OFFICE OF THE DEPUTY GENERAL MANAGER (ELECT.),
ELECTRICAL CIRCLE, SOUTHCO UTILITY, ASKA.

TENDER DOCUMENT

FOR

CONSTRUCTION OF 11/4KV 63 KVA DP MOUNTED SUB-STATION AND 11KV LINE WITH 3 x 35 MMSQ XLPE CABLE-0.2 KM (6 SPAN) FOR PROVIDING POWER SUPPLY TO CHC BUILDING AT CHIKITI UNDER CHIKITI ELECTRICAL SECTION.

ON
TURNKEY CONTRACTS (MATERIAL SUPPLY & ERECTION)

E- TENDER NOTICE NO. SOUTHCO UTILITY/ASKA CIRCLE/DEPOSIT/1, Dt. 08.08.2017.

Issue of online tender documents (bid sheets):- From dt- 08.08.2017 up to 30.08.2017 (1.00 PM)

Last date of submission of online tender: - Up to dt.- 30.08.2017 (5.00 PM)

Submission of Tender (Hard Copy) - Up to dt- 31.08.2017 (1.00 PM)

Opening of Techno-commercial bid (Part-I): - On Dt. 31.08.2017 on or after 4.00 PM

Dy. General Manager, (Elect)
Electrical Circle, Aska
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OFFICE OF THE DEPUTY GENERAL MANAGER (ELECT.),
ELECTRICAL CIRCLE, SOUTHCO UTILITY, ASKA.

Letter No_____________        Date_____________

E-Tender Notice No. Southco Utility/ Aska Circle/ Deposit/1, Dt. 08.08.2017.

Deputy General Manager (Elect), Electrical Circle, Aska invites sealed bids in duplicate on two part bidding system from experienced, qualified and eligible bidders having valid HT Electrical License from Govt. of Odisha who comply with the terms and conditions for the following work on turnkey basis under GSED, Digapahandi.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Brief description of work</th>
<th>Estimated Cost of Tender (In Rs.)</th>
<th>Earnest money deposit (In Rs.)</th>
<th>Non-refundable Tender Processing Fee (In Rs.)</th>
<th>Non-refundable cost of bid document (In Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>CONSTRUCTION OF 11/4KV 63 KVA DP MOUNTED SUB-STATION AND 11KV LINE WITH 3 x 35 MMSQ XLPE CABLE-0.2 KM (6 SPAN) FOR PROVIDING POWER SUPPLY TO CHC BUILDING AT CHIKITI UNDER CHIKITI ELECTRICAL SECTION.</td>
<td>5,32,242/-</td>
<td>5,322/-</td>
<td>628/-</td>
<td>4000.00+ GST as applicable</td>
</tr>
</tbody>
</table>

Any addendum / corrigendum to this e-Tender Notice shall be uploaded in the website only.

Issue of online tender documents:- From dt- 08.08.2017 up to 30.08.2017 (1.00 PM)
Last date of submission of online tender: - Up to dt- 30.08.2017 (5.00 PM)
Submission of Tender (Hard Copy) - Up to dt- 31.08.2017 (1.00 PM)
Opening of Techno-commercial bid (Part-I): - On Dt. 31.08.2017 on or after 4.00 PM

The under signed reserves the right to alter the tendered quantity and reject / accept any or all tenders or split the tender among tenderers without assigning any reason thereof.

Deputy General Manager, (Elect)
Electrical Circle, Aska.

1. Executive Engineer, GSED, Digapahandi.
2. Chief Finance officer, Southco Utility, Berhampur.
3. Chief Operating Officer, Southco Utility, Berhampur.
4. Notice Board of This Office for wide circulation.
The interested bidders would be required to enroll themselves on the tender portal www.tenderwizard.com/SOUTHCO. Complete set of bidding documents are available in www.tenderwizard.com /SOUTHCO portal from Dt. 08.08.2017 onwards (as per the e-tender schedule). Interested bidders may visit SOUTHCO’s official web site www.southcoodisha.com or www.tenderwizard.com /SOUTHCO for detail specification. Any addendum / corrigendum to this e-Tender Notice shall be uploaded in the website only.

The bidders can view the tender documents from www.southcoodisha.com website free of cost.

(i) The bidders who want to submit bid shall have to pay the Rs. 4000.00 with GST as applicable towards tender cost (non-refundable inclusive GST as applicable), in the form of Demand draft only, drawn in favour of “Administrator Southco Utility, Aska Circle, Expenditure Assout” payable at Aska.

(ii) The bidders shall have to submit the non-refundable tender processing fee of Rs. 628/- (including service tax 18 %) in form of e-payment mode only.

( NOTE: For tender processing fee to K.S.E.D.C. Ltd. Bangalore, the bidder can use various modes of e-payment facility available through Tender wizard Portal, i.e. by Credit Card, Debit Card, Net Banking).

(iii) The bidders shall scan the Demand Draft / Bank guarantee, towards EMD and Tender Cost against the tender and upload the same in the prescribed form in .pdf or .jpg format in addition to sending the original as stated above.

(iv) The prospective bidders are advised to register their user ID, Password, company ID from website www.tenderwizard.com/SOUTHCO by clicking on hyper link “Register Me”.

(v) Any clarifications regarding the scope of work and technical features can be had from the undersigned during office hours.

NB: All subsequent addendum/Corrigendum to the tender shall be hoisted in SOUTHCO’s official web site www.southcoodisha.com and www.tenderwizard.com/SOUTHCO only

For detail procedure to be followed for submission of Bid, please refer Clause No. 13 to 17 of ITB (page no.14 to 16)
SECTION – I

INVITATION FOR BIDS (IFB)

E- TENDER NOTICE NO. SOUTHCO UTILITY/ASKA CIRCLE/DEPOSIT/1, Dt. 08.08.2017
OFFICE OF THE DEPUTY GENERAL MANAGER (ELECT.),
ELECTRICAL CIRCLE, SOUTHCORE UTILITY, ASKA.

1.0 Dy. General Manager (Elect.), Electrical Circle, Aska 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 their respective licensed area. The bidder must fulfill all the qualification requirements as specified in clause 2.0 stated below.

Scope of Work:-

# 11/.4 KV 63 KVA DP Mounted Sub-Station with 09 meter long, 300 Kg. PSC Pole - 1 No

# 11 KV line with 3x35 mmsq XLPE cable with 09 meter long, 300 kg. PSC Pole – 0.20 KM

# Installation of Service connection with LT CT Meter - 1 No.

The work should be done on Turn-Key basis except the following Material as supplied by Southco Utility:-

- (20-100)A LT Whole Current Meter - 1 No
- AMR KIT- 1 No

2.0 Bidders to be considered as eligible (to bid) should meet the following qualifications;

(a) Bidder must quote for the entire quantum of works specified under each such Work.

(b) Bidder shall be financially sound and stable having liquid assets as stated in the enclosed format and/or access to credit facility of not less than one fifth of estimated cost of the Work(s) for which he has submitted the bid.

(c) Two or more like minded contractor(s) and/or manufacturer(s) of electrical items, which are under scope of supply of the contractor as per this tender specification, may form a joint venture/ consortium agreement amongst themselves and apply against this tender specification, provided they qualify the criteria. Sample format of Joint Venture is enclosed herewith in Annexure-IV. However, if the bidder is quoting against the Work in his individual capacity, he cannot be a part of joint venture / consortium agreement to participate in Work(s) as notified against this tender specification.
(d) If the bidder is a joint venture / consortium, they shall comply the qualifying criteria as follows:

i) **Both the partner shall have the stipulated liquidity as stated in the qualifying criteria.**

ii) However, liquidity figures of all partners shall be added together to determine the qualifying criteria.

(g) One of the partners shall be nominated as Lead Partner and the lead partner shall be authorized to incur liabilities and receive instructions for and on behalf of all partners of the joint venture / consortium and entire execution of the contract including receipt of payments shall be done exclusively through the lead partner. This authorization shall be evidenced by submitting by a Power of Attorney signed by legally authorized signatories of all partners.

(h) All partners of joint venture / consortium shall be liable jointly and severally for the execution of contract in accordance with the contract terms and a copy of the agreement entered into by the joint venture / consortium partners having such a provision shall be submitted with the Bid. A statement to this effect shall be included in the authorization mentioned as above as well as in the Bid form and in Contract form (in case of a successful bid)

(i) In addition to above the bidder should submit the following documents in **Part-I** bid as qualifying terms.

   i. Self Attested copy of valid electrical (HT) license for electrical works.
   ii. Self Attested copy of EPF registration.
   iii. Self Attested copy of ESI registration.
   iv. Self Attested copy of GST registration.
   v. Self Attested copy of PAN & TIN No.
   vi. Self Attested copy of Existing Labour license

(j) The bidders who have earlier failed to execute the works order(s) of the **Owner** shall not be eligible to participate in this tender.

(k) **Owner** reserves the right to waive minor deviation, if they do not materially affect the capacity of the bidder to perform the contract.
### 3. E.M.D & TIME SCHEDULES:

<table>
<thead>
<tr>
<th>SL. NO.</th>
<th>DESCRIPTION</th>
<th>SCHEDULE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cost of Tender document</td>
<td>Rs 4000/- + GST as applicable (To be paid in shape of DD, in favour of “Administrator SOUTHCO Utility, payable at Berhampur)</td>
</tr>
<tr>
<td>2</td>
<td>Bid security (EMD)</td>
<td>As mentioned in Tender Notice at page -3 in shape of DD in favour of “Administrator Southco Utility, Aska Circle, Expenditure Account”, payable at Aska or in shape of BG in favour of “Administrator Southco Utility, Aska Circle, Expenditure Account” payable at Aska branch of BG issuing Bank.</td>
</tr>
<tr>
<td>3</td>
<td>Tender processing fee</td>
<td>As mentioned in Tender Notice at page -4. (To be paid to K.S.E.D.C.Ltd, Bangalore on e-payment mode. <strong>NOTE:</strong> For tender processing fee the bidder can use various modes of e-payment facility available through Tender wizard Portal, i.e. by Credit Card, Debit Card, Net Banking).</td>
</tr>
<tr>
<td>5</td>
<td>Issue of bid document</td>
<td>FROM : Dt. 08.08.2017 onwards</td>
</tr>
<tr>
<td>6</td>
<td>Last date of submission of online tender</td>
<td>Up to Dt. 30.08.2017 <strong>(5.00 PM)</strong></td>
</tr>
<tr>
<td>7</td>
<td>Last date and time of receipt of bid. (Hard Copy)</td>
<td>ON Dt. 31.08.2017 UP TO 01.00 PM</td>
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<tr>
<td>8</td>
<td>Opening of Techno-commercial bid (Part-I)</td>
<td>ON Dt. 31.08.2017 <strong>on or after 04.00 PM</strong></td>
</tr>
</tbody>
</table>

4.0 All correspondence with regard to the above shall be made to the following address:

**Deputy General Manager, Electrical Circle, Aska.**
College Square, Nuagam, Aska, Pin-761111,
**circlehead.aska@southcoodisha.com**, Ph.No. (06822) 271196.

Deputy General Manager,
Electrical Circle, Aska.
SECTION-II

INSTRUCTION TO BIDDERS

E- TENDER NOTICE NO. SOUTHCO UTILITY/ASKA CIRCLE/DEPOSIT/1, Dt. 08.08.2017
INSTRUCTIONS TO BIDDERS:

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 Odisha. The Owner has now floated this tender for supply of materials, Construction of 11/.4 KV 63 KVA sub-station along with 11 KV line with 3 X 35 mmsq XLPE cable with 09 mtr long 300 Kg PSC Pole for power supply to CHC building at Chikiti.

2.0 SCOPE OF WORKS

# 11/.4 KV 63 KVA DP Mounted Sub-Station with 09 meter long, 300 Kg, PSC Pole - 1 No

# 11 KV line with 3x35 mmsq XLPE cable with 09 meter long, 300 kg, PSC Pole – 0.20 KM

# Installation of Service connection with LT CT Meter- 1 No.

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.

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.
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) Bid Form
(e) BG Formats
(f) Price Bid format (BOQ)

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 will/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 corrigendum/Addendum shall be part of the Bidding Documents, and it will be notified on the website only. Interested bidders may visit SOUTHCO’s website www.southcoodisha.com or www.tenderwizard.com/SOUTHCO for detail enquiry.
6.03 In order to afford prospective Bidders reasonable time in which to take the Amendment into account 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 **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 favor of “Administrator Southco Utility, Aska Circle, Expenditure Account” payable at Aska drawn at any nationalized bank.

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.
9.0    BID PRICES

9.01    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.

9.02    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.

9.03    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.

10.0    BID CURRENCIES

Prices shall be quoted in Indian Rupees Only.

11.0    PERIOD OF VALIDITY OF BIDS

11.01    Bids shall remain valid for 180 days from the date of opening of the Bid.

11.02    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.

12.0    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.
D. SUBMISSION OF BID:

13.1 MODE OF SUBMISSION OF BID:-

The bidder shall submit the bid in Electronic Mode only i.e. in www.tenderwizard.com/SOUTHCO portal. The bidder must ensure that the bids are received in the specified website of the SOUTHCO by the date and time indicated in the Tender notice.

13.2 Bids submitted by telex/telegram will not be accepted.

13.3 The SOUTHCO Utility reserves the right to reject any bid, which is not submitted in electronic mode and according to the instruction, stipulated above.

13.4 PARTICIPATION IN e-TENDER:-

13.4.1 ACQUISITION OF DIGITAL SIGNATURE CERTIFICATE

(i) For all the users it is mandatory to procure the Digital Signatures of Class III only.

(ii) Bidders / Contractors are requested to follow the below steps for registration.

13.4.2 REGISTRATION IN TENDER WIZARD PORTAL

(i) Log in www.tenderwizard.com/SOUTHCO Click “Register”, fill the online registration Form.

(ii) Payment for an amount of Rs. 2290/- shall be made to KSEDCL, Bangalore for vendor registration in tender wizard portal in e-payment mode only.

The bidders/supplier who have already registered in e-tendering site of SOUTHCO, they need not to pay the registration amount to KSEDCL again for this tender.

(iii) As soon as the verification is being done the e-tender user id will be enabled/provided.

13.4.3 ON LINE REQUEST FOR e-tender DOCUMENTS.

After viewing Tender Notification in www.tenderwizard.com/SOUTHCO if bidder intends to participate in tender, he has to use his e-tendering User Id and Password which has been received after registration and acquisition of DSCs (Digital signature certificate). If any Bidder wants to participate in the tender he has to follow the instructions given below. (i) Insert the PKI
(which consist of your Digital Signature Certificate) in your System. (Note: Make sure that necessary software of PKI be installed in your system).

(ii) Click / Double Click to open the Microsoft Internet Explorer (This icon will be located on the Desktop of the computer).

(iii) Go to Start > Programs > Internet Explorer. Type www.tenderwizard.com/SOUTHCO in the address bar, to access the Login Screen.

(iv) Enter e-tender User Id and Password, click on “Go”. Click on “Click here to login” for selecting the Digital Signature Certificate. Select the Certificate and enter DSC Password. Re-enter the e-Procurement User Id Password

(v) Click “Un Applied” to view / apply for new tenders.

(vi) Click on Request icon for online request. After making the request, bidder has to pay the requisite tender processing fee (as indicated in tender notice Page -3) through e-payment facility only available in the portal. Bidders will receive the Tender Documents which can be checked and downloaded by following the below steps.

(vi) Click to view the tender documents which are received by the user. Tender document screen appears.

(vii) Click “Click here to download” to download the documents.

**NOTE:** For vendor registration and payment of tender processing fee to KESDCL, the bidder can use various modes of e-payment facility available through Tender wizard Portal, i.e. by Credit Card, Debit Card, Net Banking.

