

TENDER DOCUMENT

Southco Utility
Corporate Office, Berhampur

TENDER NOTICE NO: Tech/RLTAP(13-14)/02/FY-15-16

**FOR
TURNKEY CONTRACTS (SUPPLY & ERECTION)**

**For
Up-rating of 33 KV line conductor from 55mm² ACSR to 100mm² AAAC-25Km.
from Pandripani to Mathili under Malkangiri District under RLTA scheme 2013-14**

The last date and time of receipt of tender-
Date and time of opening of Technical Bid-

dt 24.08.15 upto 13.00Hrs
dt 24.08.15 at 15.30Hrs

Ref No.-

Date-

TENDER NOTICE NO: Tech/RLTAP(13-14)/02 /FY-14-15

Southco Utility invites sealed bids in duplicate on two part bidding system from experienced, qualified and eligible bidders having valid HT Electrical License and Civil license who comply with the terms and conditions for the following work on turnkey basis.

Sl No	Description of work	Estimated cost (in Rs)	EMD 01% (in Rs)	Non refundable cost of bid documents incl. VAT 5% (in Rs)
1	Up-rating of 33 KV line conductor from 55mm ² ACSR to 100mm ² AAAC-25Km. from Pandripani to Mathili under Malkangiri District under RLTAP scheme 2013-14	72,40,710/-	72,407/-	10,500/-

The tender documents will be available from the office of the undersigned during office hours on working days on payment of **Rs 10,500/-** in shape of cash / Bank Draft in favour of **Southco, Berhampur**, payable at Berhampur (Non-Refundable) or can also download the tender documents from our website www.southcoodisha.com. For the details of tender specification, terms and conditions please visit our website.

1. Sale of bid documents will be from- **dt 01.08.15**
2. Last date / time of submission of bids- **dt 24.08.15 upto 13.00Hrs.**
3. Date & time for opening of Technical bids- **dt 24.08.15 at 15.30 Hrs.**

Southco Utility reserves the right to alter the tendered quantity and reject / accept any or all tenders or split the tender among bidders without assigning any reason thereof.

General Manager
(Tech., Proj. & Safety)
Southco Utility, Berhampur.

Copy Communicated to-

1. IT, Discoms Monitoring Unit, Bhubaneswar for information and he is requested to upload the same in Southco website i.e www.southcoodisha.com.
2. CGM (IT), Discoms Monitoring Unit, Plot No.N-1/22, IRC village, Nayapalli, Bhubaneswar-751012.
3. All EEs under Distribution and Construction Divisions under Southco Utility. They are requested to display on their notice board for wide circulation.
4. DGMs / SEs, in-charge of Electrical Circles under Southco Utility. They are requested to display on their notice board for wide circulation.
5. COO, Southco Utility, Berhampur.
6. CFO, Southco Utility, Berhampur.
7. TA to the Authorised officer for kind information of Authorised officer
8. Collector, Malkangiri for kind information.
9. Notice board of this office.

Section – I

INVITATION FOR BIDS (IFB)

TENDER NOTICE NO: Tech/RLTAP(13-14)/ 02/FY-15-16

- 1.0 **Southco Utility** invites sealed tenders from reputed Electrical Contractors with required license, either in individual capacity or as part of a joint venture agreement /consortium for carrying-out various Electrical Installation works on ‘Turnkey’ basis in the jurisdiction of its licensed area. The bidder must fulfill all the qualification requirements as specified in clause 2.0 stated below. The sealed envelopes shall be duly superscribed as “**TENDER NOTICE No: TENDER NOTICE NO: Tech/RLTAP(13-14)/01/FY-15-16.** Due date of opening- dt 24.08.15 at 15.30Hrs.

Sl No	Description of work	Estimated cost (in Rs)	EMD 01% (in Rs)	Non refundable cost of bid documents incl. VAT 5%(in Rs)
1	Up-rating of 33 KV line conductor from 55mm ² ACSR to 100mm ² AAAC-25Km. from Pandripani to Mathili under Malkangiri District under RLTAP scheme 2013-14	72,40,710/-	72,407/-	10,500/-

- 2.0 Bidders to be considered as eligible (to bid) should meet the following qualifications:
- (a) Bidder may quote for any one package or for multiple packages; however, bidder must quote for the entire quantum of works specified under each such package(s).
 - (b) The minimum Average Annual Turnover of the bidder in any three financial years out of the last five financial years **should not be less than the estimated value**. The bidder may submit the relevant additional documents.
 - (c) In addition to above, the bidder should submit the following documents in **Part-I** bid as qualifying terms:
 - i. Valid electrical (HT) license for electrical works.
 - ii. EPF registration.
 - iii. ESI registration.
 - iv. Service Tax registration.
 - v. VAT Clearance Certificate.
 - vi. PAN & TIN No.
 - vii. Existing Labour license.
 - viii. Last 3Years audited balance sheet & profit loss account.
 - ix. Experience Certificate (Work order copy, Electrical Inspection Report)
 - x. User’s performance certificate

NB:

 1. All the documents to be submitted are to be self attested.
 2. At any point of time if required original documents may be asked for verification.
 - (d) The bidders who have earlier failed to execute the works order(s) of the **Owner** shall not be eligible to participate in this tender.
 - (e) **Owner reserves the right to waive minor deviation, if they do not materially affect the capacity of the bidder to perform the contract.**
- 3.0 Bids specification document can be obtained from the office of the undersigned on payment of **Rs. 10,500/-** towards non-refundable cost of bid documents (Including VAT) through cash / Bank DD drawn in favour of **Southco , Berhampur** payable at **Berhampur** (Non-refundable) during office hours from **10:30AM to 04:30PM till dt. 24.08.15.**

- 4.0 The tender documents can also be downloaded from Southco website www.Southcoodisha.com. In case tender papers are downloaded from these websites, then the bidder has to enclose a Demand Draft drawn on any schedule bank, payable at Berhampur, covering the cost of bid documents as stated above in a separate envelope with suitable superscription “ **Cost of Bid Documents: Rs. 10,500/- Tender Notice No: TENDER NOTICE NO: Tech/RLTAP(13-14)/01/FY-15-16 Dtd: 31.07.15**”. The envelope should accompany the Bid Documents.
- 5.0 Price shall be inclusive of all taxes & duties.
- 6.0 Project Completion Schedules:-

Description	Date
Issue of Tender Document	dt 01.08.15.
Submission of Bids	dt 24.08.15 upto 13.00Hrs
Opening of Bids (Technical Bid)	dt 24.08.15 upto 15.300Hrs
Opening of Bids (Price Bid)	Will be intimated
Completion period	To be completed within 90 days from the date of issue of Work Order.

- 7.0 All correspondences with regard to the above shall be made to the following address:
General Manager (Tech., Proj. & Safety), Southco Utility, Berhampur.

General Manager
(Tech., Proj. & Safety),
Southco Utility, Berhampur.

Section – II

INSTRUCTION TO BIDDERS (ITB)

TENDER NOTICE NO: Tech/RLTAP(13-14)/ 02/FY-15-16

A. GENERAL:-

1.0 Southco Utility, hereinafter referred to as the “Owner” is desirous of implementing the various works at their respective licensed area in the state of Orissa. The Owner has now floated this tender **for Up-rating of 33 KV line conductor from 55mm² ACSR to 100mm² AAAC-25Km. (5nos. Intermediate pin point Pole & 1 cut point pole for each km.), from Pandripani to Mathili under RLTA (2013-14) scheme under Malkangiri District.**

2.0 SCOPE OF WORKS:-

The scope shall include:

Up-rating of 33 KV line conductor from 55mm² ACSR to 100mm² AAAC-25Km. (5nos. Intermediate pin point Pole & 1 cut point pole for each km.), from Pandripani to Mathili under RLTA (2013-14) scheme under Malkangiri District under Southco Utility area, conforming to the REC Technical Specifications & CEA guidelines.

3.0 DISCLAIMER:-

3.01 This Document includes statements, which reflect various assumptions, which may or may not be correct. Each Bidder should conduct its own estimation and analysis and should check the accuracy, reliability and completeness of the information in this Document and obtain independent advice from appropriate sources in their own interest.

3.02 Neither the Owner nor its employees will have any liability whatsoever to any Bidder or any other person under the law or contract, the principles of restitution or unjust enrichment or otherwise for any loss, expense or damage whatsoever which may arise from or be incurred or suffered in connection with anything contained in this Document, any matter deemed to form part of this Document, provision of Services and any other information supplied by or on behalf of Owner or its employees, or otherwise arising in any way from the selection process for the Supply & Construction.

3.03 Though adequate care has been taken while issuing the Bid document, the Bidder should satisfy itself that documents are complete in all respects. Intimation of any discrepancy shall be given to this office immediately.

3.04 **This Document and the information contained herein are strictly confidential and are for the use of only the person(s) to whom it is issued. It may not be copied or distributed by the recipient to third parties (other than in confidence to the recipient’s professional advisors).**

4.0 COST OF BIDDING:-

The Bidder shall bear all costs associated with the preparation and submission of its Bid and Owner will in no case be responsible or liable for those costs.

B. BIDDING DOCUMENTS:-

5.0 BIDDING DOCUMENTS:-

5.01 The Scope of Works, Bidding Procedures and Contract Terms are described in the Bidding Documents. In addition to the covering letter accompanying Bidding Documents, the Bidding Documents include:

- (a) Invitation for BIDs (IFB)
- (b) Instructions to Bidders (ITB)
- (c) General Conditions of Contract (GCC)
- (d) General Technical Specification (GTS)

- (e) Bid Forms and Formats
- (f) Price Bid

5.02 The Bidder is expected to examine the Bidding Documents, including all Instructions, Forms, Terms and Specifications. 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 may result in the rejection of the Bid.

6.0 AMENDMENT OF BIDDING DOCUMENTS:-

- 6.01 At any time prior to the deadline for submission of Bids, the Owner may, for any reasons, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by Amendment.
- 6.02 The Amendment shall be part of the Bidding Documents, pursuant to Clause 5.01, and it will be notified in writing by Fax/E-mail to all the Bidders who have received the Bidding Documents and confirmed their participation to Bid, and will be binding on them.
- 6.03 In order to afford prospective Bidders reasonable time in which to consider the Amendment in preparing their Bids, the Owner may, at its discretion, extend the deadline for the submission of Bids.

C. PREPARATION OF BIDS:-

7.0 LANGUAGE OF BID:-

The Bid prepared by the Bidder, and all correspondence and documents relating to the Bid exchanged by the Bidder and the Owner, shall be written in the English Language. Any printed literature furnished by the Bidder may be written in another Language, provided that this literature is accompanied by an English translation, in which case, for purposes of interpretation of the Bid, the English translation shall govern.

8.0 DOCUMENTS COMPRISING THE BID:-

The Bid prepared and submitted by the Bidder shall comprise the following components:

- (a) Bid Form, Price BID & other Schedules (STRICTLY AS PER FORMAT).
- (b) All the Bids must be accompanied with the required EMD.
- (c) Power of Attorney indicating that the person(s) signing the Bid have the authority to sign the Bid and thus that the Bid is binding upon the Bidder during the full period of its validity, in accordance with clause 12.0.

9.0 BID FORM:-

9.01 The Bidder shall complete an 'Original' and another one 'Copy' of the Bid Form and the appropriate Price & Other Schedules.

9.02 Bid Security

The bidder shall furnish, as part of its bid, a bid security as already specified in the tender document. The bid security is required to protect the Owner against the risk of Bidder's conduct which would warrant the security's forfeiture.

The bid security shall be denominated in the currency of the bid, and shall be in the following form:

- (a) Bank Draft in favour of , **Berhampur** payable at **Berhampur**.

Unsuccessful bidders' bid security will be discharged or returned as promptly as possible but not later than **thirty (30) days** after the expiration of the period of bid validity. The successful bidder's bid security will be discharged upon furnishing the performance security.

The bid security may be forfeited:

- (a) if the Bidder:
- i) withdraws its bid during the period of bid validity specified by the Bidder in the Bid Form; or
- (b) in the case of a successful Bidder, if the Bidder fails:
- (i) to sign & accept the Contract, or
 - (ii) to furnish the required Composite performance Bank Guarantee within the stipulated period.

10.0 BID PRICES:-

- 10.01 Bidders shall quote with a break-up of prices for individual items. The total Bid Price shall also cover all the Supplier's obligations mentioned in or reasonably to be inferred from the Bidding Documents in respect of design, Supply, Transportation to site, all in accordance with the requirement of Bidding Documents. The Bidder shall complete the appropriate Price Schedules included herein, stating the Unit Price for each item & total Price.
- 10.02 The prices offered shall be inclusive of all costs as well as Duties, Taxes and Levies paid or payable during execution of the supply works, break up of price constituents, should be there.
- 10.03 Prices quoted by the Bidder shall be "Firm" and not subject to any price adjustment during the performance of the Contract. A Bid submitted with an adjustable price quotation will be treated as non-responsive and rejected.

11.0 BID CURRENCIES:-

Prices shall be quoted in Indian Rupees Only.

12.0 PERIOD OF VALIDITY OF BIDS:-

- 12.01 Bids shall remain valid for **180 days** from the date of opening of the Bid.
- 12.02 Notwithstanding Clause 12.01 above, the Owner may solicit the Bidder's consent to an extension of the Period of Bid Validity. The request and the responses thereto shall be made in writing by Fax/e-mail.

13.0 ALTERNATIVE BIDS:-

Bidders shall submit Bids, which comply with the Bidding Documents. Alternative Bids will not be considered. The attention of Bidders is drawn to the provisions of Clause 22.03 & 22.04 regarding the rejection of Bids, which are not substantially responsive to the requirements of the Bidding Documents.

14.0 FORMAT AND SIGNING OF BID:-

- 14.01 The original Bid Form and accompanying documents (as specified in Clause 9.0), clearly marked "Original Bid", plus one copy must be received by the Owner at the date, time and place specified pursuant to Clauses 15.0 and 16.0. In the event of any discrepancy between the original and the copies, the original shall govern.
- 14.02 The original and copy of the Bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to sign on behalf of the Bidder. Such authorization shall be indicated by written Power-of-Attorney accompanying the Bid.
- 14.03 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.

15.0 SUBMISSION OF BID: -

- 15.01 Sealed tenders in Two parts each in duplicate, each complete in all respects in the manner hereinafter specified are to be submitted to **General Manager (Tech, Proj & Safety), Corporate Office, Southco Utility, Berhampur** on or before the date and time specified in the notice inviting the tenders. Each copy of the bids (original and duplicate) shall be submitted in separate double sealed envelopes superscripted on each of the covers the tender specification number and the due date of opening of the bids on the right hand top side of the envelop. On the left top side original/ duplicate as is relevant shall be written.
- 15.02 The tenders are required to be submitted in Two Parts each in separate double sealed Covers.
- i) **Part - I:** Super-scribed as "**Technical and commercial bid**" shall contain EMD, Cost of Bid Documents and Techno commercial documents.
 - ii) **Part – II:** Super-scribed as "**Price Bid**". The Part - II should contain only Price bid.
- 15.03 Fax and Telegraphic tenders shall not be accepted.
- 15.04 Receipt of bids/ revised bids after the cut off time and date as specified in the Tender Specification shall not be permitted and such bids shall be rejected outright. The **Owner** shall not be responsible for any delay in transit in post / courier etc. in this regard.

16.0 DEADLINE FOR SUBMISSION OF BIDS:-

- 16.01 The original Bid, together with the required copies, must be received by the Owner at the address specified not later than **13.00 Hrs on dt 24.08.15**.
- 16.02 The Owner may, at its discretion, extend the deadline for the submission of Bids, in which case all rights and obligations of the Owner and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended.

17.0 ONE BID PER BIDDER:-

Each Bidder shall submit only one Bid either by itself, or as a partner in a Joint Venture. A Bidder who submits or participates in more than one Bid will cause all those Bids to be rejected.

18.0 LATE BIDS:-

Any Bid received by the Owner after the deadline for submission of Bids prescribed by the Owner, pursuant to Clause 16.0, will be declared "Late" and rejected and returned unopened to the Bidder.

19.0 MODIFICATIONS AND WITHDRAWAL OF BIDS:-

19.01 The Bidder is not allowed to modify or withdraw its Bid after submission of the Bid.

19.02 No Bid may be modified to the deadline for Bids.

E. EVALUATION OF BID:-

20.0 PROCESS TO BE CONFIDENTIAL:-

Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process. Any effort by a Bidder to influence the Owner's processing of Bids or award decisions may result in the rejection of the Bidder's Bid.

21.0 CLARIFICATION OF BIDS:-

To assist in the examination, evaluation and comparison of Bids, the Owner may, at its discretion, ask the Bidder for a clarification of its Bid. All responses to requests for clarification shall be in writing and no change in the price or substance of the Bid shall be sought, offered or permitted.

22.0 PRELIMINARY EXAMINATION OF BIDS / RESPONSIVENESS:-

22.01 Owner will examine the Bids to determine whether they are complete, whether any 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.

22.02 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price per item that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price per item will be corrected. If there is a discrepancy between the Total Amount and the sum of the total price per item, the sum of the total price per item shall prevail and the Total Amount will be corrected.

22.03 Prior to the detailed evaluation, Owner will determine the substantial responsiveness of each Bid to the Bidding Documents including acceptable quality of the goods offered. A substantially responsive Bid is one, which conforms to all the terms and conditions of the Bidding Documents without material deviation.

22.04 A Bid determined as not substantially responsive will be rejected by the Owner and may not subsequently be made responsive by the Bidder by correction of the non-conformity.

23.0 EVALUATION AND COMPARISON OF BIDS:-

23.01 The evaluation of Bids shall be done based on the delivered cost competitiveness basis.

23.02 The evaluation of the Bids shall be a stage-wise procedure. The following stages are identified for evaluation purposes:

In the first stage, the Bids would be subjected to a responsiveness check. The Technical Proposals and the Conditional ties of the Bidders would be evaluated.

Subsequently, the Financial Proposals along with Supplementary Financial Proposals, if any, of Bidders with Techno-commercially Acceptable Bids shall be considered for final evaluation.

23.03 The Owner's evaluation of a Bid will take into account, in addition to the Bid price, the following factors, in the manner and to the extent indicated in this Clause:

- (a) Work schedule.
- (b) Deviations from Bidding Documents.

Bidders shall base their Bid price on the terms and conditions specified in Bidding Documents. The cost of all quantifiable deviations and omissions from the specification, terms and conditions specified in Bidding Documents shall be evaluated. The Owner will make its own assessment of the cost of any deviation for the purpose of ensuring fair comparison of Bids.

23.04 Any adjustments in price, which result from the above procedures, shall be added or subtracted for the purposes of comparative evaluation only to arrive at an "Evaluated Bid Price". Bid Prices quoted by Bidders shall remain unaltered.

24.0 CONTACTING THE OWNER:-

24.01 From the time of Bid opening to the time of contract award, if any Bidder wishes to contact the Owner on any matter related to the Bid, it should be do so in writing.

24.02 Any effort by a Bidder to influence the Owner and / or in the Owner's decisions in respect of Bid evaluation, Bid comparison or Contract Award, will result in the rejection of the Bidder's Bid.

25.0 THE OWNER'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS:-

The Owner 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 the Owner's action.

26.0 AWARD OF CONTRACT:-

The Owner will award the Contract to the successful Bidder whose Bid has been determined to be the lowest - evaluated responsive Bid, provided further that the Bidder has been determined to be qualified to satisfactorily perform the Contract. Owner reserves the right to award order other bidders in the tender, provided it is required for progress of project & provided he agrees to come to the lowest rate.

27.0 THE OWNER'S RIGHT TO VARY QUANTITIES:-

The Owner reserves the right to vary the quantity i.e. increase or decrease the quantities without any change in terms and conditions during the execution of the Order.

28.0 LETTER OF INTENT/ NOTIFICATION OF AWARD:-

The letter of intent / Notification of Award shall be issued to the successful Bidder whose bids have been considered responsive, techno-commercially acceptable and evaluated to be the Lowest (L1). The successful Bidder shall be required to furnish a letter of acceptance **within 7 days** of issue of the letter of intent /Notification of Award by Owner.

29.0 CORRUPT OR FRAUDULENT PRACTICES:-

29.01 The Owner requires that the Bidders observe the highest standard of ethics during the execution of the Project. In pursuance of this policy, the Owner:

Defines, for the purposes of this provision, the terms set forth below as follows:

- i) "Corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving, or soliciting of anything of value to influence the action of any such official in the 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 of the benefits of free and open competition.
 - (a) Will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
 - (b) Will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded an contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, an contract.

29.02 Furthermore, Bidders shall be aware of the provision stated in the General Conditions of Contract.

General Manager
(Tech., Proj. & Safety),
Southco Utility, Berhampur.

Section – III

GENERAL CONDITIONS OF CONTRACT (GCC)

TENDER NOTICE NO: Tech/RLTAP(13-14)/ 02/FY-15-16

GENERAL CONDITION OF CONTRACT (GCC) :-

1.0 GENERAL: -

Southco Utility herein after referred to as the “**Owner**” is desirous of implementing the various works at its licensed area in the state of Odisha on Total Turnkey Basis under deposit head. The “**Owner**” has now floated this tender for “**Up-rating of 33 KV line conductor from 55mm² ACSR to 100mm² AAAC-25Km. (5nos. Intermediate pin point Pole & 1 cut point pole for each km.), from Pandripani to Mathili**” under RLTA (2013-14) scheme under Malkangiri District.

