submission of bids, TSECL may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by amendment (s).

5.2. The amendment shall be notified in writing or by Fax or Post or Email to all prospective Bidders, who have received the Bidding Documents at the address contained in the letter of request for issue of Bidding Documents from the Bidders. TSECL shall bear no responsibility or liability arising out of non-receipt of the same in time or otherwise.

5.3. In order to afford prospective bidders reasonable time to take the amendment into account in preparing their bids, TSECL may, at its discretion, extend the deadline for submission of bids.



5.4. Such amendments, clarifications, etc shall be binding on the bidders and shall be given due consideration by the bidders while they submit their bids and invariably enclose such documents as a part of the Bid.

6.0 PREPARATION OF BIDS:- The Bid prepared by the Bidders and all correspondences 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.

7.0 LOCAL CONDITIONS

7.1 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.**

7.2 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.**

8.0 DOCUMENTS COMPRISING THE BID

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

8.1 Part-I: Bid Earnest Money, Pre-Qualification Bid and Techno-Commercial Bid/ Proposal

- a) Containing **Bid earnest money** as per the stipulations of the Bid Documents in a separate sealed envelope.
- b) Containing Documentary Evidence of the Bidder fulfilling the **QUALIFYING REQUIREMENTS FOR BIDDERS** stipulated in Sl no-2 of Part-I of the Bid Document and **Technical Proposal, drawings** etc. along with his **Commercial Terms, Payment Terms** in conformity with the Bid Documents.

8.2 Part-II: Price Bid

- a) Prices shall be quoted in figures & words in Rupees only, in the “**Schedule of Quantity & Prices**”(Schedule-A) attached to the Bid document. **Quoted Prices shall be FIRM and inclusive of all cost of labour, insurance, EPF charges, spares, T&Ps, all consumables & materials and all applicable tax and duties.**
- b) **GST** as applicable on twenty eight (28) days prior to deadline for submission of bids, shall be mentioned in the **Schedule-A.**
- c) **Applicable GST as per clause 8.2 (b) above shall be paid / reimbursed by TSECL on actual against tax invoices raised by the contractor.**
- d) Statutory variation in Taxes & duties after twenty eight (28) days prior to deadline for submission of bids and during the scheduled completion period will be adjusted / reimbursed against production of documentary evidence.
- e) Income Tax as admissible will be deducted at source for which necessary TDS certificate will be issued”

9.0 SCOPE OF THE PROPOSAL

The scope of the proposal shall cover erection of all the equipments, equipment foundation, over ground lines & cables as well as underground cable lines as per drawing & specification in the bidding document, Galvanized Steel lattice structures, insulators and fitting fixtures etc. specified under the accompanying Technical Specification & **Bidding Schedule / ANNEXURES.**



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9.1 It shall include the following:

- i. Detailed design of the **1.1 KV XLPE cable , 1.1 KV XLPE cable jointing KITS, MS. Nuts & Bolts** and **G.I.PipeHDPE** pipe, LT kiosk etc.as applicable for the proposed work.
- ii. Complete manufacture including shop testing of all kinds of Hardware.
- iii. Providing engineering drawing, design & schematic of proposed underground 1.1KV line, LT kiosk etc. for approval by TSECL.
- iv. Packing and transportation from the Manufacturer's works to the Site.
- v. Receipt, storage, preservation and conservation of equipment and materials at Site.
- vi. Pre-assembly, if any, Erection, Testing and Commissioning of all the equipment.
- vii. Reliability & Performance Test on completion & Commissioning of erected finished job.
- viii. Providing **Guaranteed Technical Particulars** of Equipment / Materials as performat enclosed.

9.2 Bids containing deviations from provisions relating to the following clauses shall be considered as '**non-responsive**':

- a) Prices and Taxes & duties, (Clause 10.0 (Section-II), & 32.0 (Section-III),
- b) Bid Guarantee:- Clause 6.0, Section-I
- c) Contract Performance Guarantee:- Clause 6.0, Section-I
- d) Liquidated Damages: **Clause 13.0**, General Condition of Contract (Section-III)
- e) Guarantee:**Clause 14.0**, Section-III
- f) Payment: **Clause 33.0**, Section-III.

9.1 Bids not covering the above entire Scope of Work shall be treated as incomplete and hence rejected.

11.0 PRICES AND TAXES & DUTIES.

- 11.1 Prices shall be quoted in figures & words in Rupees only, in the "**Schedule of Quantity & Prices**"(Schedule-A)attached to the Bid document. **Quoted Prices shall be FIRM and inclusive of all cost of labour, insurance, EPF charges, spares, T&Ps, all consumables & materials and all applicable tax and duties accept GST.**
- 11.2 **Goods and Services Tax (GST)**as applicable on twenty eight (28) days prior to deadline for submission of bids, shall be mentioned in the **Schedule-A.**
- 11.3 **Applicable GST as per clause 8.2 (b) above shall be paid / reimbursed by TSECL on actual against documentary proof based on tax invoices raised by the contractor.**
- 11.4 **Statutory** variation in Taxes & duties after twenty eight (28) days prior to deadline for submission of bids and during the scheduled completion period will be adjusted / reimbursed against production of documentary evidence.
- 11.5 **Income** Tax as admissible will be deducted at source for which necessary TDS certificate will be issued.

11.0 TIME SCHEDULE

- 11.1 The basic consideration and the essence of the Contract shall be strict adherence to the time schedule for performing the specified works.
- 11.2 The requirement of **completion schedule** for the works is mentioned in **Clause – 1** (Section – I) of this document.
- 11.3 The **completion schedule** as stated in Clause – 1 (Section – I) shall be one of the major



factors in consideration of the Bids.

11.4 TSECL reserves the right to request for a change in the work schedule during post-bid discussion with successful bidder.

11.5 The successful Bidder shall be required to submit detailed **BAR CHART** and finalize the same with TSECL, as per the requirement of completion schedule.

12.0 CONTRACT QUALITY ASSURANCE

12.1 The Bidder shall include in his proposal, the **quality assurance programme**

Containing the overall **quality management and procedures** which he proposed to follow in the performance of the works during various phases, as detailed in relevant clause of the General Technical Conditions.

12.2 At the time of award of Contract, the detailed **quality assurance programme** to be followed for the execution of the contract shall be mutually discussed and agreed to and such agreed programme shall form part of the contract.

13.0 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.

14.0 BRAND NAMES

All the equipments/ materials/ Hardware /Spares shall be supplied from the 'list of the makes / manufacturers' as stipulated in the attached technical specification. Any deviation in this regard shall not be entertained and bids having such deviation shall be rejected. In case brand names are not specified in the attached technical specification, standard equipments / materials of reputed manufacturer acceptable to TSECL shall be supplied.

15.0 BID GUARANTEE

15.1 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** only in favour of **Tripura State Electricity Corporation Limited** payable at **SBI, TLA House Branch, Agartala, and West Tripura.**

15.2 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.**

15.3 The earnest money shall be deposited in **Indian rupees only.**

15.4 Any bid not secured in accordance with para 18.1 and 18.3 above shall be rejected by TSECL as non-responsive.

15.5 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.

15.6 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 6.0 of Section – I.**

15.7 The earnest money shall be forfeited:

- a. If a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the bid form; or
- b. In case of a successful Bidder fails:
 - i) to sign the contract; or



- ii) to furnish the 'Contract Performance Guarantee'.
15.8 No interest shall be payable by TSECL on the above earnest money.

16.0 PERIOD OF VALIDITY OF BIDS

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

16.2 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 cable or fax). The Earnest money provided under **Clause 6.0 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

17.0 FORMAT OF BID

17.1 The Bidder shall prepare two copies of the Bid, clearly marking the "**Original Bid**" and "**Copy of Bid**". In the event of any discrepancy between them, the original shall prevail.

17.2 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.

17.3 The Bid shall be submitted **in two parts** as described in clause no. 8 of Section – II.

17.4 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.

18.0 SIGNATURE OF BIDS

18.1 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.

18.2 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).

18.3 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.

18.4 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.

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

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

18.7 Bids not conforming to all the above requirements may be disqualified.

18.8 The original **Bidding document** shall be signed by the bidder(s) **on all pages** and will be



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enclosed with the **COMMERCIAL / PRICE** bidding schedule and all corrections to rates and items in the Bid(s) should be initiated by the Bidder(s). Every Page of the **Schedule Price Bidding** shall be signed in full by the Bidder(s).

19.0 SEALING AND MARKING OF BIDS

19.1 The Bidders shall seal the “**Original**” and “**Copy of Bid**” in an inner and an outer envelope, duly marking the envelopes as “Original” and “Copy”.

19.2 The inner and outer envelopes shall be:

19.3 Addressed to TSECL at the following address:-

Deputy General Manager
Capital Complex Electrical Division
79 tilla, Agartala, Tripura (W)

19.4 Bear (the NIT No., Name of work & date of opening) in 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”.

19.5 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.

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

20.0 DEADLINE FOR SUBMISSION OF BIDS

20.1 The Bidders have the option of sending the Bid by registered post or submitting the Bid in person. **Bids submitted by Telex/Telegram/Fax shall not be accepted.** No request from any Bidder to TSECL to collect the Bid from airlines, cargo agents etc. shall be entertained.

20.2 Bids shall be received by TSECL at the address specified under para 22.2(a) of Section - II, not later than the time & date mentioned in the Invitation to Bid.

20.3 TSECL may, at its discretion, extend this deadline for the submission of Bids, in which case all rights and obligations of TSECL and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.

21.0 LATE BIDS:- Any Bid received by TSECL after the time & date fixed or extended for submission of Bids prescribed by TSECL, shall be rejected and /or returned unopened to the Bidder

22.0 MODIFICATION AND WITHDRAWAL OF BIDS

22.1 **The Bidder may modify or withdraw its Bid after the Bid’s submission provided that written notice of the modification or withdrawal is received by TSECL prior to the deadline prescribed for submission of Bids.**

22.2 **The** Bidder’s modification or withdrawal notice shall be prepared, sealed, marked and dispatched in accordance with the provisions of clause 22 of section – II.

22.3 **No** Bid shall be modified / withdrawn in the interval between the deadline for submission of Bids and the expiration of the period of Bid validity specified by the Bidder on the Bid Form. Withdrawal/modification of a Bid during this interval shall result forfeiture of the earnest money deposited by the bidder.

23.0 INFORMATION REQUIRED WITH THE PROPOSAL

23.1 The Bids must clearly indicate the name of the manufacturer, the type of model of each principal item of equipment proposed to be furnished and erected. The Bid shall also contain drawings and descriptive materials indicating general dimensions, principles of operation, the



extent of pre-assembly involved, major construction equipment proposed to be deployed, method of erection and the proposed erection organizational structure. **The above information shall be provided by the Bidder in the form of separate sheets, drawings, catalogues, etc. in five copies.**

- 23.2 Any bid not containing sufficient descriptive material to describe accurately the equipment proposed, shall be treated as incomplete and hence rejected. Such descriptive materials and drawings submitted by the Bidder shall be retained by TSECL. Any major departure from these drawings and descriptive material submitted shall not be permitted during the execution of the Contract without specific written permission of TSECL.
- 23.3 Oral statements made by the Bidder at any time regarding quality, quantity or arrangement of the equipment or any other matter shall not be considered.
- 23.4 Standard catalogue pages and other documents of the Bidder may be used in the Bid to provide additional information and data as deemed necessary by the Bidder.

24.0 In case the proposal information contradicts specification requirements; the specification requirements shall govern, unless otherwise brought out clearly in the technical / commercial deviation schedule.

BID OPENING AND EVALUATION

25.0 OPENING OF BIDS BY TSECL

- 25.1 First the cover containing Earnest money as per clause 6.0 of Section - I shall be opened and then documents of qualifying requirement as per clause 2.0 of Section-I shall be opened. Only those Bidders whose Bid contains Earnest money and documents of qualifying requirements as per the stipulations of Section - I shall be considered eligible for opening of Part-I of the Bid which shall also be opened on the same day if possible. The Price Bid (Part – II) of the eligible bidders on the basis of evaluation of part-I Bid shall be opened on a subsequent date. **The date of opening of the price Bid (Part – II) shall be notified in writing or by Fax to all qualified Bidders.**
- 25.2 In case the above schedule date of opening of Bid is declared holiday by the State / Central Govt. the Bid will be opened on the following working day keeping time unaltered.
- 25.3 The Bid and its all parts shall be opened in the presence of Bidders' representatives (up to 2 persons) who choose to attend at the date and time for opening of bids indicated in the NIT or in case any extension has been given thereto, on the extended bid opening date and time notified to all the Bidders, who have purchased the Bidding Documents. The Bidders' representatives who are present shall sign a register evidencing their attendance.
- 25.4 No person / agent shall be allowed to be present during opening of Bid without valid authorization from the concerned bidder.
- 25.5 The Bidders names, bid prices, modifications, bid withdrawals and the presence or absence of the requisite earnest money and such other details as TSECL, at its discretion, may consider appropriate shall be announced at the opening.
- 25.6 No electronic recording devices shall be permitted during bid opening.

26.0 CLARIFICATION OF BIDS:-To assist in the examination, evaluation and comparison of Bids, TSECL may, at its discretion, ask the Bidder for a clarification of its Bid. The request for clarification and the response shall be in writing and no change in the price or substance of the Bid shall be sought, offered or permitted.

27.0 PRELIMINARY EXAMINATION

- 27.1 TSECL shall examine the Bids to determine whether they are complete, whether any



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computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed and whether the Bids are generally in order.

- 27.2 Arithmetical errors shall be rectified on the following basis: If there is a discrepancy between **the unit price** and the **total price** that is obtained by multiplying the unit price and quantity, **the unit price shall prevail** and total price shall be corrected. If there is a discrepancy between words and figures, the **amount in words** shall prevail. If the Bidder does not accept the correction of the errors as above, his bid shall be rejected and the amount of earnest money shall be forfeited.
- 27.3 The Bidder shall ensure that the prices furnished by him are complete. **Total amount against each item as well as grand total of bid shall be computed and worked out both in figures and words, failing which bid shall be treated as cancelled/ rejected.** In the case of not quoting of rates of any item (**supply / erection /inspection**) in the specified price schedules of the Bid Form, TSECL shall be entitled to consider the highest price of the tender for the purpose of evaluation and for the purpose of award of the Contract, use the lowest prices of the tender.
- 27.4 Prior to the detailed evaluation, TSECL shall determine the substantial responsiveness of each Bid w.r.t. Bidding Documents. For purpose of these Clauses, a substantially responsive Bid is one which conforms to all the terms and conditions of the Bidding Documents without material deviations. A material deviation is one which affects in any way the prices, quality, quantity or delivery period of the equipment or which limits in any way the responsibilities or liabilities of the Bidder or any right of TSECL as required in these specifications and documents. TSECL determination of a Bid's responsiveness shall be based on the contents of the Bid itself without recourse to extrinsic evidence.
- 27.5 A Bid determined as not substantially responsive shall be rejected by TSECL and may not subsequently be made responsive by the Bidder by correction of the non-conformity.
- 27.6 TSECL may waive any minor non-conformity or irregularity in a Bid which does not constitute a material deviation, provided such waiver does not prejudice or affect the relative ranking of any Bidder.

28.0 EVALUATION OF BIDS:-

- 28.1 During bid evaluation, TSECL may ask the bidder for clarification of its bid. The request for clarification and the response shall be in writing, and no change in the price or substance of the bid shall be sought, offered or permitted.
- 28.2 The total evaluated prices shall be considered for comparison of prices of different bidders and the evaluation of the bids shall be done on total quoted price for the total Package as per Schedule-A: Schedule of Quantities & Prices. In case the bidder has not quoted for any of the items, the price of all such item(s) against which bidder has not quoted rates/amount (viz. items left blank or against which '-' is indicated) in the schedules will be deemed to have been included in other item(s)/ Total quoted amount.
- 28.3 All applicable taxes, duties and levies as mentioned in Schedule-A Schedule of Quantities & Prices shall be considered for the purpose of evaluation of bid.
- 28.4 Evaluated bid prices of all the bidders shall be compared among themselves to determine the lowest evaluated Bid and, as a result of this comparison, the lowest Bid shall be selected for consideration of award of the Contract.