**ONLINE SUBMISSION OF BID**

The bidder has to furnish the Tender cost, BID SECURITY (EMD) and a set of hard copy of supporting documents uploaded in this tender except bid sheets (.xls) prior to last date and time of receipt of bids as specified in tender Notice. Tender processing fees is mandatory & to be paid on e-payment mode as stated elsewhere in the document.
PROPER FILLING UP OF THE PRICE SCHEDULE:

The bidder should fill up the Techno commercial and price schedule properly and fill in the bid sheets provided in .xls format and upload the same without changing the file name. The tender may be rejected if the schedule of price is submitted in incomplete form.

NB: The bid sheets (.xls file) shall be uploaded in www.tenderwizard.com/SOUTHCO portal, prior to online closing of the tender. By no other means (except online) price bid shall be accepted for evaluation of tender.

15.0
(i) After completing all the formalities Bidders will have to submit the tender as specified NIT and they must take care of all instructions. Prior to submission, verify whether all the required documents have been attached and uploaded to the particular tender or not.

15.1 Note down / take a print of bid control number once it displayed on the screen

(ii) Tender Opening event can be viewed online.

(iii) Competitors bid sheets are available in the website for all participated bidders.

NOTES:

15.2 For any e-tendering assistant contact help desk number,

080- 40482000(Bangalore). SOUTHCO HELP DESK- 09937140591,

16.0 DEAD LINE FOR SUBMISSION OF BIDS

16.1 Soft copy of the bid shall be uploaded through the portal www.tenderwizard.com/SOUTHCO on or before the online submission time and date as stipulated in the bidding document. DD towards Tender cost, DD/BG towards Bid Security & a set of all required documents (except bid sheets in .xls format) must be received by SOUTHCO at the address specified not later than the time and date stated in the tender notification. In the event of the specified date for the submission of bids being declared a holiday for SOUTHCO, the bids will be received on the next working day as per the time indicated in tender notification.

16.2 SOUTHCO may, at its discretion, extend this deadline for submission of bids by amending the Bidding Documents in accordance with ITB for the reasons specified therein at any time prior to opening of, in which case all rights and obligations of Employer and bidders will thereafter be subject to the deadline as extended.
LATE BIDS

(i) Soft part of the bid will not be uploaded on the portal after expiry of submission time and the bidder shall not be permitted to submit the same by any other mode. In such case, even if the bidder has submitted the specific documents in hard copy in original (viz., bid security, tender cost & any other document) within the stipulated deadline, its bid shall be considered as late bid. The hard copy submitted [specific documents (viz., bid security, tender cost.)] shall be returned unopened to the bidder.

(ii) Hard copy of the bid security of the bid received by SOUTHCO after the deadline for submission of bid prescribed by the GTCC will be considered as late bid even if the bidder has uploaded the soft part of the bid within the stipulated deadline. In such a case, the soft part of the bid uploaded on the portal shall be sent unopened to “Archive” and shall not be considered at all any further.

MODIFICATION AND WITHDRAWAL OF BIDS:

Bidder may modify or withdraw its bids through the relevant provisions on the portal www.tenderwizard.com/SOUTHCO up to due date and time of submission of bid indicated in tender notification.

The Bidder’s modifications shall be done and submitted as follows:

Modified Electronic form of the bid as per the provision of portal therein.

Bidder may withdraw its bid through the relevant provisions of portal only.

No bid shall be modified/ withdrawn subsequent to the dead line for submission of bids. Withdrawal/modification of bid before the expiry of bid validity shall result forfeiture of Bidder’s bid security.

SEALING AND MARKING OF BID:

(A) Hard copy of the followings should be submitted with SOUTHCO:

(i) Tender Cost

(ii) Tender processing fee acknowledgement copy.

(iii) Bid Security (EMD) in shape of DD/BG as described.

(iv) Self attested copy of Labour License.

(V) Self attested copy of Valid electrical (HT) license for electrical works.
(vi) Self attested copy of GST registration certificate.

(vii) Self attested copy of PAN Card, TIN registration certificate with VAT clearance.

(viii) Self attested copy of EPF & ESI: Registration.

(ix) All uploaded file except price bid. The same shall be uploaded in www.Tenderwizard.com / SOUTHCO portal only.

(x) Self attested copy of proof of liquid asset such as Fixed deposit, investment, credit facility by bank.

(x) Dully filled up formats of bid document in annexure-I, II, VIII & IX and other annexure as per requirement.

18.2 First Fill up through online

(i) The Electronic Form/Template of the bid (Techno –Commercial bid), as available on the portal, shall be duly filled.

(ii) Attachments –Scanned copy of documents in support requirement of the tender files named as 1.pdf to .......).

Second Fill up through online

18.3 The Electronic Form/Template of the Price bid (as available on the portal) shall be duly filled up in the xls. Format and uploaded in the website only.

(No need to submit Hard copy of price bid).

19.0 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.

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 production capability and 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/or 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) Supply 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 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 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 procurement and execution of the Project. In pursuance of this policy, the Owner:

a) 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 procurement process or in contract execution; and

ii."Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Owner, and includes collusive practice among Bidders (prior to or after Bid submission) designed to establish Bid prices at artificial non-competitive levels and to deprive the Owner of the benefits of free and open competition.

b) 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;

c)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.

Deputy General Manager,
Electrical Circle, Aska.
SECTION-III

GENERAL TERMS AND CONDITIONS

E- ENDER NOTICE NO. SOUTHCO UTILITY/ASKA CIRCLE/DEPOSIT/1, Dt. 08.08.2017
GENERAL CONDITION OF CONTRACT (GCC)

1.0 GENERAL: -
SOUTHCO, hereinafter referred to as the “Owner” are desirous of construction of various Works, on ‘Turnkey’ basis in it’s licensed area (Chikiti) in the state of Odisha as described below:

2.0 SCOPE OF WORKS : -

# 11/4 KV 63 KVA DP Mounted Sub-Station with 09 meter long, 300 Kg. PSC Pole - 1 No

# 11 KV line with 3x35 mmsq XLPE cable with 09 meter long, 300 kg. PSC Pole – 0.20 KM

# Installation of Service connection with LT CT Meter- 1 No.

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

2.02 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. Supply of materials from the approved vendor (materials which are to be supplied by the bidder) on subsequent approval of the Owner.

iii. Providing Engineering drawing, data, operational manual, etc for the Owner’s approval;

iv. Packing and transportation from the manufacturer’s works to the site.

v. Receipt, storage, preservation and conservation of equipment at the site.

vi. Pre-assembly, if any, erection testing and commissioning of all the equipment;

vii. Reliability tests and performance and guarantee tests on completion of commissioning;

viii. Loading, unloading and transportation as required.

ix. Erection of equipments in Sub-station including civil works.

x. Erection of lines of specified voltage.
xi. Testing, Commissioning of substations and lines / installations

xii. Storing before erection

xiii. Getting the substations & lines inspected by Electrical Inspector after completion of works.

xiv. Transportation of all required Southco Utility supply materials from Central Store to works site, construction of new electrical / civil structures, etc.

3.0 DEFINITION OF TERMS

(i) The ‘Contract ’ means the 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 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) ‘Sub-Contractor’ shall mean the person named in the Contract for any part of the works or any person to whom any part of the Contract has been sublet by the contractor with the consent in writing of the Engineer and will include the legal representatives, successors and permitted assigns of such person.

(v) ‘Engineer in Charge’ shall mean the officer appointed in writing by the Owner to act as Engineer from time to time for the purpose of the Contract.

(vi) ‘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.

(vii) ‘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.

(viii) ‘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**

(ix) ‘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.

(x) ‘Date of Contract’ shall mean the date on which notice of Award of Contract/Letter of Award has been issued.

(xi) ‘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.

(xii) 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.

(xiii) ‘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.

(xiv) Words imparting ‘Person’ shall include firms, companies, corporations and associations or bodies of individuals, whether incorporated or not.

(xv) 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.

(xvi) 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.


4.0 VALIDITY:-

The offer shall be valid for a period not less than 180 days from the date of bid opening.

5.0 PRICE: -

Bidders are required to quote firm price as per the prescribed format. The quoted price shall be firm and inclusive of all taxes, duties, freight & insurance and other levies, if any. **Owner** shall not be liable to pay anything extra over and above the quoted price.

6.0 EVALUATION OF BIDS & AWARD OF CONTRACT:

6.01 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.

6.02 **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.

8.03 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.

6.04 Prior to the detailed evaluation, **Owner** will determine the substantial responsiveness of each Bid to the Bidding Documents including production capability and 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.
6.05 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

6.06 The Owner will award the Contract to the successful Bidder whose Bid has been determined to be the lowest (L1) evaluated responsive Bid, when the lowest bidder 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.

6.07 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.

7.0 EARNEST MONEY DEPOSIT (EMD):

7.01 The Tender must be accompanied by Earnest Money Deposit in shape of Demand Draft in favour of Administrator Southco Utility, Aska Circle, Expenditure Account payable at Aska drawn at any nationalized bank. Bids without EM deposit will be rejected out-rightly.

7.02 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.

7.03 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.

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

8.0 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 up to 20% of the tender quantity without any change in price or other terms and conditions.

9.0 INSPECTION AND TESTING :-

A) All the materials shall be inspected by the Owner or any authorized representative of the Owner at the contractor’s or its sub-vendor’s manufacturing works. The contractor shall give the Owner an advance notice in writing about the place of testing at least 15 days before the scheduled date on which the materials will be ready for inspection. The dispatch clearance will be issued by the Owner, if the materials satisfy the required quality as per IS.

B) Engineer-in-charge shall be entitled at all reasonable times during manufacture/ installation to inspect examine and test the materials at the contractor’s premises / erection site about workmanship of the materials to be supplied under this contract. If the said materials are being manufactured in other premises, the contractor shall provide unhindered clearance, giving full rights to inspect, examine and test as if the materials were being manufactured in his premises. 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 advance notice in writing of the Date and the Place at which the materials will be ready for testing. The inspecting officer for the entire works shall be the (Respective Authority) of the concerned site.

9.02 All the work should be inspected by the Electrical Inspector.
10.0 COMPLETION AND COMPLETENESS OF THE EQUIPMENT:

10.01 **Time being the essence of the contract; the works shall be completed within 2 (Two) months from the date of issue of works order.**

10.02 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.

10.03 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.

10.04 **Owner** however reserves the right to re-schedule the completion period, if required.

11.0 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 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 and dismantle with enforcement of penalty as per contract.

C) Acquire the defective materials at reduced price considered acceptable under the circumstances.
D) Forfeit the Contract Performance Bank Guarantee.

12.0 DEVIATION FROM SPECIFICATION: -

The bidders are requested to study the specification and the attached drawings 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 delivery 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 copyright 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. For Materials (Supplied by Contractor):

15.01.01 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 months from the date of handing over the completed installations after commercial operation at required voltage level.
15.01.02 The above guarantee certificate shall be furnished in triplicate to the Owner for his approval. Any defects 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. Any such defects as notified by the Owner shall be rectified by the contractor within one month failing which the Owner will set right the defects through other agencies and recover double the cost so incurred either from any pending invoices or Bank Guarantee.

16.00. For Construction:

16.01 The bidder shall guarantee for the workmanship for a minimum period of **24 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.

16.02.02 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.

**17.0 PENALTY FOR DELAY IN COMPLETION OF CONTRACT:**

17.01 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 the L.O.A., the contractor shall sign a Contract Agreement with the Owner within fifteen days along with the detail works 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.

17.02 Penalty amount can be realized from the proceeds of the Contract Performance Bank Guarantee, if the situation so warrants.
17.03 Extension of delivery period could be with / without levy of penalty with the discretion of Owner.

18.0 RIGHT OF WAY:

Right of way issues, if any, arising during execution of the works shall have no liability on the Owner. These issues shall be settled at the sole discretion of the Contractor.

19.0 CONTRACTOR’S DEFAULT:

19.01 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 thirty (30) 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.

19.02 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.
19.03 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.

20.0 TERMINATION OF CONTRACT ON OWNER’S INITIATIVE:

20.01 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.

20.02 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.

20.03 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.

21.0 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 ten (10) 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.

22.0 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 3 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.

23.0 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.

24.0 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.

25.0 ENGINEER IN CHARGE: -

Executive Engineer, GSED, Digapahandi or Authorized Engineer of the Owner shall be the Engineer In Charge for the Project.
26.0 CONTRACT PERFORMANCE BANK GUARANTEE:-
26.01 Within 15 days of issue of the Works Order or Letter of Award, whichever is earlier, the Contractor shall submit **Contract Performance Bank Guarantee issued by a scheduled Nationalized Bank, in favour of the Owner, covering 10% of the total value of the work order.**

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 One 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 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. towards security and acceptance thereof, failing which the works orders (W.O) will be liable for cancellation without any further notice with forfeiture of E.M.D.

26.04 No interest shall be allowed by the **Owner** on the above Performance Security Deposit submitted by the Bidder.

27.0 TERMS OF PAYMENT:

27.01 70% (seventy 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 Junior Manager & SDO concerned 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 concerned J.M., A.M. / SDO submitted within 30 days to Engineers In Charge on the basis of check points involved in such items of works.

27.02 Balance 30% (thirty percent) of contract price shall be paid after completion of all works, envisaged under this Work including any additions and alterations, testing & commissioning, return of un-used free supply material, taking over certificate and entire stretch is fully ready for commercial operation. The payments shall be subjected to clearance from electrical inspectorate.
OFFICE OF THE DEPUTY GENERAL MANAGER (ELECT.),
ELECTRICAL CIRCLE, SOUTHCO UTILITY, ASKA.

Note: In case of joint venture/ consortium all BG.s shall be in the name of joint venture consortium covering all the partners including the Lead Partner. The BG should be 10% for lead partner and additional 1% by the other J.V. partner.

28.0 PAYING OFFICER:

DDO, GSED, Digapahandi.

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 Authorised Officer, Southco Utility who shall decide the case as Sole Arbitrator.

(ii) All disputes shall be subjected to exclusive jurisdiction of the Courts at Aska and the writ jurisdiction of Hon’ble High Court of Odisha at Cuttack.

31.0 Material’s To Be Issued By Southco Utility

- (20-100) A LT Whole Current Meter - 1 No
- AMR KIT - 1 No

32.0 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.

33.0 SUBMITTALS REQUIRED AFTER AWARD OF CONTRACT

33.01 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.
33.02 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.

34.0 DRAWINGS

Within 15 days of contract commencement the contractor shall submit, for approval by the Engineer in Charge, a schedule of the drawings to be produced. The schedule shall also provide a program of drawing submission, for approval by the Engineer in Charge. All drawings and design should be submitted to Engineer-In-Charge within the period specified above.

35.0 APPROVAL PROCEDURE OF SUB VENDORS & DRAWINGS OF BOUGHT OUT MATERIALS

35.01 The contractor shall submit all drawings, documents and type test reports, QAP, Name of Sub vendor, samples (as applicable) etc, to the Engineer in charge within 15 days of award of LOA/Work order 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 works.

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

35.03 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.

36.0 TAKING OVER

36.1 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 unreasonably 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 / Supervising Officer / 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.

36.2 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.
SECTION-IV

BID FORM AND ANNEXURES

E- TENDER NOTICE No. SOUTHCO UTILITY/ASKA CIRCLE/DEPOSIT/1, Dt. 08.08.2017
Annexure-I

BID FORM

To
The Dy. General Manager (Elect.)
Aska Electrical Circle, Aska.
College Square, Nuagam, Pin-761111
Tel No. (06822) 271196.

Sir,

1. We understand that SOUTHCO UTILITY is desirous for construction of
   # 11/0.4 KV 63 KVA DP Mounted Sub-Station with 09 meter long, 300 Kg. PSC Pole - 1 No
   # 11 KV line with 3x35 mmsq XLPE cable with 09 meter long, 300 kg. PSC Pole – 0.20 KM
   # Installation of Service connection with LT CT Meter- 1 No.