SCOPE OF WORKS: -

Up-rating of 33 KV line conductor from 55mm² ACSR to 100mm² AAAC-25Km. (5nos. Intermediate pin point Pole & 1 cut point pole for each km.), from Pandripani to Mathili.

2.01 The scope shall include supply and installation of all materials & equipments to complete the works.

2.02 The details of scope of work involve:

Up-rating of 33 KV line conductor from 55mm² ACSR to 100mm² AAAC-25Km. (5nos. Intermediate pin point Pole & 1 cut point pole for each km.), from Pandripani to Mathili under RLTA (2013-14) scheme under Malkangiri District	
A	Up-rating of 33 KV line conductor from 55mm² ACSR to 100mm² AAAC-25Km. (5nos. Intermediate pin point Pole & 1 cut point pole for each km.), Pandripani to Mathili

2.03 The detailed scope of the works shall include:

- i. Detailed survey of substation, line and preparation of SLD / BOQ to be done by the bidder.
- ii. Complete supply of materials from the approved vendor or from authorized dealers.
- iii. Packing and transportation from the manufacturer’s works to the site.
- iv. Receipt, storage, preservation and conservation of materials at the site.
- v. Reliability tests and performance and guarantee tests on completion of commissioning.
- vi. Erection of lines of specified voltage.
- vii. Testing, Commissioning of substations and lines/ installations.
- viii. Storing before erection.
- ix. Getting the substations & lines inspected by Electrical Inspector after completion of Works.

3.0 DEFINITION OF TERMS

- (i) The ‘**Contract** ’means acceptance of the work order by the contractor or agreement entered into between the Owner and the Contractor as per the Contract Agreement signed by the parties, including all attachments and appendices there to and all documents incorporated by reference therein.
- (ii) ‘**Owner**’ shall mean **Southco Utility, Berhampur** and shall include its legal representatives, successors and assigns.
- (iii) ‘**Contractor**’ shall mean the Bidder whose bid will be accepted by the Owner for the award of the Works and shall include such successful Bidder’s legal representatives, successors and permitted assigns.
- (iv) ‘**Engineer-in-Charge / Project Manager**’ shall mean the officer / officers appointed in writing by the Owner to act as Engineer from time to time for the purpose of the Contract.

- (v) **‘Specifications’** shall mean the specifications and Bidding Document forming a part of the Contract and such other schedules and drawings as may be mutually agreed upon.
- (vi) **‘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 the Owner or Contractor in the performance of the Contract.
- (vii) **‘Inspector’** shall mean the Owner or any person nominated by the Owner from time to time, to inspect the equipment; stores or Works under the Contract and/or the duly authorized representative of the Owner.
- (viii) **‘Notice of Award of Contract’/ ‘Letter of Award’** shall mean the official notice issued by the Owner notifying the Contractor that his bid has been accepted.
- (ix) **‘Date of Contract’** shall mean the date on which work order has been issued.
- (x) **‘Performance and Guarantee Tests’**, shall mean all operational checks and tests required to determine and demonstrate capacity, efficiency, and operating characteristics as specified in the Contract Documents.
- (xi) The term **‘Final Acceptance’/ ‘Taking Over’** shall mean the Owner’s written acceptance of the works performed under the Contract, after successful commissioning/ completion of Performance and Guarantee Tests, as specified in the accompanying Technical Specifications or otherwise agreed in the contract.
- (xii) **‘Commercial Operation’** shall mean the condition of operation in which the complete equipment covered under the Contract is officially declared by the Owner to be available for continuous operation at different loads up to and including rated capacity. Such declaration by the Owner, however, shall not relieve or prejudice the Contractor of any of his obligations under the Contract.
- (xiii) Words imparting ‘Person’ shall include firms, companies, corporations and associations or bodies of individuals, whether incorporated or not.
- (xiv) 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.
- (xv) In addition to the above the following definition 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’**.

4.0 RECEIPT AND OPENING OF THE BID: -

- 4.01 Bids in duplicate as described under clause 4.0 shall be received in the office of the Owner and shall be opened on the scheduled date and time. The Owners authorized representatives shall open bids in the presence of Bidders’ representatives on the date and time for opening of bids as specified in the Invitation to Bid or in case any extension has been given thereto, on the extended bid opening date and time notified.
- 4.02 Maximum one representative for each bidder shall be allowed to witness the opening of bids. The representative must produce suitable authorization in this regard to be eligible to witness the bid opening on behalf of the bidder. Bidders’ representatives who are present shall sign in a register evidencing their attendance.

4.03 The Bidders' names, bid prices, modifications, bid withdrawals and the presence or absence of the requisite bid guarantee and such other details as the Owner, at its discretion, may consider appropriate will be announced at the opening. No electronic recording devices will be permitted during bid opening.

4.04 Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process. Any effort by a Bidder to influence the Owner's processing of Bids or award decisions may result in the rejection of the Bidder's Bid.

5.0 EVALUATION OF BIDS & AWARD OF CONTRACT:-

5.01 To assist in the examination, evaluation and comparison of Bids, the Owner may, at its discretion, ask the Bidder for a clarification of its Bid. All responses to requests for clarification shall be in writing and no change in the price or substance of the Bid shall be sought, offered or permitted.

5.02 Owner will examine the Bids to determine whether they are complete, whether any 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.

5.03 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price per item that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price per item will be corrected. If there is a discrepancy between the Total Amount and the sum of the total price per item, the sum of the total price per item shall prevail and the Total Amount will be corrected.

5.04 Prior to the detailed evaluation, Owner will determine the substantial responsiveness of each Bid to the Bidding Documents including acceptable quality of the Goods offered. A substantially responsive Bid is one, which conforms to all the terms and conditions of the Bidding Documents without material deviation.

5.05 The Owner's evaluation of a Bid will take into account, in addition to the Bid price, the following factors, in the manner and to the extent indicated in this Clause:

- (a) Works Schedule
- (b) Deviations from Bidding Documents

5.06 The Owner will award the Contract to the successful Bidder whose Bid has been determined to be the lowest-evaluated responsive Bid, when the lowest bidders is not ready and/or capable to undertake the entire works envisaged, then the Owner may explore the possibility of the execution of works through other bidders if they are willing to execute at L1 rate. Such exploration shall be carried out in a sequential order starting with L2 bidder then with L3 bidder and so on.

5.07 In case of omission of any item in the Price bid or the price for the item has not been quoted by the firm, then zero cost shall be loaded to the bid and the contract shall be awarded with zero cost that means the firm will have to bear the cost of that item entirely as the item price shall be considered as inclusive anywhere in other items. The bidder shall have to give an undertaking to the effect that prices for any item not quoted shall be treated as free supply or to be done free of cost.

6.0 EARNEST MONEY DEPOSIT (EMD):-

6.01 The Tender must be accompanied by Earnest Money Deposit in shape of Demand Draft in favour of **Southco, Berhampur** and payable at **Berhampur**, EMD shall be of **Rs 72,407/- (Rupees Seventy-two Thousand four Hundred seven Only)** . Bids without EM deposit will be rejected out rightly.

6.02 No adjustment of any previous deposit or any amount payable from Owner shall be entertained for EMD. The EMD amount so submitted shall not carry any interest payable to the bidder.

6.03 The Earnest Money so deposited shall be forfeited:

(a) if the Bidder:

i) Withdraws its bid during the period of bid validity specified by the Bidder in the Bid Form; or

(b) in the case of a successful Bidder, if the Bidder fails:

(i) To sign the Contract, or

(ii) To furnish the required Contract Performance Bank Guarantee.

6.04 The EMD of unsuccessful bidders shall be returned **within 30 days** from the date of finalization of the order.

7.0 OWNER'S RIGHT TO VARY QUANTITIES AT TIME OF AWARD:

While placing orders and / or during execution of contract, Owner reserve the right to increase or decrease the quantity of goods and services specified in the Schedule of Requirement **upto 20%** of the tender quantity without any change in price or other terms and conditions.

8.0 INSPECTION AND TESTING:-

A) The all **major materials**(i.e, PSC pole, Conductor) shall be inspected by the Owner / any authorized representative of the Owner or jointly by the Owner/Owners Authorized Representatives with the **Third Party Inspection Evaluation Agency (TPIEA)** (If any) as per relevant IS **at the manufacturer site**. The contractor shall provide unhindered clearance, giving full rights to the Owner/ Engineer in-charge to inspect, examine and test the materials. Such inspection / examination and testing shall not relieve the contractor of his obligations to execute the contract by letter and spirit. The contractor shall give the Owner advance notice in writing of the date and place **at least 15 days before** the schedule date on which the materials will be ready for testing. Post dispatch inspection will be conducted after delivery of the materials at site and then the contractor will be allowed for use the materials.

B) Engineer-in-charge shall be entitled at all reasonable times during erection / installation to inspect examine and test the materials at the contractor's premises / erection site about quality & workmanship of the materials to be supplied under this contract. The Owner may also at its discretion get any of the materials tested in any approved laboratory at contractor's cost.

C) All the **materials except those mentioned at 8.0(A)** shall be inspected by the Owner / Engineer in-charge as per relevant IS **at the contractor's worksite**. The contractor shall give the Owner advance notice in writing about the place **at least 7 days before** the schedule date on which the material will be ready for inspection.

9.0 COMPLETION AND COMPLETENESS OF THE EQUIPMENT:-

9.01 Time being the essence of the contract; the works shall be completed **within 90days** from the date of issue of works order.

- 9.02 The works shall be treated as complete item wise when one item shall be complete in all respects with all mountings, fixtures and standard accessories which are normally supplied even though not specifically detailed in the specification. No extra payment shall be payable for such mounting, fittings, fixtures and accessories which are needed for safe operations of the equipment as required by applicable code of the country though this might not have included in the contract.
- 9.03 All similar components and/or parts of similar equipment supplied shall be interchangeable with one another. Various equipments supplied under this contract shall be subject to Owner's approval.
- 9.04 Owner however reserves the right to re-schedule the completion period, if required.

10.0 REJECTION OF MATERIALS: -

In the event of the materials supplied by the contractor and/or the installation, works are found to be defective in quality and the workmanship is poor or otherwise not in conformity with the requirements of the contract specification (Technical Specification), Owner shall reject such

materials / services and ask the contractor in writing to replace / rectify the defects. The contractor on receipt of such notification shall either rectify or replace the defective materials and / or re-install the works already executed, free of cost to the Owner. If the contractor fails to do so the Owner may at his option take the following actions which could be on concurrent basis:

- A) Replace or rectify such defective materials and recover the extra cost so involved **plus 25%** from the Contractor.
- B) Terminate the contract for balance supply and erection with enforcement of penalty as per contract.
- C) Acquire the materials which deviate from the Owners specification at reduced price considered acceptable under the circumstances.
- D) Forfeit the Contract Performance Bank Guarantee.

11.0 EXPERIENCE OF BIDDERS: -

The bidders are required to furnish information regarding their experience on the following aspects.

- i. Description of similar type of works executed during the **last three years with same or higher voltage level** with the name(s) of the party(s) to whom / where supplies / erection were made.
- ii. Works orders details (P.O / W.O No. and date only) executed (construction works) during the last three years along with Electrical inspection report copies and **copies of user's performance certificates**. Bids may not be considered if the past performance is found to be un-satisfactory.

12.0 DEVIATION FROM SPECIFICATION: -

The bidders are requested to study the specification thoroughly before tendering so that if they make any deviations, the same are prominently brought on a separate sheet under the headings "Deviations". All such deviations to the technical & commercial terms of the specification shall be indicated in a separate list as indicated above. In absence of such deviation schedule, it will be presumed that the bidder has accepted all the conditions stipulated in the tender specification, notwithstanding any deviations mentioned elsewhere in the Bid. However the acceptance of deviation is not binding on the Owner.

13.0 CONTRACTOR TO INFORM HIMSELF FULLY: -

The contractor shall examine the instructions, general conditions of the contract, specifications and the schedule of quantity and work completion to satisfy himself as to all the terms and conditions and circumstances affecting the contract price. He shall quote prices according to his own judgment and shall understand that no additional cost except as quoted shall only be considered.

14.0 PATENT RIGHT: -

The contractor shall indemnify the **Owner** against all claims, actions, suits and proceedings for the alleged infringement any patent design or copy right protected either in country of origin or in India by the use of any equipment supplied by the contractor but such indemnity shall not cover any use of the equipment other than for the purpose indicated by or reasonable to be informed from the specification.

15.0 GUARANTEE PERIOD: -

15.01 The bidder shall guarantee for the workmanship for a minimum period of **24 (Twenty four) months** from the date of completion of commissioning. The contractor shall guarantee to repair to the satisfaction of the Owner the defective parts at site free of cost within the above period. However, if the bidder fails to do so within a reasonable time, the Owner reserves the right to effect repair and recover such charges from the contractor.

15.02 If during the defect liability period any services performed found to be defective, these shall be promptly rectified by contractor on its own cost (including the cost of dismantling and reinstallation) on the instruction of Owner. The above guarantee certificate shall be furnished in triplicate to the Owner for his approval.

15.03 The materials to be supplied by the contractor shall be guaranteed for satisfactory operation against defects in design and workmanship for a period of **24 (Twenty four) months** from the date of handing over the completed installations. Any defect noticed during the above period should be rectified by the contractor free of cost to the utility provided such defects are due to faulty design, bad workmanship or bad materials used on receipt of written notice from the Owner.

16.0 PENALTY FOR DELAY IN COMPLETION OF CONTRACT: -

16.01 If the contractor fails to complete the works by the scheduled period or any extension granted thereby, the contractor shall be liable for payment of penalty amounting to **0.5% (half percent)** of the contract price per week of un-finished works subject to the maximum of **5% (five percent)** of the total contract price and subject to force majeure conditions. After receipt of LOA, the Contractor shall sign a contract agreement with the Owner **within 15 days** along with the detail work plan through PERT chart/BAR chart. **The Penalty / Liquidated damage as written above will be levied if any deviation to the schedule on any item of works due to the fault of the contractor is observed.**

16.02 Penalty amount can be realized from the proceeds of the Contract Performance Bank Guarantee, if the situation so warrants.

16.03 Extension of completion of work period could be with / without levy of penalty with the discretion of Owner.

17.0 RIGHT OF WAY:

Right of Way issues, if any arising during execution of the works shall be sorted out by contractor at his own cost. Southco Utility shall however extend all possible helps to the contractor including discussion with local authorities for early resolution of these issues. Any unresolved dispute relating to ROW issues

shall be referred to the District Collector and cost as decided by the collector shall be reimbursed to the contractor.

18.0 CONTRACTOR'S DEFAULT:

18.01 If the Contractor neglects to execute the works with due diligence and expedition or refuses or neglects to comply with any reasonable order given to him, in writing by the Engineer in connection with the works or contravenes the provisions or the contract, the Owner 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 30 (Thirty) days** from the date of serving the notice, the Owner 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 the Owner thinks fit, without prejudice to any other right, he may have under the Contract to take the works 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 the Owner 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 the Owner 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 works or of completing the works as the case may be. If the cost of completing of works or executing 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.

18.02 In addition, such action by the Owner as aforesaid shall not relieve the Contractor of his liability to pay liquidated damages for delay in completion of works.

18.03 Such action by the Owner as aforesaid the termination of the Contract under this clause shall not 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.

19.0 TERMINATION OF CONTRACT ON OWNER'S INITIATIVE:

19.01 Owner reserves the right to terminate the Contract either in part or in full due to reasons other than those mentioned under clause entitled 'Contractor's Default'. The Owner shall in such an event give **fifteen (15) days** notice in writing to the Contractor of his decision to do so.

19.02 The Contractor upon receipt of such notice shall discontinue the works on the date and to the extent specified in the notice, make all reasonable efforts to obtain cancellation of all orders and Contracts to the extent they related to the works terminated and terms satisfactory or the Owner, stop all further sub-contracting or purchasing activity related to the works terminated and assist Owner in maintenance, protection, and disposition of the works acquired under the Contract by the Owner. In the event of such a termination, the Contractor shall be paid compensation, equitable and reasonable, dictated by the circumstance prevalent at the time of termination **to be determined by the Arbitrator without stopping the works but to carry out the left over works through other agencies.**

19.03 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 the Owner is satisfied that the legal representatives of the individual Contractor or of the proprietor of the propriety concern and in the case of partnership, the surviving partners, are capable of carrying out and in the case of partnership, the surviving partners, are capable of carrying out and completing the Contract the Owner shall be entitled to cancel the Contract as to its in completed 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 the Owner 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. In the event of such cancellation, the Owner shall not hold the estate of the deceased contractor and/ or the surviving partners of the Contractor's firm liable to damages for not completing the Contract.

20.0 FORCE MAJEURE: -

The Contractor shall not be liable for any penalty for delay or for failure to perform the contract for reasons of Force Majeure such as "acts of God, acts of the Public enemy, acts of Govt., Fires, Flood, Epidemics, Quarantine restrictions, Strikes, Freight Embargos and provided that the Contractor shall **within 10 (Ten) days** from the beginning of such delay notify the Owner in writing of the cause of delay. The **Owner** shall verify the facts and grant extension as facts justify.

21.0 EXTENSION OF TIME: -

If the delivery of the equipments / materials is delayed due to reasons beyond the control of the Contractor, the Contractor shall immediately **within 03 (Three) days** inform the Owner in writing of his claim for an extension of time. The Owner on receipt of such notice may agree to extend the contract period as may be reasonable but without prejudice to other terms & conditions of the contract.

22.0 SAFETY PRECAUTIONS:-

The agency shall observe all applicable regulations regarding safety at the Site. Any compensation due on account of accident at site shall be to the contractor's account.

23.0 STORE: - Storing of materials from supply to erection shall be arranged by the contractor at his own cost. No compensation shall be made by the Owner for any damage or loss of materials during storing, transit transportation and at the time of erection.

24.0 INSURANCE: -

Contractor shall arrange adequate Transit-cum-storage-cum-erection policy and shall submit the copy of the same to the Owner. The policy shall initially remain valid for a period of **60 (sixty) days** over & above of the contractual guarantee period and shall be extended as required till handing over. Contractor shall be responsible for lodging of claim with the insurer as well as for all required follow up with the insurer for settlement of claim in case of loss/damage/theft of material during transit/storage/erection till the completed works is handed over to the Owner and is accepted by the authorized representative of the Owner in writing. Contractor shall also arrange adequate cover for his employees / laborers engaged in the works as well as arrange third party insurance cover to indemnify any possible damages to public at large not connected with the works process. Any claim(s) pertaining to this shall be the responsibility of the Contractor.

25.0 ENGINEER-In-CHARGE / PROJECT MANAGER:-

The Owner shall appoint authorized engineers as Engineer- in- charge / Project manager for the Project.

26.0 CONTRACT PERFORMANCE BANK GUARANTEE:-

26.01 **Within 15 days** of issue of the work order, you shall submit Performance Bank Guarantee issued by a Scheduled Bank, issued in favour of SOUTHCO, covering 10% of the total value of contract.

26.02 The said Bank Guarantee shall be prepared in the prescribed Performa as attached in Section V, Annexure-II. The Bank Guarantee furnished shall be executed on Non-judicial Stamp paper worth of Rs 100/- (Rupees Hundred only), purchased in the name of the issuing bank, as per the prevalent rules.

- The Bank Guarantee so provided shall be en-cashable on the **Berhampur branch of the issuing Bank**.
- 26.03** The Contract Performance Bank Guarantee mention in **clause 26.01(i)** above shall remain valid for a period **not less than 90 days** over and above the guarantee period, basing on stipulated completion period in the W.O. (i.e. at least for a period of **30 (Thirty) months** from the date of issue of the work order) towards security and acceptance thereof, failing which the work orders (W.O) will be liable for cancellation without any further notice with forfeiture of E.M.D. However, if the due date of completion of the project is delayed; the BG shall be extended, accordingly.
- 26.04** No interest shall be allowed by the Owner on the above Performance Security Deposit submitted by the Bidder except in case of demand draft or cash deposit.
- 27.0 TERMS OF PAYMENT:-**
- 27.01 80% (Eighty percent)** of contract price on pro-rata basis along with taxes and duties shall be paid progressively for each completed items of works certified by the Engineer in charge / Project manager against each calendar month by 1st week of succeeding month along with utilization certificate. No payment shall be released if the accounts for utilization of materials follow with proper certification by the Engineers In Charge / Project manager on the basis of check points involved in such items of works.
- 27.02 Balance 20% (twenty percent)** of contract price shall be paid after completion of all works, envisaged including any additions and alterations, testing & commissioning, return of dismantled materials, taking over certificate and entire stretch is fully ready for commercial operation.
- 28.0 PAYING OFFICER:-**
Owner shall notify the paying officer for the project.
- 29.0 OWNER'S RIGHTS:-**
The **Owner** reserves the right to accept any bid or reject any or all bids or cancel / withdraw invitation of bid or to vary the quantity for placement of order without assigning any reason to such decision. Such decision by the Owner shall bear no liability.
- 30.0 DISPUTE RESOLUTION AND JURISDICTION:-**
- (i) Any dispute arising out of this contract shall be referred to the **Authorized Officer, Southco Utility** who shall decide the case.
- (ii) All disputes shall be subjected to exclusive **jurisdiction of the Courts at Berhampur** and the writ jurisdiction of **Hon'ble High Court of Odisha at Cuttack**.
- 31.0 TRANSFER AND SUB-LETTING:-**
The Contractor shall not sublet, transfer, assign or otherwise part with the Contract or any part thereof, either directly or indirectly, without prior written permission of the Owner.
- 32.0 SUBMITTALS REQUIRED AFTER AWARD OF CONTRACT:-**
- 32.01 Within 15 days** of the effective date of contract the contractor shall provide three copies of an outline program of production, inspection, testing, delivery, survey, erection, pre-commissioning and commissioning in chart form. Included in the program will be the detailed schedule of drawing to be submitted.