29.0 CONTACTING THE OWNER

Bids shall be deemed to be under consideration immediately after they are opened and until such time official intimation of award/rejection is made by TSECL to the Bidders. While the bids are under consideration, Bidders and/or their representatives or other interested parties are advised to refrain from contacting by any means, the Owner and/or his employees/representatives on matters relating to the bids under consideration. TSECL, if necessary, shall obtain clarifications on the bids by requesting for such information from any or all the Bidders, either in writing or through personal



contacts as may be necessary. Bidders shall not be permitted to change the substance of the bids after the bids have been opened.

AWARD OF CONTRACT

30.0 AWARD CRITERIA

30.1 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.

30.2 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.

30.3 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.

31.0 NOTIFICATION OF AWARD

31.1 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.

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

31.3 Upon the successful Bidder's furnishing of Contract Performance Guarantee pursuant to Clause 6.0 of Section – I. TSECL shall promptly notify each unsuccessful Bidder and will discharge its bid guarantee.

32.0 SIGNING OF CONTRACT

32.1 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.

32.2 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.

33.0 CONTRACT PERFORMANCE GUARANTEE

As a Contract Performance Security, the successful Bidder, on award of work, shall have to deposit a

Contract Performance Guarantyequivalent to 10% of LOAvalue,from any scheduled bank guaranteed by Reserve Bank of India payable at Agartala or in the shape of Bank Guarantee (BG)from a Public Sector / Scheduled Indian Bank guaranteed by Reserve Bank of India as per normal format in favour of TRIPURA STATE ELECTRICITY CORPORATION LIMITED. The contract performance guarantee submitted in the shape of Bank guarantee shall be valid up to guarantee period (18 months from the date of commissioning) as per Clause – 14of section – III.



33.1 The Performance Guarantee shall cover additionally the following guarantees to TSECL:

- a. The successful Bidder guarantees the successful and satisfactory operation of the equipment supplied and erected under the Contract, as per the specifications and documents.
- b. The successful Bidder further guarantees that the equipment provided and installed by him shall be free from all defects in design, material and workmanship and shall upon written notice from TSECL fully remedy free of expenses to TSECL such defects as developed under the normal use of the said equipment within the period of guarantee specified in the relevant clause of the General Terms and conditions.

33.2 The Contract Performance Guarantee is intended to secure the performance of the entire contract. However, it is not to be construed as limiting the damages under clause entitled “**Equipment Performance Guarantee**” in Technical Specifications and damages stipulated in other clauses in the Bidding Documents.

33.3 The Contract performance Guarantee submitted in the shape of demand draft shall be returned to the Contractor without any interest at the end of successful completion and commissioning of the work against a Bank Guarantee of equivalent amount from any Public Sector / scheduled Indian Bank valid upto the Guarantee period. The Bank Guarantee such deposited shall be discharged after expiry of Guarantee period.

33.4 The contract performance Guarantee shall be forfeited: -

- a. **If the contractor fails to start the work as per approved BAR CHART for reasons solely rest on him.**
- b. **If the contractor left / suspends the work without prior written intimation to the owner’s Engineer in charge of the work stating the reasons for such suspension of work.**
- c. **If the contractor left / suspends the work for reasons which are not acceptable to TSECL.**

34.0 CORRUPT OR FRAUDULENT PRACTICES:-TSECL expects the bidders / suppliers / contractors to observe the highest standards of ethics during the procurement and execution of such contracts. In pursuance of this policy, TSECL defines, for the purpose of this provision, the terms set forth below as follows;

I. “**Corrupt practice**” means offering, giving, receiving or soliciting of anything of value to influence the action of an official in the procurement process or in contract execution, and

II. “**Fraudulent practice**” means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the owner, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the owner from the benefits of free and open competition.

- a. Will reject a proposal for award if it determines the bidder recommended for award has engaged a corrupt or fraudulent practice in competing for the contract in question.
- b. Will declare a firm ineligible, either indefinitely or for a stated period of time, if TSECL at any time determines that the firm has engaged in corrupt / fraudulent practices in competing for, or in executing the contract.

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SECTION-III

GENERAL TERMS & CONDITIONS OF CONTRACT

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 or Purchaser' 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. '**Engineer in Charge**:-The term "**Engineer in Charge**" shall mean the TSECL's nominated representative for the purpose of carrying out the work.
- 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 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.
- 1.18. A **‘Week’** shall mean continuous period of seven (7) days.
- 1.19. “Writing” shall include any manuscript, type written or printed statement, under or over signature and/or seal as the case may be.
- 1.20. When the words ‘Approved’, ‘Subject to Approval’, ‘Satisfactory’, ‘Equal to’, ‘Proper’, ‘Requested’, ‘As Directed’, ‘Where Directed’, ‘When 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.
- 1.21. **“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.
- 1.22. **‘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.
- 1.23. **“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.
- 1.24. **‘Trial Operation’, ‘Reliability Test’, ‘Trial Run’, ‘Completion Test’** shall mean the extended period of time after the startup 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.
- 1.25. **‘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.
- 1.26. 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.
- 1.27. **“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 up to and including rated capacity.** Such declaration by TSECL, however, shall not relieve or prejudice the Contractor of any of his obligations under the Contract.
- 1.28. **‘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.
- 1.29. **‘Latent Defects’** shall mean such defects caused by faulty designs, material or workmanship which cannot be detected during inspection, testing etc, based on the technology **available for carrying out such tests.**



1.30. **‘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 Executive Engineer in charge of the work.

1.31. **“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.**
- h) Indian Electricity Rules.

1.32. Words imparting ‘Person’ shall include firms, companies, corporation and association or bodies of individuals.

1.33. 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 Contract Act (1872)** and failing that in the **General Clauses Act (1897)** including amendments thereof if any.

1.34. 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 ‘Contract Performance Security’

2.0 APPLICATION

These General Conditions shall apply to the extent that they are not **superseded by provisions in other parts of the Contract.**

3.0 STANDARDS

The Goods supplied under this Contract shall conform to the standards mentioned in the Various Technical Specifications and when no applicable standard is mentioned to the authoritative standard appropriate to the Goods and such standards shall be the latest issued by the concerned institution.



4.0 LANGUAGE AND MEASURES

All documents pertaining to the Contract including specification, Schedules, notices, correspondence, operating and maintenance instructions, drawings or any other writing shall be written in English language. The Metric System of measurement shall be used exclusively in the Contract.

5.0 CONTRACT DOCUMENTS

5.1. The term "Contract Documents" shall mean and include the following which shall be deemed to form an integral part of the Contract:

- a) Invitation of Bid including letter forwarding the Bidding Documents, Instructions to Bidders, General Terms and Conditions of Contract, Erection Conditions of Contract and all other documents included under the Special Conditions of Contract and various other sections.
- b) Specifications of the equipment to be furnished and erected under the Contract as brought out in the accompanying Technical Specification.
- c) Contractor's Bid proposal and the documents attached there-to including the letter of clarifications thereto between the Contractor and TSECL prior to the Award of Contract.
- d) All the materials, literature, data and information of any sort given by the Contractor along with his bid, subject to the approval of TSECL.
- e) Letter of Award and any agreed variations of the conditions of the documents and special terms and conditions of contract if any.

6.0 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.

7.0 JURISDICTION OF CONTRACT

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

8.0 MANNER OF EXECUTION OF CONTRACT

8.1. 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.

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

8.2. **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.**

8.3. 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.

8.4.



8.5. Subsequent to signing of the Contract, the Contractor, at his own cost, shall provide TSECL with at least five (5) true copies of Agreement and one soft copy including 3(three) hard copies of the **approved drawings within fifteen (15) days after the signing of the Contract.**

9.0 ENFORCEMENT OF TERMS

9.1. 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 anyway 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.**

10.0 COMPLETION OF CONTRACT

10.1. 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.

GUARANTEE & LIABILITIES

11.0 TIME – THE ESSENCE OF CONTRACT

11.1. 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.

11.2. 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.

11.3. 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.

11.4. 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.

11.5. 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.

12.0 EFFECTIVENESS OF CONTRACT

The Contract shall be considered as having come into force from the date of the Notification of Award, unless otherwise provided in the Notification of Award.

13.0 LIQUIDATED DAMAGES.

13.1. For Equipment and erection work

13.1.1. 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. The details of such liquidated damages are brought out in the accompanying Special Conditions of Contract.



Date on which erection of line / lines (Over Ground or Underground) with all allied accessories, equipments and Sub-Station structure etc. in full respect and up to satisfaction of Engineer in charge will be done shall be treated as date of completion of erection. However warranty and liability for completing and commissioning of materials, devices, equipment etc. considered for supplying in this NIT within scope of supply of bidders shall be regulated as per provisions already contained in the document.

13.1.2. 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.

13.1.3. The liquidated damages for delay in supply & erection beyond the dates stipulated under shall be 0.5% (**point five percent**) of the contract value, per week or part thereof subject to a maximum of 5% of the Contract price.

14.0

14.1. **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 **Eighteen (18) 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.

14.2. 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.

14.3. If it becomes necessary for the Contractor to replace or renew any defective portions of the Works, the provision of this clause shall apply to portion of the Works so replaced or renewed until the **expiry of Twelve (12) months** from the date of such replacement or renewal. 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.

14.4. 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.

14.5. 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.

14.6. 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.

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

14.8. 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.

14.9. 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.

15.0 TAXES, PERMITS & LICENCES

The Contractor shall be liable and pay all non-Indian taxes, duties, levies lawfully assessed against TSECL or the Contractor in pursuance of the Contract. In addition, the Contractor shall be responsible for payment of all Indian duties, levies and taxes lawfully assessed against this contract.

16.0 REPLACEMENT OF DEFECTIVE PARTS AND MATERIALS

16.1. during the performance of the Contract, owner's Engineer in charge of the work shall decide and inform in writing to the Contractor that the Contractor has manufactured any equipment, material or part of equipment unsound and imperfect or has furnished any equipment inferior to the quality specified, the Contractor on receiving details of such defects or deficiencies shall at his own expense within Seven (7) days of his receiving the notice, or otherwise, within such time as may be reasonably necessary for making it good, proceed to alter, reconstruct or remove such works and furnish fresh equipment/materials upto the standards of the specifications. In case, the Contractor fails to do so, the Owner's Engineer in charge of the work may on giving the Contractor Seven (7) days notice in writing of his intentions to do so, proceed to remove the

portion of the works so complained of and at the cost of the Contractor perform all such work or furnish all such equipment/materials.

16.2. The Contractor's full and extreme liability under this clause shall be satisfied by the payment to TSECL of the extra cost, of such replacement procured including erection as provided for in the Contract, such extra cost being the ascertained difference between the price paid by TSECL for such replacements and the Contract Price by portion for such defective equipment/materials/works and repayments of any sum paid by TSECL to the Contractor in respect of such defective equipment/material. Should TSECL not so replace the defective equipment/materials, the Contractor's extreme liability under this clause shall be limited to repayment of all sums paid by TSECL under the Contract for such defective equipment/materials.



17.0 PATENT RIGHTS AND ROYALTIES

Royalties and fees for patents covering materials, articles, apparatus, devices, equipment or processes used in the Works shall be deemed to have been included in the Contract Price. The Contractor shall satisfy all demands that may be made at any time for such royalties or fees and he alone shall be liable for any damages or claims for patent infringements and shall keep TSECL indemnified in that regard. The Contractor shall, at his own cost and expense, defend all suits or proceedings that may be instituted for alleged infringement of any patents involved in the Works, and, in case of an award of damages, the Contractor shall pay for such award. In the event of any suit or other proceedings instituted against TSECL, the same shall be defended at the cost and expense of the Contractor who shall also satisfy/comply with any decree, order or award made against TSECL. But it shall be understood that no such machine, plant, work, material or thing has been used by TSECL for any purpose or any manner other than that for which they have been furnished and installed by the Contractor and specified under these specifications. Final payment to the Contractor by TSECL shall not be made while any such suit or claim remains unsettled. In the event any apparatus or equipment, or any part thereof furnished by the Contractor, is in such suit or proceedings held to constitute infringement, and its use is enjoined, the Contractor shall at his option and at his own expense, either procure for TSECL, the right to continue the use of said apparatus, equipment or part thereof, replace it with non-infringing apparatus or equipment or modify it, so it becomes non-infringing.

18.0 DEFENCE OF SUITS

If any action in court is brought against TSECL for the failure, omission or neglect on the part of the Contractor to perform any acts, matters, or things under the Contract, or for damage or injury caused by the alleged omission or negligence on the part of the Contractor, his agents, representatives or his Sub-Contractors, or in connection with any claim based on lawful demands of Sub-Contractors, workmen, suppliers or employees, the Contractor shall in all such cases indemnify and keep TSECL, from all losses, damages, expenses or **decrees arising of such action.**

19.0 LIMITATION OF LIABILITIES

The final payment by TSECL in pursuance of the Contract shall mean the release of the Contractor from all his liabilities under the Contract. Such final payment shall be made only at the end of the Guarantee/Warranty Period, and till such time as the contractual liabilities and responsibilities of the Contractor, shall prevail. All other payments made under the Contract shall be treated as on-account payments.

20.0 POWER TO VARY OR OMIT WORK

20.1. No alterations, amendments, omissions, suspensions or variations of the Works (hereinafter referred to as 'variation') under the Contract as detailed in the Contract Documents, shall be made by the Contractor except as directed in writing by owner's Engineer in charge of the work, but he shall have full powers subject to the provisions hereinafter contained, from time to time during the execution of the Contract, by notice in writing to instruct the Contractor to make such variation without prejudice to the Contract. The Contractor shall carry out such variation and be bound by the same conditions as far as applicable as though the said variations occurred in the Contract Documents. If any suggested variations would, in the opinion of the Contractor, if carried out, prevent him from fulfilling any of his obligations or guarantees under the Contract, he shall notify the Engineer thereof in writing and the Engineer shall decide forthwith whether or not, the same shall be carried out and if the Engineer confirm his instructions, the Contractor's obligations and guarantees shall be modified to such an extent as may be mutually agreed. Any agreed difference in cost occasioned by any such



variation shall be added to or deducted from the Contract Price as the case may be.

- 20.2. In the event of the Engineer requiring any variation, a reasonable and proper notice shall be given to the Contractor to enable him to work his arrangement accordingly, and in cases where goods or materials are already prepared or any design, drawings or pattern made or work done requires to be altered, a reasonable and agreed sum in respect thereof shall be paid to the Contractor.
- 20.3. In any case in which the Contractor has received instructions from the **Deputy General Manager / Senior Manager** in charge of the work as to the requirement of carrying out the **alterations or additional or substituted work** which either then or later on, shall in the opinion of the Contractor, involve a claim for additional payment, the Contractor shall immediately and in no case later than Thirty (30) days, after receipt of the instructions aforesaid and before carrying out the instructions, advise the Owner's Engineer in charge of the work to that effect. But the Owner's Engineer in charge of the work shall not become liable for the payment of any charges in respect of any such variations, unless the instructions for the performance of the same shall be confirmed in writing by the **Deputy General Manager** in charge of the work.
- 20.4. If any variation in the Works results in reduction of Contract Price, the parties shall agree, in writing, to the extent of any change in the price, before the Contractor proceeds with the change.
- 20.5. In all the above cases, in the event of a disagreement as to the reasonableness of the said sum, the decision of owner's Engineer in charge of the work shall prevail.
- 20.6. Notwithstanding anything stated above in this clause, owner's Engineer in charge of the work shall have the full power to instruct the Contractor, in writing, during the execution of the Contract to vary the quantities of the items or groups of items in accordance with the provisions of clause entitled 'Change of Quantity in Section – III'. The Contractor shall carry out such variations and be bound by the same conditions as though the said variations occurred in the Contract Documents.