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 60 days from the date of award of
   purchase order/letter of intent.

4. If our Bid is accepted, we will furnish a Contract Performance Bank Guarantee for an amount of 10% (Ten) percent
   of the total contract value for due performance of the Contract 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) ..........................................................
Annexure-II

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 __________

Whereas SOUTHCO UTILITY, Coporate Office, Courtpeta, Berhampur-760004 (here in after called “Owner”) has placed Work
Order No._______ Dt.__________ (hereinafter called “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 05% (Five 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 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 not withstanding 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 unrevocable. The payment so made by us under this bond shall be valid discharge of our liability for payment thereunder 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.) __________________________________________________, Aska 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 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
FORM OF JOINT VENTURE/ CONSORTIUM AGREEMENT

(To be executed on non-judicial stamp paper of appropriate value to be purchased in the name of joint venture)

PROFORMA OF JOINT VENTURE AGREEMENT BETWEEN ........................................... AND ......................................................... FOR TENDER NOTIFICATION NO. .........................................................OF (Owner).

THIS Joint Venture Agreement executed on this ........ day of ............ Two thousand Thirteen and ..................... between M/s. .............................. a company incorporated under the laws of .......................................................... and having its Registered Office at .......................................................... ....................... (hereinafter called the "Lead Partner" which expression shall include its successors, executors and permitted assigns), M/s. .............................. a company incorporated under the laws of .......................................................... and having its Registered Office at .......................................................... ....................... (hereinafter called the "Partner" which expression shall include its successors, executors and permitted assigns) and M/s. .............................. a company incorporated under the laws of .......................................................... and having its Registered Office at (hereinafter called the "Partner" which expression shall include its successors, executors and permitted assigns) for the purpose of making a bid and entering into a contract (in case of award) against the Specification No.: .......................................................... for Construction of .......................................................... (Owner) a company incorporated under the ............... having its Registered Office at .......................................................... (hereinafter called the "Owner").

Whereas the Owner invited bids as per the above mentioned Specification for the design manufacture, supply and erection, testing and commissioning of Equipment Materials stipulated in the bidding documents for AND
OFFICE OF THE DEPUTY GENERAL MANAGER (ELECT.),
ELECTRICAL CIRCLE, SOUTHCO UTILITY, ASKA.

WHEREAS GCC, forming part of the bidding documents, stipulates that a Joint Venture of two or more qualified firms as partners, meeting the requirement of GCC as applicable may bid, provided the Joint Venture fulfils all other requirements of GCC and in such a case, the BID shall be signed by all the partners so as to legally bind all the Partners of the Joint Venture, who will be jointly and severally liable to perform the Contract and all obligations hereunder.

The above clause further states that the Joint Venture agreement shall be attached to the bid and the contract performance guarantee will be as per the format enclosed with the bidding document without any restriction or liability for either party.

AND WHEREAS the bid has been submitted to the Owner vide proposal No., dated by Lead Partner based on the Joint Venture agreement between all the Partners under these presents and the bid in accordance with the requirements of GCC has been signed by all the partners.

NOW THIS INDENTURE WITNESSETH AS UNDER:

In consideration of the above premises and agreements all the Partners to this Joint Venture do hereby now agree as follows:

1. In consideration of the award of the Contract by the Owner to the Joint Venture partners, we, the Partners to the Joint Venture agreement do hereby agree that M/s ……………………………………… shall act as Lead Partner and further declare and confirm that we shall jointly and severally be bound unto the Owner for the successful performance of the Contract and shall be fully responsible for the design, manufacture, supply, and successful performance of the equipment in accordance with the Contract.

2. In case of any breach of the said Contract by the Lead Partner or other Partner(s) of the Joint Venture agreement, the Partner(s) do hereby agree to be fully responsible for the successful performance of the Contract and to carry out all the obligations and responsibilities under the Contract in accordance with the requirements of the Contract.

3. Further, if the Owner suffers any loss or damage on account of any breach in the Contract or any shortfall in the performance of the equipment in meeting the performance guaranteed as per the specification in terms of the Contract, the Partner(s) of these presents undertake to promptly make good such loss or damages caused to the
Owner, on its demand without any demur. It shall not be necessary or obligatory for the Owner to proceed against Lead Partner to these presents before proceeding against or dealing with the other Partner(s).

4. The financial liability of the Partners of this Joint Venture agreement to the Owner, with respect to any of the claims arising out of the performance of non-performance of the obligations set forth in the said Joint Venture agreement, read in conjunction with the relevant conditions of the Contract shall, however, not be limited in any way so as to restrict or limit the liabilities of any of the Partners of the Joint Venture agreement.

5. It is expressly understood and agreed between the Partners to this Joint Venture agreement that the responsibilities and obligations of each of the Partners shall be as delineated in Appendix-I (*To be incorporated suitably by the Partners) to this agreement. It is further agreed by the Partners that the above sharing of responsibilities and obligations shall not in any way be a limitation of joint and several responsibilities of the Partners under this Contract.

6. This Joint Venture agreement shall be construed and interpreted in accordance with the laws of India and the courts of Berhampur shall have the exclusive jurisdiction in all matters arising there under.

7. In case of an award of a Contract, We the Partners to the Joint Venture agreement do hereby agree that we shall be jointly and severally responsible for furnishing a contract performance security from a bank in favour of the Owner in the forms acceptable to Owner for value of 10% of the Contract Price in the currency/currencies of the Contract.

8. It is further agreed that the Joint Venture agreement shall be irrevocable and shall form an integral part of the Contract, and shall continue to be enforceable till the Owner discharges the same. It shall be effective from the date first mentioned above for all purposes and intents.

IN WITNESS WHEREOF. The Partners to the Joint Venture agreement have through their authorised representatives executed these presents and affixed Common Seals of their companies, on the day, month and year first mentioned above.

1. Common Seal ……………………….. of For Lead Partner

has been affixed in my/ our presence

pursuant to the Board of Director's (Signature of authorized resolution
dated …………………….. representative)

Name... ………………………

Signature.. ……………….. Designation
Name ................................................................. Common Seal of the company

Designation................................................................. .................................................................

2. Common Seal of .................................................... For other Partners

has been affixed in my/our presence

pursuant to the Board of Director’s

(Signature of authorised representative)

Name... .................................

Signature.. ................................. Designation

................................................

Name ................................................................. Common Seal of the company

Designation................................................................. .................................................................

WITNESSES :

1................................................................. 2.................................................................

(Signature) ................................................................. (Signature)

Name ................................................................. Name .................................................................

................................................................. .................................................................

(official address) ................................................................. (Official address)
OFFICE OF THE DEPUTY GENERAL MANAGER (ELECT.),
ELECTRICAL CIRCLE, SOUTHCO UTILITY, ASKA.

ANNEXURE – IV

PROFORMA FOR BANK GUARANTEE FOR EARNEST MONEY DEPOSIT

(ON NON-JUDICIAL STAMP PAPER OF Rs.100/-)

Ref Date Bank Guarantee No:

In accordance with invitation to Tender Notice No.---------------------- Dated ---------------------- of Southco Utility. for the execution of ______________________________________________________________ (name of package)

M/s__________________________Addr___________________________________________________________________

________________________________wish/wished to participate in the said tender and as the Bank Guarantee for the sum of Rs.__________________________ [Rupees__________________________ Valid for a period of .......... days (in words) is required to be submitted by the Bidder.

1. We the________________________________________________[Indicate the Name of the Bank] [Hereinafter referred to as ‘the Bank’] at the request of M/S ____________________ ____________________________________________________________________________________________________________________________ [Herein after referred to as supplier(s)] do hereby unequivocally and unconditionally guarantee and undertake to pay during the above said period, on written request by SOUTHCO UTILITY an amount not exceeding Rs.__________________________ to the SOUTHCO UTILITY, without any reservation. The guarantee would remain valid up to 4.00 PM of _________________ [date] and if any further extension to this is required, the same will be extended on receiving instructions from M/s ____________________ ____________________________________________________________________________________________________________________________ on whose behalf this guarantee has been issued.

2. We the _____________________________________ [Indicate the name of the bank] do hereby further undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the SOUTHCO UTILITY stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the SOUTHCO UTILITY by reason of any breach by the said supplier [s] of any of the terms or conditions or failure to perform the said Bid. 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.__________________________ (in wards)

3. We, the _______________ Bank undertake to pay the SOUTHCO UTILITY any money so demanded not withstanding any dispute or disputes so raised by the supplier [s] in any suit or proceeding instituted/pending before any Court or Tribunal relating thereto, our liability under this agreement being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the supplier(s) shall have no claim against us for making such payment.

4. We, the__________Bank [Indicate the name of the bank] or our local branch at Aska further agree that the guarantee
herein contain shall remain in full force and effect during the aforesaid period of ------------ days and it shall continue to be so enforceable till all the dues of the SOUTHCO UTILITY under by virtue of the said Bid have been fully paid and its claims satisfied or discharged or till SOUTHCO UTILITY certifies that the terms and conditions of the said Bid have been fully and properly carried out by the said Supplier [s] and accordingly discharges this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the ______________ (date) we shall be discharged from all liability under this guarantee thereafter.

5. We, the __________Bank [Indicate the name of the bank] or our local branch at Berhampur further agree that the SOUTHCO UTILITY shall have the fullest liberty without our consent and without affecting in any manner our obligations here under to vary any of the terms and conditions of the said Bid or to extend time of performance by the said Supplier [s] from time to time or to postpone for any time or from time to time any of the powers exercisable by the SOUTHCO UTILITY against the said supplier [s] and to forbear or enforce any of the terms and conditions relating to the said bid and we shall not be relieved from our liability by reason of any such variation, postponement or extension being granted to the said Supplier [s] or for any forbearance act or omission on the part of the SOUTHCO UTILITY or any indulgence by the SOUTHCO UTILITY to the said Supplier[s] or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the name, style and constitution of the Bank or the supplier [s].

7. We, the _______Bank or our local branch at Aska lastly undertake not revoke this Guarantee during its currency except with the previous consent of the SOUTHCO UTILITY in writing.

8. We, the__________________________ Bank further agree that this guarantee shall also be invokable at our place of business at Aska [Indicate address & Branch code of local branch at Aska] in the State of Orissa.

Dated ______________________ Day of 2012.

Witness ((Signature, names & address) For_______ [Indicate the name of Bank]

1. Power of Attorney No.______

2 Date: ______

SEAL OF BANK

Note: The non-judicial stamp paper of worth Rs.100/- shall be purchased in the name of the bank, which has issued the bank guarantee.
SECTION-V

GENERAL TECHNICAL SPECIFICATION

E-TENDER NOTICE No. SOUTHCO UTILITY/BERHAMPUR CIRCLE/DEPOSIT/1, Dt. 04.08.2017
GENERAL PARTICULARS OF SYSTEM

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 at appropriate voltage level via distribution sub-stations, which operate at 11/0.4 KV.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Description of Technical Parameter</th>
<th>Unit</th>
<th>KV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nominal system voltage</td>
<td>KVRms</td>
<td>11 KV</td>
</tr>
<tr>
<td>2</td>
<td>Maximum system voltage</td>
<td>KVRms</td>
<td>12 kV</td>
</tr>
<tr>
<td>3</td>
<td>Power frequency with stand voltage</td>
<td>KVRms</td>
<td>28 KV</td>
</tr>
<tr>
<td>4</td>
<td>Lightning impulse withstand voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Line to earth</td>
<td>KVp</td>
<td>75 KVP</td>
</tr>
<tr>
<td></td>
<td>b) Across isolating gap</td>
<td></td>
<td>85 KVP</td>
</tr>
<tr>
<td>5</td>
<td>One minute power frequency withstand value</td>
<td></td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Dry</td>
<td>KVRms</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Wet</td>
<td>KVRms</td>
<td>35</td>
</tr>
<tr>
<td>6</td>
<td>System frequency</td>
<td>Hz</td>
<td>50</td>
</tr>
<tr>
<td>7</td>
<td>Variation in frequency</td>
<td>%</td>
<td>As per IE Rule</td>
</tr>
<tr>
<td>8</td>
<td>Continuous current rating</td>
<td>Amp</td>
<td>1250</td>
</tr>
<tr>
<td>9</td>
<td>Symmetrical short circuit current</td>
<td>kA</td>
<td>As per IE Rule</td>
</tr>
<tr>
<td>10</td>
<td>Duration of short circuit fault current</td>
<td>Sec</td>
<td>As per IE Rule</td>
</tr>
<tr>
<td></td>
<td>Dynamic short circuit current rating</td>
<td>kAp</td>
<td>As per IE Rule</td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------</td>
<td>-----</td>
<td>----------------</td>
</tr>
<tr>
<td>12</td>
<td>Air clearances</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Phase to ground</td>
<td>meters</td>
<td>As per IE Rule</td>
</tr>
<tr>
<td></td>
<td>Phase to phase</td>
<td>meters</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conductor spacing for AIS layouts</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Phase to ground</td>
<td>meters</td>
<td>As per IE Rule</td>
</tr>
<tr>
<td></td>
<td>Phase to phase</td>
<td>meters</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Design ambient temperatures</td>
<td>°C</td>
<td>As per IE Rule</td>
</tr>
<tr>
<td>15</td>
<td>Pollution level as per IEC-815 and 71</td>
<td></td>
<td>As per IE Rule</td>
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<tr>
<td>16</td>
<td>Creepage distance</td>
<td>mm</td>
<td>As per IE Rule</td>
</tr>
<tr>
<td>17</td>
<td>Maximum fault clearing time</td>
<td>ms</td>
<td>As per IE Rule</td>
</tr>
<tr>
<td>18</td>
<td>Safety clearances</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>1. Section clearance</td>
<td>Metres</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>2. Ground clearances( between ground and bottom most part of energised object)</td>
<td>Metres</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3. Horizontal clearance</td>
<td>Metres</td>
<td>As per I.E. Rules</td>
</tr>
<tr>
<td></td>
<td>between the fence and energised object</td>
<td></td>
<td>As per I.E. Rules</td>
</tr>
<tr>
<td></td>
<td>4. Horizontal clearance</td>
<td>metres</td>
<td></td>
</tr>
<tr>
<td></td>
<td>between the road centre line and energised part of the nearby equipment</td>
<td></td>
<td>As per I.E. Rules</td>
</tr>
</tbody>
</table>
1.3 DATA

1.3.1 METEROLOGICAL

<table>
<thead>
<tr>
<th>Description</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual mean of maximum monthly average temperature.</td>
<td>42</td>
</tr>
<tr>
<td>Annual mean of minimum monthly temperature in °C</td>
<td>14</td>
</tr>
<tr>
<td>Average rain fall in mm</td>
<td>700</td>
</tr>
<tr>
<td>Average thunder storms days per year</td>
<td>55days</td>
</tr>
<tr>
<td>Design ambient temperature in °C</td>
<td>50</td>
</tr>
<tr>
<td>Maximum wind velocity in meter/sec.</td>
<td>50</td>
</tr>
<tr>
<td>Maximum relative humidity in %</td>
<td>85</td>
</tr>
<tr>
<td>Average relative humidity in %</td>
<td>60</td>
</tr>
</tbody>
</table>

1.3.2 Sub Station Philosophy

SOUTHCO has adopted the philosophy of installing open terminal air insulated substations. The bus bars may be of either rigid type or flexible train type depending upon the choice of the designer considering the overall suitability and economy of the substation to be installed.

a) Layout arrangement

The Contractor shall finalize the layout arrangements for new 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 sub-substation locations, their approach, geography and topography etc are to be collected from the concern Division to the extent possible. The Bidder shall make necessary visit to the substation sites and fully appraise himself before bidding. Deviations on account of inadequate data for substation works shall not be acceptable and the Bid shall not be considered for evaluation in such cases.

b) Soil data

Detailed soil investigations in respect of various substations have not been made. However the general characteristics of the soil are of laterite, Sandy, Hard soil. The Contractor shall investigate the properties of the soil of the substations and measure the soil resistivity as part of the scope of works.

c) 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 site visits and fully satisfy himself regarding site conditions in all respects, and shall be fully responsible for the complete design and engineering of the substations.