32.02 The periodic progress report as required by the Owner shall be submitted by the contractor as per the format prescribed by the Engineer in Charge.

33.0 APPROVAL PROCEDURE OF SUB VENDORS & DRAWINGS OF BOUGHT OUT MATERIALS OF ALL MAJOR MATERIALS:-

33.01 The contractor shall submit all drawings, documents and test reports, QAP, Name of Sub vendor, samples (as applicable) etc, to the engineer in charge **within 15 days** of award of LOA for approval. If modifications to be made if such are deemed necessary, the contractor has to resubmit them for approval without delaying the initial deliveries or completion of the contract work.

33.02 Three copies of all drawings, GTP, QAP shall be submitted for approval and three copies for any subsequent revision.

33.03 If the drawings will be as per the technical specifications, the competent authority of the Owner will return the drawings & documents to the contractor marked with **“Approved” stamp**.

34.0 TAKING OVER:-

34.1 Upon successful completion of all the tests to be performed at site on equipment / materials supplied, and erected and commissioned by the contractor, the supply engineer shall issue to the contractor a taking over certificate as a proof of the final acceptance of the equipment / materials on a written request **within 10 days** of commercial operation. Such certificate shall not be un-reasonably withheld nor will the engineer delay the issuance thereof on account of minor omission or defects, which do not affect the commercial operation and / or cause any serious to the equipment/material. The conditional Taking over Certificate can be issued if any minor omission or defects pointed by the Engineer-In-charge /Electrical Inspector. The contractor should rectify those defects **within a month** failing which department will rectify those by replacing those materials or engaging other agencies. The amount so involved will be fully recovered from the contractor’s bill. Such certificate shall, however, not relieve the contractor of any of his obligations which otherwise survive by the terms & conditions of the contract after issuance of such certificate.

34.2 For the satisfaction of Owner about quality, the Owner shall have unreserved right for arrangement of testing of equipment/ materials and the complete system independently by self or any other agency chosen by the Owner. The contractor is expected to agree and extend necessary help during such test if necessary.

35.0 EMBOSSING / PUNCHING / CASTING / PAINTING

35.1 The all equipments and materials supplied /erected under the **RLTAP Programme** shall bear distinct mark of **“Name of the Owner, GoO, RLTAP Programme, WO Order No. & Date”** by a way of embossing / punching / casting / painting etc. This should be clearly visible to naked eye.

General Manager
(Tech., Proj. & Safety)
Southco Utility, Berhampur.

SECTION - IV
GENERAL TECHNICAL SPECIFICATION (GTS)

TENDER NOTICE NO: Tech/RLTAP(13-14)/ 02/FY-15-16

1. GENERAL

1.1 Scope of works:

Up-rating of 33 KV line conductor from 55mm² ACSR to 100mm² AAAC-25Km. (5nos. Intermediate pin point Pole & 1 cut point pole for each km.), from Pandripani to Mathili under Malkangiri District under RLTA scheme 2013-14

i. Contractor's scope:

A. Supply:-

All the materials required to complete the work are to be supplied by the Contractor.

B. Construction:-

The detail work involves:

Up-rating of 33 KV line conductor from 55mm² ACSR to 100mm² AAAC-25Km. (5nos. Intermediate pin point Pole & 1 cut point pole for each km.), from Pandripani to Mathili .

Prior to the commencement of the supply/ works all relevant drawings, designs must be got approved by the Owner / Engineer-in-charge.

1.1.1 GENERAL CONDITIONS OF CONTRACT

• Responsibility of the Contractor:

The Contractor shall be responsible for the complete design and engineering, overall co-ordination with internal and external agencies, project management, loading, unloading, storage at site, inventory management at site during construction, dismantling, re-erection of installations as per Engineer in charge's advice, handling, moving to final destination, obtaining statutory clearances for successful erection, testing and commissioning of the lines & substation.

• Limitation of contract:

The scope of works shall also include all works incidentals for successful operation and commissioning and handing over of works whether specifically mentioned or not. In general, works are to be carried out by the Contractor in accordance with the stipulations in Conditions of Contract.

• Quantity variation:

The Owner reserves the right to order and delete such works, which may be necessary for him within the quantity variation option laid down in the conditions of the contract. This shall include but not limited to the manufacture, supply, testing, and delivery to site, erection and commissioning as may be required in accordance with the Conditions of Contract at the prices stated in the Schedules. The Owner shall also be at liberty to delete Any Items from the Contractor's scope at any time before commencement of works under the detailed scope of works.

1.1.2 GENERAL PARTICULARS OF SYSTEM

System description

The following are the general particulars governing the design and working of the complete system of which the Contract Works will eventually form a part: The system is three phase, 50 Hz and power is to be distributed to consumers under Southco Utility at appropriate voltage level.

Sl. No.	Description of Technical Parameter	Unit	Data	
			11 KV	33KV
1	Nominal system voltage	KVrms	11 KV	33KV
2	Maximum system voltage	KVrms	12.KV	36KV
3	Power frequency with stand voltage	KVrms	28KV	70KV
4	Lightning impulse withstand voltage	KVp	75KVp	170KVp
	a) Line to earth b) Across isolating gap		85KVp	195KVp
5	One minute power frequency withstand value	KVrms KVrms	35	95
	Dry Wet		35	75
6	System frequency	Hz	50	50
7	Variation in frequency	%	2.5	2.5
8	Continuous current rating	Amp	1250	800
9	Symmetrical short circuit current	kA	25	253
10	Duration of short circuit fault current	Sec	3	
11	Dynamic short circuit current rating	kAp	62.5kA	
12	Design ambient temperatures	°C	50	111
13	Pollution level as per IEC-815 and 71		III	
14	Maximum fault clearing time	Ms	not exceeding 150 ms	150ms
15	Safety clearances			
	1. Section clearance	Meters	3	4
	2. Ground clearances(between ground and bottom most part of energized object)			
	i. Along a street	Meters	5.791	5.791
	ii. Across a street		6.096	6.06
	3. Horizontal clearance between the fence / building, structure and energized object	Meters	3.64	

1.3.2 Layout arrangement

The Contractor shall finalize the layout arrangements for new HT/ LT OH lines, 33/11KV substations & 11/0.4KV substations in line with this Specification with the approval of the Engineer-In-charge which shall be meeting at least the basic minimum electrical clearances as specified in the schedules.

a) Location and site description

The details of the line & sub-substation locations, their approach, geography and topography etc are to be collected from the concern **Executive Engineer (Const.), Construction Division, Jeypore** to the extent possible. The Bidder shall make necessary visit to the site of line & substation and fully appraise himself before bidding. Deviations on account of inadequate data for line & substation works shall not be acceptable and the Bid may not be considered for evaluation in such cases.

b) Completeness and accuracy of information

The Contractor shall note that the information provided above and in the relevant schedules may not be complete or fully accurate at the time of bidding. For his own interest the Contractor is advised to make visit roots and fully satisfy himself regarding site conditions in all respects, and shall be fully responsible for the complete design and engineering of the line & substations.

1.4 GUARANTEES TECHNICAL PARTICULARS

The Contractor shall comply with the guaranteed technical particulars specified in the respective BIS/IEC/REC. The contractor has to submit the GTP of the materials with all relevant drawings & test report. The contractor has to get the GTP & drawings approved from the owner prior to starting of the work .The contractor have to get the vendors approved from the owner from whom the materials are to be procured.

The successful Contractor shall supply the equipment from manufacturers complying with the stipulated requirements under Southco Utility's approval. The Contractor shall be responsible for any discrepancies, errors or omissions in the particulars and guarantees. The Bidder for his own interest, shall establish the technical responsiveness of his bid, shall provide all data in appropriate technical data sheets, general/ technical information, literature, and leaflets etc. along with the bid.

1.5 COMPLIANCE WITH SPECIFICATION

All materials & equipments should comply with this Specification. Any departures from the requirements of this Specification shall be stated with reasons in the relevant **Bid Proposal Schedules (BPS)**. Bid will be considered for evaluation if reasons shown are apparently justified. Unless brought out clearly in the technical schedules, it will be presumed that the equipment is deemed to comply with the technical specification. In the event of there being any inconsistency between the provisions of the conditions of contract and the provisions of this Specification, in respect of commercial requirements, the provisions of the conditions of contract shall take precedence for commercial matters and the provisions of this Specification shall take precedence in respect of technical matters. In case of inconsistency between technical specifications (TS) quantities of various items as specified in the bid proposal sheet shall be considered for quoting. However the works shall be executed as specified in the technical specification. Only brief description is given in the BPS & the works shall be executed in line with the requirement given in the TS.

1.6 ERECTION AT SITE AND ACCOMMODATION

The Contractor shall provide, at his own cost and expense, all labors, plant and material necessary for unloading and erection at the Site and shall be entirely responsible for its efficient and correct operation. The Contractor shall be responsible for arranging and providing all living accommodation services and amenities required by his employees.

1.6.1 Use of electrical energy

The Contractor shall arrange at his own cost and expense, any site supplies of electrical energy which he may require for supplying power for heavy erection of materials or other tools, lighting and testing purposes. All such installations shall comply with all appropriate statutory regulations.

1.7 SUPERVISION AND CHECKING OF WORKS ON SITE

All works on site included in the contractor's scope of works shall be supervised by sufficient number of qualified representatives of the Contractor. The Contractor shall give in writing to the Engineer-In-charge the period of notice as specified in the General Conditions of Contract, when the plant or apparatus is ready for inspection or energization.

1.8 RESPONSIBILITY FOR THE WORK COMPLETION BY CONTRACTOR

Until each Section of the Contract Works has been taken-over or deemed to have been taken-over under the Conditions of Contract, the Contractor shall be entirely responsible for the Contract Works, under construction, or in use for the Owner's service.

1.9 COMPLIANCE WITH REGULATIONS

All apparatus and material supplied, and all works carried out shall comply in all respects with such of the requirements of all Regulations and Acts in force in the country and state in particular of the Owner as are applicable to the Contract Works and with any other applicable regulations to which the Owner is subjected to oblige.

1.10 MAINTENANCE AND CLEARING OF SITE

The placing of materials near the erection site prior to their being erected and installed shall be done in a neat, tidy and safe manner. The Contractor shall at his own expense keep the site area and erection area of the Contract Works reasonably clean and shall remove all waste material as it accumulates and as directed by the **Engineer-In-charge** from time to time.

1.11 WORKS AND SAFETY REGULATIONS

The Contractor shall ensure safety of all the workmen, material, equipment belonging to him or to others, working at the Site. The Contractor shall also provide for all safety notices and safety equipment required by the relevant legislation and deemed necessary by the **Engineers-In-charge**.

1.12 INSURANCE

1.12.1 General

In addition to the conditions covered in the General Conditions of Contract, the following provisions will also apply to the works to be done by the contractor.

1.12.2 Workmen's Compensation Insurance

This insurance shall protect the Contractor against all claims applicable under the workmen's Compensation Act, 1948 (Government of India). This policy shall also cover the Contractor against the claims for injury, disability, disease or death of his or his sub-contractor's employees, which for any reason are not covered under the Workman's Compensation Act, 1948. The liabilities shall not be less than;

a. **Workmen's Compensation-** As per statutory provisions.

b. **Employee's liability-** As per statutory provisions According to the Govt. rules.

c. Comprehensive automobile insurance

This insurance shall be in a such a form to protect the Contractor against all claims for injuries, disability, disease and death to members of public including the Employer's men and damage to the property of others arising from the use of motor vehicles during on or off the Site operations, irrespective of the Ownership of such vehicles and as per latest prevailing Govt. rules.

d. Comprehensive General Liability Insurance

This insurance shall protect the Contractor against all claims arising from injuries, disabilities, disease or death of members or public or damage to property of others, due to any act or omission on the part of the Contractor, its agents, its employees, its representatives and sub-contractors or from riots, strikes and civil commotion. The hazards to be covered will pertain to all works and areas where the Contractor, its sub-contractors, agents and employees have to perform works pursuant to the Contracts.

1.1 GENERAL

The following provisions shall supplement all the detailed technical specifications and requirements brought out in accompanying Technical Specifications. The Contractor's proposal shall be based upon the use of equipment and materials complying fully with the requirements specified herein. It is recognized that the Contractor may have standardized on the use of certain components, materials, processes or procedures different to those specified herein. Alternate proposals offering similar equipment based on the manufacturers standard practice will also be considered, provided such proposals meet the specified design standard and performance requirement and are acceptable to the **Engineer In-charge**.

1.2 QUALITY ASSURANCE

1.2.1 General

To ensure that the supply and services under the scope of this Contract, whether manufactured or performed within the Contractor's works or at Site or at any other place of works are in accordance with the Specification, with the Regulations and with relevant Indian or otherwise Authorized Standards the Contractor shall adopt suitable Quality Assurance Programmes and Procedures to ensure that all activities are being controlled as necessary. The quality assurance arrangements shall conform to the relevant requirements of ISO 9001 or ISO 9002 as appropriate.

1.2.2 Non-conforming product

The Contractor shall retain responsibility for the disposition of non-conforming items.

1.3 STANDARDS

1. Except where otherwise specified or implied, the Contract Works shall comply with the latest edition of the relevant Indian Standards, International Electro-technical Commission (IEC) standards and any other standards mentioned in this Specification. The Contractor may submit for approval, equipment or materials conforming to technically equivalent National Standards. In such cases copies of the relevant Standards or part thereof, in the English language shall be submitted with the Tender. In case of conflict the order of precedence shall be (1) IEC, (2) IS and (3) other alternative standard.

Reference to a particular standard or recommendation in this Specification does not relieve the Contractor of the necessity of providing the Contract Works complying with other relevant standards or recommendations. The list of standards provided in the schedules of this Specification is not to be considered exhaustive and the Contractor shall ensure that equipment supplied under this contract meets the requirements of the relevant standard whether or not it is mentioned therein.

- (a) Unless otherwise specified, all materials covered under this specification shall be designed, manufactured, tested and installed in conformity with the latest Indian Standard Specifications.
- (b) In case such Indian Standard Specifications are not published equivalent British Standard Specifications shall be followed. All equipments shall conform to latest Indian Electricity Rules, CEA Regulations, PWD and Local/State laws or byelaws as regards to safety, earthing and other essential provisions specified therein.
- (c) All the materials supplied by the contractor according to the contract conditions will be subject to inspection and approval by the **Owner / Engineer-In-Charge** or their authorized representative from time to time. The contractor shall extend all required facilities for such inspection free of cost. At the time of inspection, the inspecting officer shall have full liberty to reject any such material, which does not conform to specifications or the requirements. The Owner shall not entertain any claim for the rejected materials. The contractor shall remove all rejected materials from the site at his own cost.
- (d) The Owner shall not accept any surplus material procured by the contractor.
- (e) The contractor will be responsible to get electrical installations inspected by the Electrical Inspector of the State Government and to obtain the statutory clearance for energization. **Southco Utility** will deposit the necessary inspection fees.
- (f) The contractor should possess valid electrical contract license and labour license issued by the appropriate statutory authority of the State Government during the execution of the contract.
- (g) The contractor shall be registered with Provident Fund Department for engagement of Labours/ Employees.

1.4 SUBMITTALS

1.4.1 Submittals required with the bid

The following shall be required in duplicate:

- completed technical data schedule;
- Descriptive literature giving full technical details of goods offered;
- Test certificates, where available, and sample routine test reports;
- Details of manufacturer's quality assurance standards and programme and ISO 9000 series or equivalent national certification where available.
- Deviations from this specification. Only deviations approved in writing shall be accepted.

1. Survey & scope of works:

1.1 Survey shall be carried out by the contractor for the new line.

1.2 Aligning / erection of poles in the route of line along with strengthening of its foundation are in the scope of bidder.

1.3 Before undertaking the construction works in the given line the bidder shall make assessment of quantity of the required materials in consultation with Engineer-In-Charge. Accordingly, the BOQ of the works may be prepared and get it approved from Engineer In charge.

1.4 Any other works not mentioned above exclusively but required for accomplishing desired works will be in the scope of the bidder.

1.5 For all above activities shutdown shall be arranged by the subject to advanced notice in writing by the contractor.

1.6 While placing the equipment, if any equipment gets damaged due to negligent handling of the contractor, the same shall be back charged to the contractor at penal rate.

2.0 Crossings

2.0.1 **Road Crossings:** - At all road crossings, the poles shall be fitted with strain type insulators. The ground clearance from the road surfaces under maximum sag condition shall be as per IS 5613.

3.0 **Details En-route-**After survey and finalization of route, the contractor shall submit detailed route map for each line.

This would be including following details:

a) Clearance from Ground, Building, Trees etc. - Clearance from ground, buildings, trees and telephone lines shall be provided in conformity with the Indian Electricity Rules,1956 as amended up to date. The bidder shall select the height of the poles in order to achieve the prescribed electrical clearances.

4.0 **Final Schedule-** The final schedule including Bill of quantity indicating location of poles specifically marking locations of failure containment pole/structure, DTs HT line sectionalizes, line tapping points angle of deviation at various tension pole locations, all type of crossings and other details shall be submitted for the approval of the Owner.

b) Earthing of Poles:

In 11KV / 33KV line, each pole shall be earthed with coil earthing as per REC construction standard J-1.

5.0 Danger Boards:

The vendor shall provide & install danger plates on 11KV / 33KV DP structures. The danger plates shall conform to REC specification No. 57/1993.

6.0 Anti-climbing Devices:

The vendor shall provide and install anti-climbing device on 11KV / 33KV DP structures. This shall be done with G.I. Barbed wire. The barbed wire shall conform to IS-278 (Grade A1).The barbed wires shall be given chromating dip as per procedure laid down in IS: 1340.

Reference Standards:

The codes and/or standards referred to in the specifications shall govern, in all cases wherever such references are made. In case of a conflict between such codes and/or standards and the specifications, latter shall govern. Such codes and/or standards, referred to shall mean the latest revisions, amendments/ changes adopted and published by the relevant agencies unless otherwise indicated. Other internationally accepted standards which ensure equal or better performance than those specified shall also be accepted, subject to prior approval by the Owner. In case no reference is given for any item in these specifications, latest REC specification & Construction Standards shall be referred to.

A) TECHNICAL SPECIFICATION FOR ALL ALUMINIUM ALLOY CONDUCTOR (AAAC)

1. SCOPE

This specification covers design, Engineering, Manufacture, Testing, Inspection before dispatch, forwarding, packing, transportation to sites, Insurance (both during transit & storage), storage, erection, supervision testing & commissioning of all sizes of All Aluminum Alloy Conductors of the aluminum – magnesium- silicon type for use in the distribution overhead power lines of Southco Utility of Orissa.

The equipment offered shall have been successfully type testes and the design shall have been satisfactory operation for a period not less than two years on the date of bid opening. Compliance shall be demonstrated by submitting with the bid, (i) authenticated copies of the type test reports and (ii) performance certificates from the users.

The scope of supply includes the provision of type test, Rates of type tests shall be given in the appropriate price schedule of the bidding document and will be considered for evaluation. The Owner reserves the right to waive type tests as indicated in the section on Quality Assurance, Inspection and Testing in the specification.

The Aluminum Alloy Conductor shall conform in all respects to highest standards of engineering, design, workmanship, this specification and the latest revisions of relevant standards at the time of offer and the Owner shall have the power to reject any work or materials, which, in his judgment, is not in full accordance therewith.

STANDARDS

Except where modified by the specification, the Aluminum Alloy Conductor shall be designed, manufactured and tested in accordance with latest editions of the following standards.

IEC/ISO/ Other International Standard	IS	Subject
IEC :1089		Round wire concentric lay overhead electrical standard conductors
	IS 398	Aluminum Alloy Stranded Conductors
	IS 9997	Aluminum Alloy redraw rods for electrical purposes
IEC 502 : 1994		Extruded solid dielectric insulated power cables for rated voltages 1.0 KV up to 30 KV
IEC 104		Aluminum Magnesium Silicon alloy wire for overhead line conductors
	IS 1778	Reels and drums of bare conductor.
BS : 6485-1971		PVC covered conductors for overhead power lines.

This list is not to be considered exhaustive and reference to a particular standard or recommendation in this specification does not relieve the contractor of the necessity of providing the goods complying with other relevant standards or recommendations.

3. GENERAL

The wires shall be of heat treated aluminum, magnesium silicon alloy containing approximately silicon-0.5 to 0.9 %, magnesium-0.6 % to 0.9%, Fe-0.5% (maximum) , Copper- 0.1% (max), mn- 0.03% , Cr-0.03%, Zn-0.1%, B-0.06%, and having the mechanical and electrical properties specified in the table and be smooth and free from all imperfections, such as, spills, splits and scratches.

Neutral grease shall be applied between the layers of wires. The drop point temperature of the grease shall not be less than 120⁰ C.