21.0 ASSIGNMENT AND SUB-LETTING OF CONTRACT

- 21.1. The Contractor may, after informing owner's Engineer in charge of the work and getting his written approval, assign or sub-let the Contract or any part thereof other than supply of main equipments and any part of the plant for which makes are identified in the Contract. Suppliers of the equipment not identified in the Contract or any change in the identified suppliers shall be subjected to approval by the owner's Engineer in charge of the work. The experience list of equipment Contractors under consideration by the Contractor for this Contract shall be furnished to the owner's Engineer in charge of the work for approval, prior to procurement of all such items/equipment. Such assignment/sub-letting shall not relieve the Contractor of any obligation, duty or responsibility under the Contract. Any assignment as above, without prior written approval of the owner's Engineer in charge of the work, shall be void.
- 21.2. For components/equipment procured by the Contractor for the purposes of the Contract, after obtaining the written approval of TSECL, the Contractor's purchase specifications and enquiries shall call for quality plan to be submitted by the suppliers along with their proposals. The quality plans called for from the Contractors shall set out, during the various stages of manufacture and installation, the quality practices and procedures followed by the Contractors quality control organization, the relevant reference document/standard used, acceptance level, inspection documentation raised, etc. Such quality plans of the successful Contractors shall be discussed and finalized in consultation with the owner's Engineer in charge (**Deputy General Manager / Senior Manager**) of the work and shall form part of the purchase order/contract between the Contractor and the Contractor. Within three weeks of the release of the purchase orders/contracts for such bought out items/components, a copy of the same without price details but together with detailed purchase specifications, quality plans and delivery conditions shall be furnished to the owner's Engineer in charge of the work by the Contractor.

22.0 CHANGE OF QUANTITY

- 22.1. During the execution of the Contract, TSECL reserves the right to increase or decrease the quantities of items under the Contract but without any change in unit price or other terms &



conditions. Such variations shall not be subjected to any limitation for the individual items but the total variations in all such items including items not covered under the Contract shall be limited to **±25%**.

22.2. The Contract price shall accordingly be adjusted based on the unit rates available in the Contract for the change in quantities as above. The base unit rates, as identified in the Contract shall however remain constant during the currency of the Contract, except as provided for in clause 31.0 below. In case, the unit rates are not available in the contract, the same shall be worked out as below:

- i) If the rates for the additional, altered or substituted work are specified in the contract, the contractor is bound to carry the additional, altered or substituted work at the same rates as are specified in the contract.
- ii) If the rates for the additional, altered or substituted work are not specifically provided in the contract, the rates will be derived from a similar class of work as are specified in the contract.
- iii) If the rates for the additional, altered or substituted work includes any work for which no rate is specified in the contract / cannot be derived from the similar class of work in the contract, then such work shall be carried out at the rates which will be determined on the basis of current schedule of rate of TSECL above minus / plus the percentage which the total contract amount bears to the estimated cost put to tender. Provided always if the rate for particular part or parts of the item is not available in the schedule of rates, the rate of such part or parts will be determined by TSECL of the work on the basis of the prevailing market rate when the work was done.
- iv) If the rates for the additional, altered or substituted work can not be determined in the manner specified in sub-clause i, ii & iii above, then the contractor shall within 7(Seven) days of receipt of order to carry out the order, inform the owner's Engineer in charge of the work of rate which it is his intention to charge for such class of work, supported by analysis of rate or rates claimed, and TSECL shall determine the rate or rates claimed with mutual settlement with the contractor.
- v) The deviation limit referred to above is the net effect (**algebraically sum**) of all additions and deductions ordered.
- vi) Time for the completion for the work shall be extended in the proportion that the altered, additional or substituted work bears to the original contract of the work and the certificate of the owner's Engineer in charge (**Deputy General Manager / Senior Manager**) of the work shall be conclusive for approval of the time extension by TSECL.

23.0 PAKCING, FORWARDING AND SHIPMENT

23.1. The Contractor, wherever applicable, shall after proper painting, pack and crate all equipment in such a manner as to protect them from deterioration and damage during rail and road transportation to the site and storage at the site till the time of erection. The Contractor shall be held responsible for all damages due to improper package.

23.2. The Contractor shall notify the owner's Engineer in charge of the work of the date of each shipment from his works, and the expected date of arrival at the site.

23.3. The Contractor shall also give all shipping information concerning the weight, size and content of each packing including any other information the owner's Engineer in charge of the work may require.

23.4. The Contractor shall prepare detailed packing list of all packages and containers, bundles and loose materials forming each and every consignment dispatch to Site.

The Contractor shall further be responsible for making all necessary arrangements for loading, unloading and other handling, right from his works up to the Site and also till the equipment is erected, tested and commissioned. He shall be solely responsible for proper storage and safe custody of all equipment.



23.5. CO-OPERATION WITH OTHER CONTRACTORS AND CONSULTING ENGINEERS

The Contractor shall agree to cooperate with the TSECL's Consulting Engineers and freely exchange with them such technical information, as is necessary to obtain the most efficient and economical design and to avoid unnecessary duplication of efforts. The owner's Engineer in charge (**Deputy General Manager / Senior Manager**) of the work shall be provided with three copies of all correspondence addressed by the Contractor to the consulting Engineers of TSECL in respect of such exchange of technical information.

24.0 NO WAIVER OF RIGHTS

Neither the inspection by TSECL nor any order by TSECL for payment of money or any payment for or acceptance of, the whole or any part of the Works by the owner's Engineer in charge of the work, nor any extension of time, nor any possession taken by the owner's Engineer in charge of the work shall operate as a waiver of any provision of the Contract, or of any power herein reserved to TSECL or any right to damages herein provided nor shall any waiver of any breach in the Contract be held to be a waiver of any other or subsequent breach.

25.0 CERTIFICATE NOT TO AFFECT RIGHT OF TSECL AND LIABILITY OF CONTRACTOR.

No interim payment certificate of the owner's Engineer in charge of the work, nor any sum paid on account by TSECL, nor any extension of time for execution of the Works granted by TSECL shall affect or prejudice the rights of TSECL against the Contractor or relieve the Contractor of his obligation for the due performance of the Contractor, or be interpreted as approval of the Works done or of the equipment furnished and no certificate shall create liability for TSECL to pay for alterations, amendments, variations or additional works not ordered, in writing, by the owner's Engineer in charge of the work or discharge the liability of the Contractor for the payment of damages whether due, ascertained or certified or not or any sum against the payment of which he is bound to indemnify TSECL, nor shall any such certificate nor the acceptance by him of any sum paid on account or otherwise affect or prejudice the rights of TSECL against the Contractor.

26.0 INSPECTION AND TESTING OF EQUIPMENTS / MATERIALS

26.1. All equipments / 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 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.

26.2. 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.

- 26.3. 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 traveling, food and lodging charges of the inspecting officer / team of TSECL.**

27.0 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.

28.0 EXTENSION OF TIME

- 28.1. TSECL 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.

- 28.2. **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.

- 28.3. 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.

29.0 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

30.0 CONTRACT PERFORMANCE GUARANTEE

The Contractor shall furnish **Contract Performance Guarantee** as specified in Clause 6.0 of Section - I for the proper fulfillment of the Contract within Fifteen (15) days of "**Notice of Award of Contract.**"

CONTRACT PRICE ADJUSTMENT

"All prices / price components of the contract shall remain firm and no adjustment of price, whatsoever, shall be applicable during the currency of contract"



31.0 PAYMENT

31.1. 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. All payment made during the Contract shall be **on account payments only**. The final 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.

31.2. Currency of Payment

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

31.3. Due Dates for Payments

TSECL will make progressive payment as and when the payment is due as per the terms of payment set forth as herein after.

32.0 Mode of Payment

32.1. 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 cheque.

32.2. TERMS OF PAYMENT

The terms of payments for various activities under the contract are as under.

32.2.1. Price of Supply and Erection

The terms of payments for price of all equipment / materials and erection are detailed herein after.

A) Supply of Hardware, cable accessories, other sundry/ materials excepting Spares, Tools & Plant.

i) 80% of the cost of materials after:

- a. Acknowledgement of Letter of Award.
- b. Submission of contract performance guarantee as per clause 6.0 (Section – I) in the shape of demand draft in favour of Tripura State Electricity Corporation Limited payable at SBI, TLA House Branch, Agartala, West Tripura..
- c. Submission of a detailed Bar Chart based on the work schedule stipulated in the Bid document and its approval by TSECL.
- d. Signing of contract agreement.
- e. On production of dispatch documents (Delivery Challan in original) including the material inspection clearance certificate (MICC) issued by the inspecting officer / team of TSECL.
- f. Finally, **on receipt of materials at site.**
(Store receipt voucher (SRV) issued by an officer not below the rank of Senior Manager or Manager In- charge)
- g. Insurance policy/certificate.
- h. **Manufacturer's/Contractor's guarantee certificate of quality of supplied equipments and materials.**
- **Progressive bill value for supplied of equipment / materials shall not be less than Rs. 5Lacs.**



- ii) Balance 10% of the cost of materials / Cable accessories /Hardware / other sundry materials etc. after successful erection at site.
- iii) Balance 10% of the cost after successful commissioning.

B) For the Erection Component

- a. 90% on successful erection of materials / Equipments/ Cable accessories /Hardware / other sundry materials etc as per lay-out drawing / Erection Schedule / Erection Key Diagram submitted by the bidder and approved by TSECL.
- b. Balance 10% of the erection cost of materials / Equipments / Cable accessories /Hardware / other sundry materials etc. after successful commissioning.
- c. Progressive bill value for erection / laying component shall not be less than Rs. 5.00 Lacs. .

C) For the Spares & Tools & Plant

100% on receipt of the Spares and T& Plants in full and good condition.

33.0 Price adjustment/Contract Variation:- Quoted Prices shall be FIRM . No variation of the quoted prices will be allowed within the Scheduled Completion period of within any extended period as approved by Engg. in Charge / TSECL authority.

34.0 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.

35.0 SPARES

35.1. All the spares for the equipment under the Contract will, strictly, conform to the specification and documents and will be identical to the corresponding main equipment / components supplied under the Contract and shall be fully interchangeable.

35.2. All the mandatory spares covered under the Contract shall be produced along with the main equipment as a continuous operation and the delivery of the spares will be affected along with the main equipment in a phased manner and the delivery would be completed by the respective dates for the various categories of equipment as per the agreed Bar chart. In case of recommended spares, the above will be applicable provided the order for the recommended spares has been placed with the Contractor prior to commencement of manufacture of the main equipment

35.3. The quality plan and the inspection requirement finalized for the main equipment will also be applicable for the corresponding spares.

35.4. **The Contractor will provide TSECL with the manufacturing drawings, catalogues, assembly drawings and any other documents required by TSECL so as to enable the Owner to identify the recommended spares. Such details will be furnished to TSECL as soon as they are prepared but in any case not later than six months prior to commencement of manufacture of the corresponding main equipment.**

35.5. The Contractor will provide TSECL with all the addresses and particulars of his sub-suppliers while placing the order on Contractors for items /components / equipment covered under the Contract and will further ensure with his Contractors that TSECL, if so desires, will have the right to place order (s) for spares directly on them on mutually agreed terms based on offers of such Contractors.

35.6. WARRANTY FOR SPARES

The Contractor shall warrant that all spares supplied will be new and in accordance with Contract Documents and will be free from defects in design, materials and workmanship and shall further guarantee as under:

35.6.1. for 3 years operational spares (both mandatory and recommended)

d. For any item of spares ordered or to be ordered by TSECL for 3 years operational requirement of the



plant which is manufactured as a continuous operation together with the corresponding main equipment/component, the warranty will be **12 months from the scheduled date of commercial operation of the last unit of main equipment under the Contract.** In case of any failure in the original component/equipment due to faulty designs, materials and workmanship, the corresponding spare parts, if any, supplied will be replaced without any extra cost to TSECL unless a joint examination and analysis by TSECL and the Contractor of such spare parts prove that the defect found in the original part that failed, can safely be assumed not to be present in spare parts. Such replaced spare parts will have the same warranty as applicable to the replacement made for the defective original part/component provided that such replacement for the original equipment and the spare replaced are again manufactured together. The discarded spare parts will become the property of the Contractor as soon as they have been replaced by the Contractor.

- e. For the item of spares ordered / to be ordered by TSECL for 3 years operational requirement of the equipment, which with the written approval of the Owner, are not manufactured as a continuous operation together with the manufacture of the corresponding main equipment / component, will be warranted for 6000 hrs of trouble free operation, **if used within a period of 18 months (reckoned from the date of delivery at Site)**. However, if such spare parts are put to use after 18 months of the delivery at site then the guarantee of such spares will stand valid till the expiry of 36 months from the scheduled date of **the completion of commissioning of the last unit of equipment** or 6000 hrs of trouble free operation after such spares are put in service, whichever is earlier.

f. For long Term Requirement.

For items of spares that may be ordered by TSECL to cover requirements beyond 3 years of initial operation of the plant, the warranty will be till the expiry of 6000 hrs of trouble free operation if used within a period of 18 months from the date of delivery at Site. For items of spares that may be used after 18 months from the date of delivery at Site, the warranty period will be 12 months from the date they are put to use or 6000 hrs of trouble free operation, whichever is earlier.

35.6.2. The warranty of spares that are not used within 18 months from the respective dates of the delivery at Site covered in Para (b) & (c) above will, however, be subject to the condition that all such spares have been stored / maintained / preserved in accordance with Contractor's standard recommended practice, if any, and the same have been furnished to TSECL.

35.6.3. To enable TSECL to finalize the requirement of recommended spares which are ordered subsequent to placement of order for main equipment in addition to necessary technical details, catalogue and such other information brought-out here-in-above, the Contractor will also provide a justification in support of reasonableness of the quoted prices of spares which will, inter-alia, include documentary evidence that the prices quoted by the Contractor are not higher than those charged by them from other customers in the same period.

35.6.4. In addition to the spares recommended by the Contractor, if TSECL further identifies certain particular items of spares, the Contractor will submit the prices and delivery quotations for such spares within 30 days of receipt of such request with validity period for 6 months for consideration of placement of order for additional spares, if TSECL so desires

35.6.5. The Contractor shall guarantee the long-term availability of spares to TSECL for the full life of the equipment covered under the Contract. **The Contractor shall guarantee that before going out of production of spare parts of the equipment, he shall give at least twelve (12) months advance notice so that the latter may order his bulk requirement of spares, if he so desires.** The same provision will also be applicable to Sub-Contractor of any spares by the Contractor or his Sub-Contractors. Further, in case of discontinuance of manufacture of any spares by the Contractor or his Sub-Contractors, the Contractor will provide TSECL, two years in advance, full manufacturing drawings, material specifications and technical information required by TSECL for the purpose of manufacture of such items.

35.6.6. Further in case of discontinuance of supply of spares by the Contractor or his Sub-contractors,



the Contractor will provide TSECL with full information for replacement of such spares with other equivalent makes, if so required by TSECL.

- 35.6.7. The prices of all future requirements of items of spares beyond 3 years operational requirement will be derived from the corresponding ex-works price at which the order for such spares have been placed by TSECL as part of mandatory spares or recommended spares. Ex-works order price of future spares shall be computed in accordance with the price adjustment provisions covered under the main Contract excepting that 'the base indices will be counted from the scheduled date of successful completion of trial operation of the last equipment under the main project and there will be no ceiling on the amount of narration in the prices. The above option for procuring future long term requirement of spares by TSECL shall remain valid for a period of 5 years from successful completion of commissioning of the last unit of equipment.
- 35.6.8. The Contractor will indicate in advance the delivery period of the items of spares, which TSECL may procure in accordance with above Sub-clause. In case of emergency requirements of spares, the Contractor would make every effort to expedite the manufacture and delivery of such spares on the basis of mutually agreed time schedule.
- 35.6.9. In case the Contractor fails to supply the mandatory, recommended or long term spares in accordance with the terms stipulated above, TSECL shall be entitled to purchase the same from alternate sources at the risk and the cost of the Contractor and recover from the Contractor, the excess amount paid by TSECL over the rates worked out on the above basis. In the event of such risk purchase by TSECL, the purchases will be as per the works and procurement policy of TSECL prevalent at the time of such purchases and at his option, may include a representative of the Contractor in finalizing the purchases.
- 35.6.10. It is expressly understood that the final settlement between the parties in terms of the relevant clauses of the Bidding Documents shall not relieve the Contractor of any his obligations under the provision of long term availability of spares unless otherwise discharged in writing by TSECL.

36.0 TRANSFER OF THE TITLE

- 36.1. This **Transfer of Title of equipments** / materials shall not be construed to mean the acceptance and the consequent "Taking Over" of equipment and materials. The Contractor shall continue to be responsible for the quality and performance of such equipment and materials and for their compliance with the specifications until "**Taking Over**" and the fulfillment of guarantee provisions of this Contract.
- 36.2. This Transfer of Title shall not relieve the Contractor from the responsibility for all **risks of loss or damage** to the equipment and materials as specified under the clause entitled "Insurance" of this Section.