1.4 GUARANTEES TECHNICAL PARTICULARS

The Contract Works shall comply with the guaranteed technical particulars specified or quoted in the bid. All plant and apparatus supplied under this Contract shall be to the approval of the Engineer In-charge. All plant and equipment supplied under this contract must have been type tested and have been on satisfactory service at identical ratings for at least preceding three years. The bidder shall furnish in his bid the necessary supporting data in this regard in specified formats for consideration during bid evaluation. If during evaluation non compliance is identified, the successful Contractor shall be bound to supply the equipment from manufacturers complying with the stipulated requirements under SOUTHCO’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 apparatus should comply with this Specification. Any departures from the requirements of this Specification shall be stated with reasons in the relevant Bid Proposal Schedules 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 specification (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 TEST AND MAINTENANCE EQUIPMENT

The Contractor shall supply the type, quantity of test and maintenance equipment specified in the Schedules as part of the contract works.

1.7 SPARES

The Contractor shall provide the mandatory spares detailed in the Schedules and shall, where considered necessary, provide a list of recommended spare parts (optional spares) together with their individual prices. The Employer may order all or any of the spare parts listed at the time of contract award and the spare parts so required by the owner, shall be supplied as part of the Works under this specification. Additional spares may be ordered at any time during the contract at the rates stated in the Price Schedule.

a) Mandatory spares

The owner has indicated the requirement of mandatory spares as a percentage of the population of main equipment together with proposed storage locations. The quantities shall be determined by the Contractor and indicated in the relevant Bid Price Schedules. These quantities shall be considered for evaluation of the bids.

b) Optional spares

The Contractor may recommend a list of optional spare parts together with the quantity and usage rates for their equipment in the relevant Bid Proposal Schedule. The Engineer In-charge
shall assess their requirement and place orders. The spares shall include consumable items sufficient for a plant operational period of five years after commissioning, as well as essential replacement parts to cover the event of a break-down which would affect the availability or safety of the plant. Spares shall be available during the life of the equipment and the Contractor shall give 12 months notice of his, or any sub-contractor’s, intention to cease manufacture of any component used in the equipment. The Contractor shall ensure that sufficient spare parts and consumable items are available for his own use during commissioning of the plant. Spares ordered by the owner shall not be used by the Contractor without the written consent of the Engineer In-charge and any spares so used by the Contractor during the commissioning of the plant shall be replaced before the closure of contract by the Contractor at the Contractor’s expense. Any spare apparatus, parts and tools shall be subject to the same specification, tests and conditions as similar material supplied under the Scope of Works of the Contract. They shall be strictly interchangeable and suitable for use in place of the corresponding parts supplied with the plant and must be suitably marked and numbered for identification and prepared for storage by greasing or painting to prevent deterioration. All spare apparatus or materials containing electrical insulation shall be packed and delivered in cases suitable for storing such parts or material over a period of years without deterioration. Such cases shall have affixed to both the underside and topside of the lid a list detailing its contents. The case will remain the property of the owner.

1.8 TRAINING

The Contractor will be required to provide suitable training for selected staff both on site and at the Contractor’s place of works free of cost. The size of the training groups will be limited to 20. Details of the training considered, appropriate shall be stated clearly, at the bidding stage, based on the number of trainees specified. The cost of training including all course fees shall be included.

The areas in which it is considered training should be provided, and duration of the training courses, are given in this section. Alternative arrangements, where considered appropriate, should be suggested.

Four categories of training are considered appropriate namely:

1.8.1 Hardware maintenance.

1.8.2 Installation and commissioning techniques.

1.9 Hardware maintenance
Courses for hardware maintenance shall identify techniques for preventative physical maintenance and for identification, isolation and replacement of faulty components. This course shall take place before equipment is delivered to site. An essential part of the hardware maintenance course shall include highlighting the philosophy of computer based preventive maintenance and identification of the various diagnostic/interrogation facilities available. The Contractor shall supply adequate documented instructions to enable a detailed interrogation and analysis process to be carried out using the diagnostic software facilities. All items of hardware to be supplied shall be covered by the course.

1.10 Installation and commissioning techniques

The owner’s staff will be present during the installation and commissioning period and it is essential that they are to be fully involved in any on-site corrections or modifications to hardware and software equipment. It is envisaged that it will be necessary for the Contractor to run installation and commissioning techniques courses each of approximately one week in duration at site for the training of the owner’s staff.

1.11 ERECTION AT SITE AND ACCOMMODATION

The Contractor shall provide, at his own cost and expense, all labours, plant and material necessary for unloading, erection and dismantle 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.

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 plant, welding plant or other tools, lighting and testing purposes. All wiring for such tackle and for lighting from the point of supply shall be provided by the Contractor and all such installations shall comply with all appropriate statutory regulations.

1.12 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. Before putting any plant or apparatus into operation the Contractor shall satisfy himself as to the correctness of all connections between the
plant and apparatus supplied under this and other contracts. The Contractor shall advise the Engineer –In-charge in writing, giving the period of notice as specified in the General Conditions of Contract, when the plant or apparatus is ready for inspection or energisation.

1.13 RESPONSIBILITY FOR THE RUNNING OF PLANT 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, whether under construction, during tests, or in use for the owner’s service.

1.14 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.

1.15 MAINTENANCE AND CLEARING OF SITE

The placing of materials and plant 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 allocated to him and also the 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.

1.16 INSURANCE

1.16.1 General

In addition to the conditions covered under the Clause titled insurance in the Special Conditions of Contract, the following provisions will also apply to the portion of works to be done beyond the Supplier’s own or his sub-Contractors manufacturing Works.

1.16.2 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 employee’s, which for any reason are not covered under the Workmen’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 owner'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, it’s agents, it’s employees, it’s 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, it’s sub-contractors, agents and employees have to perform works pursuant to the Contracts.

### 1.17 WORKS AND SAFETY REGULATIONS

The Contractor shall ensure safety of all the workmen, plant and 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 Engineer-In-charge.

### 1.18 SUBMITTALS

**1.18.1 Submittals required with the bid**
The following shall be required in duplicate:

- completed technical data schedule;
- descriptive literature giving full technical details of equipment offered;
- type test certificates, where available, and sample routine test reports;
- detailed reference list of customers already using equipment offered during the last 5 years with particular emphasis on units of similar design and rating;
- details of manufacturer's quality assurance standards and programme and ISO 9000 series or equivalent national certification;
- deviations from this specification. Only deviations approved in writing before award of contract shall be accepted;

1.18.2 Submittals required after contract award

1.18.2.1 Five copies of the programme for production and testing.

1.18.2.2 Drawings

Within 15 days of contract commencement the Contractor shall submit, for approval by the SOUTHCO, a schedule of the drawings to be produced detailing which are to be submitted for "Approval" and which are to be submitted "For Information Only". The schedule shall also provide a programme of drawing submission, for approval by the Engineer-In-Charge, that ensures that all drawings and calculations are submitted within the period specified above. All detail drawings submitted for approval shall be to scale not less than 1:20. Lettering sizes and thickness of lettering and lines shall be selected so that if reduced by two stages to one quarter of their size, the alphanumeric characters and lines are still perfectly legible so as to enable them to be microfilmed. For presentation of design drawings and circuit documents IEC Publication 617 or equivalent standards for graphical symbols are to be followed.

1.18.2.3 APPROVAL PROCEDURE

The Contractor shall submit all drawings, documents and type test reports for approval in sufficient time to permit modifications to be made if such are deemed necessary and re-submit them for approval without delaying the initial deliveries or completion of the contract works.
TECHNICAL SPECIFICATION

FOR

CONSTRUCTION OF 11KV, 3Ø3W LINE
II. TECHNICAL SPECIFICATION FOR CONSTRUCTION OF 11KV, 3Ø3W LINE:

For erection of 11KV 3P 3W OH line 100mm² AAAC used & for Sub-Station 55 mm² AAAC Used for jumpering.

1.0 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 is 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 /presence of owner’s representative. Accordingly the BOQ of the works is to be prepared by the bidder 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 bidder.

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 panel rate.

1.7 Due to heavy conductor being used for conductoring failure containment structures (Single pole / DP / Four pole as per site condition) may be required along the entire length shall be provided for lines as approved by Engineer-In-Charge.
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.

2.0.2 **Power Line Crossings**: Where the line is to cross over another line of the same voltage or lower voltage, provisions to prevent the possibility of their coming into contact with each shall be made in accordance with the Indian Electricity Rules, 1956 as amended from time to time. All the works related to the above proposal shall be deemed to be included in the scope of the contractor.

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

This would be including following details:

a) All poles on both sides of all the crossings shall be tension poles i.e. disc type insulators shall be used on these poles. At all the crossing described above the contractor shall use protective guarding as per REC Construction Standard A-1 to fulfill statutory requirements for 11 KV trunks & main spur line. 11 KV branch spur line, being in the village, protective guarding shall be used all along with line.

b) 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 vendor shall select the height (out of 8 mtr / 9mtr / 10mtr / 11 mtr.) 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, DTR 11 KV 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.
5.0 Pole & Pole Erection

5.1 Type of Poles

PSC/Rail / Joist poles of various sizes as per enclosed BOQ shall be used.

5.3 Foundation & Pole Erection: Size of foundation of each type of pole is given at Annexure-A of this section. The type of foundation for individual poles shall be decided during detailed engineering.

a) Erection of Poles: The poles are to be erected in alignment with utmost care. The poles shall then be lifted to the pit with the help of wooden supports. The pole shall then be kept in the vertical position with the help of 25 mm (min) manila ropes which shall act as the temporary anchor. The verticality of the pole shall be checked by sprit level in both longitudinal & transverse directions. Once, this is done, the back filling/concreting shall be done in the pit. The temporary anchor shall be removed only when poles set properly in the foundation.

b) Earthing of Poles

In 11KV line, each poles shall be earthed with coil earthing as per REC construction standard as per REC specification.

7.0 Danger Boards

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

8.0 Anti-climbing Devices

The vendor shall provide and install anti-climbing device on all 11 KV line. 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.
9.0 Insulators & Hardware Fittings.

9.1 For 11 kV Line

a) Cross Arm for 11 KV line: The contractor shall install “V” Shape cross arm GI/MS as per REC Construction Standard

b) Back Clamp for “V” cross arm: The contractor shall install Back Clamp for “V” cross arm as per REC Construction Standard.

c) Pole Top Bracket: The contractor shall install Pole top Brackets as per REC Construction Standard

d) Insulators and Insulator Fittings: The contractor shall supply & install Disc & Pin insulator REC Construction Standards

10.0 Fittings Common to all Line

a) Pin Insulator Binding: The contractor shall use AL binding wire for binding. Binding shall be as per REC Construction Standards.

b) Mid Span Compression Joint & Repair Sleeves: The contractor shall supply & install the Mid Span Compression Joint and Repair Sleeves as per IS: 2121 (Part II).

c) Guy/Stay wire Clamp: The contractor shall supply & install Guy/Stay wire Clamp as per REC Construction Standard

11.0 Stay/Guy Sets

a) The Stay/Guys shall be used at the following pole locations;

i) At all the tapping points & dead end poles;

ii) At all the points where DTR is installed;

iii) At all the points as per REC construction dwg. No. A-10 (for the diversion angle of 10-60 degree)

iv) Both side poles at all the crossing for road, nallah, railway crossings etc.
b) The arrangement and number of stay sets to be installed on different pole structures shall be as per REC Construction Standards No. A-23 to A-27, G-5 & G-8. However, this shall be decided finally during erection, as per the advice of Engineer In charge of SOUTHCO. Complete stay set shall be as per REC Construction Standards No. G-1. The stay clamp is envisaged as GS structure along with other clamps brackets etc.

12.0 Erection of stay sets

The contractor shall install the stay set complete in all respect. This includes excavation of pit size 0.5 x0.5 x 1.6 meter in all kinds of soil including laterite/hard rocks. Stay plate and anchor rod shall be pre cast with PCC in the ratio 1:2:4 (the volume of PCC shall be 0.5 x0.5x0.8 meter) and shall be placed in the bottom of the pit. The rest (upper half) of the pit shall be filled with excavated soil duly compacted layer by layer. An angle between 30 to 45 degrees shall be maintained between stay wire and the pole. The stay wire shall be used with a stay insulator at a height of 5 mts. above ground level with F.I. turn buckle.

15.0 HT/LT/Road Crossing Guarding.

The contractor shall install protective guarding as per REC construction standard A-1 for 11 KV lines, the guarding shall be provided at all the crossing i.e. road, telecommunication & power lines, railway line, nallah etc,

The contractor is required to follow local statutory regulations stipulated in Electricity (Supply) Act 1948, Indian Electricity Rules 1956 as amended and other local rules and regulations referred in these specifications.

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.
TECHNICAL

SPECIFICATION OF MATERIALS
III. TECHNICAL SPECIFICATION OF MATERIALS

A. PSC Pole (8 Mtr. x 200 Kg & 9 Mtr. x 300 Kg)

TECHNICAL SPECIFICATIONS

1. Applicable Standard:

   The Poles shall comply with latest standards as following:

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

2. Materials:

   2.1 Cement

   The cement 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).

   2.2 Aggregates

   Aggregates 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.

   2.3 Water

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

   2.4 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.
2.5 Pres-Stressing Steel
The 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.

2.6 Concrete Mix

The 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:

a) Minimum works cube strength at 28 days should be at least 420 Kg/cm².
b) The concrete strength at transfer should be at least 210 Kg/cm².
c) The mix should contain at least 380 Kg of cement per cubic meter of concrete.
d) 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.

3. Design Requirements

The poles shall be designed for the following requirements:

3.1 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.

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

3.3 The factor of safety for all poles 9.0Mts.Shall not be less than 2.0 and for 8.0 M poles, the factor of safety shall not be less than 2.5.

3.4 The average permanent load shall be 40% of the working load.

3.5 The F.O.S. against first load shall be 1.0.

3.6 At average permanent load, permissible tensile stress in concrete shall be 30 kg/cm².

3.7 At the design value of first crack load, the modulus of rupture shall not exceed 53.0kg/cm² for M-40.

3.8 The ultimate moment capacity in the longitudinal direction should be at least one fourth of that in the transverse direction.
3.9 The maximum compressive stress in concrete at the time of transfer of pre-stress should not exceed 0.8 times the cube strength.

3.10 The concrete strength at transfer shall not be less than half, the 28 days strength ensured in the design, i.e. 420x0.5=210kg/cm².

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”.

4 Dimensions and Reinforcements
The cross-sectional dimensions and the details of pre-stressing wires should conform to the particulars given in the enclosed drawing NH/RE/PSC/01.

The provisions of holes for fixing cross-arms and other fixtures should conform to the REC specification No. 15/1979.

5 Manufacture

5.1 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.

5.2 All wires shall be accurately stretched with uniform pre-stressed 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.

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

7 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.

8 Compacting
Concrete shall be compacted by spinning, vibrating, shocking or other suitable mechanical means. Hand compacting shall not be permitted.
9  **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, a sear 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).

10  **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.

11  **Holes for Cross Arms etc**

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

12  **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.
13 Earthing

13.1 Earthing shall be provided by having length of 8 SWG GI wire embedded in Concrete during manufacture and the ends of the wires left projecting from the pole to a length of 100 mm at 250 mm from top and 150 mm below ground level.