3.1 Mechanical and Electrical Characteristics of Aluminium Alloy Wires used in the Construction of Stranded Aluminium Alloy Conductors

Nominal Diameter	Minimum Diameter	Max. Diameter	Cross Sectional Area	Mass	Minimum Breaking Load		Maximum Resistance at 20 ⁰ C
					Before stranding	After stranding	
1	2	3	4	5	6	7	8
Mm	mm	mm	mm ²	Kg/km	KN	KN	ohms/km
3.81	3.77	3.85	11.40	30.78	3.52	3.34	2.938
3.94	3.90	3.98	12.19	32.92	3.77	3.58	2.746
4.26	4.22	4.30	14.25	38.48	4.40	4.18	2.345

Maximum resistance values given in column 8 have been calculated from the maximum values of the resistivity as specified and the cross sectional area based on the minimum diameter.

The minimum breaking load is calculated on nominal diameter at ultimate tensile strength of 0.309 KN / mm² for wire before stranding and 95% of the ultimate tensile strength after stranding.

4. PHYSICAL CONSTANTS FOR ALUMINIUM ALLOY WIRES

4.1 Resistivity :

For the purpose of this specification, the standard value of resistivity of aluminum alloy wire which shall be used for calculation is to be taken as 0.0325 ohm mm² /m at 20⁰ C. the maximum value of resistivity of any single wire shall not , however, exceed 0.0328 ohm. mm²/m at 20⁰ C

4.2 Density :

At a temperature of 20⁰ C, the density of aluminum alloy wire is to be taken as 2700 kg/m³.

4.3 Temperature Coefficient of Linear Expansion :

The temperature coefficient of linear expansion of aluminium alloy wire is to be taken as $23 \times 10^{-6} / ^\circ \text{C}$

4.4 Constant – Mass Temperature Coefficient

At a Temperature of 20⁰ C, the constant – mass temperature coefficient of resistance of aluminum alloy wires, measured between two potential points rigidly fixed to the wire, is taken as 0.00360/⁰ C

5. STANDARD SIZES

5.1 Nominal Sizes of Wires

The aluminum alloy wires for standard constructions covered by this specification shall have the diameters as specified in the table and a tolerance of $\pm 1\%$ shall be permitted on the nominal diameter.

5.2 Standard Conductors

The sizes, resistance and masses (excluding the mass of grease) of stranded aluminum alloy conductors shall be as given in table.

5.3 Mechanical and Electrical Characteristics of Aluminum Alloy Stranded Conductors

Sl. No.	Actual Area	Stranding and Wire Dia	Approx. Overall Dia	Approx. Mass	Calculated Maximum Resistance at 20 ⁰ C	Approx Calculated Breaking Load
1	2	3	4	5	6	7
	Mm ²	Mm	mm	kg/km	ohms/km	KN
1	100	7/4.26	12.78	272.86	0.3390	29.26
2	232	19/3.94	19.70	636.67	0.1471	68.05

5.3.1 Increase in Length due to Stranding

When straightened out, each wire in any particular layer of a stranded conductor, except the central wire, is longer than the stranded conductor by an amount depending on the lay ratio of that layer.

5.3.2 Resistance and Mass of Conductor

The resistance of any length of stranded conductor is the resistance of the same length of any one wire multiplied by a constant as set out in the table below.

The mass of each wire in any particular layer of the stranded conductor, except the central wire, will be greater than that of an equal length of straight wire by an amount depending on the lay ratio of that layer. The total mass of any length of an aluminum stranded conductor is, therefore, obtained by multiplying the mass of an equal length of straight wire by an appropriate constant as mentioned below. In calculating the stranding constants as mentioned in the table below, the mean lay ratio, that is the arithmetic mean of the relevant

minimum and maximum values in table for lay ratio has been assumed for each layer.

5.3.3 Calculated Breaking Load of Conductor

- For a conductor containing not more than 37 wires, 95% of the sum of strength of the individual wires calculated from the values of the minimum breaking load given in this specification.
- For a conductor containing more than 37 wires, 90% of the sum of the strengths of the individual wire calculated from the values of the minimum breaking load given in this specification.

5.3.4 Calculated Area and Maximum Resistance of Conductor

The actual area of a stranded conductor has been taken as the sum of the cross-sectional areas of the individual wires of nominal diameter.

Maximum resistance values of stranded conductor have been calculated on the basis of maximum resistivity and the cross-sectional area based on the minimum diameter of wires.

5.4

Stranding Constants

Number of Wires in Conductor	Stranding Constants	
	Mass	Electrical Resistance
(1)	(2)	(3)
7	7.091	0.1447
19	19.34	0.05357

6. JOINTS IN WIRES

6.1 Conductor containing seven wires

There shall be no joint in any wire of a stranded conductor containing seven wires, except those made in the base rod or wire before final drawing.

6.2 Conductors containing more than seven wires

In stranded conductors containing more than seven wires, joints in individual wires are permitted in any layer except the outermost layer (in addition to those made in the base rod or wire before final drawing) but no two such joints shall be less than 15 m apart in the complete stranded conductor. Such joints shall be made by cold pressure butt welding. They are not required to fulfill the mechanical requirements for unjointed wires.

7. STRANDING

The wire used in the construction of a stranded conductor shall, before and after stranding, satisfy all the relevant requirements of this standard.

The lay ratio of the different layers shall be within the limits given in the table for lay ratio.

In all constructions, the successive layers shall have opposite directions of lay, the outermost layer being righ-handed. The wires in each layer shall be evenly and closely stranded

7.1 Lay Ratios for Aluminum Alloy Stranded Conductors

Number of Wires in Conductor	LAY RATIOS							
	3/6 Wire Layer		12 Wire Layer		18 Wire Layer		24 Wire Layer	
	Min	Max	Min	Max	Min	Max	Min	Max
7	10	14	---	---	---	---	---	---
19	10	16	10	14	---	---	---	---

NOTE: For the purpose of calculation the mean lay ratio shall be taken as the arithmetic mean of the relevant minimum and maximum values given in this table.

8. LENGTHS AND VARIATIONS IN LENGTHS:

Unless otherwise agreed between the Employer and the Contractor, stranded aluminum alloy conductors shall be supplied in the manufacturer’s usual production lengths to be indicated in the bid Schedule. The Employer reserves the right to specify particular lengths of conductor such that certain drum lengths will be shorter than others. There will in both cases be a permitted variation of $-0 + 5\%$ in the length of any one conductor length.

9. TESTS

9.1 Type Tests

The following tests shall be carried out as per relevant ISS once on samples of completed line conductor during each production run of up to 500 kms of the conductor from each manufacturing facility.

9.1.1 Ultimate Tensile Strength Test

This test is intended to confirm not only the breaking strength of the finished conductor but also that the conductor has been uniformly stranded.

A conductor sample of minimum 5 m length fitted with compression dead end clamps at either end shall be mounted in a suitable tensile test machine. Circles perpendicular to the axis of the conductor shall be marked at two places on its surface. Tension on the conductor sample shall be increased at a steady rate upto 50% of the minimum UTS specified and held for one minute. The circles drawn shall not be distorted due to relative movement of the individual strands. Thereafter the load shall be increased at a steady rate to the specified minimum UTS and held at that load for one minute. The conductor sample shall not fail during this period. The applied load shall then be increased until the failing load is reached and the value recorded.

9.1.2 D.C Resistance Test

On a conductor sample of minimum 5 m length two contact clamps shall be fitted with a pre-

determined bolt torque. The resistance between the clamps shall be measured using a Kelvin double bridge by initially placing the clamps at zero separation and subsequently one meter apart. The test shall be repeated at least five times and the average value recorded. The value obtained shall be corrected to the value at 20⁰ C, which shall conform to the requirements of this specification.

9.2 Routine Tests

Measurement of Physical Dimensions : The samples should meet the desired dimensional requirements before conducting following Routine Tests as per relevant ISS.

9.2.1 Selection of Test Samples

Samples for the tests specified in this specification shall be taken by the manufacturer before stranding, from not less than 10% of the individual lengths of aluminium alloy wire included in any one final heat-treatment batch and which will be included in any one consignment of the stranded conductors to be supplied.

Alternatively, if desired by the at the time of placing an order, that the tests be made in the presence of his representative, samples of wire shall be taken from length of stranded conductor.

Samples shall then be obtained by cutting 1.2 meters from the outer end of the finished conductor from not more than 10% of the finished reels or drums.

Tests for electrical and mechanical properties of aluminum alloy wire shall ordinarily be made before stranding since wires unlaidd from conductors may have different physical properties from those of the wire prior to stranding because of the deformation brought about by stranding and by straightening for test.

Spools offered for inspection shall be divided into equal lots, the number of lots being equal to the number of samples to be selected, a fraction of a lot being counted as s complete lot. One sample spool shall be selected at random from each lot.

The following test shall be carried out once on samples of completed line conductor during each production run of up to 500 kms of the conductor from each manufacturing facility.

9.2.2 Breaking Load Test

The breaking load of one specimen, cut from each of the samples taken shall be determined by means of a suitable tensile testing machine. The load shall be applied gradually and the rate of separation of the jaws of the testing machine shall be not less than 25 mm / min and not greater than 100mm /min.

9.2.3 Elongation Test

The elongation of one specimen cut from each of the samples taken shall be determined as follows:

The specimen shall be straightened by hand and an original gauge length of 200 mm shall be marked on the wire. A tensile load shall be applied as described above and the elongation shall be measured after the fractured ends have been fitted together. If the fracture occurs outside the gauge marks, or within 25 mm of either mark, and the required elongation is not obtained, the test shall be disregarded and another test should be made.

When tested before and after stranding, the elongation shall not be less than 4% on a gauge length of 200 mm.

9.2.4 D.C Resistance Test

The electrical resistance test of one specimen cut from each of the samples taken shall be measured at ambient temperature. The measured resistance shall be corrected to the value at 20⁰ C by means of the formula :

$$R_{20} = R_T \left[\frac{1}{1 + \alpha (T-20)} \right]$$

where ,

- R₂₀ = resistance corrected at 20⁰ C
- R_T = resistance measured T⁰C
- α = constant – mass temperature coefficient of resistance, 0.0036, and
- T = ambient temperature during measurement.

The resistance corrected at 20⁰ C shall not be more than the maximum values specified.

9.2.5 Chemical Analysis of Aluminum Alloy

Samples taken from the alloy coils / strands shall be chemically / spectrographically analyzed. The results shall conform to the requirements stated in this specification. The contractor shall make available material analyses, control documents and certificates from each batch as and when required by the **Owner**.

Test should be conducted at the independent test house by the owner in the case of absence Of facility at manufacturer. However the cost of such testing shall be borne by the manufacturer.

9.2.6 Dimensional and Lay Length Check

The individual strands of the conductors shall be dimensionally checked and the lay lengths checked to ensure that they conform to the requirements of this specification

Ten percent drums from each lot shall be rewound in the presence of the Owner or his representative to allow visual checking of the conductor for joints, scratches or other surface imperfections and to ensure that the conductor generally conforms to the requirements this specification. The length of conductor wound on the drum shall be re-measured by means of an approved counter / meter during the rewinding process.

9.2.7 Visual and dimensional Checks on the Conductor Drums.

The drums shall be visually and dimensionally checked to ensure that they conform to the requirements of this specification and of IS 1778: Specification for reels and drums of bare conductors. For wooden drums, a suitable barrel batten strength test procedure is required. The Bidder shall state in his bid the tests to be carried out on the drums and shall include those tests in the Quality Assurance Programme.

9.2.8 Acceptance Tests :

All tests required to confirm enclosed Guaranteed Technical Particulars (GTP) requirements of this specification needs to be conducted as Acceptance Tests.

10. REJECTION AND RETESTS

10.1 Type Tests

Should the conductor fail any of the type tests specified above, the Owner will not accept any conductor manufactured from the material, nor conductor made by the manufacturing methods used for the conductor which failed the test.

The manufacturer shall propose suitable modifications to his materials and techniques in order that he can produce conductor which will satisfactorily pass the type test requirements.

10.2 Routine Tests

Should any one of the test pieces first selected fail the requirements of the tests, two further samples from the same batch shall be selected for testings, one of which shall be from the length from which the original test sample was taken unless that length has been withdrawn by the manufacturer.

Should the test pieces from both these additional samples satisfy the requirements of the tests, the batch represented by these samples shall be deemed to comply with the standard. Should the test pieces from either of the two additional samples fail, the batch represented shall be deemed not to comply with the standard.

If checks on individual strand diameters, conductor lay lengths and conductor surface condition indicate non-compliance with the requirements of the specification, the particular drum will be rejected. Inspection will then be carried out on two further drums within the same batch. If the conductor on either of the drums is non-complaint, the complete batch will be rejected.

10.3 Delivery Extension due to Rejection of Conductor

The rejection of conductor due to its failure to pass either type or routine tests shall not permit the Contractor to apply for any extension to the time period within which he has contracted to complete the project.

B) TECHNICAL SPECIFICATION OF 9MTR 300KG PSC POLE

TECHNICAL SPECIFICATIONS

Applicable Standard:

The Poles shall comply with latest standards as under:

REC Specification No. 15/1979, REC Specification No. 24/1983, IS 1678, IS 2905, IS 7321.

II. Materials: Cement

Cement to be used in the manufacture of pre-stressed concrete poles shall be ordinary for rapid hardening Portland cement confirming to IS: 269-1976 (Specification for ordinary and low heat Portland cement) or IS: 8041 E-1978 (Specification for rapid hardening Portland cement).

Aggregates

Aggregates to be used for the manufacture of pre-stressed concrete poles shall confirm to IS: 383 (Specification for coarse and fine aggregates from natural sources for concrete). The nominal maximum sizes of aggregates shall in no case exceed 12 mm.

Water

Water should be free from chlorides, sulphates, other salts and organic matter. Potable water will be generally suitable.

Admixture

Admixture should not contain Calcium Chloride or other chlorides and salts which are likely to promote corrosion of pre-stressing steel. The admixture shall conform to IS: 9103.

Pres-Stressing Steel

Pre-stressing steel wires including those used as un tensioned wires should conform to IS:1785 (Part-I) (Specification for plain hard-drawn steel wire for pre-stressed concrete, Part-I cold drawn stress relieved wire).IS:1785 (Part-II)(Specification for plain hard-drawn steel wire) or IS:6003 (Specification for indented wire for pre-stressed concrete).The type design given in the annexure are for plain wires of 4 mm diameter with a guaranteed ultimate strength of 160 kg/mm². All pre-stressing steel shall be free from splits, harmful scratches, surface flaw, rough, aged and imperfect edges and other defects likely to impair its use in pre-stressed concrete.

Concrete Mix

Concrete mix shall be designed to the requirements laid down for controlled concrete (also called design mix concrete) in IS: 1343-1980 (Code of practice for pre-stressed concrete) and IS: 456 – 1978 (Code of practice for plain and reinforced concrete) subject to the following special conditions:

Minimum works cube strength at 28 days should be at least 420 g/cm². The concrete strength at transfer should be at least 210 Kg/cm².

The mix should contain at least 380 Kg of cement per cubic meter of concrete.

The mix should contain as low water content as is consistent with adequate workability. It becomes necessary to add water to increase the workability the cement content also should be raised in such a way that the original value of water cement ratio is maintained.

III. Design Requirements

The poles shall be designed for the following requirements:

The poles shall be planted directly in the ground with a planting depth as per IS: 1678. Wherever, planting depth is required to be increased beyond the specified limits or alternative arrangements are required to be made on account of ground conditions e.g. water logging etc., the same shall be in the scope of the bidder at no extra cost to owner. The bidder shall furnish necessary design calculations/details of alternative arrangements in this regard.

The working load on the poles should correspond to those that are likely to come on the pole during their service life.

The factor of safety for all poles 9.0Mts. Shall not be less than 2.0. The average permanent load shall be 40% of the working load. The F.O.S. against first load shall be 1.0. At average permanent load, permissible tensile stress in concrete shall be 30 kg/cm². At the design value of first crack load, the modulus of rupture shall not exceed 53.0kg/cm² for M-40.

The ultimate moment capacity in the longitudinal direction should be at least one fourth of that in the transverse direction.

The maximum compressive stress in concrete at the time of transfer of pre-stress should not exceed 0.8 times the cube strength.

The concrete strength at transfer shall not be less than half, the 28 days strength ensured in the design, i.e. $420 \times 0.5 = 210 \text{kg/cm}^2$. For model check calculations on the design of poles, referred to in the annexure, a reference may be made to the REC –Manual on Manufacturing of solid PCC poles, Part-I-Design Aspects.

IV. Dimensions and Reinforcement

The cross-sectional dimensions and the details of pre-stressing wires should conform to the particulars given in the enclosed drawing. The provisions of holes for fixing cross-arms and other fixtures should conform to the REC specification No.15/1979.

All pre-stressing wires and reinforcements shall be accurately fixed as shown in drawings and maintained in position during manufacture. The un-tensioned reinforcement as indicated in the drawings should be held in position by the use of stirrups which should go round all the wires.

All wires shall be accurately stretched with uniform pre-stress in each wire. Each wire or group of wires shall be anchored positively during casing. Care should be taken to see that the

anchorages do not yield before the concrete attains the necessary strength.

V. Cover

The cover of concrete measured from the outside of pre-stressing tendon shall be normally 20 mm.

VI. Welding and Lapping of Steel

The high tensile steel wire shall be continuous over the entire length of the tendon. Welding shall not be allowed in any case. However, joining or coupling may be permitted provided the strength of the joint or coupling is not less than the strength of each individual wire.

VII. Compacting

Concrete shall be compacted by spinning, vibrating, shocking or other suitable mechanical means. Hand compacting shall not be permitted.

VIII. Curing

The concrete shall be covered with a layer of sacking, canvass, Hessian or similar absorbent material and kept constantly wet up to the time when the strength of concrete is at least equal to the minimum strength of concrete at transfer of pre-stress. Thereafter, the pole may be removed from the mould and watered at intervals to prevent surface cracking of the unit the interval should depend on the atmospheric humidity and temperature. The pre-stressing wires shall be de-tensioned only after the concrete has attained the specified strength at transfer (i.e. 200 or 210 kg/cm² as applicable). The cubes cast for the purpose of determining the strength at transfer should be cured, as far as possible, under condition similar to those under which the poles are cured. The transfer stage shall be determined based on the daily tests carried out on concrete cubes till the specified strength indicated above is reached. Thereafter the test on concrete shall be carried out as detailed in IS: 1343 (code of practice for pre-stressed concrete). The manufacture shall supply, when required by the owner or his representative, result of compressive test conducted in accordance with IS: 456 (Code of practice for plain and reinforced concrete) on concrete cubes made from the concrete used for the poles. If the manufacture so desired, the manufacture shall supply cubes for test purpose and such cubes shall be tested in accordance with IS: 456 (Code of practice for plain and reinforced concrete).

IX. Lifting Eye-Hooks or Holes

Separate eye-hooks or hoes shall be provided for handling the transport, one each at a distance of 0.15 times the overall length, from either end of the pole. Eye-hooks, if provided, should be properly anchored and should be on the face that has the shorter dimension of the cross-section. Holes, if provided for lifting purpose, should be perpendicular to the broad face of the pole.

X. Holes for Cross Arms etc

Sufficient number of holes shall be provided in the poles for attachment of cross arms and other equipments.

XI. Stacking & Transportation

Stacking should be done in such a manner that the broad side of the pole is vertical. Each tier in the stack should be supported on timber sleeper located as 0.15 times the overall length, measured from the end. The timber supported in the stack should be aligned in vertical line.

XII. Earthing

- (a) Earthing shall be provided by having length of 6 SWG GI wire embedded in Concrete during manufacture and the ends of the wires left projecting from the pole to a length of 100mm at 250 mm from top and 1000 mm below ground level.
- (b) Earth wire shall not be allowed to come in contact with the pre-stressing wires

B. PSC Pole (9 Mtr x 300 Kg)

GUARANTEED TECHNICAL PARTICULARS

(To be submitted along with offer)

SI No.	Description	Unit	Bidder's Offer
			Bidder's Offer 9 Mtr X 300 Kg
1	Type of pole		
2	Factor of Safety		
3	Overall Length of Pole Meters	meters	
4	Working Load Kg	Kg	
5	Overall Dimensions		
A	Bottom Depth	mm	
B	Top Depth		
C	Breadth		
6	Reinforcement Detail:		
7	Diameter of prestressing wire		
8	No. of Tensioned wires		
9	No. of Untensioned wire		
10	Length of each untensioned wire		
11	Concrete Detail		
A	Cement Type		
B	Grade		
C	Type		
D	Quantity	Cubic meter/pole	
E	Standard confirming to:		
12	Steel Quality	Kg/Pole	
A	Ultimate Tensile Strength (UTS)	Km/Cm ²	
B	Weight		

**C) 33 KV,11 KV “V” CROSS ARM, BACK CLAMP FOR “V”
CROSS ARM & POLE TOP BRACKET (F CLAMP)**

TECHNICAL SPECIFICATIONS

8.0.1 Qualification Criteria of Manufacturer:-

The prospective bidder may source the above items from manufacturers who must qualify the following requirements:

The manufacturer should have supplied at least 1000 no.s (of each item) to electricity supply utilities / PSUs.