37.0 INSURANCE

- 37.1. 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 "Construction & commissioning 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.
- 37.2. Any loss or damage to the equipment or any material (specified in the Schedule) during handling, transportation, storage, erection, putting into satisfactory operation and all activities to be



performed till the successful completion of commissioning of the equipment shall be to the account of the Contractor. The Contractor shall be responsible for preference of all claims and make good the damages or loss by way of repairs and/or replacement of the equipment, damaged or lost. The transfer of title shall not in any way relieve the Contractor of the above responsibilities during the period of **Construction & commissioning Contract**. The Contractor shall provide TSECL with copy of all insurance policies and documents taken out by him in pursuance of the **Construction & commissioning Contract**. Such copies of documents shall be submitted to TSECL immediately after such insurance coverage. The Contractor shall also inform TSECL in writing at least Sixty (60) Days in advance regarding the expiry/cancellation and/or change in any of such documents and ensure revalidation, renewal etc., as may be necessary well in time.

37.3. The perils required to be covered under the insurance shall include, but not be limited to fire and allied risks, miscellaneous accidents (erection risks) **workman compensation risks, loss or damage in transit, theft, pilferage, riot, strikes, social unrest and malicious damages, civil commotion, weather conditions, accidents of all kinds, etc.** The scope of such insurance shall be adequate to cover the replacement / reinstatement cost of the equipment for all risks upto and including delivery of goods and other costs till the equipment is delivered at Site. The insurance policies to be taken should be on replacement value basis and/or incorporating escalation clause. Notwithstanding the extent of insurance cover and the amount of claim available from the underwriters, the Contractor shall be liable to make good the full replacement / rectification value of all equipment/materials and to ensure their availability as per project requirements.

37.4. All costs on account of insurance liabilities covered under the Contract will be to Contractor's account and will be included in Contract Price, However, TSECL may from time to time, during the pendency of the Contract, ask the Contractor in writing to limit the insurance coverage, risks and in such a case, the parties to the **Construction & commissioning Contract** will agree for a mutual settlement, for reduction in Contract price to the extent of reduced premium amount. The Contractor, while arranging the insurance shall ensure to obtain all discounts on premium, which may be available for higher volume or for reason of financing arrangement of the project.

38.0 LIABILITY FOR ACCIDENTS AND DAMAGES

Under the Contract, the Contractor shall be responsible for loss or damage to the equipment until the successful completion of commissioning as defined else-where in the Bidding Documents.

39.0 DELAYS BY TSECL OR HIS AUTHORISED AGENTS

39.1. 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 caused delay in the Contractor's performance of the Contract. Regarding reasonableness or otherwise of the extension of time, the decision of the TSECL shall be final.

40.0 DEMURRAGE, WHARFAGE, ETC.

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.

41.0 FORCE MAJEURE

41.1. 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.

- 41.2. 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.

42.0 SUSPENSION OF WORK

- 42.1. 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 to duration of the suspension.

43.0 CONTRACTOR'S DEFAULT

- 43.1. 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 TSECL's Engineer in charge (**Deputy General Manager / Senior Manager**) 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 thereof 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 thereof as aforesaid 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.

- 43.2. 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.

44.0 TERMINATION OF CONTRACT ON OWNER'S INITIATIVE

- 44.1. 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.
- 44.2. The Contractor upon receipt of such notice shall discontinue the work on the date and to the extent specified in the notice.



- 44.3. 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

45.0 SETTLEMENT OF DISPUTES

- 45.1. 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.
- 45.2. If any dispute or difference of any kind whatsoever shall arise between **Deputy General Manager / Senior Manager** 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.
- 45.3. In the event the Contractor being dissatisfied with any such decision, the matters in dispute shall be referred to arbitration as hereinafter provided.

46.0 ARBITRATION

- 46.1. 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.
- 46.1.1. The arbitration shall be conducted by an arbitrator, to be nominated by TSECL and he will be the sole arbitrator to conduct the arbitration.
- 46.1.2. 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.
- 46.2. The arbitrators may, from time to time with the consent of all the parties enlarge the time for making the award.
- 46.3. 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.
- 46.4. During settlement of disputes and arbitration proceedings, both parties shall be obliged to carry out their respective obligations under the Contract.

47.0 RECONCILIATION OF ACCOUNTS

The Contractor shall prepare and submit every 4(four) 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 (**Senior Manager**) 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.



SECTION-IV

ERECTION CONDITIONS OF CONTRACT

1.0 General:

1.1 This specification covers erection including supply of 11KV & 1.1 KV XLPE Cable and other sundry materials specified in Section - I. The contractor shall clearly indicate in his offer the sources from where he proposes to procure the raw material / completed material and its components related to erection, installation, construction & commissioning Contract on turnkey basis.

1.2 Any material / item of work not specifically mentioned in the contract but required to satisfactorily complete and commission the job is deemed to be included in the scope of work of the contractor.

1.3 The work shall be carried out as per relevant Indian Standard. In those cases where specific IS code is not available, the work shall be executed as per best engineering practice / construction standard of TSECL / REC or CBIP guide lines or as specified in the document. The contractor shall indicate in his offer the detailed description of procedure to be deployed for stringing operation.

2.0 Location Details: The lines shall be laid in the areas covered within jurisdiction of Electrical Sub-Division no- V, GB under Capital Complex Electrical Division.

3.0 Details of Line Route and Terrain:

The 11 KVUG power lines will be running almost through plain areas of Electrical Sub-Division no- V, GB . Preparation of preliminary route alignment maps of power lines covered under this package indicating the general topography and major crossings like HV power lines and road etc. are in the contractor's scope.

4.0 Access to the Line and Right of Way:

Owner will facilitate and assist the contractor in getting clearance and securing way leave and right of way from Private / Public / Govt. owned lands. However it shall be the responsibility of the contractor to conduct preliminary survey before quoting the bid and further getting clearance for right of way during execution. The Owner shall not be responsible for delay on this account or pay any compensation in lieu of getting clearance/ any damages for right of way during execution of the project. **ROW (Right of Way) is to be arranged by Agency / Contractor.**

5.0 Detailed Survey for Optimization of Pole Location:

5.1 The detailed survey for line route and optimization of line location along with profiling shall be carried out by the successful contractor. The provisional quantity only has been indicated in the **Schedule of work.**

5.2 The single line diagram of existing UG lines and **DT(s) proposed** for installation etc. works and where works require to be carried out shall be available in the office of the DGM, Capital Complex Electrical Division, Agartala wherefrom the same can be obtained by the contractor. The detailed survey shall be carried out by the contractor along the suggested route. The contractor will examine the site of works and its surroundings and obtain at his own responsibility and expenses, all information regarding general site characteristics, crossings, accessibility, infrastructure details etc. The Owner will, however, assist the interested contractor to see and inspect the site of work. For this purpose the contractors are requested to contact the **Dy. General Manager, Capital Complex Electrical Division, Agartala.**



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- 5.3 The contractor should note that the Owner will not furnish the topographical map prepared by Archeological Survey of India but will make available any assistance that may be required for obtaining topographical map.
- 5.4 In case the 11 KV underground cables is to be laid along the municipal road / highway or any other road than the ones mentioned above, the contractor shall make preliminary survey to assess such requirement and take into account in his bid. TSECL will provide support and assistance in getting approval from civic authorities. However, proposal for approval shall be submitted by the contractor well in time.
- 6.0 Clearance from Ground, Building, Trees etc.:** Clearance from ground, building, trees and telephone lines shall be provided in conformity with the Indian Electricity Rules 1956.
- 6.1 The tree cutting shall be the responsibility of the contractor at the time of survey as well as during actual execution. However, the contractor shall count, mark and put proper Nos. with suitable quality of paint at his own cost on all the trees that are to be cut by him at the time of actual execution of work. Contractor may note that TSECL shall not pay any compensation for any loss or damage to the properties or for tree cutting necessitated due to contractor's work.
- 6.2 Any way-lay which may be required shall be arranged by the by the contractor .TSECL will provide all support and assistance for such way lay as required but ultimate responsibility rests with the contractor.
- 6.3 To evaluate and tabulate the trees and bushes coming within 6.096 m on either side of the centre alignment of the support, the trees will be numbered and marked with quality paint serially from angle point 1 onwards and corresponding number will be painted on the stem of trees at a height of 1m from ground level. The trees listed should contain the following information:
- a) Girth (circumference) measured at a height of 1 m from ground level.
 - b) Approximate height of the tree with an accuracy of +/- 2 mtrs.
 - c) Name & the type of the species / tree.
- 6.4 The profile sheets duly spotted with preliminary schedule indicating position of poles, wind span, weight span, angle of deviation, river or road crossings and other details shall be submitted for approval of the Owner. After approval, the contractor shall submit six copies of approved profile along with one set of reproducible final profile drawing to the Owner for record purpose.

7.0 Environmental Conditions:

General Climatic Conditions:

The installations are required to operate satisfactory under the following site conditions:

- i) Max. temperature 50 Degree C
- ii) Min. temperature -3 Degree C
- iii) Max. relative humidity 100%



- iv) Min. relative humidity 26%
- v) Average No. of rainy days / annum Nearly 120 days.
- vi) Average annual rainfall 900 mm
- vii) Average No. of dust storm days / annum 35
- viii) Isoceraunic level 45
- ix) Max. Wind pressure 195 kg./sq.m.
- x) Altitude above mean sea level Less than 1000 M

The area is in extreme climatic belt. Monsoons are generally active in the area from the month of June to September. The area is also prone to mild dust storms during the months of Oct to March. The maximum temperature in summer season shall be of the order of 50°C and minimum temperature in winters shall be of the order of 3°C. Normal day temperature during summer is 40°C. Hail & Storm takes place in the months of April & May.

8.0 Technical Data:

The contractor shall furnish all technical data as per relevant schedules in five copies.

9.0 Statutory Regulations and Standards:

9.1 Statutory Regulations:

The contractor is required to follow Statutory Regulations stipulated in **Electricity Act 2003** and **Indian Electricity Rules 1956** as amended to-date and other local rules and regulations referred to in this specification.

9.2 Reference Standards:

The work shall be carried out in accordance with specifications & construction standards attached hereto. The **codes or standards** referred to in this specification shall govern in all cases wherever such references are made. In case of conflict between such codes or standards and specification, latter shall govern. Such codes or standards referred to shall mean the latest revision, amendments/ changes adopted and published by relevant agencies. Other internationally accepted standards, which ensure equivalent or better performance than those specified shall also be accepted. All tested steel sections shall be supplied conforming to relevant Indian Standard Specifications.

10.0 Quality Assurance, Inspection and Testing:

10.1 QUALITY CONTROL



Quality Control Procedures for the manufacture of **11 KV XLPE cable jointing KITS, Steel Sections (MS. Channel, MS. Flat, MS angle), Nuts & Bolts, G.I. Pipe, ACSR** etc. shall be prepared by the contractor and submitted to the TSECL for approval.

10.2 Quality Assurance Program

This shall be prepared and followed to ensure that the equipment, materials and services under the scope of the contract whether manufactured or performed within the contractor's works or at his subcontractors' premises or at the TSECL's site or at any other place of work are in accordance with the specifications. The contractor shall adopt suitable quality assurance program to control all activities at all points necessary. Such program shall be broadly outlined in his bid and finalized after discussions with the TSECL before the award of the contract. The contractor shall submit his detailed program after the award of the contract for approval by the Owner after discussion. However, in case a detailed valid program approved by the TSECL already exists, same would be followed till its validity. The quality assurance program by the contractor shall generally cover the following:

- (a) Organization structure for the management and implementation of the proposed quality assurance program;
- (b) Documentation of control system;
- (c) Qualification data of contractor's key personnel;
- (d) The procedure for purchase of materials, parts components and selection of sub-contractors' services including Contractor analysis, source inspection, incoming raw material inspection, verification of material purchases, etc.
- (e) System for shop manufacturing and site erection controls including process control, fabrication and assembly control;
- (f) Control of non-conforming items and system for corrective actions;
- (g) Inspection and test procedure both for manufacture and field activities;
- (h) Control of calibration and testing and measuring of field activities;
- (i) System for indication and appraisal of inspection status;
- (j) System for quality audits;
- (k) System for authorizing release of manufactured products to the TSECL;
- (l) System for maintenance of records;
- (m) System for handling, storage and delivery; and
- (n) A quality plan detailing the specific quality control measures and procedures for controlling the quality characteristics relevant to each item of equipment and materials furnished and/or services rendered.



10.2.1 The Owner or his duly authorized representative reserves the right to carry out quality audits and quality surveillances of the system and procedures of the contractor, his sub-contractors' quality management and control activities.

10.2.2 The contractor will be required to submit all quality assurance documents as stipulated in the quality program at the time of the Owner's inspection of equipment and materials.

10.2.3 The contractor shall adopt suitable quality assurance program to control each activity. Such program shall be outlined by the contractor and shall be finally accepted by the Owner.

10.3 Inspection and Testing:

Refer clause no. 26 of Section – III, General Terms & Conditions of Contract.

10.4 General

10.4.1 **All goods/ Jointing Kits** being supplied, shall conform to type tests, sample tests as per the technical specifications and shall be subject to routine, acceptance and site tests in accordance with requirements stipulated under the respective sections, unless otherwise stated. The Owner reserves the right to witness any or all the type and sample tests. The contractor shall inform the Owner of the detailed program of tests at least two (2) weeks in advance in case of domestic supplies.

10.4.2 The contractor shall furnish to the Owner the reports of all type tests, sample and routine tests as per technical specification along with the equipment/materials drawings. The type tests conducted earlier should have been conducted in accredited laboratories (based on ISO/IEC by a reputed accreditation body) or witnessed by Owner or another electric power utility. The type test reports submitted shall be of the tests conducted within last five (5) years prior to the date of bid opening. In case the test reports are of a test conducted five (5) years prior to the date of bid opening, and don't correspond to the offered equipment/material, or don't comply with the Technical Specifications, the contractor shall repeat this / these test / tests at no extra cost to the Owner before sample (acceptance) tests.

10.4.3 The Owner, his duly authorized representative and/or outside inspection agency acting on behalf of the Owner shall have free access at all reasonable times to the contractor's/sub-Contractor's premises or works and shall have the power at all reasonable times to inspect and examine the equipment /materials and workmanship of the works during its manufacture or erection. If part of the works is being manufactured or assembled at other premises or works, the contractor shall obtain for the Owner, his duly authorized representatives and/or outside inspection agency permission to inspect as if the works were manufactured or assembled on the contractor's own premises or works. Inspection may be made at any stage of manufacture, dispatch or at the site at the option of the Owner, and the equipment if found unsatisfactory due to bad workmanship or quality or material is liable to be rejected.

10.4.4 When the factory tests have been completed at the contractor's or subcontractor's works, the Owner / Inspector shall issue a certificate to this effect within fifteen (15) days after the completion of the tests, but if the tests are not witnessed by the Owner/Inspector, the certificate shall be issued within 15 days of receipt of the contractor's test certificate by the Owner's representative. Failure of the Owner / Inspector to issue such a certificate shall not prevent the contractor from proceeding with



the works. The completion of these tests or the issue of the certificate shall not bind the Owner to accept the equipment/materials should it, on further tests after erection, be found not complying with the contract. The equipment / materials shall be dispatched to site only after approval of test reports and issuance of the inspection certificate by the Owner.

10.4.5 The inspection by the Owner and issue of the inspection certificate thereon shall in no way limit the liabilities and responsibilities of the contractor in respect to the agreed quality assurance program forming part of the contract.

10.4.6 The Owner will have the right of having at contractor's expenses any other test(s) of reasonable nature carried out at the manufacturer's premises or at any other place in addition of aforesaid type and routine tests to satisfy that the equipment / materials comply with the specifications.

10.4.7 The Owner deserves the right for getting any field tests not specified in the respective sections of the technical specifications conducted on the completely assembled equipment at site. The Owner will provide the testing equipment for these tests.

10.4.8 The contractor shall ensure that his subcontractors manufacturing and supplying the goods (material and equipment) shall perform the routine tests specified in the related standards and in the technical specifications of this contract regularly.

10.4.9 The contractor shall notify the Owner in writing at least two (2) weeks in advance for inspection and testing or as otherwise directed in advance of the date and place at which any material or work will be ready for inspection and testing.