13.2 Earth wire shall not be allowed to come in contact with the pre-stressing wires.

(B) TECHNICAL SPECIFICATION MILD STEEL CHANNEL & ANGLE

1. General:

The structure materials for DP structure and others shall be fabricated with specified sections of mild steel materials as per the drawing and bill of quantity. These structure materials and cross arms shall be fastened with clamps or other structure materials by means of 5/8” diameter G.I. bolts of appropriate length only. After fabrication or erection the structure materials/ cross arms shall be painted with two coats each of red oxide primer and aluminium paint.

2. 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.

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<td>IS: 1852</td>
<td>Rolling and Cutting Tolerances for Hot Rolled Steel products</td>
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3) 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.

(C) TECHNICAL SPECIFICATION OF INSULATORS:

The insulators shall be of porcelain. These shall be non-absorbent and vitreous throughout. The exposed surface shall be glazed. Unless otherwise it is specified, the glaze is of brown colour. The glaze shall cover all the porcelain parts of the insulator except those areas which serve as supports during firing or are left unglazed for the purpose of assembly. The insulators shall have adequate mechanical strength, high degree of resistance to electrical puncture, resistance to climatic & atmospheric conditions prevailing at site and made from one piece of moulded porcelain.

Applicable standard:

Unless otherwise it is stipulated in this specification he insulators shall comply with Indian standard specification IS: 731-1971 and the insulator fittings with IS 2486(Part-I)-1971 and IS: 2486(Part-II)-1974 or the latest version thereof.

(i) Disc Insulator

Disc insulators made of glazed porcelain shall be used as insulators on dead ends, cut points or tapping points of 11 KV. T & C type disc insulators of mechanical strength not less than 70KN shall be used confirming to IS: 731/1971. These shall be mounted on metallic cross-arms with the help of suitable non-magnetic galvanised iron hardware fittings. Small fittings like spring washers, nuts etc may be electro-galvanised.

(ii) Pin Insulators

The minimum creep-age distance of 270 mm for 11000 volts. These shall be mounted on metallic cross-arms with the help of non-magnetic threaded galvanised iron pins. The pins shall
be a single piece obtained preferably by the process of forging. The threads of the nuts shall be cut after galvanising and shall be well oiled and greased.

(iii) Stay Insulator
The stay insulators used for stay installation and guy wires shall confirm to IS: 5300/1969.

(iv) Post type insulators

Post insulator shall conform in general to IS 2544, IEC 168 and IEC 815.

(D) TECHNICAL SPECIFICATION G.I STAY WIRE-

The wires shall be drawn from steel made by open hearth basic oxygen or electric arc furnace process and of such quality that when drawn to the size of wires specified and coated with Zinc, the finished strand and the individual wires shall be of uniform quality and have properties and characteristic as specified in this specification.

1. Applicable standards:

The GI stranded wire shall comply with the specific requirements of IS:2141-1979, IS: 4826-1979, IS: 6594-1974 or the latest version thereof.

(D) TECHNICAL SPECIFICATION G.I. WIRE

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

1. Applicable standard:

The GI wire shall comply with the specific requirements of IS: 280-1978 and IS: 7887-1975 or the latest version thereof.

2. Galvanizing:
The wires shall be galvanized with Heavy coating as per IS: 4826-1979 or the latest version thereof.

(E) TECHNICAL SPECIFICATION 11 KV, 400A/200 AMP AB SWITCH (3 POLE)

1. Scope:

This specification covers manufacturing testing and supply of 11KV, 400/200 AMPS 50HZ Air Break switches for outdoor installation in horizontal configuration. The switches are suitable for operation under off load conditions only and are intended for use on Distribution Sub – stations and tapping sectionalizing points of 11 KV lines.

2. Description of the materials:

The 11KV A.B. Switch sets shall confirm to the following parameters:

a) Number of poles  
   3

b) Number of Post insulator per pole  
   2nos12KVpostinsulator.

c) Nominal system voltage  
   11KV

d) Highest system voltage  
   12KV

e) Rated frequency  
   50Hz

f) System earthing  
   effectively earthed.

g) Rated nominal current  
   400/200 amps

h) Altitude of installation  
   Not exceeding1000M

The post insulators used in the A.B. Switches shall have the following ratings:

a) Power frequency withstand voltage (dry)  
   25KV (RMS)

b) Power frequency withstand voltage(wet)  
   35KV (RMS)

c) Impulse withstand voltage(dry)  
   75KV

d) Power frequency puncture withstand  
   1.3

3. Standards:

The AB Switch Set shall conform to the following standards:

a) IS-9920 (Part-I to V)

b) IS-2544/1973 (for porcelain post insulators)

c) IS-2633, (for galvanization of ferrous parts.) or its latest amendments if any.

4. Insulator make:

12KV post insulators complete with post and cap duly cemented to be used in the AB Switch Set conforming to IS-2544/1973. The bidder shall furnish the type test certificate of the post insulators from their manufacturer for reference and scrutiny. The bidder shall mention make, type of insulation materials, metal fittings, Creepage distance, protected Creepage distance, tensile Strength, compressing strength, torsion strength and cantilever strength.
5. Other technical details:

5.1 General: The 11KV A.B. Switch Set shall be the gang operated rotating single air break type having 2 post insulators per phase. The operating mechanism shall be suitable for manual operation from the ground level and shall be so designed that all the three phases shall open or close simultaneously. The Switches shall be robust in construction, easy in operation and shall be protected against over travel or staining that might adversely affect any of its parts. The required base M.S. Channel (hot dip galvanized) phase coupling rod, operation rod with intermediate guide braided with flexible electrolytic copper, tail piece of required current carrying capacity and operation mechanism with ‘ON’ & ‘OFF’ positions shall be provided. The operation rod shall be medium gage of 32mm diameter nominal bore G.I. pipe single length 6 meters. The phase coupling rod for gang operation shall be of medium gauge 25 mm dia. nominal bore G.I pipe. The Rating post insulators shall be provide with suitable bearing mounted on a base channel with 8mm dia. thrust collar and 6mm split pin made out of stainless steel. The operating down rod shall be coupled to the spindle (minimum) dia. – 32mm for gang operation through another suitable bearing by two numbers 10mm dia. stainless steel bolts with double nuts. All the bearings shall be provided with grease nipple. All metal (ferrous) parts shall be galvanized and polished. The pipe shall be galvanized in accordance with IS-4736/1968. The post insulators should be fixed with the base channel using Galvanized Nuts and Bolts.

5.2. Mounting: The A.B. Switches shall be suitable for horizontal mounting in double pole sub-station structures. MS Galvanized base Channel & base support channel should be of min. size 75x40x6 mm.

5.3. Switching Blades: It shall be made out of electrolytic copper with silver plated. The approximate size shall be 220mm X 50X 6 mm. The Switch shall have such a spring mechanism so as to ensure that the speed of the opening of contact is independent of speed of manual operation.

5.4. Fixed Contracts: The fixed Jaw type female contracts shall be made of electrolytic copper (minimum 95% copper composition) duly silver coated controlled by stainless steel high pressure spring housed in robust G.I. Cover. It is essential that provision shall be made in fixed female contracts to take the shock arising from the closing of move contract blade without the
same being transmitted to the post insulator. The arrangement made in this regard shall be specifically shown in the drawing.

5.5 Arcing Horn: - As the switches are generally meant for isolating transmission line and distribution transformers, suitable arcing horns shall be provided for breaking the charging current. Horn shall be made of 10mm dia. G.I. Rod with spring assisted operation.

6.6 Terminal Connectors: - Terminal connectors shall be robust in design. The size of fixed connector shall be (80 X 50 X 6 mm) and size of movable connector shall be of (80 X 50) X (80 X 50) X 6 mm of copper casting with uniform machine finishing duly silver plated made out of minimum 95% copper composition with 2 nos. 12mm dia. holes provided with suitable brass bolts and double nuts, flat washers & 2nos. bimetallic solder less sockets suitable up to 100 mm$^2$ conductor.

6.7 Spacing: - The minimum clearance between phases to the switch shall be 760mm. The operation down rod shall be at a transverse distance of 300mm from the outer limb of the switch. The centre spacing between two post insulators of the same phase shall be 380mm. In the open position of the A.B. switches the moving blade shall rotate through 90°. This shall be exhibited in the drawing.

6.8 Sample, Drawing & Literatures: - Sample of each items 11KV 400 amps. A.B. Switch & 11KV 200Amp. 3P A.B Switch shall be furnished and three copies of drawings item similar to the sample shall be furnished along with the tender.

6.9 The details of construction and materials of different parts of the A.B. Switch shall clearly be indicate in the tender and illustrative pamphlet / literature for the same shall be submitted along with the tender.

7.0 TEST & TEST CERTIFICATE: -

7.1 Type Test: - Certificate for the following type tests conducted (within five years proceeding to the date of opening of the tender)on a prototype set of A.B. Switch in a NABL approved test house/CPRI shall have to be submitted along with offer. Dielectric Test (impulse and one minute wire power frequency withstand voltage test.)
- Temperature rise test (for contacts and terminals)
- Shorts Time current and peak withstand current test.
- Mainly active load breaking capacity test.
- Transformer off-load breaking capacity test.
- Line charging breaking capacity test.
- Cable charging breaking test.
- Operation and mechanical endurance test.
- Mechanical strength test for post insulator, as per IS-2444/1937 shall be furnished.
- Test for galvanization of metal (ferrous) parts.
7.2 Routine /Acceptance Test: - The inspection may be carried out by the owner at any stage of manufacture. The successful bidder shall grant free access to the owner’s representative at a reasonable time when the works is in progress. The following routine tests shall have to be conducted on each set and results are to be furnished for consideration of deputing inspecting officer for inspection and conduction testing of the materials at the works of the manufacturer. the supplier shall give fifteen days advance intimation to the owner to enable him to depute his representative for witnessing the tests.

1. Power frequency voltage dry test.


3. Tests to prove satisfactory operation.

4. Dimension Check

5. Galvanization test.

6. Operational test.

8.0 Guaranteed Technical Particulars: - The bidder shall furnish the guaranteed technical particular duly filled in the format along with the tender.

9.0 Completeness of Equipment: -
All fittings, accessories of apparatus which may not have been specifically mentioned in this specification but which are usual or necessary in equipment of similar plat shall be deemed to be included in the specification and shall be supplied by the Tenderer without extra charge. All plant and equipment shall be completed in all details whether such details are mentioned in the specification or not.

(F).TECHNICAL SPECIFICATION OF EARTHING COIL:

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 Nos. 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

The specification covers design, manufacture, testing for use in earthing of the HT 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.


IV. TESTS

Galvanizing Tests
Minimum Mass of Zinc on GI Wire used 280 cm/m² after Coiling-266 gm/m². The certificate from recognized laboratory shall be submitted towards mass 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
Minimum length of wire to be grounded during installation -1000 mm.

The turns should be closely bound. Weight of one finished Earthing Coils (min.) – 1.850 Kg.
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 HT stay sets 20 mm dia.

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 1800 mm 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 50x50x1.6 mm and one GI Hexagonal nut conforming to IS: 1363:1967 & IS: 1367:1967. Both washer and nut to suit the threaded rod of 20 mm. The other end of the rod to be made into a round eye having an inner dia. of 40 mm 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 22 mm 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 and 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 filet 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 property 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.

**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.

(H).TECHNICAL SPECIFICATION OF 7/10 G.I. STAY WIRES:

I. Qualification Criteria of Manufacturer:-

The prospective bidder may source Stay Wire from manufacturers only 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 Kg (all sizes 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. Application Standards

Except when they conflict with the specific requirements of this specification, the G.I Stay Stranded Wires shall comply with the specific requirements of IS: 2141-1979. IS:4826-1979 & IS: 6594-1974 or the latest versions thereof.

III. Application and Sizes

The G.I. stranded wires covered in this Specification are intended for use on the overhead power line poles, distribution transformer structures etc. The G.I stranded wires shall be of 7/10 SWG for 11 KV lines standard sizes.

IV. Materials

The wires shall be drawn from steel made by the open hearth basic oxygen or electric furnace process and of such quality that when drawn to the size of wire specified and coated with zinc, the finished strand and the individual wires shall be of uniform quality and have the properties and characteristics as specified in this specification. The wires shall not contain sulphur and phosphorus exceeding 0.060% each.
Tensile Grade

The wires shall be of tensile grade 4, having minimum tensile strength of 700 N/mm² conforming to IS:2141.

General Requirements

The outer wire of strands shall have a right-hand lay.

The lay length of wire strands shall be 12 to 18 times the strand diameter.

Minimum Breaking Load

The minimum breaking load of the wires before and after stranding shall be as follows:

<table>
<thead>
<tr>
<th>No. of wires &amp; constant</th>
<th>Wire Dia. (mm)</th>
<th>Min. breaking load of the Single wire before stranding (KN)</th>
<th>Min. breaking load of the standard wire (KN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 (6/1)</td>
<td>4.0</td>
<td>8.80</td>
<td>54.9</td>
</tr>
</tbody>
</table>

V. Construction

The galvanized stay wire shall be of 7-wire construction. The wires shall be so stranded together that when an evenly distributed pull is applied at the ends of completed strand, each wire shall take an equal share of the pull. Joints are permitted in the individual wires during stranding but such joints shall not be less than 15 metres apart in the finished strands. The wire shall be circular and free from scale, irregularities, imperfection, flaws, splits and other defects.

VI. Tolerances

A tolerance of (+) 2.5% on the diameter of wires before stranding shall be permitted.

VII. Sampling Criteria

The sampling criteria shall be in accordance with IS:2141.

VIII. Tests on Wires before Manufacture

The wires shall be subjected to the following tests in accordance with IS:2141:

Ductility Test

Tolerance on Wire Diameter
OFFICE OF THE DEPUTY GENERAL MANAGER (ELECT.),
ELECTRICAL CIRCLE, SOUTHCO UTILITY, ASKA.

Tests on Completed Strand

The completed strand shall be tested for the following tests in accordance with IS:2141. Tensile and Elongation Test: The percentage elongation of the stranded wire shall not be less than 6%.

Chemical analysis Galvanizing Test

The Zinc Coating shall conform to "Heavy Coating" as laid down in IS:4826.

IX. Marking

Each coil shall carry a metallic tag, securely attached to the inner part of the coil bearing the following information:

a) Manufacturers name or trade mark
b) Lot number and coil number
c) Size
d) Construction
e) Tensile Designation
f) Lay
g) Coating
h) Length
i) Mass
j) ISI certification mark, if any

X. Packing

The wires shall be supplied in 75-100 Kg. coils. The packing should be done in accordance with the provisions of IS:6594

XI. Other Items:

For remaining items of stay sets mentioned in the enclosed drawing, relevant applicable Indian standards shall be applicable.
(I). TECHNICAL SPECIFICATION OF ALUMINIUM BINDING WIRE:

SCOPE :

Scope covers manufacture, testing and supply of 3.53 mm dia. Aluminium Binding Wire as per IS 398.

MATERIALS :

The material comprising the wire shall have the following chemical composition: Aluminium 99.5% minimum Copper, silicon and iron 0.5% maximum The surface of the wire shall be smooth and free from all irregularities and imperfections. Its cross sections shall closely approximate that of true circle.

<table>
<thead>
<tr>
<th>Diameter of wire</th>
<th>Cross sectional area of nominal dia. Wires (mm²)</th>
<th>Weight of wire kg/km</th>
<th>Breaking Load (kN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>3.15</td>
<td>9.787</td>
<td>26.45</td>
</tr>
<tr>
<td>Nominal</td>
<td>3.53</td>
<td></td>
<td>1.57</td>
</tr>
<tr>
<td>Maximum</td>
<td>3.55</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Inspection and Tests**

The following routine checks and tests shall be carried out on 10% of the coils of aluminium binding wire. If anyone sample fails to pass any one of the test nominated for that wire, then samples shall be taken from every coil in the consignment and any coil from which a sample proves defective shall be rejected. On no account shall any rejected material be presented for test again unless with the written approval of, and under conditions determined by the owner.