The bidder should enclose Performance Certificates from the above users issued in the name of the manufacturer as proof of successful operation in field.

a) Hot Dip Galvanised Cross arms and Pole Top Brackets for both 33 KV & 11kV construction at intermediate and light angle pole shall be fabricated from grade 43A mild steel of channel section and for heavy angle poles, end poles and section poles fabricated from grade 43A mild steel of angle section. The grades of structural steel shall conform to IS – 226: 1975.

b) The 33 KV & 11 KV ‘ V ’ Cross arm shall be made out of 100x 50x5.6. mm MS Channel of (9.56 kg/mtr weight) .

The Back Clamp for both 33 KV & 11 KV shall be made out of 75 x 10 MS Flat and shall be suitably designed to fit PSC Pole 10 Mtr x 300 Kg.

c) The Pole Top Bracket (F Clamp) shall be made out of 75 x 10 MS Flat suitably designed to fit PSC Pole 10 Mtr x 300 Kg for both 33 KV & 11 KV.

Except where otherwise indicated all dimensions are subject to the following tolerances:

dimensions up to and including 50mm: +1mm: and dimensions greater than 50mm: +2%

All steel members and other parts of fabricated material as delivered shall be free of warps, local deformation, unauthorized splices, or unauthorized bends. Bending of flat strap shall be carried out cold. Straightening shall be carried out by pressure and not by hammering.

Straightness is of particular importance if the alignment of bolt holes along a member is referred to its edges.

Holes and other provisions for field assembly shall be properly marked and cross referenced. Where required, either by notations on the drawing or by the necessity of proper identification and fittings for field assembly, the connection shall be match marked. A tolerance of not more than 1mm shall be permitted in the distance between the center lines of bolt holes.

The holes may be either drilled or punched and, unless otherwise stated, shall be not more than 2mm greater in diameter than the bolts. When assembling the components force may be used to bring the bolt holes together (provided neither members nor holes are thereby distorted) but all force must be removed before the bolt is inserted. Otherwise strain shall be deemed to be present and the structure may be rejected even though it may be, in all other respects, in conformity with the specification.

The back of the inner angle irons of lap joints shall be chamfered and the ends of the members cut where necessary and such other measures taken as will ensure that all members can be bolted together without strain or distortion. In particular, steps shall be taken to relieve stress in cold worked steel so as to prevent the onset of embitterment during galvanizing. Similar parts shall be interchangeable.

Shapes and plates shall be fabricated and assembled in the shop to the greatest extent practicable. Shearing flame cutting and chipping shall be done carefully, neatly and accurately. Holes shall be cut, drilled or punched at right angles to the surface and shall not be made or enlarged by burning. Holes shall be clean-cut without torn or ragged edges, and burrs resulting from drilling or reaming operations shall be removed with the proper tool.

Shapes and plates shall be fabricated to the tolerance that will permit field erection within tolerance, except as otherwise specified. All fabrication shall be carried out in a neat and workmanlike manner so as to facilitate cleaning, painting, galvanizing and inspection and to avoid areas in which water and other matter can lodge.

Contact surfaces at all connections shall be free of loose scale, dirt, burrs, oil and other foreign materials that might prevent solid seating of the parts.

8.0.2 Fabrication has to be made as per drg. of ‘ V ‘ X-arm, Back clamp & ‘ F ‘ clamp.

GALVANISING

All type of cross arms back clamps, F clamps & stay clamps shall be hot dip galvanized, are as following:

All galvanizing shall be carried out by the hot dip process, in accordance with Specification IS 2629. However, high tensile steel nuts, bolts and spring washer shall be electro galvanized to Service Condition 4. The zinc coating (610 gms per sq.mt) shall be smooth, continuous and uniform. It shall be free from acid spot and shall not scale, blister or be removable by handling or packing.

There shall be no impurities in the zinc or additives to the galvanic bath which could have a detrimental effect on the durability of the zinc coating.

Before picking, all welding, drilling, cutting, grinding and other finishing operations must be completed and all grease, paints, varnish, oil, welding slag and other foreign matter completely removed.

All protuberances which would affect the life of galvanizing shall also be removed.

The weight of zinc deposited shall be in accordance with that stated in Standard IS 2629 and shall not less than 0.61kg/m² with a minimum thickness of 86 microns for items of thickness more than 5mm, 0.46kg/m² (64 microns) for items of thickness between 2mm and 5mm and 0.33kg/m² (47 microns) for items less than 2mm thick.

Parts shall not be galvanized if their shapes are such that the pickling solutions cannot be removed with certainty or if galvanizing would be unsatisfactory or if their mechanical strength would be reduced. Surfaces in contact with oil shall not be galvanized unless they are subsequently coated with an oil resistant varnish or paint.

In the event of damage to the galvanizing the method used for repair shall be subject to the approval of the Engineer in Charge or that of his representative.

In no case the repair of galvanisation on site will be permitted.

The threads of all galvanized bolts and screwed rods shall be cleared of spelter by spinning or brushing. A die shall not be used for cleaning the threads unless specifically approved by the Engineer in Charge. All nuts shall be galvanized. The threads of nuts shall be cleaned with a tap and the threads oiled.

Partial immersion of the work shall not be permitted and the galvanizing tank must therefore be sufficiently large to permit galvanizing to be carried out by one immersion.

After galvanizing no drilling or welding shall be performed on the galvanized parts of the equipment excepting that nuts may be threaded after galvanizing. To avoid the formation of white rust galvanized materials shall be stacked during transport and stored in such a manner as to permit adequate ventilation. Sodium dichromate treatment shall be provided to avoid formation of white rust after hot dip galvanization.

The galvanized steel shall be subjected to test as per IS-2633.

8.0.3

**33 KV & 11 KV V CROSS ARM
GURANTEED TECHNICAL PARTICULARS**

(To be submitted along with offer)

Sl. No.	Description Unit		Bidder's offer	
			33 Kv	11 Kv
1	Type of crossarm			
2	Grade of steel			
3	Steel standard			
4	Fabrication Standard			
5	Dimensions	Mm		
6	Steel section utilized			
7	Steel tensile strength	N/cm ²		
8	Working load	Kg		

9	Details of galvanizing method utilized and standard/specification conforming to?			
10	Weight of cross arm	kg		
11	Whether drawing has been submitted with the bid			

Signature of Bidder

(This form is to be duly filled up by the bidder & submit along with the Tender)

8.0.4

POLE TOP BRACKETS (F CLAMP)

GURANTEED TECHNICAL PARTICULARS

(To be submitted along with offer)

Sl. No.	Description Unit		Bidder's offer	
			33 Kv	11 Kv
1	Type of crossarm			
2	Grade of steel			
3	Steel standard			
4	Fabrication Standard			
5	Dimensions	Mm		
6	Steel section utilized			
7	Steel tensile strength	N/cm ²		
8	Working load	Kg		
9	Details of galvanizing method utilized and standard/specification conforming to?			
10	Weight of cross arm	kg		
11	Whether drawing has been submitted with the bid			

Signature of Bidder

(This form is to be duly filled up by the bidder & submit along with the Tender)

8.0.5

BACK CLAMP FOR "V" CROSS ARM

GURANTEED TECHNICAL PARTICULARS

(To be submitted along with offer)

Sl. No.	Description Unit		Bidder's offer	
			33 Kv	11 Kv
1	Type of Clamp			
2	Grade of steel			
3	Steel standard			
4	Fabrication Standard			
5	Dimensions	Mm		
6	Steel section utilized			

7	Steel tensile strength	N/cm ²		
8	Working load	Kg		
9	Details of galvanizing method utilized and standard/specification conforming to?			
10	Weight of back clamp	kg		
11	Whether drawing has been submitted with the bid			

Signature of Bidder

(This form is to be duly filled up by the bidder & submit along with the Tender)

8.0.6 Fixing of Cross Arms

After the erection of supports and providing guys, the cross-arms are to be mounted on the support with necessary clamps, bolts and nuts. The practice of fixing the cross arms before the pole erection should be followed.

D) TECHNICAL SPECIFICATION OF 33KV PIN INSULATOR

33 Kv Pin Insulators.-IS-731/77 (Porcelain Insulator for O/H power lines with nominal voltage greater than 1000 volts.

Design and Construction

The material shall conform in all respect to the relevant Indian standards with latest amendments indicated below :

Indian Standards	Title
BIS:731/1976	Porcelain insulators for overhead power lines with a nominal voltage greater than 1000V
BIS:2486(Part-1 toPart-4)	Metal fittings of insulators for overhead power lines with nominal voltage greater than 1000V
BIS:7935-1975	Porcelain insulators for overhead power lines with a nominal voltage upto and including 1000V
REC SPEC : 3/1971	33 KV Porcelain insulators and fittings
REC SPEC : 21/1981	Guy Insulator (Stay Insulator)

1.10 General Requirements for 33 KV Pin Insulator

All insulators for 33KV shall conform to Type B of latest version of IS: 731. Insulator shall be as per enclosed drawing. Pin insulator shall consist of a single piece of porcelain, intended to be mounted rigidly on supporting structure by a pin, which passes up inside the insulator. The pin type insulator shall have a top groove and shall be threaded to take mild steel pins. The profile of threads shall be as per IS: 1445.

Insulators shall confirm the following specific conditions of I.S. given below.

Insulator	Designation	Minimum Mechanical Failing Load	Minimum Creepage Distance
33KV Pin Insulator	Type B of IS:731	10KN	580mm

GURANTEED TECHNICAL PARTICULARS OF 33 KV PIN INSULATOR

Sl. No.	Description	Bidder's Offer
1	Manufacturer's name	
2	Address of manufacturer	
3	Location of type testing	
4	Applicable standard	
5	Type of insulator (Porcelain or toughened glass)	
6	Dry impulse withstand voltage	
7	Wet power frequency, 1 minute, withstand voltage	
8	Dry, Critical Impulse Flashover Voltage	
9	Dry, power frequency, Critical Flashover Voltage	
10	Wet, power frequency, Critical Flashover Voltage	
11	Power frequency Puncture Voltage	
12	Safe Working Load	
13	Minimum Failing Load	
14	Creepage Distance	
15	Protected Creepage Distance	
16	Type and Grade of Materials : Insulator	
17	Type and Grade of Materials : Thimble	
18	Type and Grade of Materials : Cement	
19	Type of semi conducting Glaze	
20	Radius of Conductor Groove	
21	Colour of Insulator	
22	Weight of Insulator	
23	Number of Insulators per Crate	
24	Gross Weight of Loaded Crate	
25	Whether drawing showing dimensional details have been furnished along with Bid	
26	Whether Type Test Certificates have been furnished	
27	Other particulars (if any)	

Signature of Bidder

(This form is to be duly filled up by the bidder & submit along with the Tender)

E) TECHNICAL SPECIFICATION OF 33KV G.I.PIN

APPLICABLE STANDARD :

I. 33 kV GI Pin shall comply with the requirements of IS: 2486

General Requirement;

The pins shall be of single piece obtained by the process of forging. They will not be made by any process using more than one piece of material. The pin will have good finish, free from flaws and other defects. The finish of the collar shall be such that a sharp angle between the collar and the shank is avoided. All ferrous pins, nuts and washers, except those made of stainless steel shall be galvanized by hot dip process. Other fittings, i.e. flat washers and spring washers may be electro-galvanized as per IS: 2486. The threads of nuts, and topped holes, when cut after galvanization shall be well oiled or greased. The pins shall be as per relevant figure indicated in IS 2486 (part II) having stalk length of 165 mm and shank length of 150 mm with minimum failing load of 10 KN with large heads and shall match with the pin type insulators with cemented zinc thimble having similar threads.

TESTS:

The pins shall be tested as per IS: 2486 (part-1):1993

I. Type Test:

The bidder has to enclose the reports of the following type tests carried out in any govt. recognized laboratory along with the bid documents.

- a) Checking of Threads on Heads
- b) Galvanizing Test
- c) Visual Examination
- d) Mechanical Test.

II. Acceptance Tests:

Following tests shall be carried out at the works of the manufacturer before dispatch.

- a) Checking of Threads on Heads
- b) Galvanizing Test
- c) Visual Examination
- d) Mechanical Test.

GURANTEED TECHNICAL PARTICULARS

Sl. No.	General Technical Particulars	Bidder's Offer
1.	Manufacturer's name & Address	
2.	Standard applicable specification	
3.	Minimum failing load	

4.	Dimensions (mm)	
A	Total length	
B	Shank length	
C	Stalk length	
5.	Type of threads	
6.	Threads per Inch	
7.	Type of galvanization of pin & nuts	
8.	Mass of zinc (minimum)	
9.	Applicable specification	
10.	No. of Nuts with each pin & its size	
11.	No. of spring washer with each pin & its size	
12.	Packing details	
A	Type of packing	
B	Weight of each pin approx, (with nut & washers)	
C	No. of Pins in each packing (Kg)	
13.	Tolerance in weight / dimensions, if any	
14.	I.S.I. Certificate License number	
15.	Any other relevant information the bidder would like to indicate	
16.	Manufacturer's Trade mark with each GS Pins	
17.	Whether drawing has been submitted by the bidder	

Signaturee of Bidder

(This form is to be duly filled up by the bidder & submit along with the Tender)

F) HT & LT STAY SETS

TECHNICAL SPECIFICATION

I. Qualification Criteria of Manufacturer:-

The prospective bidder may source Stay Sets from manufacturers only must qualify all the following requirements:

- a) Manufacturer must have successfully carried out Type Test of similar item from any NABL Accredited Laboratory within the last 5 years, prior to the date of submission of the bid.

- b) The manufacturer should have supplied at least 1000 sets (both HT & LT taken together) to electricity supply utilities / PSUs. The bidder should enclose Performance Certificates from the above users issued in the name of the manufacturer as proof of successful operation in field.

II. SCOPE

This specification covers design, manufacture, testing and dispatch of LT Stay Sets of 16 mm and HT stay sets 20 mm dia.

III. GENERAL REQUIREMENTS

16 MM Dia Stay sets (Galvanized) – LT Stay Set

This stay sets (Line Guy set) will consist of the following components:-

Anchor Rod with one washer and Nut

Overall length of rod should be 1800 mm to be made out of 16 mm dia GI Rod, one end threaded up to 40 mm length with a pitch of 5 threads per cm and provided with one square GI washer of size 40X40x1.6mm and one GI hexagonal nut conforming to IS:1367:1967 & IS:1363:1967. Both washer and nut to suit threaded rod of 16 mm dia. The other end of the rod to be made into a round eye having an inner dia of 40mm with best quality welding.

Anchor Plate Size 200 x 200 x6 mm

To be made out of GI plate of 6 mm thickness. The anchor plate should have at its centre 18 mm dia hole.

Turn Buckle & Eye Bolt with 2 Nuts

To be made of 16 mm dia GI Rod having an overall length of 450mm, one end of the rod to be threaded up to 300 mm length with a pitch of 5 threads per cm and provided with two GI Hexagonal nuts of suitable size conforming to IS:1363:1967 & IS:1367:1967. The other end of rod shall be rounded into a circular eye of 40mm inner dia with proper and good quality welding.

Bow with Welded Angle

To be made out of 16mm dia GI rod. The finished bow shall have an over all length of 995 mm and height of 450 mm, the apex or top of the bow shall be bent at an angle of 10 R. The other end shall be welded with proper and good quality welding to a GI angle 180 mm long having a dimension of 50x50x6mm. The angle shall have 3 holes of 18 mm dia each.

Thimble

To be made on 1.5 mm thick GI sheet into a size of 75x22x40mm and shape as per standard shall be supplied.

Average Weight of Finished 16mm Stay Sets shall be at least 7.702 KG (Minimum)
(Excluding Nuts Thimbles and Washer) 8.445 Kg. (Maximum)

20 mm Dia Stays Sets for 33 Kv,11 KV Lines (Galvanized) HT Stay Set

The Stay Set (Line Guy Set) will consist of the following components:

Anchor Rod with one Washer and Nut

Overall length of Rod should be 1800mm to be made out of 20 mm dia GI rod one end threaded up to 40 mm length with a pitch of threads per cm. And provided with one square G.I Washer of Size 50x50x1.6mm and one GI Hexagonal nut conforming to IS: 1363:1967 & IS:1367:1967. Both washer and nut to suit the threaded rod of 20mm. The other end of the rod to be made into a round eye having an inner dia of 40mm with best quality of welding. Dimensional and other details are indicated and submitted by bidders for owner's approval before start of manufacturing.

Anchor Plate Size 300 x 300 x 8 mm

To be made out of G.S. Plate of 8 mm thickness. The anchor plate to have at its centre 22mm dia hole.

Turn Buckle, Eye Bolt with 2 Nuts.

To be made of 20 mm dia G.I Rod having an overall length of 450 mm. One end of the rod to be threaded up to 300 mm length with a pitch of 4 threads per cm. The 20 mm dia bolt so made shall be provided with two G.I Hexagonal nuts of suitable size conforming to IS: 1363:1967 & IS: 1367:1967. The other end of the rod shall be rounded into a circular eye of 40mm inner dia with proper and good quality of welding. Welding details are to be indicated by the bidder separately for approval.

Bow with Welded Channel:

To be made out of 16mm dia G.I Rod. The finished bow shall have an overall length of 995 mm and height of 450 mm. The apex or top of the bow shall be bent at an angle of 10R. The other end shall be welded with proper and good quality welding to a G.I Channel 200 mm long having a dimension of 100x50x4.7 mm. The Channel shall have 2 holes of 18 mm dia and 22 dia hole at its centre as per drawing No.3 enclosed herewith.

Thimble 2 Nos.

To be made of 1.5 mm thick G.I sheet into a size of 75x22x40mm and shape as per standard.

Galvanizing

The complete assembly shall be hot dip galvanized.

Welding

The minimum strength of welding provided on various components of 16mm and 20 mm dia stay sets shall be 3100 kg & 4900 kg respectively. Minimum 6mm fillet weld or its equivalent weld area

should be deposited in all positions of the job i.e. at any point of the weld length. The welding shall be conforming to relevant IS: 823/1964 or its latest amendment.

Threading

The threads on the Anchor Rods, Eye Bolts and Nuts shall be as per specification IS; 4218:1967 (ISO Metric Screw Threads). The Nuts shall be conforming to the requirements of IS: 1367:1967 and have dimension as per IS 1363:1967. The mechanical property requirement of fasteners shall confirm to the properly clause 4.6 each for anchor rods and Eye bolt and property clause 4 for nuts as per IS: 1367:1967.

Average weight of finished 20 mm Stays Set: 14.523 Kg.(Min) (Excluding Nuts Thimble & Washer) :15.569 Kg.(Max.)

IV. TESTS

The contractor shall be required to conduct testing of materials at Govt./Recognized testing laboratory during pre-dispatch inspection for Tensile Load of 3100 Kg/4900Kg. applied for one minute on the welding and maintained for one minute for 16 mm and 20mm dia stay sets respectively.

V. IDENTIFICATION MARK

All stay sets should carry the identification mark of the Owner applicable.

This should be engraved on the body of stay rods to ensure proper identification of the materials. The nuts should be of a size compatible with threaded portion of rods and there should be not play or slippage of nuts.

Welding wherever required should be perfect and should not give way after erection.

VI. TOLERANCES

The tolerances for various components of the stay sets are indicated below subject to the condition that the average weight of finished stay sets of 16mm dia excluding nuts, thimbles and washers shall not be less than the weight specified above:-

GURANTEED TECHNICAL PARTICULARS

(To be submitted along with Offer)

Signature of Bidder

(This form is to be duly filled up by the bidder & submit along with the Tender)

G) TECHNICAL SPECIFICATION OF HT & LT STAY INSULATOR

General requirement for Stay Insulators

These insulators shall generally comply with latest version of IS: 1445, REC Specification No.4/1972 and fittings with IS: 7935-1975 or the latest version thereof.

Guy strain insulators shall conform to designation C as per IS:5300.

Insulator Materials

1.1 Porcelain

The porcelain used in the manufacture of shells shall be sound, free from defects thoroughly vitrified and smoothly glazed. It should not engage directly with hard metal.

1.2 Glaze

The finished porcelain shall be glazed in brown colour. The glaze shall cover all exposed parts of the insulator and shall have a good lustre, smooth surface and good performance under the extreme weather conditions of a tropical climate. It shall not crack or chip by ageing under the normal service conditions. The glaze shall have the same co-efficient of expansion as if the porcelain body throughout the working temperature range. The insulator shall be so designed that the stresses due to expansion and contraction in any part of the insulator shall not lead to deterioration.

1.3 Cement

Cement used in the manufacture of the insulator shall not cause fracture by expansion or loosening by contraction. The cement shall not give rise to chemical reaction with metal fittings and its thickness shall be as small and uniform as possible. Proper care shall be taken to correctly centre and locate individual parts during cementing.

1.4 QUALITY ASSURANCE AND TESTING

1.5 Type Tests.

Reports of the following type tests conducted in any NABL accredited laboratory, shall have to be submitted along with the bid.

- (a) Visual examination
- (b) Verification of dimensions
- (c) Visible Discharge test (dry)
- (d) Impulse voltage withstand and flashover test(dry)
- (e) Power frequency voltage withstands and flashover test (i) dry (ii) wet.
- (f) Temperature Cycle test
- (g) Mechanical failing Load Test (for pin insulator only) to be carried out as

- per procedure described at Sub-clause 12.2.5 below
- (h) 24 hour Mechanical Strength Test for Strain Insulator
- (i) Puncture Test
- (j) Porosity Test
- (k) Galvanizing Test
- (l) Electro-mechanical failing test (for Strain Insulator only) to be carried out as per procedure described at Sub-clause 12.2.5 below
- (m) Thermal mechanical performance test (for Strain insulators only) to be carried out as per procedure described at Sub-clause 12.2.5 below)

Note: Type test reports shall be submitted for acceptance which should not be more than five (05) years old as on date of bid opening.