10.4.10 Should any postponement become necessary; the contractor shall provide written notification at least one week prior to the originally scheduled date. The Owner shall give 48 hours' notice in writing to the contractor, of his intention to attend the tests, or ask for postponement, if required.

10.4.11 Should the Owner explicitly waive to attend the relevant test, the contractor may proceed with the test, which shall be deemed to have been made in his presence, and the contractor shall forthwith forward to the Owner duly certified copies of the test reports for approval.

10.4.12 All sample and type tests will be performed at the presence of the authorized personnel of the contractor or inspectors authorized by the contractor, if there is no representative of Owner. Owner may or may not be present in any or all sample and type tests but all test reports shall be approved by Owner. This procedure shall not release the contractor from any of his responsibilities or obligations under this contract. The contractor shall prepare and agree with the Owner, the test programs so that tests to be performed in countries (i.e., at manufacturer's factory recognized test facilities) are carried out in sequence which would permit TSECL to organize in an optimal manner the supervision of the said tests by the inspection agency.

ACRONYMS

Reference Abbreviations Name and Address	
IEC	International Electro Technical Commission Bureau Central de la Commission Electro Technique International, Rue de verembe Geneva, Switzerland



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ISO	In International Organization for Standardization, Danish Board of Standardization Aurchoegyej-12 DK-2900, Heerprup, DENMARK
ISS	Indian Standard Bureau of Indian Standards Nanak Bhavan 9, Bahadur Shah ZafarMarg, NEW DELHI-110002, INDIA

11. SPECIFIC REQUIREMNT

The contractor shall be responsible for safety of human and equipment during erection, construction, testing & commissioning and during working in the locations.. It will be the responsibility of the contractor to co-ordinate and obtain electrical inspector's clearance before commissioning. Any additional items or modification due to observation of such statutory authorities shall be provided by the contractor at no extra cost.

.....***.....



SECTION-V

1. FOREWORD

The provisions under this section are intended to supplement general requirements for the materials, equipments, **erection, construction and services** covered under other sections of this bid document and are not exclusive. However in case of conflict between the requirements specified in this section and requirements specified under other sections, the requirements specified under respective sections shall prevail.

2. GENERAL REQUIREMENT

- 2.1 The bidders shall submit the technical requirements, data and information as per the technical data sheets provided in this Section.
- 2.2 The contractors shall furnish catalogues, engineering data, technical information, design **documents, drawings relating to supply of cable accessories, other sundry materials, erection key diagram and construction etc.**
- 2.3 It is recognized that the manufacturers' may have standardized the use of certain components, materials, processes or procedures different from those specified herein. Alternate proposals offering similar equipment based on the manufacturer's standard practice will also be considered provided such proposals meet the specified designs, standard and performance requirements and are acceptable to the Owner.
- 2.4 Except for lighting fixtures, wherever a material or article is specified or defined by the name of a particular brand, manufacturer or Contractor, the specific name mentioned shall be understood as establishing type, function and quality and not as limiting competition.
- 2.5 Equipment furnished shall be complete in every respect with all mountings, fittings, fixtures and standard accessories normally provided with such equipment and/or needed for erection, completion and safe operation of the equipment as required by applicable codes though they may not have been specifically detailed in the Technical Specifications unless included in the list of exclusions. Materials and components not specifically stated in the specification but which are necessary for satisfactory operation, unless specifically excluded, shall be deemed to be included in the scope of the specification and shall be supplied without any extra cost. All similar standard components/ parts of similar standard equipment provided shall be inter-changeable with one another.

3. STANDARDS

- 3.1 The erection & construction works including supply of specific sundry materials and accessories covered by the specification shall be designed, engineered, manufactured, built, tested and commissioned in accordance with the Acts, Rules, Laws and Regulations of India.
- 3.2 The equipment to be furnished under this specification shall conform to latest issue with all amendments (as on the date of bid opening) of standard specified in this document, unless specifically mentioned in the specification.
- 3.3 The bidder shall note that standards mentioned in the specification are not mutually exclusive or complete in themselves, but intended to complement each other.



- 3.4 The bidder shall also note that list of standards presented in this specification is not complete. Whenever necessary, the list of standards shall be considered in conjunction with specific IS/IEC.
- 3.5 When the specific requirements stipulated in the specifications exceed or differ than those required by the applicable standards, the stipulation of the specification shall take precedence.
- 3.6 Other internationally accepted standards which ensure equivalent or better performance than that specified in the standards specified under individual sections for various equipments shall also, be accepted, however the salient points of difference shall be clearly brought out in additional information schedule with English language version of such standard. The equipment conforming to standards other than specified under individual sections for various equipments shall be subject to Owner's/owner's approval.
- 3.7 The contractor shall clearly indicate the specific standards in accordance with which the works will be carried out.

4. SERVICES TO BE PERFORMED BY THE EQUIPMENT BEING FURNISHED:

- 4.1 All equipment shall perform satisfactorily under various electrical, electromechanical and meteorological conditions of the site of installation.
- 4.2 All equipment shall be able to withstand all external and internal mechanical, thermal and electromechanical forces due to various factors like wind load, temperature variation, short circuit etc for the equipment.
- 4.3 The terminal connectors of the equipment shall be designed taking into account various forces that are required to be withstood.
- 4.4 The equipment shall also comply with the following:
- a) All outdoor equipments except marshalling kiosks etc. shall be suitable for hot line washing.
 - b) To facilitate erection of equipment, all items to be assembled at site shall be "match marked".
 - c) All piping, if any between equipment control cabinet / operating mechanism to marshalling box etc. of the equipment, shall bear proper identification to facilitate the connection at site.



SECTION – VI

TECHNICAL SPECIFICATION SECTION

A. GALVANIZED IRON PIPES:

1.0 SCOPE:

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

2.0 MATERIAL:

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

3.0 DIMENSIONS 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 free from defects such as cracks etc.

6.0 GALVANISING:

Pipes shall be galvanised 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 galvanising.
- ◆ Galvanising Bath: The molten metal in the galvanising 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.



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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 conforming 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, licence 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.

B. HEAT SHRINKABLE TYPE TERMINATIONS FOR 11 KV XLPE CABLES

1. 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. 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. CLIMATIC CONDITIONS:

As mentioned in the General Climatic Conditions in **clause 9 of Sec-IV**.

4. 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. 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 solidly earthed neutral for working voltage of 11 KV. 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 is made and contractors shall categorically confirm 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 armourearthing 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 50 degree Centigrade for more than 5 years.

5.2.9 The **fault level (as well as duration) withstand capability** of terminations should be strictly matching with the 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. GUARANTEED TECHNICAL PARTICULARS:

The terminations shall have **same electrical and thermal characteristics as those of cables with which these are intended to be used.**

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

8. 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:

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. INSPECTION:

9.1 All test and inspection shall be made at the place of manufacture unless otherwise especially agreed upon by the manufacturer / bidder/contractor and purchaser (TSECL) 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. Cost of



inspection including to and fro expenses of at least two nos. inspectors of TSECL shall be borne by the contractor.

9.2 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.

10. 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.EARTHING AND EARTHING WITH 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.

1.0 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 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.
- i. 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 g/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.

- ii. 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.

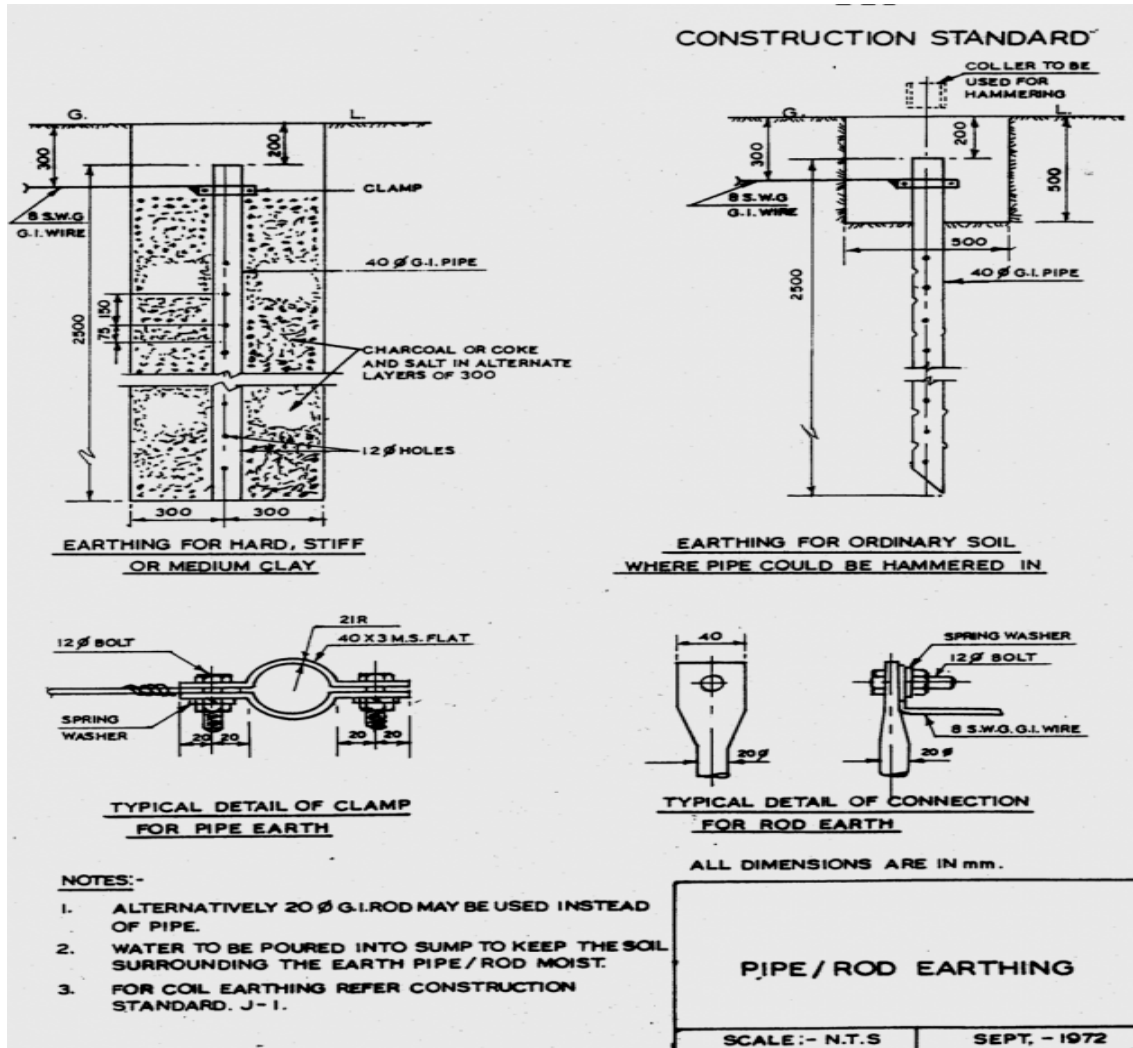
(b) One direct connection with Lightning arrester on H.T. side (11KV) and cross-arm.

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.



TECHNICAL SPECIFICATION FOR 11KV XLPE HT POWER CABLE:

1.0 SCOPE:

This Section of the Specification covers design, manufacturing, testing, packing, supply & delivery, transportation at site, insurance and lying of 3Core, 11 kV, XLPE, 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:

- a. Maximum ambient temperature in open air($^{\circ}$ C) : 50
- b. Maximum ambient temperature in shade ($^{\circ}$ C) : 45
- c. Minimum temperature in shade ($^{\circ}$ C) : 3
- d. Relative humidity (%) : 10 to 100
- e. Maximum annual rainfall (mm) : 1450



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- 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 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 ASTM D 2863)
Acid Gas Generation	Max 20% (as per IEC 7541)
Smoke Density Rating	60% (as per ASTM D 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 (U₀ / 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



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(vi) Variation in frequency %	: ± 3
(vii) (a) Maximum allowable temp. of conductor during continuous normal operation at rated full load current. °C	: 90
(b) Maximum allowable temp. under short circuit condition °C	: 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 earthing	: 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 tanded 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 deteriorious 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:**



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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.

Quality Assurance plans shall be submitted.

5.9 Current Rating:

5.9.1 The indicative value of continuous current carrying capacities at Maximum conductor temperature of 90° C (for design purpose by field) of the various sizes of the cables are given below:

Sl. No	Size of 3 Core Cable (Sq.mm)	Continuous Current Carrying Capacity in Amp	
		In Ground	In Air
1	50	130	140
2	95	185	200
3	120	200	230
4	150	235	265
4	185	270	310
5	240	305	345
6	300	340	396

5.9.2 Short circuit ratings of various sizes of 3 core cable calculated for duration of one second at maximum temperature of 250° C, are given below:

Sl. No	Size of 3 Core Cable (Sq.mm)	Conductor short circuit rating in kA (rms)
1	50	4.70
2	95	8.93
3	120	11.28
4	150	14.1
4	185	17.4



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5	240	22.6
6	300	28.2

5.9.3 The current rating shall be based on maximum conductor temperature of 900 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, coloured strip of Red, Yellow and Blue colours 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 repetition 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 at least 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

7.1 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.

7.2 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.

7.3 The contractor shall keep the Owner informed in advance about the program of manufacturing of cables so that arrangement can be made for inspection.

7.4 The Owner reserves the right to insist for witnessing the acceptance / routing tests of

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 paint. 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.

10.0 MARKING

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

- (a) Name of manufacturer (b) Year of manufacture (c) Voltage grade (d) Size of cable (e) TSECL.

TECHNICAL SPECIFICATIONS OF XLPE CABLE LAYING & TERMINATION WORK

1. **SCOPE-** This chapter covers the requirements for the selection, installation, jointing & Commissioning of power cables as per present scope of work .For details not covered in these Specifications, IS : 1255 - 1983 CODE OF PRACTICE FOR INSTALLATION AND



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MAINTENANCE Of POWER CABLES. All references to BIS-Specifications and codes are for codes with amendments issued upto date i.e. till the date of call of tender.

2. STORAGE AND HANDLING

- I. The cable drums shall be stored on a well-drained, hard surface, so that the drums do not sink in the ground causing rot and damage to the cable drums. Paved surface is preferred, particularly for long term storage.
- II. The drums shall always be stored on their flanges, and not on their flat sides.
- III. Both ends of the cables should be properly sealed to prevent ingress/ absorption of moisture by the insulation during storage.
- IV. Protection from rain and sun is preferable for long term storage for all types of cables. There should also ventilation between cable drums.
- V. During storage, periodical rolling of drums once in, say, 3 months through 90 degrees shall be done,
- VI. Damaged battens of drums etc. should be replaced as may be necessary.
- VII. When the cable drums have to be moved over short distances, they should be rolled in the direction of the arrow marked on the drum.
- VIII. For manual transportation over long distances, the drum should be mounted on cable drum wheels, strong enough to carry the weight of the drum and pulled by means of ropes. Alternatively, they may be mounted on a trailer or on a suitable mechanical transport.
- IX. For loading into and unloading from vehicles, a crane or a suitable lifting tackle should be used. Small sized cable drums can also be rolled down carefully on a suitable ramp or rails, for unloading, provided no damage is likely to be caused to the cable or to the drum.

3. INSTALLATION

- I. Cables with kinks, straightened kinks or any other apparent defects like defective armouring etc. shall not be installed
- II. Cables shall not be bent sharp to a small radius either while handling or in installation. The minimum safe bending radius for PVC/XLPE (MV) cables shall be 12 times the overall diameter of the cable. The minimum safe bending radius for PILCA/XLPE (HV) cables shall be as permissible in IS:1255-1983 . At joints and terminations, the bending radius of individual cores of a multi core cable of any type shall not be less than 15 times its overall diameter.
- III. The ends of cables, suitable sealing compound/tape shall be used for this purpose, if likely exposed to rain in transit storage. Suitable heat shrinkable caps may also be used for the purpose
While the shortest practicable route should be preferred, the cable route shall generally follow fixed developments such as roads, foot paths etc. with proper offsets so that future maintenance, identification etc. are rendered easy
- IV. Cable route shall be planned away from drains and near the property, As far as possible; the alignment of the cable route shall be decided after taking into consideration the present and likely future requirements of other services including cables route, possibility of widening of roads/lanes etc
- V. Corrosive soils, ground surrounding sewage effluent etc. shall be avoided As far as possible, the alignment of the cable route shall be decided after taking into consideration the present and likely future requirements of other services including cables route, possibility of widening of roads/lanes etc for the routes.
- VI. Power and communication cables shall as far as possible cross each other at right angles. The horizontal and vertical clearances between them shall not be less than 60cm.
- VII. Way leave for the cable route shall be obtained as necessary, from the appropriate authorities
- VIII. *Route indicators* - Power cable route Indicators should be provided at an interval not exceeding 200 M and also at turning points of the power cable route wherever practicable.