**Physical properties**

The surface of the finished wires shall be checked to ensure that it is smooth, free from all irregularities, imperfections and inclusions and that its cross section approximates closely that of true circle. The wire shall be checked to ensure that its diameter and weight are within the values given in the table above for characteristic of a aluminium binding wire.

**Ultimate tensile strength**

When tested on a standard tensile testing machine, the value obtained for the ultimate tensile stress shall not be less than 1.57kN.

**Wrapping test**

The wire shall withstand one cycle of a wrapping test as follows: The wire shall be closely wrapped round a wire of its own diameter form a close helix of eight turns. Six turns shall then
be unwrapped and again closely rewrapped in the same direction as the first wrapping. The wire shall not break or crack when subjected to this test.

**Packing & Delivery**

The aluminium binding wire shall be delivered in 30m coils, with a permitted tolerance of +5%. Random or non standard lengths shall not be permitted. Each coil shall be adequately guarded against damage due to transportation and handling and shall have an outer layer of tightly wound polythene tape or be contained in a suitable, transparent plastic bag. The internal diameter of the wound coil shall not be such as to result in a permanent set in the conductor. The coils shall be contained in non returnable wooden cases, with a gross weight not in excess of 300 kg. The number of coils contained shall be marked on the outside of each case.

**(J). TECHNICAL SPECIFICATION OF 11 KV “V” CROSS ARMS & BACK CLAMP FOR “V” CROSS ARM:**

**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 Nos. (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) Cross arms and Pole Top Brackets for 11 KV construction at intermediate and light angle pole shall be fabricated from grade 129A mild steel of channel section and for heavy angle poles, end poles and section poles fabricated from grade 129A mild steel of angle section. The grades of structural steel shall conform to IS – 226: 1975.

(b) The 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 11 KV shall be made out of 75 x 10 MS Flat and shall be suitably designed to fit RS Joist Pole 10 Mtr, 11 Mtr long (100X116).

(c) The Pole Top Bracket (F Clamp) shall be made out of 75 x 10 MS Flat suitably designed to fit RS Joist Pole 10 Mtr, 11 Mtr long (100x116) for 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.

**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.
(K) TECHNICAL SPECIFICATION FOR EQUIPMENT CLAMPS & CONNECTORS

SCOPE

This specification covers design, manufacture, assembly, testing at manufacturer’s works, supply and delivery at site of all terminal connectors of 11KV equipments (mainly breaker, isolator, CT,PT,CVT,BPI and LA) and all other clamps and dropper connectors required for the switch yard as per approved lay out and system design.

STANDARDS

The terminal connectors under this specification shall conform strictly to the requirements of the latest version of the following standards as amended up-to date, except where specified otherwise.

i) IS: 556- Power Connectors.

ii) IS:617- Aluminium & Aluminium Alloy

iii) IS: 2629- Recommended Practice for hot dip galvanizing of iron and steel.

iv) IS: 2633 -Method of testing uniformity of coating of zinc coated articles.

(L) TECHNICAL SPECIFICATION FOR SURGE ARRESTERS:

SCOPE

This Specification provides for the design, manufacture, inspection and testing before dispatch, packing and delivery F.O.R. (destination) of metal oxide (gapless) Surge Arresters with discharge counters, insulating base, terminal connectors and other accessories as specified here in.

STANDARDS:-

Except to the extent modified in the Specification, the Surge Arrester shall conform to the latest editions and amendments of the standards listed hereunder.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Ref Standard</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IEC-99-4</td>
<td>Specification for Surge Arresters without gap for AC</td>
</tr>
</tbody>
</table>
Surge Arresters with the requirement of other authoritative standards, which ensure equal or better quality than the standards, mentioned above shall also be acceptable. Where the equipment offered by the supplier conforms to other standards, salient points of difference between the standards adopted and the specified standards shall be clearly brought out in the offer. 4 (Four) copies of the reference standards in English language shall be furnished along with the offer.

**GENERAL TECHNICAL REQUIREMENTS :**

The Surge Arrester shall confirm the technical requirements. The energy handling capability of each rating of Arrester offered, supported by calculations, shall be furnished with the offer.

The Surge Arresters shall be fitted with pressure relief devices and arc diverting paths and shall be tested as per the requirements of IEC for minimum prospective symmetrical fault current. A grading ring shall be provided if required, (for attaining all the relevant technical parameters) on each complete Surge Arrester.

1. Distribution Transformer.
2. Circuit Breakers/Isolators

**N:B**
Installation of 11KV, 200A, 3Pole HG Fuse:

The standard 11KV 200A 3P HG Fuse should be supplied by the Bidder for installation at 11/0.4KV Sub Stations as per construction standard of latest REC Guide lines. The supplied HG Fuse must be satisfied with the Engineer-in-charge of SOUTHCO. The testing & checking must be obtained at the time of submission of bills with guarantee certificate. Present construction standard may be obtained and produce the same with quoting bid for approval of Engineer-in-charge of SOUTHCO before execution of work.

M. 11 KV, 400 Amp. 3 poles HG Fuse

1. SCOPE: This specification covers the manufacture, testing and supply of 11 KV,400 Amps 3 pole, H.G. Fuse Sets.

2. (a) The 11 KV H.G. Fuses shall be suitable for outdoor operation in horizontal configuration under the climatic conditions specified. It shall be of the following ratings:-

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Number of Poles</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>No. of Insulator per Pole</td>
<td>2 nos. 12 KV post Insulators</td>
</tr>
<tr>
<td>3</td>
<td>Nominal system Voltage</td>
<td>11 KV</td>
</tr>
<tr>
<td>4</td>
<td>Highest System of Voltage</td>
<td>12 KV</td>
</tr>
<tr>
<td>5</td>
<td>Rated frequency</td>
<td>50 Hz</td>
</tr>
<tr>
<td>6</td>
<td>System Frequency</td>
<td>Effectively earthed</td>
</tr>
<tr>
<td>7</td>
<td>Rated normal current</td>
<td>400 Amps</td>
</tr>
<tr>
<td>8</td>
<td>Altitudes of installation</td>
<td>Not exceeding 1000 M.</td>
</tr>
</tbody>
</table>

(b) The post insulator used in the H.G. Fuse set shall have the following ratings:-
<table>
<thead>
<tr>
<th></th>
<th>Power frequency withstand voltage (dry)</th>
<th>35 KV (RMS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Power frequency withstand voltage (wet)</td>
<td>35 KV (RMS)</td>
</tr>
<tr>
<td>3</td>
<td>Impulse withstand voltage (dry)</td>
<td>75 KV (Peak)</td>
</tr>
<tr>
<td>4</td>
<td>Power frequency withstand voltage</td>
<td>1.3 times the actual dry flashover voltage of the unit</td>
</tr>
</tbody>
</table>

3. **STANDARDS** :-

The H.G. Fuse set shall confirm to the following standards.

IS- 9385-1980 (for high voltage expulsion fuses and similar fuses).

IS- 2544-1973 (for porecelain post insulators or its latest amendments if any.).

IS- 2633-1979 (for Galvanisation of ferrous parts).

4. **INSULATOR MAKE** :- 12 KV post insulator complete with pedestal cap duly cemented to be used in 11 KV H.G. Fuse sets confirming to IS-2544/1973.

5. **TECHNICAL DETAILS** :- The H.G. Fuses shall have adjustable arcing horns made of solid copper rod having 7.62 mm dia. The horns shall be fitted with screwing devices with flynuts for fixing and tightening the fuse wire. It shall have robust terminal connector 5s of size 80 mm x 50 mm x 8 mm made of copper casting (95% minimum copper composition) duly silver plated with two numbers of 12 mm dia brass bolts and double nuts with flat brass washers. The connectors should be capable of connecting crimpable conductor up-to 80 Sq. mm size (ACSR/ Alloy) with bimetallic solder less sockets. The H.G Fuse Set shall suitable for horizontal mounting on substation structures. The minimum clearance between the adjacent phases of the fuse set shall be 760 mm and the centre to centre (distance between two post insulators of the same phase) shall be 410 mm. All metal (ferrous) parts shall be galvanized and polished. Only 12 KV post insulator (original cemented and not pin insulators shall be used for the H.G. Fuse Set.

6. **CLIMATIC CONDITIONS** :- The H.G. fuse set shall be suitable for operation under the following climatic conditions:-
7 Type Test:-

Certificate for the following type tests conducted on a prototype set of HG Fuse in a NABL approved test house/CPRI shall have to be submitted along with offer.

a) Dielectric test (impulse & one minute wet power frequency withstand voltage test.)
b) Temperature rise test (for terminals)
c) Mechanical strength test for the post of insulator as per IS-2544/1973
d) Test for galvanization of metal (ferrous) parts.

8. ROUTINE/ACEPTANCE TESTS:-

The inspection may be carried out by the Purchaser at any stage of manufacture. The successful bidder shall grant free access to the Purchaser’s representative at a reasonable time when the work is in progress. The following routine tests shall have to be conducted on each set and
results are to be furnished for consideration of deputing inspecting officer for inspection and conduction testing of the materials at the works of the manufacturer. the supplier shall give fifteen days advance intimation to the Purchaser to enable him to depute his representative for witnessing the tests.

a) Power frequency voltage dry test  
b) Dimension Check  
c) Galvanization test.

9. Guaranteed Technical Particulars:  

The bidders are required to furnish the guaranteed technical particulars duly filed in the proforma along with the bid.

10. Completeness of Equipment:  

Any fittings accessories or apparatus which may not have been specifically mentioned in this specification but which are usually necessary in equipment of similar plant shall be deemed to be included in the specification and shall be supplied by the bidder without extra charge. All plant and equipment shall be complete in all details whether such details are mentioned in the specification or not.

11. Inspection:  

Routine and acceptance test shall be conducted at the place of manufacturer. The bidders are requested to furnish details of equipments which will be used for testing along with the bid. The bids of these manufacturers who do not have adequate testing facilities for conducting routine and acceptance test are liable for cancellation. The successful bidder has to furnish routine test certificate and guarantee certificate for each consignment of materials to be inspected at the time of offer of materials for inspection.
N. 11KV LIGHTNING ARRESTER (12KV 10KA)

TECHNICAL SPECIFICATION

1.0 SCOPE

1.1 This Specification provides for the design, manufacture, inspection and testing before dispatch, packing and delivery F.O.R. (destination) of metal oxide (gapless) Surge Arresters with discharge counters, insulating base, terminal connectors and other accessories as specified here in.

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

1.3 STANDARDS:-

Except to the extent modified in the Specification, the Surge Arrester shall conform to the latest editions and amendments of the standards listed hereunder.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Standard</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IEC-99-4</td>
<td>Specification for Surge Arresters without gap for AC</td>
</tr>
<tr>
<td>2</td>
<td>IS:2147</td>
<td>Degree of protection, provided by enclosures for low voltage</td>
</tr>
<tr>
<td>3</td>
<td>IS:2629</td>
<td>Recommended practice for hot dip galvanization of iron and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>zinc coated</td>
</tr>
<tr>
<td>4</td>
<td>IS:2633</td>
<td>Method for testing uniformity of coating on zinc coated</td>
</tr>
<tr>
<td>5</td>
<td>IS:3070</td>
<td>Specification for surge arresters for alternating current</td>
</tr>
<tr>
<td>7</td>
<td>IEC-60-1</td>
<td>High-Voltage Test technique.</td>
</tr>
<tr>
<td>8</td>
<td>IEC-270</td>
<td>Partial discharge measurements.</td>
</tr>
<tr>
<td>9</td>
<td>IEC-99-1</td>
<td>Non-linear resistor type gapped arresters for a.c. systems.</td>
</tr>
</tbody>
</table>
1.4 Surge Arresters with the requirement of other authoritative standards, which ensure equal or better quality than the standards mentioned above shall also be acceptable. Where the equipment offered by the supplier conforms to other standards, salient points of difference between the standards adopted and the specified standards shall be clearly brought out in the offer. 4 (Four) copies of the reference standards in English language shall be furnished along with the offer.

1.5 GENERAL TECHNICAL REQUIREMENTS:

1.5.1 The Surge Arrester shall confirm the technical requirements.

1.5.2 The energy handling capability of each rating of Arrester offered, supported by calculations, shall be furnished with the offer.

1.5.3 The Surge Arresters shall be fitted with pressure relief devices and arc diverting paths and shall be tested as per the requirements of IEC for minimum prospective symmetrical fault current as specified in Appendix-I.

1.5.4 A grading ring shall be provided if required, (for attaining all the relevant technical parameters) on each complete Surge Arrester.

1.6 DUTY REQUIREMENT:

1.6.1 Surge Arresters shall be of gapless type without any series or shunt gaps and with vertical mounting arrangement.

i. Surge Arresters shall be capable of discharging over voltages occurring during switching of unloaded transformers, lines, capacitors and reactors.

ii. The Surge Arresters shall be capable of discharging lightning and switching surges and temporary power frequency over-voltages.
iii. The Surge Arresters shall be capable of discharging the energy equivalent to class 3 of IEC-99-4.

1.6.2 The reference current of the arrester shall be high enough to eliminate the influence of grading and stray capacitance on the measured reference voltage. The supplier shall submit values and the supporting evidence along with calculations on above.

1.6.3 Surge Arresters shall be fully stabilized thermally to give a life expectancy as per standard under site conditions.

1.6.4 Surge Arresters shall be able to withstand maximum wind load of 260 Kg./sq.m.

1.6.5 Surge Arresters shall be capable of withstanding effects of direct solar radiation

1.6.6 Surge arresters shall be capable of spark over on severe switching Surges and multiple strokes.

1.6.7 The Surge Arrester should be adequately designed to operate satisfactorily under temporary power frequency over-voltage as given in specific technical requirements, after discharging two shots of respective long duration surges.

1.6.8 Unless otherwise brought out separately by the Bidder in the schedule of deviations, the Surge Arresters, offered shall confirm to the specification scrupulously. All deviations from the specification shall be brought out in the schedule of deviations. The discrepancies between the specification and the catalogues or literature, submitted as part of the offer shall not be considered as valid deviations unless specifically brought out in the schedule of deviations.

1.7 CONSTRUCTION:

1.7.1 Non linear blocks shall be sintered metal oxide material. These shall be provided in such a way as to obtain robust construction with excellent electrical and mechanical properties even after repeated operations.

1.7.2 All the units of arresters of same rating shall be inter-changeable without adversely affecting the performance.

1.7.3 The Surge Arresters shall be suitable for pedestal type mounting.

1.7.4 All the necessary flanges, bolts, nuts, clamps etc. required for assembly of complete arrester with accessories and mounting on support structure to be supplied by the purchaser, shall be included in supplier’s scope of supply.
1.7.5 The drilling details for mounting the Arrester on owner’s support shall be supplied by the supplier.

1.7.6 The minimum permissible separation between the Surge Arrester and any earthed object shall be indicated by the Bidder in his offer.

1.7.7 Surge Arresters shall be designed to incorporate pressure relief devices and arc diverting paths to prevent shattering of the blocks or the porcelain housing, following prolonged current flow or internal flash over and providing path for flow of rated fault currents in the event of arrester failure.

1.7.8 Surge Arresters shall incorporate anti-contamination feature to prevent arrester failure, caused by uneven voltage gradient across the stack, resulting from contamination of the arrester porcelain.

1.7.9 Seals shall be provided in such a way that these are always effectively maintained even when discharging rated lightning current.

1.7.10 The heat treatment cycle details along with necessary quality checks used for individual blocks along with insulating layer, formed across each block are to be furnished. Metalised coating thickness for reduced resistance between adjacent discs is to be furnished along with the procedure for checking the same. Details of thermal stability test for current distribution of current on individual disc is to be furnished.

1.7.11 Each individual unit of Surge Arresters shall be hermetically sealed and fully protected against ingress of moisture. The hermetic seal shall be effective for the entire lifetime of the arrester and under the service conditions as specified. The supplier shall furnish sectional view of the arrester showing details of sealing employed.