1.6 Acceptance Tests:

The following tests shall be conducted at the works of the manufacturer on a suitable number of individual insulators.

- (a) Verification of dimensions
- (b) Temperature cycle test
- (c) Electro-mechanical failing test (for Strain Insulator only) to be carried out as per procedure described at Sub-clause 12.2.5 below
- (d) Puncture Test
- (e) Porosity Test
- (f) Galvanizing Test

1.7 Routine Test

The manufacturer should have facilities to conduct following routine tests at their works.

- (a) Visual Inspection
- (b) Mechanical routine test (for Strain Insulator only)
- (c) Electrical routine test (for Strain Insulator only)
- (d) Hydraulic Internal Pressure on Shells (for strain insulators only) to be carried out as per relevant BIS Clause or as per Annexure A Point-1

The bidder shall have to submit the list testing and measuring equipments along with bid documents.

1.8 Test during Manufacture

On all components as applicable.

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

(d) Hydraulic Internal Pressure tests on disc insulator shells as per relevant BIS Clause.

1.9 Hydraulic (For Disc Insulators Internal Pressure Test on Shells)

The test shall be carried out as per relevant BIS Clause.

1.11 Thermal Mechanical Performance Test (if applicable)

Thermal Mechanical Performance Test shall be performed in accordance with IEC-383-1-1993 Clause 20 with the following modifications:

- (1) The applied mechanical load during this test shall be 70% of the rated electromechanical or mechanical value.
- (2) The acceptance criteria shall be

- (a) X greater than or equal to $R + 3S$

Where

X Mean value of the individual mechanical failing load.

R Rated electro-mechanical/mechanical failing load

S Standard deviation.

- (b) The minimum sample size shall be taken as 20 for disc insulator units

- (c) The individual electromechanical failing load shall be at least equal to the rated value. Also puncture shall not occur before the ultimate fracture.

1.11 Electromechanical/Mechanical Failing Load Test.

This test shall be performed in accordance with clause 18 and 19 of IEC 383 with the following acceptance.

- (i) X greater than or equal to $R + 3S$

Where

X Mean value of the electro-mechanical/mechanical/failing load

R Rated electro-mechanical/mechanical failing load

S Standard deviation.

- (ii) The minimum sample size shall be taken as 20 for disc insulators units. However, for larger lot size, IEC 591 shall be applicable.

- (iii) The individual electro-mechanical/mechanical failing load shall be at least equal to the rated value. Also electrical puncture shall not occur before the ultimate fracture.

Note: The owner had right to waive any type/special test if the supplier produces the test report for such tests conducted on identical Insulators.

1.12 Packing and Marking

- a) Each insulator shall be visibly and indelibly marked as following :
 - (i). Name and Trademark of manufacturer
 - (ii). Month / Year of manufacturer
 - (iii). Minimum failing load in KN
 Marking on porcelain shall be printed / engraved and shall be applied before firing.
- b) All insulators shall be packed in strong seasoned wooden crates. The gross weight of the crates along with the material shall not normally exceed 200 Kg to avoid handling problem
- c) The packing shall be of sufficient strength to withstand rough handling during transit, storage at site and subsequent handling in the field.
- d) Suitable cushioning, protective padding or spacers shall be provided to prevent damage or deformation during transit and handling.

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

Insulators shall confirm the following specific conditions of I.S. given below

Insulator	Designation	Minimum Mechanical Failing Load	Minimum Creepage Distance
33/11KV Stay Insulator	Type C of IS:1445	88KN	57mm
LT Stay Insulator	Type C of IS:1445	44KN	41mm

GURANTEED TECHNICAL PARTICULARS

Sl. No.	Description	HT Stay Insulator	LT Stay Insulator
1	Manufacturer's name		
2	Address of manufacturer		
3	Location of type testing		
4	Applicable standard & Type		
5	Type of insulator (Porcelain or toughened glass)		
6	Dry impulse withstand voltage		
7	Wet power frequency, 1 minute, withstand voltage		

8	Dry, Critical Impulse Flashover Voltage		
9	Dry, power frequency, Critical Flashover Voltage		
10	Wet, power frequency, Critical Flashover Voltage		
11	Power frequency Puncture Voltage		
12	Safe Working Load		
13	Minimum Failing Load		
14	Creepage Distance		
15	Protected Creepage Distance		
16	Type and Grade of Materials : Insulator		
17	Colour of Insulator		
18	Weight of Insulator		
19	Number of Insulators per Crate		
20	Type of semi-conducting glaze		
21	Minimum dia of Stay wire hole		
21	Gross Weight of Loaded Crate		
22	Whether drawing showing dimensional details have been furnished along with Bid		
23	Whether Type Test Certificates have been furnished		
24	Other particulars (if any)		

Signature of the Bidder

(This form is to be duly filled up by the bidder & submit along with the Tender)

H) TECHNICAL SPECIFICATION OF 70KN DISC INSULATOR

1.1 SCOPE.

This specification provides for design, manufacture, engineering, inspection and testing before dispatch packing and delivery FOR (destination) for Indian manufacturers of disc. Insulators & Post Insulators as per technical requirements furnished in this specification.

These insulators are to be used in suspension and tension insulators strings for the suspension and anchoring of the bus-bar conductors.

Following is the list of documents constituting this tender.

- (i) Technical specification.
- (ii) Technical data sheet.
- (iii) Drawings of insulators

All the above volumes along with amendments there of shall be read and interpreted together.

However, in case of a contradiction between the –Technical Specification and any other volume, the provisions of this volume will prevail.

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

1.2 STANDARDS:

1.2.1 Except as modified in this specification, the disc insulators shall conform to the following Indian Standards, which shall mean latest revisions and amendments. Equivalent International and Internally recognized standards to which some of these standards generally correspond are also listed below.

Sl. No.	Indian Standard	Title.	Internationa
1.	IS: 206	Method for Chemical Analysis of Slab Zinc.	
2.	IS: 209	Specification for Zinc.	BS: 3436
3.	IS: 731	Porcelain insulators for overhead power lines with a normal voltage greater than 1000V	BS: 137(I&II); IEC 274 IEC 383
4.	IS: 2071 Part-(I) Part-(II) Part-(III)	Method of High Voltage Testing.	
5.	IS: 2121 (Part-I)	Specification of Conductors and Earth wire Accessories for Overhead Power lines. Armour Rods, Binding wires and tapes for conductor.	
6.	IS: 2486	Specification for Insulator fittings for overhead power lines with a nominal voltage greater than 1000V.	
	Part – I	General Requirement and Tests.	BS: 3288
	Part – II	Dimensional Requirements.	IEC: 120
	Part – III	Locking devices.	IEC: 372
7.	IS: 2629	Recommended practice for Hot Dip Galvanisation for iron and steel.	
8.	IS: 2633	Testing for Uniformity of Coating of Zinc coated articles.	
9.	IS: 3138	Hexagonal Bolts & Nuts.	ISO/R 947 &

10.	IS: 3188	Dimensions for Disc Insulators.	IEC: 305
11.	IS: 4218	Metric Screw Threads	ISO/R 68-1969 R 26-1963, R 262-
12.	IS: 6745	Determination of weight of zinc coating on zinc coated iron and steel articles.	
13	IS: 8263	Methods of RIV Test of HV insulators.	IEC 437 NEMA Publication No.107/1964
14	IS: 8269	Methods for switching impulse test on HV insulators.	IEC: 506
15		Thermal mechanical performance test and mechanical performance test on string insulator units.	IEC: 575
16	IEC	Long Rod Insulators	IEC-433

1.2.2 The standards mentioned above are available from:

Reference.	Abbreviation	Name & Address:
BS		British Standards, British Standards Institution, 101, Pentonville Road, N-19 ND,U
IEC / CISPR		International Electro technical commission Electro Technique International. 1, Rue de verembe Geneva SWITZERLAND.
IS		Bureau of Indian Standards, Manak Bhavan, 9 Bahadurshah Zafar Marg, New Delhi- 110001
ISO		International Organisation for Standardization. Danish Board of Standardization Dansk Standardizing Sraat Aurehoegvej-12 DK-2900 Hellestrup DENMARK.
NEMA		National Electric Manufacturers Association 1`55, East 44 th . Street New York, NY 10017 USA

1.3 (A) PRINCIPAL PARAMETERS.

1.3.1 DETAILS OF DISC INSULATORS:

The Insulator strings shall consist of standard discs for use in three phases, 50 Hz 33/11KV S/S of Southco Utility in a moderately polluted atmosphere. The discs shall be cap and pin, ball and socket type, radio interference and have characteristics as shown in Table-I and all ferrous parts shall be hot dip galvanized as per the latest edition of IS 2629. The zinc to be used for making sleeves shall be 99.95 % pure.

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

Sl. No	Type of String.	Size of disc. Insulator (mm)	Minimum creepage distance of each disc(mm)	No. of standard discs 33KV	Electro-mechanical strength of insulator string fittings (KN)
1.	Single suspension	255x145	430	1x3	45
2.	Double suspension	-do-	-do-	2x3	2x45
3.	Single Tension	280x170	-do-	1x4	70
4.	Double Tension	-do-	-do-	2x4	2x70

1.3.2 SPECIFICATION DRAWINGS:

The specification in respect of the disc insulators are described. These specification for information and guidance of the Bidder only. The drawings to be furnished by the supplier shall be as per his own design and manufacture and in line with the specification.

1.3 (B) GENERAL TECHNICAL REQUIREMENTS:

1.3.1 Porcelain:

The porcelain used in the manufacture of the shells shall be ivory white nonporous of high dielectric, mechanical and thermal strength, free from internal stresses blisters, laminations, voids, forgone matter imperfections or other defects which might render it in any way unusable for insulator shells. Porcelain shall remain unaffected by climatic conditions ozone, acid, alkalis, zinc or dust. The manufacturing shall be by the wet process and impervious character obtained by through verification.

The insulator shall be made of highest grade, dense, homogeneous, wet-process porcelain, completely and uniformly vitrified throughout to produce uniform mechanical and electrical

strength and long life service. The porcelain shall be free from warping, roughness, cracks, blisters, laminations, projecting points foreign particles and other defects, except those within the limits of standard accepted practice. Surfaces and grooves shall be shaped for easy cleaning. Shells shall be substantially symmetrical.

1.3.2 Porcelain glaze:

Surface to come in contact with cement shall be made rough by sand glazing. All other exposed surfaces shall be glazed with ceramic materials having the same temperature coefficient of expansion as that of the insulator shell. The thickness of the glaze shall be uniform throughout and the colour of the glaze shall be down. The Glaze shall have a visible luster and smooth on surface and be capable of satisfactory performance under extreme tropical climatic weather conditions and prevent ageing of the porcelain. The glaze shall remain under compression on the porcelain body throughout the working temperature range.

1.4 METAL PARTS:

(i) Cap and Ball Pins:

Ball pins shall be made with drop forged steel caps with malleable cast iron. They shall be in one single piece and duly hot dip galvanized. They shall not contain parts or pieces joined together welded, shrink fitted or by any other process from more than one piece of materials. The pins shall be of high tensile steel, drop forged and heat-treated. The caps shall be cast with good quality black heart malleable cast iron and annealed. Galvanizing shall be by the hot dip process with a heavy coating of zinc of very high purity. The bidder shall specify the grade composition and mechanical properties of steel used for caps and pins. The cap and pin shall be of such design that it will not yield or distort under the specified mechanical load in such a manner as to change the relative spacing of the insulators or add other stresses to the shells. The insulator caps shall be of the socket type provided with nonferrous metal or stainless steel cotter pins and shall provide positive locking of the coupling.

(ii) Security Clips:

The security clips shall be made of phosphor bronze or of stainless steel.

1.5 FILLER MATERIAL:

Cement to be used, as a filler material be quick setting, fast curing Portland cement. It shall not cause fracture by expansion or loosening by contraction. Cement shall not react chemically with metal parts in contact with it and its thickness shall be as small and as uniform as possible.

1.6 MATERIALS DESIGN AND WORKMANSHIP:

1.6.1 GENERAL:

All raw materials to be used in the manufacture of these insulators shall be subject to strict raw material quality control and to stage testing/ quality control during manufacturing stage to ensure the quality of the final end product. Manufacturing shall conform to the best engineering practices adopted in the field of extra high voltage transmission. Bidders shall therefore offer insulators as are guaranteed by them for satisfactory performance on Transmission lines.

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

1.6.2 INSULATOR SHELL:

The design of the insulator shells shall be such that stresses due to expansion and contraction in any part of the insulator shall not lead to deterioration. Shells with cracks shall be eliminated by temperature cycle test followed by mallet test. Shells shall be dried under controlled conditions of humidity and temper.

1.6.3 METAL PARTS:

- 1) The pin and cap shall be designed to transmit the mechanical stress to the shell by compression and develop uniform mechanical strength in the insulator. The cap shall be circular with the inner and outer surfaces concentric and of such design that it will not yield or distort under loaded conditions. The head portion of the pinball shall be suitably designed so that when the insulator is under tension the stresses are uniformly distributed over the pinhole portion of the shell. The pinball shall move freely in the cap socket either during assembly of a string or during erection of a string or when a string is placed in position.
- ii) Metal caps shall be free from cracks, seams, shrinks, air holes, blowholes and rough edges. All metal surfaces shall be perfectly smooth with no projecting part or irregularities, which may cause corona. All load bearing surfaces shall be smooth and uniform so as to distribute the loading stress uniformly. Pins shall not show any microscopically visible cracks, inclusions and voids.

1.6.4 GALVANIZING:

All ferrous parts, shall be hot dip galvanized in accordance with IS: 2629. The zinc to be used for galvanizing shall conform to grade Zn 99.5 as per IS: 209. The zinc coating shall be uniform, smoothly adherent, reasonably light, continuous and free from impurities such as flux, ash, rust stains, bulky white deposits and blisters. Before ball fittings are galvanized, all die flashing on the shank and on the bearing surface of the ball shall be carefully removed without reducing the designed dimensional requirements.

1.6.5 CEMENTING:

The insulator design shall. Be such that the insulating medium shall not directly engaged with hard metal. The surface of porcelain and coated with resilient paint to offset the effect of difference in thermal expansions of these materials. High quality Portland cement shall be used for cementing the porcelain to the cap & pin.

1.6.6 SECURITY CLIPS (LOCKING DEVICES)

The security clips to be used as locking device for ball and socket coupling shall be 'R' shaped hump type to provide for positive locking of the coupling as per IS: 2486 (Part-IV). The legs of the security clips shall allow for spreading after installation to prevent complete withdrawal from the socket. The locking device shall resilient corrosion resistant and of sufficient

mechanical strength. There shall be no possibility of the locking device to be displaced or be capable of rotation, which placed in position, and under no circumstances shall it allow separation of insulator units and fittings. ‘W’ type security clips are also acceptable. The hole for the security clip shall be counter sunk and the clip shall be of such design that the eye of the clip may be engaged by a hot line clip puller to provide for disengagement under energized conditions. The force required for pulling the clip into its unlocked positions shall not be less than 50 N (5 kg.) or more than 500 N (50 kgs.).

1.6.7 MARKING:

Each insulator shall have the rated combined mechanical and electrical strength marked clearly on the porcelain surface. Each insulator shall also bear symbols identifying the manufacturer, month, and year of manufacture. Marking on porcelain shall be printed, not impressed, and shall be applied before firing.

1.6.8 BALL AND SOCKET DESIGNATION:

The dimensions of the ball and sockets for 70 and 90 KN discs shall be of 16 mm and for 120 KN and 160 KN discs shall be of 20 mm designation in accordance with the standard dimensions stated in IS: 2486 (Part-II).

1.6.9 DIMENSIONAL TOLERANCE OF INSULATOR DISCS:

It shall be ensured that the dimensions of the disc insulators are within the limits specified below:

a) Diameter of Disc (mm)	Standard	Maximum	Minimum
45 KN Disc	255	266	244
70 KN Disc	280	293	267
b) Ball to Ball spacing Between Discs (mm)	Standard	Maximum	Minimum
45 KN Disc	145	149	141
70 KN Disc	170	175	165

1.6.10 INTERCHANGEABILITY:

The insulators inclusive of the ball and socket fittings shall be of standard design suitable for use with hardware fittings of any make conforming to relevant Indian Standards.

1.6.11 FREEDOM FROM DEFECTS:

Insulators shall have none of the following defects:

- 1) Ball pin shake.
- 2) Cementing defects near the pin like small blow holes, small hair cracks lumps etc.
- 3) Sand fall defects on the surface of the insulator.

1.7. INSULATOR STRINGS:

1.7.1 TYPE AND RATING:

The insulator strings shall be formed with standard discs described in this specification for use on 3 phases 33 KV 50 Hz effectively earthed systems in an atmosphere with pollution level as indicated in project synopsis. Suspension insulator strings for use with suspension/tangent supports are to be fitted with discs 45 KN EMS rating while tension insulator strings for use with Anchor / Tension towers are to be fitted with discs of 70 KN KN EMS level rating.

1.7.2 STRING SIZE:

The sizes of the disc insulator, the number to be used in different types of strings, their electro-mechanical strength and minimum nominal creep age distance shall be as given in this specification.

1.7.3 Insulator units after assembly shall be concentric and coaxial within limits as permitted by Indian Standards.

1.7.4 The strings design shall be such that when units are coupled together there shall be contact between the shell of one unit and metal of the adjacent unit.

1.8 DIMENSIONAL TOLERANCE OF INSULATORS DISCS

It shall be ensured that the dimensions of the long rod insulators are within the limits as per relevant IEC/ISS.

1.9 TESTS (FOR DISC INSULATORS) :

The following tests shall be carried out on the insulator string and disc insulators.

1.9.1 TYPE TEST:

This shall mean those tests, which are to be carried out to prove the design, process of manufacture and general conformity of the material and product with the intents of this specification. These tests shall be conducted on a representative number of samples prior to commencement of commercial production. The Bidder shall indicate his schedule for carrying out these tests.

1.9.2 ACCEPTANCE TESTS:

This shall mean these tests, which are to be carried out on samples taken from each lot offered for pre-dispatch inspection for the purpose of acceptance of the lot.

1.9.3 ROUTINE TESTS:

This shall mean those tests, which are to be carried out on each insulator to check the requirements, which are likely to vary during production.

1.9.4 TESTS DURING MANUFACTURE:

Stage tests during manufacture shall mean those tests, which are to be carried out during the process of manufacture to ensure quality control such that the end product is of the designed quality conforming to the intent of this specification.

1.9.5 TEST VALUE:

For all type and acceptance tests the acceptance values shall be the value guaranteed by the bidder in the guaranteed technical particulars of the acceptance value specified in this specification of the relevant standard whichever is more stringent for that particular test.

1.9.6 TEST PROCEDURE AND SAMPLING NORMS:

The norms and procedure of sampling for the above tests shall be as per the relevant Indian Standard or the internationally accepted standards. This will be discussed and mutually agreed to between the supplier and owner before placement of order. The standards and normal according to which these tests are to be carried out are listed against each test. Where a particular test is a specific requirement of this specification, the norms and procedure for the same shall be as mutually agreed to between the supplier and the owner in the quality assurance programme.

1.9.7 TYPE, ROUTINE & ACCEPTANCE TESTS:

The following type test shall be conducted on a suitable number of individual unit components, materials or complete strings.

- | | |
|--|--|
| 1. On complete insulator string with hardware fittings | Standards
BS:137(Part-I)
IEC: 383 |
| a) Power frequency voltage withstand test with corona control rings and under wet condition. | |
| b) Impulse voltage withstand test under dry condition. | |
| c) Mechanical strength test. | As per this specification. |
| 2. On Insulators: | |
| a) Verification of dimensions. | IS: 731 |
| b) Thermal mechanical performance test: | IEC:575 |
| c) Power frequency voltage withstand and flashover (I) dry (ii) wet. | BS: 173 |

- d) Impulse voltage withstand flashover test (dry) : IEC: 383
- e) Visible discharge test (dry) : IS:731
- All the type tests given under clause No.5.14 above shall be conducted on single suspension and Double Tension insulator string along with hardware fittings.
- 3. ACCEPTANCE TESTS: For insulator:**
- a) Visual examination : IS:731
- b) Verification of dimensions. : IS:731
- c) Temperature cycle test. : IS:731
- d) Galvanizing test. : IS:731
- e) Mechanical performance test. : IEC:575
- f) Test on licking device for ball and socket coupling : IEC-372
- g) Eccentricity test. As per this specification.
- h) Electro-mechanical strength test. :
- i) Puncture test. : IS:731 j) Porosit
- 4. ROUTINE TESTS:**
- For insulators:**
- a) Visual inspection. : IS:731
- b) Mechanical routine test.
- c) Electrical routine test. : IEC:383
- 5. TEST DURING MANUFACTURE:**
- Chemical analysis, hardness test and magnetic particle inspection for forgings. : As per this specification.