IX.

4. Methods of laying:-

(a) Trenching

- I. XLPE cables under the present scope of work will be laid through digging a trench of 500 mm width and 1200 mm depth excluding locations where it is likely to vary on higher side. The trenches shall be excavated in reasonably straight lines. Wherever there is a change in the direction, a suitable curvature shall be adopted complying with the requirements of IS:1255-1983
- II. Where gradients and changes in depth are unavoidable, these shall be gradual.
- III. The bottom of the trench shall be level and free from stones, brick bats etc.
- IV. The excavation should be done by suitable means-manual or mechanical. The excavated soil shall be stacked firmly by the side of the trench such that it may not fall back into the trench.
- V. Adequate precautions should be taken not to damage any existing cable(s), pipes or any other such installations in the route during excavation.

(b) Sand cushioning

- I. Sand cushioning of 600 mm thick to be placed at the bottom of the trench to form a bed for the cables. **When the cables have been laid they shall be inspected and accepted by the Engineer in Charge.** They shall then be covered with second Sand layer which shall be punned around and over the cables to a level of 100mm above the top of the cables. Where more than one horizontal layer of cables is to be laid similar sand bedding shall be provided for each layer.

(c) Flat Brick soling

- I. Two layers of First class brick of nominal size 22cmX11.4cmX7 cm **over the second sand layer to be placed centrally over the cables, throughout the length of the cable.** The bricks to be placed breadth-wise for the full length of the cable. No final filling in of trenches shall be commenced until the Engineer in charge has accepted the placing of Plain Flat Brick soling.
- II. Where more than one cable is to be laid in the same trench, this protective covering shall cover all the cables and project at least 5cm over the sides of the end cables.

(d) Back filling with excavated earth :- The trenches to be then back-filled with excavated earth, free from stones or other sharp ended debris and shall be rammed and watered, in successive layers not exceeding 30cm depth. A crown of earth not less than 50mm and not exceeding 100mm in the centre and tapering towards the sides of the trench shall be left to allow for subsidence. The crown of the earth however, should not exceed 10 Cms so as not to be a hazard to vehicular traffic. The temporary re-statements of roadways should be inspected at regular intervals, particularly during wet weather and settlements should be made good by further filling as may be required.

- **Extra loop cable:-** Approximately 3m of surplus cable shall be left on each terminal end of the cable and on each side of the underground joints. The surplus cable shall be left in the form of a loop. Where there are long runs of cables such loose cable may be left at suitable intervals as specified by the Engineer-inCharge.
- **Trenching, laying & sand cushioning work related to coiling of excess Cable and Cable Joints to be provided with same technical specification as detailed above.**

(e) Testing before laying

- I. All the time of issue of cables for laying, the cables shall be tested for continuity and insulation resistance \
- II. The cable drum shall be properly mounted on jacks, or on a cable wheel at a suitable location, making sure that the spindle, jack etc. are strong enough to carry



- the weight of the drum without failure, and that the spindle is horizontal in the bearings so as to prevent the drum creeping to one side while rotating.
- III. The cable shall be pulled over on rollers in the trench steadily and uniformly without any jerks and strain. The entire cable length shall as far as possible be laid off in one stretch. PVC/XLPE cables less than 120sq.mm. size may be removed by "Flaking" i.e. by making one long loop in the reverse direction.
- IV. After the cable has been so uncoiled, it shall be lifted slightly over the rollers beginning from one end and by helpers standing about 10m apart and drawn straight. The cable shall then be lifted off the rollers and laid in a reasonably straight line.

(f) Testing before covering

The cables shall be tested for continuity of cores and insulation resistance and the cable length shall be measured, before closing the trench. The cable end shall be sealed /covered.

(g) Laying of single core cables

- I. Three single core cables forming one three phase circuit shall normally be laid in close trefoil formation and shall be bound together at intervals of approximately 1m.
- II. The relative position of the three cables shall be changed at each joint at the time of original installation, complete transposition being effected in every three consecutive cable lengths.
- III. Route *indicators* - Power cable route Indicators should be provided at an interval not exceeding 200 M and also at turning points of the power cable route wherever practicable.

(h) Earthing and Bonding

- I. The metal sheath, metal screen (if any) and armour of any cable should be efficiently earthed at both ends.
- II. In case of single-core cables of larger sizes, the armour, lead sheath and metal screen, if any, is bonded at times only at one point.
- III. Attention is drawn in this case to the presence of standing voltages along armour or lead sheath and to the considerable increase in such voltages when cables carry fault currents, These voltages must be taken into account when considering safety and outer sheath insulation requirement,
- IV. All metal pipes or conduits in which the cables have been installed, should be efficiently bonded and earthed.

Where cables not having metallic sheath are used, embedding additional earth electrodes and connecting the same with steel armour of cable becomes necessary, Earthing and bonding should be done in accordance with IS : 3043-1966

(i) High Voltage Test:- Cables after jointing and terminating are subjected to DC high voltage test as detailed below. The leakage current shall also be measured and recorded for future reference.



DC Test Voltages after Installation (Before Commissioning)			
Rated Voltage of Cables(KV)	Test Voltage between		Duration (in Minutes)
	Any Conductor and Mettalic Sheath / Screen / Armour (in KV)	Conductor to Conductor (for Un Screened Cables(in KV)	
19/33	3	3	5

During the high voltage test, all other electrical equipment related to the cable installation, such as switches, instrument transformers, bus bars, etc, must be earthed and adequate clearance should be maintained from the other equipment and framework to prevent flashovers. In each test, the metallic sheath/screen/armour should be connected, to earth.

(j) **CABLE INSTALLATION PLAN:-** On completion of laying, terminating and jointing of the cables, a plan should be prepared, which should contain the following details of the installation.

- I. Type of cables, cross-section area, rated voltage. Details of construction, cable number and drum number;
- II. Year and month of laying;
- III. Actual length between joint-to-joint or ends;
- IV. Location of cables and joints in relation to certain fixed reference points, for example, buildings, hydrant, boundary stones, etc;
- V. Date of making joint; and
- VI. Results of original electrical measurements and testing on cable installation.
- VII. Cables shall be properly arranged in the trenches such that criss crossing is avoided and final take off to feeder pillars / poles or as required as specified or as per approved drawing is facilitated. Contractors are responsible for arrangement of cables in cable trench. Adequate sizes of GI pipe sleeves shall be utilized for end termination of cable. Pipe sleeves shall be laid at an angle of maximum 45° to the trench wall. In case of larger dia cables i.e. 50 mm and above adequately sized pipe with larger bend radius shall be provided for ease of drawing of cable or for replacement. In place where it is not possible, a smaller trench may be provided as approved by Engineer in charge.
- VIII.** Cable markers shall be provided as directed at **every 30 m and at cable joint locations.**
- IX. Temporary ends if any shall be protected against dirt and moisture and prevents damage to the insulation. Proper PVC or rubber insulating tape shall be used. Use of friction type or fabric tape is not permitted
- X. Cables laid underground in excavated cable trenches shall be as per the approved drawings. Trenches shall be of sufficient depth and width for laying of all cables. Cables shall be spaced properly so that heat dissipation is attained..
- XI. Cables shall be laid in trenches as shown in the drawing. Before laying the cable the bottom of trench shall be filled with sand 150 mm of depth duly leveled. The cables laid on this sand shall be covered with further 150 mm depth sand on top of largest diameter of the cable. Sand shall be lightly pressed. Protective covering



of suitable bricks / HT tiles/ half round slab as specified and as per approved drawings shall be provided before back filling the trench with soil, rammed and leveled.

XII. Insulation resistance test of all the cables shall be taken in presence of Engineer in charge. Defective cables shall be immediately replaced before laying of cables of other groups.

XIII. Suitable GI / HDPE/ RCC hume pipes for protection as directed shall be provided as required. Cable ends shall be drawing carefully through such pipes to prevent damage to the cable. Radius at bending shall not be less than the recommended bending radius of the cables specified by the manufacturer. Standard gauge of pipe filling shall be used for sizing the pipe.

XIV. Prior approvals for cutting holes for laying cable in existing structures and foundations shall be obtained from the Engineer in charge.

XV. GI pipes laid for cable laying shall be bend with hydraulically operated bending machine.(which is to be arranged by the contractor).Bends of pipes shall be placed in such a way that they are concealed in wall, soil or structures. The open end of the pipes shall be suitably plugged with plugs supplied by the contractor at no extra cost.

XVI. Supporting angles for cables shall be suitably clamped / tied by means of nylon cords and the angles shall be painted before laying the cables. The paint shall be done with one coat of red lead paint and two coats of approved bituminous aluminum paint unless otherwise specified.

G. CIVIL WORK

1.0 Scope:-

1.1 **This covers the following:-**

- a) The required earth excavation work in the Road, Sub-Station including back filling and neatly dressing of site.
- b) The required concrete work for equipment foundation including supply of M.S.T or round Rods , cement, sand, brick aggregate.
- c) Construction of Cable trench wherever necessary for laying of cables for electrical equipments and providing RCC slabs on cable trenches as required. The contractor shall construct cable- trench as per direction of Engineer-in-charge.
- d). Construction of foundation bases for electrical equipments to be installed with R.C.C. as well as cementconcrete work as per approved drawing and design.

21. Remaining if any items:

Reputed manufacturer having credentials of supplying to different Central / State power utilities with latest **IS of respective materials.**

i. **TECHNICAL SPECIFICATIONS OF 1.1 KV XLPE CABLE LAYING & TERMINATION WORK**

5. SCOPE



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This chapter covers the requirements for the selection, installation, jointing & Commissioning of power cables as per present scope of work .For details not covered in these Specifications, IS : 1255 - 1983 CODE OF PRACTICE FOR INSTALLATION AND MAINTENANCE OF POWER CABLES. All references to BIS-Specifications and codes are for codes with amendments issued upto date i.e. till the date of call of tender.

6. STORAGE AND HANDLING

- X. The cable drums shall be stored on a well drained, hard surface, so that the drums do not sink in the ground causing rot and damage to the cable drums. Paved surface is preferred, particularly for long term storage.
- XI. The drums shall always be stored on their flanges, and not on their flat sides.
- XII. Both ends of the cables should be properly sealed to prevent ingress/ absorption of moisture by the insulation during storage.
- XIII. Protection from rain and sun is preferable for long term storage for all types of cables. There should also ventilation between cable drums.
- XIV. During storage, periodical rolling of drums once in, say, 3 months through 90 degrees shall be done,
- XV. Damaged battens of drums etc. should be replaced as may be necessary.
- XVI. When the cable drums have to be moved over short distances, they should be rolled in the direction of the arrow marked on the drum.
- XVII. For manual transportation over long distances, the drum should be mounted on cable drum wheels, strong enough to carry the weight of the drum and pulled by means of ropes. Alternatively, they may be mounted on a trailer or on a suitable mechanical transport.
- XVIII. For loading into and unloading from vehicles, a crane or a suitable lifting tackle should be used. Small sized cable drums can also be rolled down carefully on a suitable ramp or rails, for unloading, provided no damage is likely to be caused to the cable or to the drum.

7. INSTALLATION

- X. Cables with kinks, straightened kinks or any other apparent defects like defective armouring etc. shall not be installed
- XI. Cables shall not be bent sharp to a small radius either while handling or in installation. The minimum safe bending radius for PVC/XLPE (MV) cables shall be 12 times the overall diameter of the cable. The minimum safe bending radius for PILCA/XLPE (HV) cables shall be as permissible in IS:1255-1983 . At joints and terminations, the bending radius of individual cores of a multi core cable of any type shall not be less than 15 times its overall diameter.
- XII. The ends of cables, suitable sealing compound/tape shall be used for this purpose, if likely exposed to rain in transit storage. Suitable heat shrinkable caps may also be used for the purpose
While the shortest practicable route should be preferred, the cable route shall generally follow fixed developments such as roads, foot paths etc. with proper offsets so that future maintenance, identification etc. are rendered easy
- XIII. Cable route shall be planned away from drains and near the property, As far as possible; the alignment of the cable route shall be decided after taking into consideration the present and likely future requirements of other services including cables route, possibility of widening of roads/lanes etc
- XIV. Corrosive soils, ground surrounding sewage effluent etc. shall be avoided As far as possible, the alignment of the cable route shall be decided after taking into consideration the present and likely future requirements of other services including cables route, possibility of widening of roads/lanes etc for the routes.
- XV. Power and communication cables shall as far as possible cross each other at right angles. The horizontal and vertical clearances between them shall not be less than 60cm.
- XVI. Way leave for the cable route shall be obtained as necessary, from the appropriate authorities
- XVII. *Route indicators* - Power cable route Indicators should be provided at an interval not exceeding 200 M and also at turning points of the power cable route wherever practicable.

8. Methods of laying:-

(a) Trenching

- VI. XLPE cables under the present scope of work will be laid through digging a trench of 500 mm width and 1100 mm depth excluding locations where it is likely to vary on higher side. The trenches shall be excavated in reasonably straight lines. Wherever there is a change in the direction, a suitable curvature shall be adopted complying with the requirements of IS:1255-1983
- VII. Where gradients and changes in depth are unavoidable, these shall be gradual.
- VIII. The bottom of the trench shall be level and free from stones, brick bats etc.
- IX. The excavation should be done by suitable means-manual or mechanical. The excavated soil shall be stacked firmly by the side of the trench such that it may not fall back into the trench.



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- X. Adequate precautions should be taken not to damage any existing cable(s), pipes or any other such installations in the route during excavation.

(b) Sand cushioning

- II. Sand cushioning of 100 mm thick to be placed at the bottom of the trench to form a bed for the cables. **When the cables have been laid they shall be inspected and accepted by the Engineer in Charge.** They shall then be covered with second Sand layer which shall be punned around and over the cables to a level of 100mm above the top of the cables. Where more than one horizontal layer of cables is to be laid similar sand bedding shall be provided for each layer.

(c) Flat Brick soling

- III. One layer of First class brick of nominal size 22cmX11.4cmX7 cm **over the second sand layer to be placed centrally over the cables, throughout the** length of the cable. The bricks to be placed breadth-wise for the full length of the cable. No final filling in of trenches shall be commenced until the Engineer in charge has accepted the placing of Plain Flat Brick soling.
- IV. Where more than one cable is to be laid in the same trench, this protective covering shall cover all the cables and project at least 5cm over the sides of the end cables.

(d) Back filling with excavated earth :- The trenches to be then back-filled with excavated earth, free from stones or other sharp ended debris and shall be rammed and watered, in successive layers not exceeding 30cm depth. A crown of earth not less than 50mm and not exceeding 100mm in the centre and tapering towards the sides of the trench shall be left to allow for subsidence. The crown of the earth however, should not exceed 10 Cms so as not to be a hazard to vehicular traffic. The temporary re-statements of roadways should be inspected at regular intervals, particularly during wet weather and settlements should be made good by further filling as may be required.

- **Extra loop cable:-** Approximately 3m of surplus cable shall be left on each terminal end of the cable and on each side of the underground joints. The surplus cable shall be left in the form of a loop. Where there are long runs of cables such loose cable may be left at suitable intervals as specified by the Engineer-in-Charge.
- **Trenching, laying & sand cushioning work** related to coiling of excess Cable and Cable Joints to be provided with same technical specification as detailed above.

(e) Testing before laying

- V. All the time of issue of cables for laying, the cables shall be tested for continuity and insulation resistance \
- VI. The cable drum shall be properly mounted on jacks, or on a cable wheel at a suitable location, making sure that the spindle, jack etc. are strong enough to carry the weight of the drum without failure, and that the spindle is horizontal in the bearings so as to prevent the drum creeping to one side while rotating.
- VII. The cable shall be pulled over on rollers in the trench steadily and uniformly without any jerks and strain. The entire cable length shall as far as possible be laid off in one stretch. PVC/XLPE cables less than 120sq.mm. size may be removed by "Flaking" i.e. by making one long loop in the reverse direction.
- VIII. After the cable has been so uncoiled, it shall be lifted slightly over the rollers beginning from one end by helpers standing about 10m apart and drawn straight. The cable shall then be lifted off the rollers and laid in a reasonably straight line.