1.7.12 The Surge Arresters shall be suitable for hot line washing.

1.8 PORCELAIN HOUSING:

1.8.1 All porcelain Housings shall be free from lamination cavities or other flaws, affecting the maximum level of mechanical and electrical strengths.
1.8.2 The porcelain shall be well vitrified and non-porous.

1.8.3 The minimum creep age distance of the arrester housing shall be as per Cl 7.21 of the TS.

1.8.4 The porcelain petticoat shall be preferably of self-cleaning type (Aerofoil design). The details of the porcelain housing such as height, angle of inclination, shape of petticoats, gap between the petticoats, diameter (ID and OD) etc. shall be indicated by the Bidder in his offer in the form of detailed drawing.

1.8.5 Porcelain housings shall be so co-coordinated that external flash over will not occur due to application of impulse or switching Surge voltages up to the maximum design value for arrester.

1.9 GALVANISATION, NICKEL PLATING ETC.:

1.9.1 All ferrous parts exposed to atmosphere shall be hot dip galvanised as per IS: 2629, as amended from time to time. Tinned copper/brass lugs shall be used for internal wiring of discharge counter. Screws used for electrical connections shall be either made of brass or shall be nickel-plated.

1.9.2 Ground terminal pads and nameplate brackets shall be hot dip galvanized.

1.10.3 The material shall be galvanized only after completing all shop operations

1.11 ACCESSORIES AND FITTINGS:

1.11.1 Surge Counters

1.11.2 A self- contained Surge counter, suitably enclosed for outdoor use and requiring no auxiliary of battery supply for operation shall be provided for each unit. The surge counter shall be
operated by the discharge current, passed by the surge arrester and shall be suitable for mounting on the support structure of the Arrester.

1.11.3 Surge counters shall be of the Electro-mechanical type and designed for continuous service.

1.11.4 The cyclometer counter shall be visible through an inspection window from ground level. The counter terminals shall be robust and adequate size and shall be so located that the incoming and outgoing connections are made with minimum possible bends.

1.11.5 Internal parts shall be unaffected by atmospheric conditions at site. Alternatively, a weather proof housing to IP 55 shall be provided and this shall be designed to allow the recording device to be read from ground level without exposing the internal parts to the atmosphere.

1.11.6 The Surge Counter shall be connected in the main earth lead from the arrester in such a manner that the direction of the earth lead is not changed or its surge impedance materially altered. A bolted link shall be provided so that the surge counter may be short circuited and removed without taking the arrester out of service.

1.11.7 All necessary accessories and earthing connection leads between the bottom of the Arrester and discharge counter shall be in the supplier’s scope of supply.

1.12 NAME PLATE:

Each single pole Arrester shall be provided with non-corrosive legible name plate, at the base bearing thereon, voltage rating of the complete pole and the number of demountable sections with the following data, indelibly marked

i) SOUTHCO

ii) Purchase order No. &
OFFICE OF THE DEPUTY GENERAL MANAGER (ELECT.),
ELECTRICAL CIRCLE, SOUTHCO UTILITY, ASKA.

iii) Date.
iv) Name of device.

iv) Manufacturer’s name and trademark and identification no. of the arrester being supplied.
v) Year of manufacture
vi) Rated voltage
vii) Rated Frequency
viii) Maximum continuous operating voltage.
ix) Type
x) Nominal discharge current.
xii) Pressure relief current in KA(rms)

1.13 TEST:

1.13.1 Type Tests:

The surge Arrester offered should have been subjected to the following type tests in an independent NABL Accredited test laboratory. The bidder shall furnish type test reports along with the offer. These tests must not have been conducted within five years before the date of opening of technical bid.

1 Insulation withstands tests:

(a) Lightning Impulse Voltage Test.

2 Residual voltage tests.

3 Long duration current impulse withstands tests.
4 Operating duty tests.
5 Pressure relief tests.
(a) High current test.
(b) Low current test.
6 Power frequency voltage vs. time curve. (Temporary over voltage test)
7 Contamination test. (Artificial pollution test).
8 Seismic withstand test.
9 IP-55 test on surge counter.
10 Minimum current operation tests of the surge counter.
11 Maximum current withstand test of the surge counter.
12 Mechanical terminal load test on bushing.
13 Partial discharge test.

N.B.:- Even if the condition i.e. the dry arcing distance or the sum of the partial dry arcing distances
is larger than the test voltage divided by 500 KV/m', the lightning impulse voltage test must
have been conducted or is to be conducted without any financial liability to SOUTHCO.

1.13.2 ROUTINE TESTS:

The following routine tests shall be conducted at the supplier's cost on each surge arrester
and shall be submitted along with or before offering for inspection for purchaser's approval.

(a) Measurement of reference voltage.
(b) Residual voltage tests.
(c) Measurement for partial discharge and contact noise.
(d) Sealing test for units with sealed housings.
1.13.3 ACCEPTANCE TESTS:

The following tests, considered as acceptance tests, shall be conducted in the presence of purchasers representative for which no charges will be payable by SOUTHCO. The acceptance tests, whenever possible shall be conducted on the complete arrester unit. The number of samples to be subjected to acceptance test shall be decided by the purchaser at the time of actual testing.

I Temperature Cycle Test on Housing.

II Measurement of Power Frequency Voltage at the reference current.

III Measurement of leakage current and capacitive current at M.C.O.V.

IV Lightning Impulse Residual Voltage Test at N.D.C., 50% of N.D.C. & 200% of N.D.C. V Partial Discharge Tests on complete arresters/units at 1.05 times M.C.O.V.

VI Special Thermal stability test.

VII Porosity test on porcelain components.

VIII Galvanization test on metal parts.

IX The functional (operational) test on the Surge Counter by way of checking its operation at following nominal discharge currents:

a) 100 Amps with 8/20 micro second wave shape.

b) 10 KA with 8/20 micro second wave shape.

X Check of calibration of leakage current meters.
OFFICE OF THE DEPUTY GENERAL MANAGER (ELECT.),
ELECTRICAL CIRCLE, SOUTHCO UTILITY, ASKA.

1.14 INSPECTION:

I The purchaser inspector shall have access at all time to the works and all other places of manufacture, where the Surge Arresters are being manufactured and the supplier shall provide all facilities for unrestricted inspection of the supplier’s works, raw materials, manufacture of all the accessories and for conducting the necessary tests.

II The supplier shall keep the purchaser informed in advance of the time of starting and the progress of manufacture of equipment 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 material has been satisfactorily inspected tested and dispatch schedule attached to this specification.

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

1.15 QUALITY ASSURANCE PLAN:

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

(i) Statement giving list of important raw materials, names of sub-suppliers for the raw materials, list of standards according to which the raw materials are tested, list of tests, normally carried out on raw materials in presence of Bidder’s representative, copies of test certificates.

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

(iii) List of manufacturing facilities available.
(iv) Level of automation, achieved and list of areas where manual processing exists.

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

(vi) Special features provided in the equipment to make it maintenance free.

(vii) List of testing equipments, meters available with Bidder for final testing of equipment, specified and test plant limitation, if any, vis-à-vis the type, acceptance and routine tests, specified in the relevant standards and this specification. These limitations shall be very clearly brought out in the offer.

(viii) All the testing equipments, meters etc. should have been calibrated in a Government approved laboratory. The Bidder must submit the list of testing equipments and meters test-wise as per Annexure-C of this Technical Specification.

1.15.2 The suppliers, within 30 days of placement of order submit the following information to the purchaser.

(i) List of raw materials as well as bought out accessories and the names of the materials as well as bought-out accessories and the names of sub-suppliers, selected from those, furnished along with the offer.

(ii) Type test certificates of the raw material and bought out accessories.

(iii) Quality Assurance Plan (QAP) with hold points for the purchaser’s inspection. The QAP and hold points shall be discussed between the purchaser and the supplier before the QAP is finalized.

1.15.3 The supplier shall submit the routine test certificates of bought out item and raw martial at
the time of acceptance testing of the fully assembled equipment.

1.16 DOCUMENTATION:

1.16.1 All drawings shall conform to relevant Indian Standard as per relevant IS. All drawings shall be in ink and suitable for microfilming. All dimensions and data shall be in S.I. Units.

1.16.2 The supplier shall furnish four sets of following drawings / documents along with his offer.

(i) General outlines drawings of the complete Arrester with technical parameters.

(ii) Drawings showing clearance from grounded and other line objects and between adjacent poles of Surge Arresters, required at various heights of Surge Arresters.

(iii) Drawings showing details of pressure relief devices.

(iv) Detailed drawing of discharge counters along with the wiring and schematic drawing of discharge counter and meter.

(v) Outline drawing of insulating base.

(vi) Details of grading rings, if used.

(vii) Mounting details of Surge Arresters.

(viii) Details of line terminal and ground terminals.

(ix) Volt-time characteristics of Surge Arresters.

(x) Details of galvanization being provided on different ferrous parts.

(xi) The detailed dimensional drawing of porcelain Housing such as ID, OD, thickness and
insulator details such as height, profile of petticoats, angle of inclination and gap between successive petticoats, total creepage distance etc.

(xii) Cross-sectional view of the Surge Arrester Units showing all components.

1.17 TEST REPORTS:

(i) Four copies of type test reports shall be furnished to the purchaser with the tender specification. Copies of acceptance test reports and routine test reports shall be furnished to the purchaser. One copy will be returned duly certified by the purchaser and only thereafter shall the materials be dispatched.

(ii) All records of routine test reports shall be maintained by the supplier at his works for periodic inspection by the purchaser.

(iii) All test reports of tests, conducted during manufacture shall be maintained by the supplier. These shall be produced for verification as and when requested for by the purchaser.

1.18 PACKING AND FORWARDING:

1.18.1 The equipment shall be packed in suitable crates so as to withstand handling during transport and outdoor storage during transit. The supplier shall be responsible for any damage to the equipment during transit, due to improper and inadequate packing. The easily damageable material shall be carefully packed and marked with the appropriate caution symbols. Wherever necessary, proper arrangement of lifting such as lifting hooks etc. shall be provided. Any material found short inside the packing cases shall be supplied by the supplier without any extra cost.

1.18.2 Each consignment shall be accompanied by a detailed packing list containing the following information:
(a) Name of the consignee:

(b) Details of consignment:

(c) Destination:

(d) Total weight of consignment:

(e) Sign showing upper/lower side of the crate:

(f) Handling and unpacking instructions:

(g) Bill of materials indicating contents of each package:

The supplier shall ensure that the bill of materials is approved by the purchaser before dispatch.

1.19 QUANTITY AND DELIVERY REQUIREMENT:

The scope of supply shall include a supply of 2.5% extra quantity of bolts, nuts, washers, split pins, cotter pins and such other small loose items free of cost.

1. **Galvanization**: - All ferrous parts should be galvanized as per IS - 2633 / 1972 or its latest amendments if any & all non-ferrous part should be duly electroplated with silver.

2. **Type Test Certificate**: - The Type Test Certificate, conducted within five years, preceding to date of opening of tender from Govt. Testing Laboratory (NABL accredited) // CPRI shall be submitted. The Certificate from a Govt. Testing Laboratory (NABL accredited) regarding galvanization as per ISS is to be furnished during inspection of materials at the cost of Bidder.

3. **Drawing**: - To be furnished by Bidder. The details of construction and materials of different parts shall clearly be indicated in the drawing and illustrative pamphlet // literature for the same shall be submitted along with the tender.
O. TECHNICAL SPECIFICATION OF 3x 35 MMSQ XLPE CABLE & JOINTING KIT

As per REC Standard and IS Standard

P. TECHNICAL SPECIFICATION OF 100 KVA TRANSFORMER

3 star rated 11/0.433 kv 100 KVA transformer as per REC Standard

1. SCOPE

1.1 The specification covers the design, engineering, manufacture, stage inspection, testing, pre-delivery inspection, supply, delivery, loading, unloading and performance requirements of 11/0.433 KV non-sealed type aluminum wound BEE specified 3 Star Distribution Transformers for outdoor use in the networks of SOUTHCO. The transformers shall be double wound, three phase, CRGO M3 Grade (0.23mm) or better, oil immersed with ONAN cooling with Oil filled up to maximum permissible level. The ratings required under this specification are 100 KVA with Aluminum windings.

The equipment offered should have been successfully type tested within five years from date of tender and the designs should have been in satisfactory operation for a period not less than three years as 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, specifically from Central Govt./ State Govt. or their undertakings.

1.2 The scope of supply should also include the provision of type test. Purchaser reserves the right to waive type tests as indicated in the section on Quality Assurance, Inspection and Testing in this specification.

The transformer 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 Purchaser shall have the power to reject any work or material, which, in his judgment, is not in full accordance therewith

2. CODES & STANDARDS

2.1 Except where modified by this specification, the transformers shall be designed, manufactured and tested in accordance with the latest editions of the following standards. The Bidder may propose alternative standards, provided it is demonstrated that they give a degree of quality and performance equivalent to or better than the referenced standards. Whether to accept or reject any alternative standard shall be adjudged by the Purchaser. The Bidder shall furnish a copy of the alternative standard proposed along with the bid. If the alternative standard is in a language other than English, an English translation shall be submitted with the standard. In the case of conflict the order of precedence shall be 1) IEC or ISO Standards, 2) Indian Standards, 3) other alternative standards.

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<thead>
<tr>
<th>IEC/ISO</th>
<th>Indian Standard</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC 71</td>
<td>IS 2026</td>
<td>Power Transformers.</td>
</tr>
<tr>
<td>IEC 76</td>
<td>IS 1180</td>
<td>Outdoor Three Phase Distribution Transformers up to 500 KVA, 11/0.4 KV, Non-Sealed Type.</td>
</tr>
<tr>
<td>IEC 137</td>
<td>IS 2099</td>
<td>Bushing for Alternating Voltages above 1000V.</td>
</tr>
<tr>
<td>IEC 156</td>
<td>IS 335</td>
<td>Method of determining Electric Strength of Insulating Oils.</td>
</tr>
<tr>
<td>IEC 296</td>
<td>IS 6792</td>
<td>Method of determination of electric strength of insulating oils.</td>
</tr>
<tr>
<td>IEC 354</td>
<td>IS 6600</td>
<td>Loading Guide for oil immersed Transformers</td>
</tr>
<tr>
<td>IEC 437</td>
<td></td>
<td>Radio Influence Voltage Measurement.</td>
</tr>
<tr>
<td>IEC 551</td>
<td></td>
<td>Determination of Transformer and Reactor Sound Levels.</td>
</tr>
</tbody>
</table>
IEC 616  Terminal and Tapping markings for power transformers.

IEC 722  Guide to the Lightning and Switching impulse testing of Power Transformers and Reactors.

ISO 1460/BS 729  Galvanizing

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

3. SERVICE CONDITIONS

The service conditions shall be as follows:

maximum altitude above sea level 1,000m
maximum ambient air temperature 50° C
maximum daily average ambient air temperature 40° C
minimum ambient air temperature -5° C
maximum temperature attainable by an object exposed to the sun 60° C
maximum yearly weighted average ambient temperature 32° C
maximum relative humidity 100%
average number of thunderstorm days per annum (isokeraunic level) 70
average number of rainy days per annum 120
average annual rainfall 1500 mm
maximum wind pressure 260Kg / m²

Environmentally, the region where the equipment will be installed includes coastal areas, subject to high relative humidity, which can give rise to condensation. Onshore winds will frequently be salt laden. On occasions, the combination of salt and condensation may create pollution conditions for outdoor insulators.
Therefore, outdoor material and equipment shall be designed and protected for use in exposed, heavily polluted, salty, corrosive, tropical and humid coastal atmosphere.

4. **SYSTEM CONDITIONS:**

The equipment shall be suitable for installation in supply systems of the following characteristics.