1.9.8 ADDITIONAL TESTS:

The owner reserves the right for carrying out any other tests of a reasonable nature at the works of the supplier/ laboratory or at any other recognized laboratory/ research institute in addition to the above mentioned type, acceptance and routine tests at the cost of the owner to satisfy that the material complies with the intent of this specification.

1.9.9 CO-ORDINATION FOR TESTING:

For insulator strings, the supplier shall arrange to conduct testing of their disc insulators with the hardware fittings to be supplied to the owner by other suppliers. The supplier is also required to guarantee overall satisfactory performance of the disc insulator with the hardware fittings.

NOTE:

In respect of electrical tests on a complete string consisting of insulators and hardware guarantee of values of responsibility of testing shall be with hardware manufacturer of RIV corona and voltage distribution test and with insulator manufacturer for all other tests.

1.10 TEST CHARGES AND TEST SCHEDULE:

1.10.1 TYPE TEST:

The insulator offered shall be fully type tested as per this specification. In case the equipment of the type and design offered, has already been type tested in an independent test laboratory. The bidder shall furnish four sets of type test reports along

with the offer. These tests must not have been conducted earlier than five years. The owner reserves the right to demand repetition of some or all type tests in the presence of owners' carrying representative. For this purpose the bidder may quote unit rates for carrying out each type test. These prices shall be taken into consideration for bid evaluation. For any change in the design/type already type tested and the design/type offered against this specification, owner reserves the right to demand repetition of tests without any extra cost.

1.10.2 ACCEPTANCE AND ROUTINE TEST:

All acceptance and routine tests as stipulated herein shall be carried out by the supplier in the presence of owner's representative.

1.10.3 Immediately after finalization of the programme of type/ acceptance/ routine testing, the supplier shall give sufficient advance intimation to the owner to enable him to depute his representative for witnessing the tests.

1.10.4 For type tests involving tests on a complete insulator string with hardware fittings, the owner will advice the supplier of the hardware fittings to provide the necessary fittings to the place of the test.

1.10.5 In case of failure of the complete string in any type tests, the supplier whose product has failed in the tests shall get the tests repeated at his cost. In case of any dispute, assessment of the owner as to the items that has caused the failure in any of the type tests shall be final and binding.

1.10.6 VOLTAGE DISTRIBUTION TEST:

- a) The voltage across each insulator unit shall be measured by sphere gap method. The result obtained shall be converted into percentage and proportionate correction be applied as to give a total of 100% distribution.
- b) The complete insulator string along with its hardware fitting excluding arcing horn corona controlling/grading ring and suspension assembly/dead end assembly shall be subject to a load equal to 50% of the specified minimum ultimate tensile strength (UTS) which shall be increased already rate to 68% of the minimum UTS specified. The load shall be held for five minutes and then removed. After removal of the load, the string components shall not show any visual deformation and it shall be possible to disassemble them by hand,. Hand tools may be used to remove cotter pins and loosen the nuts initially. The string shall then be reassembled and loaded to 50% of UTS and the load shall be further increased at a steady rate till the specified minimum UTS and held for one minute. No fracture should occur during this period. The applied load shall then be increased until the failing loads reached and the value recorded.

1.10.7 VIBRATION TEST:

The suspension string shall be tested in suspension mode, and tension string in tension mode itself in laboratory span of minimum 30 meters. In the case of suspensions string a load equal to 600 Kg. shall be applied along with the axis of the suspensions string by means of turn buckle. The insulators string along with hardware fittings and two sub conductors throughout the duration of the test vibration dampers shall not be used on the test span. Both the sub- conductors shall be vertically vibrated simultaneously at one of

the resonance frequencies of the insulator string (more than 10Hz) by means of vibration inducing equipment. The amplitude of vibration at the antipode point nearest to the string shall be measured and the same shall not be less than 120.4 being the

frequency of vibration. The insulator strings shall be vibrated for five million cycles then rotated by 90 deg and again vibrated for 5 million cycles without any failure, after the test, the disc insulators shall be examined for looseness of pins and cap or any crack in the cement. The hardware fittings shall be examined to fatigue fatter and mechanical strength test. There shall be no deterioration of properties of hardware components and disc insulators after the vibration test. The disc insulators shall be subjected to the following tests as per relevant standards.

Test.	Percentage of disc to be tested a)
Temperature cycle test followed by	60
Mechanical performance test.	40
b) Puncture test (for porcelain insulator only)	

1.11 INSPECTION:

- i. Owner and its representative / third party inspector shall at all times be entitled to have access to the works and to all places of manufacturer where insulators are manufactured and the supplier shall afford all facilities to them for unrestricted inspection of the works, inspection of materials, inspection of manufacturing process of insulators and for conducting necessary tests as specified herein.
- ii. The supplier shall keep the owner informed in advance of the time of starting and of progress of manufacture of insulators in its various stages so that arrangements could be made for inspection.
- iii. No material shall be dispatched from its point of manufacture unless the materials has been satisfactorily inspected and tested.
- iv. The acceptance of any quantity of insulators shall in no way relieve the supplier of his responsibility for meeting all the requirement of this specification and shall not prevent subsequent rejection, if such insulators are later found to be defective.

1.12 IDENTIFICATION MARKING:

- a) Each unit of insulator shall be legibly and indelibly marked with the trade mark of the supplier, the year of manufacture, the guaranteed combined mechanical and electrical strength in kilo-Newton abbreviated by ‘_KN’ to facilitate easy identification and proper use.
- b) The marking shall be on porcelain for porcelain insulators. The marking shall be printed and not impressed and the same shall be applied before firing.

1.12 QUALITY ASSURANCE PLAN:

The bidder hereunder shall invariably furnish following information along with his offer, failing which the offer shall be liable for rejection.

- a. Statement giving list of important raw materials, names of sub-suppliers for the raw materials, list of standards according to which the raw material are tested, list of tests normally carried out on raw materials in presence of bidder’s representative, copies of test certificates.
- b. Informations and copies of test certificates as in (i) above in respect of bought out materials.

- c. List of manufacturing facilities available.
- d. Level of automation achieved and lists of area where manual processing exists.
- e. List of areas in manufacturing process, where stage inspections are normally carried out in quality control and details of such tests and inspection.
- f. Special features provided in the equipment to make it maintenance free.
- g. List of testing equipping available with the bidder for final testing of equipment specified and test plant limitation, if any, vis-à-vis the type, special, acceptance and routine tests specified in the relevant standards. These limitations shall be very clearly brought out in schedule of deviations from specified test requirements.

The supplier shall within 30 days of placement of order submit the following information to the owner.

List of raw material and the names of sub-suppliers selected from those furnished along with the offer.

1.14 CHEMICAL ANALYSIS OF ZINC USED FOR GALVANIZING.

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

1.15 TESTS FOR FORGINGS:

The chemical analysis hardness tests and magnetic particle inspection for forgings will be as per the internationally recognized procedures for these tests. The sampling will be based on heat number and heat treatment batch. The details regarding test will be as discussed and mutually agreed to by the supplier and owner in quality assurance programme.

1.16 TESTS ON CASTING:

The chemical analysis mechanical and metallographic tests and magnetic particle inspection for castings will be as per the internationally recognized procedures for these tests. The samplings will be based on heat number and heat treatment batch. The details regarding test will be as discussed and mutually agreed to by the supplier and owner in quality assurance programme.

1.17 HYDRAULIC INTERNAL PRESSURE TEST ON SHELLS:

The test shall be earned out on 100% shells before assembly. The details regarding test will be as discussed and mutually agreed to by the suppliers and owner in Quality Assurance Programme.

1.18 THERMAL MECHANICAL PERFORMANCE TEST:

The thermal mechanical performance test shall be carried out on minimum 15 number of disc insulators units as per the procedure given in IEC 575. The performance of the insulator unit shall be determined by the same standard.

1.19 ECCENTRICITY TEST:

The insulator shall be vertically mounted on a future using dummy pin and socket. A vertical scale with horizontal slider shall be used for the axial run out. The pointer shall be positioned in contact with the bottom of the outermost petticoat of the disc. The disc insulators shall be rotated with reference to the fixture and the slider shall be allowed to move up and down on the scale but always maintaining contact with the bottom of the outer most petticoats. After one full rotation of the disc the maximum and minimum position the slider has reached on the scale can be found out. Difference between the above two readings shall satisfy the guaranteed value for axial run out.

Similarly using a horizontal scale with veridical slider the radial run out shall be measured. The slider shall be positioned on the scale to establish contact with the circumstance of the disc insulator and disc insulator rotated on its future always maintaining the contact. After one full rotation of the disc the maximum and minimum position the slider has reached on the scale can be found out. Difference between the above two readings shall satisfy the guaranteed value for axial run out.

1.20 CRACK DETECTION TEST:

Crack detection test shall be carried out on each ball and pin before assembly of disc unit. The supplier shall maintain complete record of having conducted such tests on each and every piece of ball pin The bidder shall furnish full details of the equipment available with him for crack test and also indicate the test procedure in detail.

I) TECHNICAL SPECIFICATION OF 11KV (B&S), 33KV (B&S) & 11KV (T&C) HARDWARE FITTING

1.1 SCOPE

This Specification covers design manufacture, testing at manufacturer's Works, supply and delivery of power conductor accessories, insulator and hardware fittings for string insulators suitable for use in 33 KV Over-head transmission lines and sub-stations of Southco Utility. The hard wares to be supplied shall be as per approved drawings of Southco Utility. Any change there of shall be with due permission of the owner. The firm shall submit his drawings for approval of owner and only after which the manufacturing shall be started. The materials/equipment offered, shall be complete with all components, which are necessary or usual for the efficient performance and satisfactory maintenance. Such part shall be deemed to be within the scope of contract.

1.2 STANDARDS

The materials covered under this Specification shall comply with the requirement of the latest version of the following standards as amended upto date, except where specified otherwise.

- | | | |
|------|-----------------------|---|
| i) | IS:2486 Part-II & III | Insulator fitting for overhead power lines with a nominal voltage greater than 1,000 volts. |
| ii) | IS:2121 Part I & II | Conductor & earth wire accessories for overhead power lines. |
| iii) | IS:9708 | Stock Bridge Vibration Dampers on overhead power lines. |
| iv) | IS:2633 | Method of testing of uniformity of coating on zinc coated articles |
| v) | IS:209 | Specification for Zinc. |
| vi) | BS:916 | Specification for Hexagonal bolts and nuts. |

1.3 MATERIALS AND DESIGN

Aluminium and aluminium alloys, malleable iron and forged steel, having required mechanical strength, corrosion resistance and mach inability depending on the types of application for which accessories / fittings are needed, shall be employed.

In manufacturer of the accessories / fittings, the composition of the aluminium alloys used shall be made available to Employer if required for verification.

The materials offered shall be of first class quality, workmanship, well finished and approved design. All castings shall be free from blow-holes, flaws, cracks of other defects and shall be

smooth, close grained and true forms and dimensions. All machined surfaces should be free, smooth and well finished.

Metal fittings of specified material for conductor and earth wire accessories and string insulator fittings are required to have excellent mechanical properties such as strength, toughness and high resistance against corrosion. All current carrying parts shall be so designed and manufactured that contact resistance is reduced to the minimum.

All bolts, nuts, bolt-heads shall be the white worth's standard thread. Bolt heads and nuts shall be hexagonal. Nuts shall be locked in an approved manner. The treads in nuts and tapped holes shall be cut after galvanizing and shall be well fabricated and greased. All other treads shall be cut before galvanizing. The bolt treads shall be undercut to take care of increase in diameter due to galvanizing.

All nuts shall be made of materials to Clause 4.8 of IS:1367 (latest edition) with regard to its mechanical properties.

The general design conductor and earth wire accessories and insulator fittings shall be such as to ensure uniformity, high strength, free from corona formation and high resistance against corrosion even in case of high level of atmosphere pollution.

All hooks, eyes, pins, bolts, suspension clamps and other fittings for attaching to the tower or to the line conductor or to the earth wire shall be so designed that the effects of vibration, both on the conductor and the fittings itself, are minimized.

Special attention must be given to ensure smooth finished surface throughout. Adequate bearing area between fittings shall be provided and point or line contacts shall be avoided.

All accessories and hard wares shall be free from cracks, shrinks, slender air holes, burrs or rough edges.

The design of the accessories and hard wares shall be such as to avoid local corona formation or discharge likely to cause interference to tele-transmission signals of any kind.

1.4 GALVANISING :

All ferrous parts of conductor and ground wire accessories and insulator hard wares shall be galvanized in accordance with IS: 2629-Recommended Practice for hot dip galvanizing of iron and steel or any other equivalent authoritative standards. The weight of zinc coating shall be determined as per method stipulated in IS: 2633 for testing weights, thickness and uniformity of coating of hot dip galvanized articles or as per any other equivalent authoritative standards. The zinc used or galvanization shall conform to grade zn 98 of IS: 209. The galvanized parts shall withstand four (4) dips of 1 minute each time while testing uniformity of zinc coating as per IS: 2633. Spring washers shall be electro galvanized.

1.5 INSULATOR HARDWARES

The insulator disc hardware and string assemblies to be offered by the bidder shall be suitable to meet the requirement given in the specific technical particulars as detailed hereinafter.

Hardware for suspension and tension insulator shall be suitable for insulator with normal pin shank diameter of 20 mm. in case of tension string unit and 16mm. for suspension string unit.

Each insulator string shall generally include the following hardware components.

Single Suspension Set.

Double Suspension Set.

a) Ball Hook.	i) Ball Hook.
b) tower side arcing horn	(i) Socket clevis with R-Type security clip-3 Nos.
c) Socket Eye with R-Type security clip.	(ii) Yoke Plate-2 Nos.
d) Line side arcing horn	(iii) Tower side arcing horns-2Nos.
e) Suspension clamps	(iv) Ball clevis – 2 Nos.
	(v) Line side arcing horns-2 Nos.
	(vi) Clevis Eye.
	(vii) Suspension Clamp.

Single Tension Set :

Double TensionSet:

a) Anchor Shackle.	a) Anchor Shackle.
b) Ball Eye.	b) Chain Link.
c) Tower side arcing horn	c) Yoke Plate – 2 Nos
d) Socket Clevis with R-Type security clip.	d) Tower side arching horn.
e) Line side arcing horn	e) Ball Clevis – 2 Nos.
f) Bolted type dead end clamp.	f) Socket Clevis with R-Type security clip – 2 Nos.
	g) Line side arcing horns.
	h) Bolted type dead end clamps.

1.6 SUSPENSION CLAMPS

This clamp will be envelope type made out of aluminum alloy suitable for accommodating preformed armored rod.

1.7 TENSION CLAMPS

The Tension Clamps shall be made out of aluminium alloy and of 4 pair bolted (M-16) type suitable for 345 mm² AAA PANTHER –up conductor (**In case of lines it will be suitable for 80mm² 100 mm² 150 mm²**)The tension clamps shall not permit slipping or damage to failure of the complete conductor or any part thereof at a load less than 90% of the ultimate strength of conductor. The mechanical efficiency of tension / clamps shall not be affected by method of erection involving come / along or similar clamps or tension stringing operation during or after assembly and erection of tension clamp itself. The tension clamp shall be of a design that will ensure unrestricted flow of current without use of parallel groove clamps. The clamps shall be as light as possible.

1.8 ARCING HORNS

Each hardware assembly shall have provision for attaching arcing horns of both adjustable and non/adjustable type across the suspension and tension strings or tower side. However each hardware assembly shall be provided with arching horn of fixed type on line side only.

1.9 TESTS, TEST CERTIFICATE AND PERFORMANCE REPORTS

The fittings and accessories for the power conductor, insulator and hardware shall be tested in accordance with IS:2121, IS:2486, BS:916 for hexagonal bolts and nuts or any other authoritative equivalent standards. Six sets of type and routine test certificates and performance reports are to be submitted by the bidder.

The Employer however, reserves the right to get all the tests performed in accordance with the relevant I.S. Specification as Acceptance Test in presence of Employer-s representatives.

The bidder shall clearly state the testing facilities available in the laboratory at his Works and his ability to carry out the tests in accordance with this Specification. All the specified tests shall be carried out without any extra cost.

Acceptance Test for power conductor accessories.

- a) Visual examination
- b) Dimensional verification
- c) Failing load test
- d) Slip strength test (for clamps)
- e) Electrical resistance test
- f) Fatigue test (for vibration dampers)
- g) Mass pull off test (for vibration dampers)
- h) Galvanizing test.

1.10 ACCEPTANCE TEST FOR HARDWARES

- i) Dimensional verification.
- ii) Ultimate tensile test.
- iii) Slip strength test.
- iv) Electrical resistance test.
- v) Heating cycle test
- vi) Breaking strength of full string assembly.
- vii) Galvanizing test.

1 BONDING PIECES:

- | | | |
|-----------------------------------|---|--|
| a) material | : | flexible copper bond
tinned copper flexible |
| b) Length | : | Not less than 750 mm. |
| c) Bolt size | : | 16mm x 40 mm. |
| d) Copper area. | : | 34 sq.mm. |
| e) Thickness of long | : | 6 mm. |
| f) Material for connecting socket | : | Tinned Brass |

1.12 FASTENERS: Bolts, Nuts & Washers

1. All bolts and nuts shall conform to IS-6639 – 1972. All bolts and nuts shall be galvanized. All bolts and nuts shall have hexagonal heads, the heads being truly concentric, and square with the shank, which must be perfectly straight.
2. Bolts up-to M16 and having length up-to ten times the diameter of the bolt should be manufactured by cold forging and thread rolling process to obtain good and reliable mechanical properties and effective dimensional control. The shear strength of bolt for 5.6 grades should be 310 Mpa minimum as per IS-12427. Bolts should be provided with washer face in accordance with IS-1363 Part-I to ensure proper bearing.
3. Fully threaded bolts shall not be used. The length of the bolt shall be such that the threaded portion shall not extend into the place of contact of the component parts.
4. All bolts shall be threaded to take the full depth of the nuts and threaded enough to permit

the firm gripping of the component parts but not further. It shall be ensured that the threaded portion of the bolt protrudes not less than 3 mm and not more than 8 mm when fully tightened. All nuts shall fit and be tight to the point where shank of the bolt connects to the head.

5. Flat washers and spring washers shall be provided wherever necessary and shall be of positive lock type. Spring washers shall be electro-galvanized. The thickness of washers shall conform to IS-2016-1967.
6. The bidder shall furnish bolt schedules giving thickness of components connected, the nut and the washer and the length of shank and the threaded portion of the bolts and size of holes and any other special details of this nature.
7. To obviate bending stress in bolt, it shall not connect aggregate thickness more than three time its diameter.
8. Bolts at the joints shall be so staggered that nuts may be tightened with spanners without fouling.
9. Fasteners of grade higher than 8.8 are not to be used and minimum grade for bolts shall be 5.6.

1.13 GENERAL:

1. All ferrous parts including fasteners shall be hot dip galvanized, after all machining has been completed. Nuts may however be tapped (threaded) after galvanizing and the threads oiled. Spring washers shall be electro-galvanized. The bolt threads shall be undercut to take care of the increase in diameter due to galvanizing. Galvanizing shall be done in accordance with IS-2629-1985 and shall satisfy the tests mentioned in IS: 2633-1986. Fasteners shall withstand four dips while spring washers shall withstand three dips of one-minute duration in the standard Preece test. Other galvanized materials shall be guaranteed to withstand at least six successive dips each lasting one minute under the Standard Preece test for galvanizing.
2. The zinc coating shall be perfectly adherent of uniform thickness, smooth, reasonably bright, continuous and free from imperfections such as flux, ash, rust stains, bulky white deposits and blisters. The zinc used for galvanizing shall be of grade Zn 99.95 as per IS 209-1979.
3. Pin balls shall be checked with the applicable -G_I gauges in at least two directions, one of which shall be across the line of die flashing and the other 90 deg. to this line. 'NO GO' gauges shall not pass in any direction.
4. Socket ends, before galvanizing shall be of uniform contour. The bearing surface of socket ends shall be uniform about the entire circumference without depressions or high spots. The internal contours of socket ends shall be concentric with the axis of the fittings as per IS 2486/IEC-120. The axis of the bearing surfaces of socket ends shall be coaxial with the axis of the fittings. There shall be no noticeable tilting of the bearing surfaces with the axis of the fittings.
5. All current carrying parts shall be so designed and manufactured that contact resistance is reduced to minimum.
6. Welding of aluminum shall be by inert gas shielded tungsten arc or inert gas, shielded metal arc process. Welds shall be clean, sound, smooth, and uniform without overlaps, properly fused and completely sealed. There shall be no cracks, voids incomplete penetration, incomplete fusion, under-cutting or inclusions Porosity shall be minimized so that mechanical properties of the aluminum alloys are not affected. All welds shall be properly finished as per good engineering practices.

1.14 Electrical Design:

The normal duty and heavy duty suspension, light duty, normal duty and heavy duty tension insulator sets shall all comply with the technical requirements and satisfy the test requirements

1.15 Mechanical design:

The mechanical strength of the insulators and corresponding insulator fittings must match. The design shall be such that stresses due to expansion and contraction in any part of the insulator shall not lead to the development of defects.

Insulating material shall not engage directly with hard metal. All fixing materials shall be of approved quality, shall be applied in an approved manner and shall not enter into chemical action with the metal parts or cause fracture by expansion in service. Where cement is used as a fixing medium, cement thickness shall be as small and even as possible and proper care shall be taken to correctly centre and locate the individual parts during cementing.