(f) Testing before covering

The cables shall be tested for continuity of cores and insulation resistance and the cable length shall be measured, before closing the trench. The cable end shall be sealed /covered.

(g) Laying of single core cables

- IV. Three single core cables forming one three phase circuit shall normally be laid in close trefoil formation and shall be bound together at intervals of approximately 1m.
- V. The relative position of the three cables shall be changed at each joint at the time of original installation, complete transposition being effected in every three consecutive cable lengths.



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VI. Route indicators - Power cable route indicators should be provided at an interval not exceeding 200 M and also at turning points of the power cable route wherever practicable.

(h) Earthing and Bonding

- V. The metal sheath, metal screen (if any) and armour of any cable should be efficiently earthed at both ends.
- VI. In case of single-core cables of larger sizes, the armour, lead sheath and metal screen, if any, is bonded at times only at one point.
- VII. Attention is drawn in this case to the presence of standing voltages along armour or lead sheath and to the considerable increase in such voltages when cables carry fault currents, These voltages must be taken into account when considering safety and outer sheath insulation requirement,
- VIII. All metal pipes or conduits in which the cables have been installed, should be efficiently bonded and earthed. Where cables not having metallic sheath are used, embedding additional earth electrodes and connecting the same with steel armour of cable becomes necessary, Earthing and bonding should be done in accordance with IS : 3043-1966

(i) High Voltage Test:- Cables after jointing and terminating are subjected to DC high voltage test as detailed below. The leakage current shall also be measured and recorded for future reference.

DC Test Voltages after Installation (Before Commissioning)			
Rated Voltage of Cables(KV)	Test Voltage between		Duration (in Minutes)
	Any Conductor and Metallic Sheath / Screen / Armour (in KV)	Conductor to Conductor (for Un Screened Cables(in KV)	
0.65 / 1.1	3	3	5

During the high voltage test, all other electrical equipment related to the cable installation, such as switches, instrument transformers, bus bars, etc, must be earthed and adequate clearance should be maintained from the other equipment and framework to prevent flashovers. In each test, the metallic sheath/screen/armour should be connected, to earth.

(j) CABLE INSTALLATION PLAN:- On completion of laying, terminating and jointing of the cables, a plan should be prepared, which should contain the following details of the installation.

- XVII. Type of cables, cross-section area, rated voltage. Details of construction, cable number and drum number;
- XVIII. Year and month of laying;
- XIX. Actual length between joint-to-joint or ends;
- XX. Location of cables and joints in relation to certain fixed reference points, for example, buildings, hydrant, boundary stones, etc;
- XXI. Date of making joint; and
- XXII. Results of original electrical measurements and testing on cable installation.
- XXIII. Cables shall be properly arranged in the trenches such that criss crossing is avoided and final take off to feeder pillars / poles or as required as specified or as per approved drawing is facilitated. Contractors are responsible for arrangement of cables in cable trench. Adequate sizes of GI pipe sleeves shall be utilized for end termination of cable. Pipe sleeves shall be laid at an angle of maximum 45° to the trench wall. In case of larger dia cables i.e. 50 mm and above adequately sized pipe with larger bend radius shall be provided for ease of drawing of cable or for replacement. In place where it is not possible, a smaller trench may be provided as approved by Engineer in charge.
- XXIV. Cable markers shall be provided as directed at every 30 m and at cable joint locations.**
- XXV. Temporary ends if any shall be protected against dirt and moisture and prevents damage to the insulation. Proper PVC or rubber insulating tape shall be used. Use of friction type or fabric tape is not permitted
- XXVI. Cables laid underground in excavated cable trenches shall be as per the approved drawings. Trenches shall be of sufficient depth and width for laying of all cables. Cables shall be spaced properly so that heat dissipation is attained..



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- XXVII. Cables shall be laid in trenches as shown in the drawing. Before laying the cable the bottom of trench shall be filled with sand 100 mm of depth duly leveled. The cables laid on this sand shall be covered with further 150 mm depth sand on top of largest diameter of the cable. Sand shall be lightly pressed. Protective covering of suitable bricks / HT tiles/ half round slab as specified and as per approved drawings shall be provided before back filling the trench with soil, rammed and leveled.
- XXVIII. Insulation resistance test of all the cables shall be taken in presence of Engineer in charge. Defective cables shall be immediately replaced before laying of cables of other groups.
- XXIX. Suitable GI / HDPE/ RCC hume pipes for protection as directed shall be provided as required. Cable ends shall be drawing carefully through such pipes to prevent damage to the cable. Radius at bending shall not be less than the recommended bending radius of the cables specified by the manufacturer. Standard gauge of pipe filling shall be used for sizing the pipe.
- XXX. Prior approvals for cutting holes for laying cable in existing structures and foundations shall be obtained from the Engineer in charge.
- XXXI. GI pipes laid for cable laying shall be bend with hydraulically operated bending machine.(which is to be arranged by the contractor).Bends of pipes shall be placed in such a way that they are concealed in wall, soil or structures. The open end of the pipes shall be suitably plugged with plugs supplied by the contractor at no extra cost.
- XXXII. Supporting angles for cables shall be suitably clamped / tied by means of nylon cords and the angles shall be painted before laying the cables. The paint shall be done with one coat of red lead paint and two coats of approved bituminous aluminum paint unless otherwise specified.

I THREE & HALF CORE, XLPE INSULATED AND PVC SHEATHED ARMoured LT CABLES:

SCOPE:- This specification covers the design, manufacturing, testing at manufacturer's works and safe delivery at site the 1100V grade , Aluminium Conductor, XLPE insulated, FRLS PVC inner sheathed, GI wire armoured and FRLS PVC outer sheathed LT power Cables , ISI marked & conforming to IS 7098 Part-I/1988 with latest amendments or the equivalent International Standards,scheduled to be laid and commissioned in the grounded systems as specified within the scope of work detailed in the bid document..

Power supply: 433V, 3 phase, 4 wire, grounded system.

System grounding: Solidly grounded

System fault level: 35 MVA (50 kA) symmetrical

1. STANDARDS :

Unless otherwise stipulated in this specification the following standards with latest amendments shall be applicable.

IS : 7098(Pt-I)/1988	XLPE Insulated (heavy duty) electric cable for working Voltages up to and including 1100 V
IS : 8130/1984	Conductors for insulated cables.
IS : 5831/1984	XLPE insulation and sheath of electric cables.
IS: 10810/1984	Method of test for cables.
IS : 3975/1979	Galvanized Steel Wire/Strips.
IS : 10418/1982	Drums for electric cables.

2. CLIMATIC CONDITIONS :

a.Maximum ambient temperature in open air(°C) : 50



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- 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. Seismic level (Horizontal acceleration) : 0.3 g.
- g. General nature of climate : Moderately hot and humid Tropical climate, conducive to rust and fungus growth.

3. GENERAL REQUIREMENT: Supply and erection of following types of LT XLPE cables with assigned quantities are within the scope of work. The bidder must be agreed for Supply and erection of $\pm 20\%$ of the tendered quantity as per same rate & terms & conditions.

4.1 The material used for construction of the cables shall be of best qualities complying with the requirement of relevant standards. The cables shall be suitable for outdoor/indoor installation free in air and shall be capable of withstanding the normal stresses associated with transportation, erection, reeling and unreeling operations without getting deformed.

4.2 The cable shall be suitable for use where combination of ambient temperature and temperature rise due to load results in a conductor temperature not exceeding 90°C under normal operation and 250°C under short circuit condition.

4.3 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 ASTM D 2863)
Acid Gas Generation	Max 20% (as per IEC 7541)
Smoke Density Rating	60% (as per ASTM D 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. MATERIAL :

5.1 CONDUCTOR:- The Aluminum conductor shall be of electrical purity, electrolytic grade H2/H4 aluminum and shall be stranded shaped/circular in section; smooth, uniform in quality and free from scale, inequalities, spills, splits and other defects. The conductors shall conform to appropriatedimensions and resistance given in **IS 8130 (Part I): 1984**.

5.2 INSULATION:- The insulating material for power cables shall be extruded cross linked polyethylene (XLPE) compound as per **IS-7098(Part-I)-1988**, conforming to the requirements of IS:5831. The minimum thickness of insulation shall not be less than the values specified in Table-2 of IS-7098 (Part-I)-1988. No negative tolerance shall be applicable for the thickness. The cores shall be identified by the following colour schedule for 3 & 1/2 core : Red, yellow, blue and black, Reduced neutral core being black.



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- 5.3 FILLERS:-** The filler shall be of vulcanized rubber, un-vulcanized rubber or thermoplastic material and shall be provided to fill the gaps between cores. The filler material shall be so chosen so as to be compatible with temperature of the cable and shall have no deleterious effect on other components of the cable. These shall not be harder than XLPE and PVC used for insulation and outer sheath respectively. The central hole/void, if any, of the cable shall be invariable filled with suitable filler material so that there is no gap in the center.
- 5.4 Inner Sheath:-** The inner sheath material as applicable shall be extruded FRLS PVC ST-2, compatible with thermal rating of insulation conforming to **IS-6380-1984**. The sheath shall have adequate thickness, mechanical strength and elasticity
- 5.5 ARMOURING:-** The armouring arranged over the inner sheath shall consist of one layer of GI round wire. The armour wire being put on the cable shall conform to **IS 3975-1988** for all requirements. The direction of lay of armour shall be opposite to that of the cores. The joints in the armour wire / strips shall be made by brazing or welding and the surface irregularities shall be removed. A joint in any wire / strips shall be at least 300 mm from the nearest joint in any other armour / wire in the completed cable.
- 5.6 OUTER SHEATH:-** Extruded outer sheath shall be provided over the armouring. The material used for sheathing shall be FRLS PVC sheath, Type ST-2 base compound conforming to IS 1554/ IS 5831 for power cable. The colour of the outer sheath shall be black. The thickness of outer sheath shall be in accordance with the **IS 1554 (Part-I)-1988**.
- 5.7** The dimensions of the insulation, inner sheath and armour materials shall be governed by values given in latest IS: 7098(pt.2)1958.

5. TESTS AND TEST CERTIFICATES:

The cable should meet the requirement of all tests including optional tests as per relevant standards. The cable should meet the requirement of all tests including optional tests as per relevant standards. If the cable fails to pass the test specified, the purchaser shall have the option to reject it.

6.1. Acceptance test

- 6.1.1 Tensile & wrapping test for Al.
6.1.2 Conductor resistance
6.1.3 Full physical dimension measurements for insulation, sheath & armour.
6.1.4 Tensile/elongation for insulation & sheath.
6.1.5 Volume resistivity at room temperature & at 90 °C
6.1.6 Hot set test for XLPE.
6.1.7 HV test.

6.2. Special test (FRLS test)

- 6.2.1 Oxygen index test.
6.2.2 Temperature index test.
6.2.3 Smoke density test.
6.2.4 HCL gas generation test.
6.2.5 Flammability test
6.2.6 Swedish chimney test.

6.3. Routing test (On each drum)

- 6.3.1 Conductor resistance test
6.3.2 HV test.
6.3.3 Insulation Resistance test

6.4. Type test

- 6.4.1 Ageing test.
6.4.2 Shrinkage test.
6.4.3 Hot deformation test on insulation/sheath.
6.4.4 Heat shock test.
6.4.5 Loss of mass.
6.4.6 Thermal stability.
6.4.7 Water absorption test for XLPE.
6.4.8 Test on armored wires:-
- Dimension measurement.

- Tensile strength test.



- Elongation test.
- Winding test.
- Mass of zinc coating.
- Uniformity of zinc coating
- Anti-rodent test
- Cold Impact test (Optional test)

6.5. Test requirement of FRLS inner & outer sheath

The inner and outer sheath of cables shall meet the following test requirements related to flame retardance, low smoke emission, low acid and toxic gas emission. The BIDDERS shall have proper test apparatus to conduct all the relevant tests as per the applicable Standards mentioned herein.

6.5.1 Flame retardance test

6.5.1.1 Oxygen Index and Temperature index test

The critical oxygen index value shall be minimum 29 when tested at 27+2°C as per ASTM D-2863 and the temperature index value shall be minimum 250°C at oxygen index of 21 when tested as per NES 715.

6.5.1.2 Flammability test

- i. Cables shall pass test under fire conditions as per IS-10810- Part-53.
- ii. Cables shall also pass tests as per IS-10810 Part- 61 & Part-62.

Flammability shall be as per IEC 332-1 and IS 694: 1990.

6.5.2 Smoke Generation test

The cables shall satisfy the tests conducted to evaluate the percentage obscuration by smoke in an optical system placed in the path of the smoke. The maximum smoke density rating shall not be more than 60% when tested as per ASTM-D-2843.

6.5.3 Acid Gas Generation test

The hydrochloric acid generation when tested as per IEC 754-1 shall be less than 20% by weight.

6.5.4 Resistance to Ultra Violet Radiation

This test shall be carried out as per DIN 53387. The retention values of tensile strength and ultimate elongation after the tests shall be minimum 60% of tensile strength and ultimate elongation before test.

6.5.5 Water Absorption



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Outer sheathes shall be subjected to tests for water absorption as per IS-10810. When additional characteristics are required, the tests shall be as applicable or as agreed to between

PURCHASER and VENDOR before the placement of order.

6.6. The purchaser at his option may waive all or any of the type tests provided type test certificate carried out on essentially identical cable are furnished by the manufacturer.

6. Guarantee against defects:- The cable shall be guaranteed against any type of defects and for trouble free operation conforming to this specification for a period of at least 12 months from the date of commissioning or 18 months from the date of dispatch from the supplier's works whichever is earlier. The following performance characteristics of cables shall be guaranteed at the maximum continuous rating when operating under the specified operating conditions:

☐ Voltage drop

☐ Maximum current rating

☐ Operating conductor Resistance at 20 °C

☐ FRLS properties

7. SEQUENTIAL LENGTH MARKING

Length of the cable shall be sequentially marked on every metre length of the cable to be supplied by the contractor as follows:

Name of manufacturer:

Configuration of the cable: viz. Core & Sq. mm, A2XWY/2XWY/YWY / YY as applicable

Year of manufacturing:

8. PACKING AND MARKING

The minimum single length of cable shall be

a) Total lengths \geq 500 metres

The cable shall be wound on **non-returnable steel drums** of suitable size, packed and marked.

The packing shall be such that it can withstand rough handling during transport and shall ensure that no damage will be caused to the cable during transit. The markings done on the drums shall have the following information:-

i) Trade mark or trade name, if any.

ii) Name of the manufacturer.

iii) Nominal sectional area of the conductor of the cable.

iv) Number of cores

v) Voltage grade and type of the cable.

vi) Length of the cable on the drum.

vii) Direction of rotation of the drum (an arrow).

viii) Type of cable.

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



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end of the cable shall be firmly and properly secured to the drum.

9. INSPECTION:

10.1 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.

10.2 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.

10.3 The contractor shall keep the Owner informed in advance about the program of manufacturing of cables so that arrangement can be made for inspection.

10. IDENTIFICATION :

(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, coloured strip of Red, Yellow, Blue and Black colours shall be used for identification of phases/Neutral.

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**

11. STANDARD LENGTH:

11.1 The cables shall be supplied in the standard length of 250 meters for size 3.5Cx300 mm² & 3.5Cx185 mm², 500 meters for size 3.5Cx50 mm²

11.2 A tolerance (+/-) 5% shall be allowed in standard length.

11.3 Only one cable length shall be acceptable of non-standard length measuring not less than 50% of standard length to complete the ordered quantity in each size.

12. QUANTITY TOLERANCE: The quantity tolerance of (+/-) 2% shall be allowed in each size for completion of supply.

13. GUARANTEED TECHNICAL PARTICULARS: The bidder shall furnish guaranteed technical particulars in Annexure-A.

14.0 DOCUMENTATION/ CONSTRUCTIONAL DRAWINGS

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

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

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

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

14.5 Literature, pamphlets for the record items.

ANNEXURE-A

GUARANTEED TECHNICAL AND OTHER PARTICULARS FOR LT CABLE

15. DATA FOR APPROVAL

The following documents shall be furnished along with the tender;

(i) Technical particulars of all cables as given above



- (ii) Cross section of all cables
- (iii) QAP of cable
- (iv) Test report(s) of past supplies for similar items
- (v) Past supplies and their feedback report
- (vi) CPRI/ ERDA type test certificates etc.