1.16 Technical Specification for Design, Supply and Testing of Hard ware fittings.

1.16.1 Type tests:

The following type tests shall be conducted on hardware fittings.

A. On suspension hardware fittings only.

- (i) Magnetic power loss test.
- (ii) Clamp slip strength Vs torque
- (iii) Mechanical strength test.
- (iv) On one test on elastomer.

B. On Tension hard ware fittings only.

- (i) Electrical resistance test for Dead end assembly. IS 2486 (Part-I) 1971
- (ii) Heating cycle test for dead end assembly. -do-
- (iii) Slip strength test for dead end assembly. IS 2486 (Part-I)
- (iv) Mechanical strength test.

C. On both suspension and tension hardware fittings.

- (i) Visual examination. IS-2486 (Part-I) 1971
- (ii) Verification of dimension. -do-
- (iii) Galvanizing / electroplating test. -do-
- (iv) Mechanical strength test of each component (including corona control ring/grading ring and arcing horn)
- (v) Mechanical strength test of welded joint.
- (vi) Mechanical strength test for corona control ring/grading ring and arcing horn. BS-3288 (Part-I)
- (vii) Test on locking device for ball and socket coupling. IEC – 3721984
- (viii) Chemical analysis, hardness tests, grain size, inclusion rating and magnetic particle inspection for forging/casting.

D. On suspension hardware fittings only.

- (i) Clamp slip strength ver as torque test for suspension clamp.
- (ii) Shore hardness test of elastomer cushion for AG suspension clamp.
- (iii) Bend test for armour IS-

(iv)	Resilience test for	-do-
(v)	Conductivity test for	-do-

All the acceptance tests stated at clause shall also be carried out on composite insulator unit, except the eccentricity test at clause. In addition to these, all the acceptance tests indicated in IEC 1109 shall also be carried out without any extra cost to the employer.

E. For hardware fittings.

- (a) Visual examination. IS-2121 (Part-I)
- (b) Proof & test.

F. Tests on conductor accessories.

G. Type tests.

H. Mid span compression joint for conductor and earth wire.

- (a) Chemical analysis of materials.
- (b) Electrical resistance tests. IS-2121 (Part-II) 1981 clause 6.5 & 6.6
- (c) Heating cycle test. -do-
- (d) Slip strength test. -do-

J) TECHNICAL SPECIFICATION FOR EARTHING COIL

TECHNICAL SPECIFICATION

I. Qualification Criteria of Manufacturer:-

The prospective bidder may source Earthing Coil from manufacturers who must qualify all the following requirements:

- a) The manufacturer must have successfully carried out Type Test of similar item from any NABL Accredited Laboratory within the last 5 years, prior to the date of submission of the bid.
- b) The manufacturer should have supplied at least 1000 no.s o electricity supply utilities / PSUs. The bidder should enclose Performance Certificates from the above users issued in the name of the manufacturer as proof of successful operation in field.

II. SCOPE

The specification covers design, manufacture, testing and dispatch to the owner's stores of Earthing Coils for use in earthing of the HT & LT poles.

III. GENERAL REQUIREMENTS

Earthing coils shall be fabricated from soft GI Wire Hot Dip Galvanized. The Hot Dip galvanized wire shall have clean surface and shall be free from paint enamel or any other poor conducting material. The coil shall be made as per REC constructions standard. The Hot Dip galvanizing shall conform to IS: 2629/1966, 2633/1972 and 4826/1969 with latest amendments.

IV. TESTS

Galvanizing Tests

Minimum Mass of Zinc

On GI Wire used 280 gm/m²

After Coiling-266 gm/m².The certificate from recognized laboratory shall be submitted towards mas of zinc.

Dip Test

Dip test shall stand 3 dips of 1 minute and one dip of ½ minute before coiling and 4 dips of 1 minute after coiling as per IS: 4826/1979

Adhesion Test

As per ISS 4826 – 1979.

V. DIMENSIONAL REQUIREMENT

Nominal dia of GI Wire -4 mm (Tolerance±2.5%)

Minimum no. of turns – 115 Nos.

External dia of Coil (Min) – 50 mm

Length of Coil (Min) – 460 mm

Free length of GI Wire at one end coil (Min.) – 2500 mm

The turns should be closely bound. Weight of one finished Earthing Coils (min.) – 1.850 Kg.

GUARANTEED TECHNICAL PARTICULARS

(To be submitted along with Offer)

Sl. No.	GENERAL TECHNICAL PARTICULARS	Bidder's Offer
1	Nominal diameter of wire	
2	No. of turns	
3	External dia of Coil	
4	Length of Coil	
5	Mass of Zinc	
6	Total weight of Coil	
7	Whether drawing enclosed (yes)	

Signature of Bidder

(This form is to be duly filled up by the bidder & submit along with the Tender)

K) TECHNICAL SPECIFICATIONS OF MILD STEEL CHANNEL & ANGLE

1.00.00 SCOPE

This specification covers design, manufacture, testing and dispatch to owner's stores of M.S. Channel & Angle for use in structures in distribution system.

2.00.00 APPLICABLE STANDARD

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

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

3.00.00 GENERAL REQUIREMENTS

3.01.00 Raw material

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

The Chemical composition and Physical properties of the finished material shall be as per the equivalent standards.

Chemical Composition and Physical Properties of M.S. Angles, M.S. Channels, and M.S. Flat conforming to IS: Conforming to IS: 2062/84

3.02.00 Chemical Composition

3.02.01 Chemical composition For Fe 410 WA Grade

- 1 C - 0.23% MAX
- 2 Mn - 1.5% MAX
- 3 S - 0.050% MAX
- 4 P - 0.050% MAX
- 5 SI - 0.40% MAX
- 6 CE (Carbon Equivalent)- 0.42% MAX

3.04.00 Mechanical Properties

- 1. Tensile strength Kg/mm² - 410
 - 2. Yield stress Min. for thickness/diameter
 - < 20 mm - 26 Kg/mm² OR 250 N/ mm²
 - 20-40 mm - 24 Kg/mm² OR 240 N/ mm²
 - > 40 mm - 23 Kg/mm² OR 230 N/ mm²
 - 3. Elongation % - 23%
 - 4. Bend Test (Internal Dia) - Min-3t
- (t-is the thickness of the material).

3.05.00 Tolerance

Variation in ordered quantity for any destination and overall ordered quantity be only to the extent of $\pm 2\%$.

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

4.00.00 TEST

Steel Section shall be tested in IS approved Laboratory or Standard Laboratory the Bidder country having all facilities available for conducting all the test prescribed in relevant IS or IEC or to any equivalent International Standard or any recognized and reputable International Laboratory or Institutions.

The bidders are required to specifically indicate that;

They hold valid IS (or equivalent IEC) License.

Steel Section offered are bearing requisite IS certification or equivalent marks.

The bidders are required to submit a copy of the valid IS (or equivalent IEC) License clearly indicating size and range of product against respective ISS or any equivalent International Standards along with their offer.

5.00.00 MARKING

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

6.00.00 INSPECTION AND TEST CERTIFICATES

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

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

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

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

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

SECTION-V

PRICE BID

TENDER NOTICE NO: Tech/RLTAP(13-14)/02/FY-15-16

SECTION-V PRICE SCHEDULE FORMAT

Up-rating of 33 KV line conductor from 55mm² ACSR to 100mm² AAAC-25Km., from Pandripani to Mathili

Sl. No.	Description of materials	Unit	Qty.	Supply rate per unit (in Rs)	Installation rate per unit (in Rs.)	Unit supply & Installation Rate (Rs.)	Amount (Rs.)
1	100 mm sq AAAC Conductor	km	77.25				
2	9 mtrs PSC Pole	No	150				
3	33 KV 'V' Cross Arm	No	125				
4	Back Clamp for 'V' Cross Arm	No	125				
5	33KV Poletop Bracket	NO	125				
6	33 KV Pin Insulator	No	375				
7	33 KV G.I. Pin	No	375				
8	H.T.Stay Set (Complete)	Set	50				
9	HT Stay Insulator	No	50				
10	HT Stay Clamp	Pair	50				
11	7/8 G.I. stay wire	Kg.	400				
12	33 KV Disc Insulator (B&S) 70 KN	No	450				
13	33KV Hard ware fitting (B&S)	No	150				
14	Earthing support Gl coil type	No	150				
15	100x50x6mm M.S.Channel 3.5 Mtr Long (9.2 Kg / Mtr) 4 Nos.	Kg	3220				
16	Concreting of support C.C - 1:4:8 using 40mm BHG metal size - 5'x2'x2' = 20CFT = 0.570Cum Padding 900x600x150mm = $\frac{0.081}{0.651}$ Cum @2925= 1904.17each	NO	150				
17	Nut, Bolt & Washers	Kg	375				
18	Fixing of stay set with 0.5Cum cement concret foundation 1:3:6 size (900mmx600mmx900mm) using 40mm BHG metal.	No.	50				
19	Sundries (paint ,DB , clamp connector, Anti-climbing Device, Binding Tape & etc)	KM	25				
20	Dismantalling of conductor with all accessories and return to store	KM	25				
Grand Total							
Rupees in words.....							

Bid proposal sheets enclosed with this tender specification.

Bidder will be permitted to only enter the itemwise rates. No other modification shall be permitted.

Bidders are required to sign each and every page and enclose the same in the price Bid in sealed condition. One soft copy in CD shall also be submitted in the price Bid.

Note

1. Unit rate is inclusive of all taxes and duties including service tax under reverse charge mechanism.

2. Any discrepancy in unit rate and amount, unit rates stands.

3. Any column left blank shall be treated as nil / inclusive of.

(Signature of the Bidders)

FORMS AND FORMATS

TENDER NOTICE NO: Tech/RLTAP(13-14)/02 /FY-15-16

BID FORM

To

The General Manager
(Tech, Proj & Safety)
Southco Utility, Berhampur.

Sir,

1. We understand that Southco Utility is desirous for **Up-rating of 33 KV line conductor from 55mm² ACSR to 100mm² AAAC-25Km. (5nos. Intermediate pin point Pole & 1 cut point pole for each km.), from to Pandripani to Mathili District under RLTA scheme 2013-14** 2. Having examined the Bidding Documents for the above named works, we the undersigned, offer to deliver the goods in full conformity with the Drawings, Conditions of Contract and specifications for the sum of..... (figures) or such other sums as may be determined in accordance with the terms and conditions of the contract. The above amounts are in accordance with the Price Schedules attached herewith and are made part of this bid.
3. If our Bid is accepted, we undertake to complete the entire works **within 03 (Three) months** from the date of award of Work Order order/letter of intent.
4. If our Bid is accepted, we will furnish the Contract Performance Bank Guarantee for the amount as per **clause 26.0** of tender as well as covering the Guarantee & warrantee obligations of the products, in accordance with the General Conditions of Contract.
5. We agree to abide by this Bid for a period of **180 days** from the date fixed for bid opening, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
6. We declare that we have studied the provision of Indian Income Tax Law and other Indian Laws for supply of equipments/materials and the prices have been quoted accordingly.
7. Unless and until Letter of Intent is issued, this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.
8. We understand that you are not bound to accept the lowest, or any bid you may receive.
9. There is provision for Resolution of Disputes under this Contract, in accordance with the Laws and Jurisdiction of Contract.

Dated this..... day of..... 20.....

Signature..... In the capacity of

.....duly authorized to sign for and on behalf of

(IN BLOCK CAPITALS).....

PROFORMA FOR COMPOSITE PERFORMANCE BANK GUARANTEE

This Guarantee Bond is executed this ____ day of _____ by us the

_____ Bank at _____
P.O. _____ P.S. _____ Dist _____ State _____

(Indicate designation of Owner)

Whereas Southco Utility , Corporate Office: Courtpetta, Berhampur, Ganjam - 760004 registered under the Company Act 1956 (here in after called “the Owner”) has placed works Order No. _____ Dt. _____ (hereinafter called “the Agreement”) with M/s _____ (hereinafter called “the Contractor”) and whereas Southco Utility (as the case may be) has agreed (1) to exempt the Contractor from making payment of security deposit, (2) to release 100% payment of the cost of works as per the said agreement and (3) to exempt from performance guarantee on furnishing by the Contractor to the Southco Utility a composite Bank Guarantee of the value of 10% (ten percent) of the Contract price of the said Agreement.

1. Now, therefore, in consideration of Southco Utility having agreed (1) to exempt the Contractor for making payment of security deposit, (2) to release 100% payment to the Contractor and (3) to exempt from furnishing performance guarantee in terms of the said Agreement as aforesaid, we the _____ Bank, Address _____ (code No. _____) (hereinafter referred to as “the Bank”) do hereby undertake to pay to the Southco Utility an amount not exceeding Rs. _____ (Rupees _____) only against any loss or damage caused to or suffered by Southco Utility by reason of any breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement.

2. We, the _____ Bank do hereby undertake to pay the amounts due and payable under the guarantee without any demur, merely on a demand Southco Utility stating that the amount claimed is due by way of loss or damage caused to or suffered by Southco Utility by reason of any breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement or by the reason of any breach by the said Contractor’s failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____ (Rupees _____) only.

3. We, the _____ Bank also undertake to pay to Southco Utility any money so demanded notwithstanding any dispute or dispute raised by the Contractor(s) in any suit or proceeding instituted/ pending before any court or Tribunal relating thereto our liability under this Agreement being absolute and un revocable. The payment so made by us under this bond shall be valid discharge of our liability for payment there under and the Contractor(s) shall have no claim against us for making such payment.

4. We, the _____ Bank further agree that the guarantee herein contain shall remain in full force and affect during the period that would be taken for the performance of the said Agreement and it shall continue to remain in force endorsable till all the dues of Southco Utility under by virtue of the said Agreement have been fully paid and its claim satisfied or discharged or till Southco Utility certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharge this guarantee and will not be revoked by us during the validity of the guarantee period.

Unless a demand or claim under this guarantee is made on us or with _____ (Local Bank Name, address and code No.) _____, Berhampur in writing on or before _____ (date) we shall be discharged from all liability under this guarantee thereafter.

5. We, the _____ Bank further agree that Southco Utility shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor(s) and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractor(s) or for any forbearance act or omission on part of Southco Utility UTILITY or any indulgence by Southco Utility to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provisions have effect of so relieving us.

6. The Guarantee will not be discharged due to change in the name, style and constitution of the Bank and or Contractor(s).

7. We, the _____ Bank lastly undertake not to revoke this Guarantee during its currency except with the previous consent of Southco Utility in writing.

Dated _____ the _____ day of Two thousand _____.

Not withstanding anything contained herein above.

Our liability under this Bank Guarantee shall not exceed Rs. _____ (Rupees _____) only.

The Bank Guarantee shall be valid up to _____ only.

We are liable to pay the guaranteed amount depending on the filing of claim and any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand and received by us on or before Dt. _____ otherwise bank shall be discharged of all liabilities under this guarantee thereafter.

For _____

(Indicate the name of the Bank)

N.B.:

(1) Name of the Contractor:

(2) No. & date of the Works order / agreement:

(3) Amount of Works Order:

(4) Name of Works:

(5) Name of the Bank:

(6) Amount of the Bank Guarantee:

(7) Validity period or date up to which the agreement is valid:

(8) Signature of the Constituent Authority of the Bank with seal:

(9) Name & addresses of the Witnesses with signature:

(10) The Bank Guarantee shall be accepted only after getting confirmation from the respective Banks.

Annexure - III

ABSTRACT OF GENERAL TERMS AND CONDITIONS

- | | |
|---|----------|
| 1. Whether the bidder is a Contractor & furnished relevant documents: | Yes / No |
| 2. Required Cost of Tender Furnished: | Yes / No |
| 3. Required Earnest Money Furnished in Demand Draft: | Yes / No |
| 4. Whether valid HT electrical license enclosed with the bid: | Yes / No |
| 5. Whether valid labour license enclosed with the bid: | Yes / No |
| 6. Contractor's past experience including Owner's certificate furnished or not: | Yes / No |
| 7. Audited annual reports for the last 3 years furnished or not: | Yes / No |
| 8. Deviation to the specification , if any (List enclosed or not): | Yes / No |
| 9. Whether agreed to Owner's completion schedule: | Yes / No |
| 10. Whether agreed to Owner's Guarantee clause: | Yes / No |
| 11. Whether agreed for 180 days' validity period of Prices: | Yes / No |
| 12. Whether the Prices are FIRM : | Yes / No |
| 13. Whether agreed to furnish security deposit in shape of B.G. encashable at Berhampur in case his tender is successful: | Yes / No |
| 14. Whether agreed to penalty for delayed completion: | Yes / No |
| 15. Whether agreed to Owner's standard terms of payment or not: | Yes / No |
| 16. Valid ITCC & STCC furnished or not: | Yes / No |
| 17. Registration under Building and Other Construction Workers Welfare Cess Act: | Yes / No |

Signature of the bidder
With seal of the Bidder

This form is to be duly filled up & signed by the Bidder along with seal & submitted along with the Part-I of tender.

**LETTER OF COMPLIANCE OF QUALIFYING REQUIREMENT
(In case of Bidder being a Single Firm)**

To

The General Manager
(Tech, Proj & Safety)
Southco Utility, Berhampur

Sir,

I/We (Name of Bidder) are submitting the bid as a single firm. In support of our meeting the Qualifying requirements (QR) for bidders, stipulated in this tender specification, we furnish herewith the details/documents etc. as follows.

Table – A : Previous Works Experience

Package Quoted for	Description of Proposed Works	Tender Qty	Qty Installed & Commissioned					
			Sl. No.	FY	Name of Client	WO Ref	Qty Installed	Documents provided in proof of having executed the works during the relevant FY.

Table – B: Average Annual Turnover

Package Quoted for	Estimated Cost of the Package (Rs. in Lakh)	Annual Turnover (Rs. in Lakh)	
		Name of Member	
		Financial Year	Turnover (Rs. in Lakh)
		Total	
Total Estimated Cost of the packages quoted for		Average Turnover	

Table – C : Access to Credit Facility :

Package Quoted for	Estimated Cost of the Package (Rs. in Lakh)	Liquid Assets as on Dt 30.04.14		Credit Facility	
		Description	(Rs. in Lakh)	Description	(Rs. In Lakh)
		Cash in Hand		Cash Credit	
		Cash at		LC	

General Manager (Tech, Proj & Safety) Southco Utility, Berhampur

		Bank			
Total Estimated Cost of the packages quoted for		Fixed Deposits		Others (Pl Specify)	
One fifth of the total Estimated Cost as above.		Total Liquid Assets		Total Credit Facility	

Note: Continuation sheets, of like size and format, may be used as per Bidder's requirements and annexed to this Schedule.

I/We declare that we are fulfilling the qualifying requirements as per clause no. 2.0 of Section – I, Invitation for Bids (IFB).

For & on behalf of (Name of the Bidder).

DETAILS OF COMMERCIAL DEVIATIONS

Bidder's Name & Address

To,

The General Manager
(Tech, Proj & Safety)
Southco Utility, Berhampur.

Dear Sir,

Sub: Commercial Deviation for Construction of Name of the project.

The following are the Commercial Deviations and variations from and exceptions to the Specifications and documents for the subject Project. These deviations and variations are exhaustive. Except for these deviations, the entire work shall be performed as per your specifications and documents

Volume/Clause	Ref./Page No	As specified in the Specification	Commercial deviation and variation to the specification

Date:

(Signature)

Place:

(Printed Name)

(Designation)

(Common Seal)

Note: 1. Continuation sheets, of like size and format, may be used as per Bidder's requirements and annexed to this Schedule.

2. This will be read out during opening of Part-I Bid.

DETAILS TECHNICAL DEVIATIONS

Bidder's Name & Address

To,

The General Manager
(Tech, Proj & Safety)
Southco Utility, Berhampur

Dear Sir,

Sub: Technical Deviation for Construction of Name of the Project.

The following are the Technical Deviations and variations from and exceptions to the specifications and documents for the subject package. These deviations and variations are exhaustive. Except for these deviations, the entire work shall be performed as per your specifications and documents

Volume/Clause	Ref./Page No	As specified in the Specification/Relevant ISS	Technical deviation and variation to the specification

Date:

(Signature)

Place:

(Printed Name)

(Designation)

(Common Seal)

- Note:**
1. Continuation sheets, of like size and format, may be used as per Bidder's requirements and annexed to this Schedule.
 2. The deviations and variations, if any, shall be brought out separately for each of the equipment.
 3. This will be read out during opening of Part – I bid.

SELF DECLARATION FORM

Name Of The Owner.....

Tender No :.....

Sir,

1. I/We the undersigned do hereby declare that, I/We have never been blacklist and/or there were no debaring actions against us for any default in supply of material/ equipments or in the performance of the contract entrusted to us in any of the electricity utilities of India.

2. In the event of any such information pertaining to the aforesaid matter found at any given point of time either during the course of the contract or at the bidding stage, may bid/ contract shall be liable for truncation/ cancellation /termination without any notice at the sole discretion of the owner.

Place :

Date :

Yours faithfully,

Signature of the bidder with seal.
(This form shall be duly filled-up and signed
by the bidder and submitted along with
the original copy of the bid).

UP-RATING OF CONDUCTOR FROM 55 MM² ACSR TO 100MM² AAAC OF 25KMS FROM PANDRIPANE S/S TO MATHLE S/S UNDER RTTP 13-14