L. TECHNICAL SPECIFICATION FOR LT CABLE JOINTS:-

- I. **Location:-** Before laying a cable, proper locations for the proposed cable joints, if any, shall be decided, so that when the cable is actually laid, the joints are made in the most suitable places. As far as possible, water logged locations, carriage ways, pavements, proximity to telephone cables, gas or water mains, inaccessible places, ducts, pipes, racks etc. shall be avoided for locating the cable joints.
- II. Joint pits shall be of sufficient dimensions as to allow easy and comfortable working. The sides of the pit shall be well protected from loose earth falling into it. It shall also be covered by a tarpaulin to prevent dust and other foreign matter being blown on the exposed joints and jointing materials.
- III. Terminating kits: The straight through jointing kits shall be suitable for installation on ducts and for underground burial with uncontrolled backfill and possibility of flooding by water and chemical. These shall have protection against any mechanical damage and suitably designed to be protected against rodent and termite attack
- IV. Sufficient ventilation shall be provided during jointing operation in order to disperse fumes given out by fluxing.
- V. All cable termination / joints shall be done by skilled and experienced jointers having **cable jointing proficiency certificate from appropriate authority**. Termination including supply of jointing kit is included in the contractor's scope unless specified otherwise. Termination kits shall be suitable for termination of the cables to indoor switchgear or to weather proof feeder pillar of an outdoor mounted transformer and for termination at poles. L.T Jointing (1.1 Kv) to be provided in the work must fulfil following standards & specifications.

I. Codes & Standards:-

S. No	Title	Indian Standard
1.1	Cable accessories for extruded power cable	IS:13573(Part-1) 2011
1.2	Epoxy resin system for Cast resin insulated cable jointing up to and including 11 KV	IS:10333=1962
1.3	Ferrule	IS: 8308, IS 5082
1.4	Mould	IS: 8438-1987

II. Jointing Type and size.

2.1	Jointing Type.	Polyurethane Cable Jointing / Heat Shrinkable Cable Jointing.
2.2	Kit Size.	As required for jointing of different cable sizes in the work
2.3	Rating of Cable	1.1 KV
2.4	Rated Frequency	50 HZ
2.5	Maximum Conductor Temperature	Continuous- 90 ° C Short Circuit- 250 ° C



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2.6	Cable laying conditions.	Depth of Trench:- 0.75 Meter. Ground Temperature:- 25°C Thermal resistivity of soil:- 150°C / Watt. Average Ambient Temperature:- 35°C.
-----	--------------------------	--

VI. Jointing materials:- Jointing materials and accessories like conductor ferrules, solder, flux, insulating and protective tapes, filling compound, jointing boxes, heat shrinking joint kit etc. of right quality and correct sizes, conforming to relevant Indian Standards, wherever they exist, shall be used. The design of the joint box and the composition of the filling compound shall be such as to provide an effective sealing against entry of moisture in addition to affording proper electrical characteristic to joints. Where special type of splicing connector kits or epoxy resin spliced joints or heat shrinkable jointing kits are specified, materials approved for such applications shall be used. Storing as well as jointing instructions of the manufacturer of such materials shall be strictly followed.

VII. Type tests should have been carried out to prove the general qualities and design of a given type of termination / jointing system. The type tests shall include the following tests. The type test certificates shall be submitted along with the offer for such makes of accessories not mentioned in the data sheet.

- Rated withstand A.C. Voltage test
- Partial discharge test
- Rated withstand surge voltage test
- Continuous A.C. Voltage test with cycle current load (Number of heating Cycles-3).
- Partial discharge test
- Continuous A.C. voltage test with cyclic current load (Number of heating Cycles-63).
- Thermal short circuit test
- Continuous A.C. Voltage test with cyclic current load (Number of heating Cycles-63).
- Rated withstand surge voltage test
- D.C Voltage test
- Test under the influence of moisture
- Dynamic short circuit test.

SECTION-VII

SPECIAL INSTRUCTIONS TO BIDDER(S)

- The Bidder(s), before submitting of Bid(s), are advised to invariably visit the sites of the works and satisfy himself/themselves about physical volume of works to be carried out, acquaint him/them 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.**
- The Contractor shall, be fully responsible for total **erection and commissioning** of all **Equipment, cables, & all associated items (to be supplied by the owner and themselves)** as per standard & requirement of TSECL. Therefore 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 successful erection .testing at site and completion of the work.
- The Bidder(s) shall have to furnish Manufacturer's "**Literature on product Specification**" of all **Major equipment** with Bidding Document.
- The Bidder(s) shall also furnish "**Technical Particulars**" of all sub-item(s) of Main Items.
- **List of MAKE for Equipment / Switchgear/other materials and** all items have been furnished in



the **Bidding Document**. For any **Left-Out** item, the Bidder(s) shall have to supply item of such **MAKE acceptable as Standard Product** and to be authenticated by supporting Document as to utilization by any **State Electricity board/Power utility/Power corporation of the Country**.

- The Successful Bidder shall have to submit “Design, drawing and dimensional details” of all **equipment, accessories, equipment foundation, Steel Structure supports of Equipment, Switchgears, Structures, Construction Standards and Bill of materials** for all components etc. within 15 days as per requirement and stipulations in the Bidding document from the date of issue of L.O.A. for approval of the Owner. The work shall be based strictly on such approved drawing.
- The Spares and Tools & Plants as specified in the Schedule shall be of the particular MAKE. All such spares and T & P shall be supplied along with related Literature / Manual / Catalogue of concerned Manufacturer.
- Specification of All Civil Works shall be guided by the Standards of TRIPURA PWD (Public Works Department). The Successful Bidder shall have to submit “Design and drawing of Distribution Sub-station layout, 11 KV & LT Line layout, Foundation of Equipment and Structures, Cable Trench Details, etc.” within 15 days **as per requirement and stipulations in the Bidding document** from the date of issue of L.O.A. for approval of the Owner. The work shall be based strictly on such approved drawing

All materials and equipments (Other than those considered in scope of this NIT) for the work shall be delivered / supplied by TSECL from its store yard within the project Area / stock yard within Agartala Municipal Corporation area.

- ROW (Right of Way) is to be arranged by agency / contractor. TSECL will however, provide and extend all and best possible support as may be required in obtaining Right of Way.
- **Date** on which erection of line / lines (Over ground or Underground) with all allied accessories, equipments and sub-station structures etc. in full respect and up to satisfaction of Engineer in charge will be done shall be treated as **date of completion of Erection**. However warranty and liability for completing and commissioning of materials, devices, equipment etc. considered for supplying in this NIT within scope of supply of bidder shall be regulated as per provisions already contained in the document.

GENERAL & TECHNICAL FIELD REQUIREMENT

SCOPE OF WORKS:

The scope of works include execution on **Turnkey** Basis with complete system design, procurement / manufacture, manufacturer’s quality assurance, shop testing (including type testing where specified/required), transportation, storage, erection, including all civil/structural works, site testing, commissioning of all items & materials as elaborated below including all associated activities that though not exclusively specified here in but are required for the completion of the entire works under this package.

- This specification intends to cover but not restrict to the following activities, services and works.
- Complete design and engineering of all over ground & underground lines, Distribution sub-stations, equipment, control gears, other material and services.
- Providing engineering data, drawings and O&M manuals for Owner’s review, approval and records.
- Manufacturing, supply, testing, packing, transportation and insurance from the manufacturer’s work to the site of such materials in the document.
- Receipt, storage, insurance, preservation and conservation of equipment, materials, accessories at the site.
- All civil and structural works as required.
- Fabrication, pre-assembly (if any), erection, testing at site and putting into satisfactory operation of all the equipment/material including successful commissioning.



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- In addition to the requirements indicated in the Technical Specifications, all the requirements as stated in other sections shall also be considered as a part of this specification as if completely bound herewith.
- The Bidder shall be responsible for providing all material, equipment and services specified or even not specified but otherwise which are required to ensure operability, maintainability and the reliability of the complete work covered under this specification.
- All services & activities required to be given contractually, by the bidder, during warranty period.

Survey, Pole Spotting for all HT & LT Lines and Finalization of DT Location.

- Installation of new Distribution sub-station.
- All materials to be supplied by TSECL shall have to be carried from TSECL Stores as per direction of Engg-in-charge.

All dismantled materials i/c D.T. shall have to be returned to ESD Stores.

ABBREVIATIONS

ACSR	Aluminum Conductor Steel Reinforced
DT	Distribution Transformer
PCC	Pre-stressed Compact Concrete
STP	Steel Tubular Pole
HT	High Tension
LT	Low Tension
MS	Mild Steel
XLPE	Cross Linked Poly-ethylene
GI	Galvanized Iron
BOM	Bill Of Material
G. O.A.B.	Gang Operated Air Break
DC	Direct Current
E & M	Electrical and Mechanical
UG	Underground
OG	Over ground
DOF	Drop Out Fuse
LA	Lightning Arrester
TSECL	Owner/Purchaser
ABC	Ariel Bunched Cable



LIST OF NAME(S) OF PREFERABLE MANUFACTURER

SL. NO.	ITEM	MANUFACTURER
1.	HT/LT KIOSK	ABB LIMITED/ AMARA RAJA LIMITED/ APE POWER PRIVATE LIMITED, KOLKATA/SWITCHGEAR ENGINEERS, KOLKATA/ AMIYA INDUSTRIES, KOLKATA/ PRAYAS AUTOMATION PRIVATE LIMITED/ELECTROLITE/ SR AUTOMATION/ AC POWER
2.	XLPE CABLE	HAVELS / GUPTA POWER / POLYCAB / KEI.
3	40 MM/100 MM DIA GI PIPE	TATA/BANSAL/BMW/JINDAL
4	OUTDOOR CABLE JOINTING KITS	DENSON (YAMUNA GAS & CO.) (COMPACT INTERNATIONAL) /3M/JOINTMASK

DECLARATION

I / We hereby declare that I / We have personally gone through the Bid-Documents containing general terms and conditions incorporated in the Notice Inviting Competitive Bidding for the work / supply and I / We agree to abide by all the rules and regulations of TSECL, Agartala, Tripura.



**PROFORMA OF BANK GUARANTEE FOR
CONTRACT PERFORMANCE**

(To be stamped in accordance with stamp Act)

Ref.

Bank Guarantee No.

Date.....

To
Tripura State Electricity Corporation Limited
BidyutBhavan, 79 Tilla,
Agartala – 799001,
West Tripura.

Dear Sir,

In consideration of **Tripura State Electricity Corporation Limited** (hereinafter referred to as the 'Owner', which expression shall unless repugnant to the context or meaning thereof include its successors, administrators and assigns) having awarded to M/s with its registered / Head office at(hereinafter referred to as 'Contractor' which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns), a Contract by issued of Owner's Letter of Award No.....dated.....and the same having been acknowledged by the Contractor, resulting in a Contract bearing No.datedvalued atfor(scope of contract) and the Contactor having agreed to provide a Contract Performance Guarantee for the faithful performance of the entire Contract equivalent tobeing .(%) per cent) of the said value of the Contract to the Owner.

We, (Name & Address) having its Head Office at.....(hereinafter referred to as the 'Bank', which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators , executors and assigns) do hereby guarantee and undertake to pay the Owner, on demand any or all monies payable by the Contractor to the extent ofas aforesaid at any time up to ** (see in note below) (days/month/year) without any demur, reservation, contest, recourse or protest and/or without any reference to the Contractor.

Any such demand made by the Owner on the bank shall be conclusive and binding notwithstanding any difference between the Owner and the Contractor or any dispute pending before any Court, Tribunal, Arbitrator or any other authority. The Bank undertakes not to revoke this guarantee during its currency without previous consent of the Owner and further agrees that the guarantee herein contained shall continue to be enforceable till the Owner discharges this guarantee.

The Owner shall have the fullest liberty without affecting in any way the liability of the Bank under the guarantee, from time to time to extend the time for performance or the Contract by the Contractor.

The Owner shall have the fullest liberty, without affecting this guarantee, to postpone from time to time the exercise of any powers vested in them or of any right which they might have against the Contractor, and to exercise the same at any time in any manner, and either to enforce or to for bear to



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enforce any covenants, contained or implied, in the Contact between the Owner and the Contractor or any other course or remedy or security available to the Owner. The Bank shall not be released to its obligations under these presents by any exercise by the Owner of its liberty with reference to the matters aforesaid or any of them or by reason of any other act of omission or commission on the part of the Owner or any other indulgences shown by the Owner or by any other matter or thing what so ever which under law would, but for this provision have the effect of relieving the Bank.

The bank also agrees that the Owner at its option shall be entitled to enforce this guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Contractor and not withstanding any security or other guarantee the Owner may have in relation to the Contactor's liabilities.

Notwithstanding anything contained herein above our liability under this guarantee is restricted toand it shall remain in force upto and includingand shall be extended from time to time for such period (not exceeding one year), as may be desired M/son whose behalf this guarantee has been given.

Dated this day of20..... At

WITNESS

.....
(Signature)	(Signature)
.....
(Name)	(Name)
.....
(Official Address)	(Official Address)

Attorney as per Power
Of Attorney No.

Date

NOTES:

- **This sum shall be 'ten per cent (10 %)' of the Contact Price.**
 - ** **The date will be ninety (90) days after the end of date of 'Warranty Period' as specified in the Contract.**
1. **The Stamp Papers of appropriate value shall be purchased in the name of issuing Bank.**



APPLICATION FOR EXTENSION OF TIME

(Part – I)

- Name of Contractor _____
- Name of work (as given in the contract) _____

- Agreement no. _____
- Contract amount _____
- Date of Commencement of work as per agreement _____
- Period allowed for completion of work (as per agreement) _____
- Date of completion stipulated in the agreement _____
- Actual date of completion _____
- Period for which extension of time has been given previously if any _____
 - 1st extension vide No. _____
 - 2nd extension vide No. _____
 - 3rd extension vide No. _____
 - 4th extension vide No. _____
- Period for which extension have been previously given (Copies of the previous application should be attached).
- Hindrances on account of which extension is applied for with date on which hindrances occurred.

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	Period for which extension is applied for.	Remarks as to why the hindrances occurred and justification for extension of time

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

Signature of Contractor



APPLICATION FOR EXTENSION OF TIME

(Part – II)

(To be filled in by TSECL)

- Date of receipt of application from _____ contractor for the work of _____ in the Sub-Divisional _____.
- Acknowledgement issued by the Sr. Manager, vide his No. _____ Dated _____.
- 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)

- Date of receipt in the Divisional office: _____
- 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

- 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

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

Signature of AGM

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

Signature of GM (Technical)

- Recommendation / Approval of the CMD: -

Signature of CMD



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(Bidder's Letter Head)

To,
The Deputy General Manager
Capital Complex Electrical Division
79 Tilla
Tripura State Electricity Corporation Limited
Agartala - 799006, Tripura West

Sub: "No Deviation" declaration

Ref: NIT No: ----- Date:

Sir,

I/We hereby accept and abide by the scope & terms and conditions of NIT document unconditionally and on the Scope of Work, or any related area there are no deviations in this

response. (----Name of bidder----) has adhered to all the qualification requirements as well as other items listed in the NIT.

Yours faithfully,

Signature: _____

Full Name: _____

Address: _____



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PROFORMA FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF CREDIT/FACILITIES

(TO BE GIVEN BY BANKER OF BIDDER)

BANK CERTIFICATE

This is to certify that M/S..... (FULL NAME AND ADDRESS) who are submitting their Bid toagainst their tender specification vide Ref. No..... and dateis our customer for the pastyears.

Their financial transactions with our bank have been satisfactory. They enjoy the following fund based and non-fund based limits including guarantees, L/C and other credit facilities with us against which the extent of utilization as on date is also indicated below:

Sl.No.	TYPE OF FACILITY	SANCTIONED LIMIT AS ON DATE	UTILIZATION AS ON DATE.....
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This letter is issued at the request of M/S.....

Sd/-

Name of Bank.....

Name of authorized Signatory.....

Designation.....

Phone No.....

Address.....

SEAL OF THE BANK