- Frequency
  - 50 Hz ± 5%

- Nominal system voltages
  - 11 KV System: 11 KV
  - LV System: 433/250 V

- Maximum system voltages
  - 11 KV System: 12 KV
  - LV System: 476 V

- Minimum LV voltage
  - (NEC): 392 V

- Nominal short circuit apparent power of the system
  - 11 KV System: 500 MVA (IS: 2026)

- Insulation levels:
  - 1.2/50 µ sec impulse withstand
    - 11 KV System: 95 KV peak (As Per BEE, Clause No.10)

- Power frequency one minute withstand (wet and dry)
  - 11 KV System: 28 KV (rms)
  - LV System: 3 KV (rms)

- Neutral earthing arrangements:
  - LV System: Solidly earthed

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Characteristic</th>
<th>Requirement</th>
<th>Method of Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Appearance</td>
<td>The oil shall be clear &amp; transparent &amp; free from</td>
<td>A representative sample of oil shall be examined in a 100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>suspended matter or sediment</td>
<td>mm thick layer at ambient temp.</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------------------</td>
<td>-----------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>02</td>
<td>Density at $20^0$C</td>
<td>0.89 g/cm$^3$ Max.</td>
<td>IS:1448</td>
</tr>
<tr>
<td>03</td>
<td>Kinematic Viscosity at 27 deg. C Max</td>
<td>27 CST</td>
<td>IS:1448</td>
</tr>
<tr>
<td>04</td>
<td>Interfacial tension at 27 deg.C Min.</td>
<td>0.03 N/m</td>
<td>IS:6104</td>
</tr>
<tr>
<td>05</td>
<td>Flash Point</td>
<td>$136^0$C</td>
<td>IS:1448</td>
</tr>
<tr>
<td>06</td>
<td>Pour Point Max.</td>
<td>$-6^0$C</td>
<td>IS:1448</td>
</tr>
<tr>
<td>07</td>
<td>Neutralisation Value (Total Acidity) Max.</td>
<td>0.03 mg KOH/gm</td>
<td>IS:335</td>
</tr>
<tr>
<td>08</td>
<td>Electric strength</td>
<td>72.5 KV</td>
<td>IS:6792</td>
</tr>
<tr>
<td>09</td>
<td>Dielectric dissipation factor tan delta at $90^0$ C</td>
<td>0.03 Max</td>
<td>IS:6262</td>
</tr>
<tr>
<td>10</td>
<td>Min specific resistance (resistively) at 90 deg.C</td>
<td>$35 \times 10^{12}$ ohm cm (min.)</td>
<td>IS:6103</td>
</tr>
<tr>
<td></td>
<td>Oxidation stability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Neutralization value after oxidation</td>
<td>0.40mg KOH/g</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Total sludge after oxidation</td>
<td>0.10% by weight max.</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Presence of oxidation</td>
<td>The oil shall not contain anti-oxidant Additives.</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Water content Max:</td>
<td>Less than 25ppm</td>
<td></td>
</tr>
</tbody>
</table>

**25. RATING AND CONNECTION PLATE**

Each transformer shall be provided with a rating plate of weatherproof material showing the following items indelibly marked:

- type of transformer
- standard to which it is manufactured (preferably IEC 76)
- manufacturer’s name
- transformer serial number
- year of manufacture
♦ rated frequency in Hz (50)
♦ rated voltages in KV (11/0.433)
♦ number of phases (3)
♦ rated power in KVA
♦ type of cooling (ONAN)
♦ rated currents in (HV/LV)
♦ vector group symbol (Dyn11)
♦ 1.2/50µs wave impulse voltage withstand level in KVp
♦ power frequency withstand voltage in KV
♦ impedance voltage at rated current and frequency in percentage at 75 °C at normal tap
♦ Measured load loss in KW at rated current and at 75 °C at normal tap
♦ Measured no-load loss in KW at rated voltage and rated frequency
♦ continuous ambient temperature at which ratings apply in °C
♦ top oil and winding temperature rise at rated load in °C
♦ winding connection diagram
♦ Total weight in kg with complete oil filled.
♦ total weight of the transformer with out oil
♦ Volume of oil in litres.
♦ weight of core and windings in kg; and
♦ name of the purchaser
♦ IAP / DESI Scheme.
The rating plate shall conform to the requirements of the section of Labels in this specification

26. **BASE MOUNTING ARRANGEMENT**

The under base of all transformers up to 100 KVA capacity shall be provided with two 75x40 mm channels, 460 mm long with holes of 14 mm dia at a centre to centre distance of 415 mm to make them suitable for fixing on a platform or plinth.

27(a) **PUNCHINGS: Non-erasable** Punching and embossing of Volume of oil in litres, name of the Purchaser- SOUTHCO, Orissa, Name of the Supplier – M/s --------------------------, Year of Manufacture, Guarantee Period and Sl. No. of each transformer is to be made on top core channel, top cover, side walls and name plates of transformers.

27(b) **3 STAR LEVEL: In addition to above**, the supplied Distribution Transformers must contain 3 Star Level with style and information provided by the Bureau of Energy Efficiency (B.E.E), Ministry of Power, Government of India.

28. **PAINTING**

28.1 All paints shall be applied in accordance with the paint manufacturer’s recommendations. Particular attention shall be paid to the following:

28.2 a) Proper storage to avoid exposure as well as extremes of temperature.
   b) Surface preparation prior to painting.
   c) Mixing and thinning
   d) Application of paints and the recommended limit on time intervals between coats.
   e) Shelf life for storage.

28.3 All paints, when applied in normal full coat, shall be free from runs, sags, wrinkles, patchiness, brush marks or other defects.

28.3.1 All primers shall be well marked into the surface, particularly in areas where painting is evident, and the first priming coat shall be applied as soon as possible after cleaning. The paint shall be applied by airless spray according to the manufacturer’s recommendations.
However, wherever airless spray is not possible, conventional spray be used with prior approval of purchaser.

28.3.2 The supplier shall, prior to painting protect nameplates, lettering gauges, sight glasses, light fittings and similar such items.

28.4

**Cleaning and Surface Preparation**

28.4.1 After all machining, forming and welding has been completed, all steel work surfaces shall be thoroughly cleaned of rust, scale, welding slag or spatter and other contamination prior to any painting.

28.4.2 Steel surfaces shall be prepared by Sand/Shot blast cleaning or Chemical cleaning by Seven tank process including Phosphating to the appropriate quality.

28.4.3 The pressure and Volume of the compressed air supply for the blast cleaning shall meet the work requirements and shall be sufficiently free from all water contamination prior to any painting.

28.4.4 Chipping, scraping and steel wire brushing using manual or power driven tools cannot remove firmly adherent mill-scale and shall only be used where blast cleaning is impractical.

**28.5 Protective Coating**

28.5.1 As soon as all items have been cleaned and within four hours of the subsequent drying, they shall be given suitable anticorrosion protection.

**28.6 Paint Material**

Followings are the type of paints that may be suitably used for the items to be painted at shop and supply of matching paint to site:-

i) Heat resistant paint (Hot oil proof) for inside surface.

ii) For external surfaces one coat of Thermo Setting Paint or 2 coats of Zinc chromate followed by 2
coats of P.U (Poly-urethene) paint. The color of the finishing coats shall be **Tan 316 (Colour as per Lewis Berger Bison range)**.

### 28.7 Painting Procedure

28.7.1 All painting shall be carried out in conformity with both specifications and with the paint manufacture’s recommendations. All paints in any one particular system. Whether shop or site applied, shall originate from one paint manufacturer.

28.7.2 Particular attention shall be paid to the manufacture’s instructions on storage, mixing, thinning and pot life. The paint shall only be applied in the manner detailed by the manufacturer e.g. brush, roller, conventional or airless spray and shall be applied under the manufacturer’s recommended conditions. Minimum and maximum time intervals between coats shall be closely followed.

28.7.3 All prepared steel surfaces should be primed before visible re-rusting occurs or within 4 hours whichever is sooner. Chemical treated steel surfaces shall be primed as soon as the surface is dry and while the surface is warm.

28.7.4 Where the quality of film is impaired by excess film thickness, (wrinkling, mud cracking or general softness) the supplier shall remove the unsatisfactory paint coatings and apply another. As a general rule, dry film thickness should not exceed the specified minimum dry film thickness by more than 25%. In all instances, where two or more coats of the same paints are specifies, such coatings may or may not be of contrasting colors.

28.7.5 Paint applied to items that are not be painted, shall be removed at supplier’s expense, leaving the surface clean, un-stained and undamaged.

### 28.8 Damages to Paints Work

Any damage occurring to any part of the painting scheme shall be made good to the same standard of corrosion protection and appearance as that originally employed.

Any damaged paint work shall be made as follows:

a) The damaged area, together with an area extending 25mm around its boundary, shall be cleaned down to bare metal.

b) A priming coat shall immediately applied, followed by a full paint finish equal to that originally applied and extending 50mm around the perimeter of the originally damaged.

The repainted surface shall present a smooth surface. This shall be obtained by carefully chamfering the paint edges before & after priming.
28.9 **Dry Film Thickness**

To the maximum extent practicable, the coats shall be applied as a continuous film of uniform thickness and free of pores. Over-spray, skips, runs, sags and drips should be avoided. The different coats may or may not be same color.

Each coat of paint shall be allowed to harden before the next is applied as per manufacture’s recommendations. Particular attention must be paid to full film thickness at edges.

The requirement for the dry film thickness (DFT) of paint and the material to be used shall be as given below:

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Paint Type</th>
<th>Area to be painted</th>
<th>No of Coats</th>
<th>Total Dry film thickness (Min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Liquid paint</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Zinc Chromate (Primer)</td>
<td>Out side</td>
<td>01</td>
<td>30 micron</td>
</tr>
<tr>
<td></td>
<td>b) P.U. Paint (Finish Coat)</td>
<td>Out side</td>
<td>02</td>
<td>45 each</td>
</tr>
<tr>
<td></td>
<td>c) Hot Oil paint</td>
<td>inside</td>
<td>01</td>
<td>35/10 micron</td>
</tr>
</tbody>
</table>

The colour of the finishing coat shall be Sky Blue/dark Admiral Grey/Deep Green/ TAN 316 (Colour as per Lewis Berger Bison range) or any other colour as decided by the purchaser.

29 **SEALING GASKETS**

All sealing washers / gaskets shall be made of oil and heat-resistant Nitrile/Neoprene rubber/ synthetic rubber bonded cork type RC-70C gaskets. Gaskets made of natural rubber or cork sheet are not permissible.

30 **SUPRESSION OF HARMONICS**

The transformer shall be designed with attention to the suppression of harmonic voltage, especially the third and fifth.
Q. TECHNICAL SPECIFICATION OF G.I EARTH PIPE

1. SCOPE: The Specification provides for the manufacture, testing at manufacturer’s works before supply of G.I Earth Pipes.

2. STANDARDS: The G.I Earth Pipes shall confirm in all respects to the Indian Standard IS-1239 (Part-I)/ 1990.

3. GENERAL REQUIREMENTS: The G.I Earth Pipes shall be 40mm bore and 3.25mm wall thickness as per IS-1239 (Part-I), 1990 length 3meters as per specification.

4. TESTS AND TEST CERTIFICATES: All the tests shall be carried out as per the IS-1239 (Part-i), 1990.

R. GI WIRE 6 SWG & GI WIRE 8 SWG
TECHNICAL SPECIFICATIONS

I. Qualification Criteria of Manufacturer:-

The prospective bidder may source GI Wire from manufacturers only 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 Kgs. (all sizes 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 manufacture, testing and supply of hot dip galvanized MS solid wire of sizes 6 SWG (5 MM) & 8 SWG (4 MM) diameters.

III. APPLICABLE STANDARDS

ZINC

Zinc shall conform to grade Zen 98 specified in IS 209& IS: 4826-1979 with up to date amendments.

ZINC COATING
Zinc coating shall be in accordance with IS: 4826-1979 for heavily coated hard quality.

**GALVANISING**

Galvanizing shall be as per IS: 2629-1966, IS 4826-1979 with up to date amendments

**UNIFORMITY OF ZINC COATING**

Uniformity of zinc coating shall be as per IS: 2633-1972 with up to date amendments

**TENSILE PROPERTIES**

The tensile strength of the wire after galvanizing shall be between 55-95 Kg/sq.mm ensuring MS wire mechanical properties as per IS-28:1972 8.1 to 8.3.

**FREEDOM FROM DEFECTS**

As per IS: 2629-1966 & 4826-1979 & with up to date amendments be ensured

**IV. MATERIAL**

The mild steel wire shall have chemical composition maximum sulphur- 0.055%, phosphorous - 0.055%, Carbon 0.25%.

**V. TESTS**

During the process of manufacturer/fabrication and all tests for chemical, mechanical, galvanizing as per IS- 280-1979, IS1521-1972, IS-1755-1961, IS: 6745-1972 & 4826-1979 shall be carried out. The certificate towards, chemical composition shall be submitted for each lot offered for inspection.

The following tests shall be conducted in presence of the representative of the purchaser:

Visual physical inspection and measurement of specified dimension


Tensile strength and breaking load and elongation determined as per IS: 1521-1972 with up to date amendments

**VI. PACKING & MARKING**

Packing shall be as per IS: 280-1979 and each coil shall be between 50-100 kg. marking shall be as per IS:280-1972.
S. TECHNICAL SPECIFICATION FOR

G.I. Flat (25x 6 mm)

9.12 Earth Electrode (50/40 NB 3.0 Mtr Length)

I. The prospective bidder may source Earth Electrode from sub vendors / manufacturers who must qualify all the following requirements:

a) The sub vendor /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 200 no.s to electricity supply utilities / PSUs. The bidder should enclose Performance Certificates from the above users issued in the name of the manufacturer / sub vendor as proof of successful operation in field.

II. Scope:

This specification provides for design, manufacturing, testing before dispatch, supply & delivery of Earthing Device (Heavy Duty) (for use in line (40x3000) mm & SS (50x3000 mm), as per enclosed Drawing.

III. APPLICABLE STANDARDS:

The Earthing Device must be made out of 50 mm for S/S, 40 mm for line (Heavy Gauge - No minus Tolerance allowed) Wall thickness Hot Dip G.I. Pipe (as per IS ;:- 1239, m Part-1, 1990 of reputed Make(TATA/Jindal) & 3.0 mtrs length tapered finished smooth at one end for a length of 75 mm & Clamp at the other end.

Staggered drills hole of 12 mm Dia of interval of 150mm shall be made before galvanization.

The GI Earthing Clamp/ Strip (C- Clamp Type) is to be of 50mm width, 6mm thickness & flange length of 65 mm in each side. This should be suitable for termination of 4 nos of GI Flat earth electrodes. The Clamp/ Strip & Earthing pipe after fabrication will be hot dip galvanized confirming to IS: 2629/85 with latest amendments. The clamp shall have two holes in both sides suitable for 16 mm GI Bolts & Nuts.
T. 63 KVA, 11/0.433 KV, 3 STAR RATED DISTRIBUTION TRANSFORMERS

TECHNICAL SPECIFICATION

1. SCOPE

1.1 The specification covers the design, engineering, manufacture, stage inspection, testing, pre-delivery inspection, supply, delivery, loading, unloading and performance requirements of 11/0.433 KV non-sealed type aluminum wound Distribution Transformers for outdoor use as per IS 1180(Part-1)2014 confirming to energy efficiency level-1 (3-Star rated) in the networks of SOUTHCO. The transformers shall be double wound, three phase, CRGO M3 Grade (0.23mm) or better, oil immersed with ONAN cooling with Oil filled up to maximum permissible level. The ratings required under this specification is 63 KVA with Aluminum windings.

1.2 The equipment offered should have been successfully type tested within five years from date of tender and the designs should have been in satisfactory operation for a period not less than Five years as 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, specifically from Central Govt./ State Govt. or their undertakings.

1.3 The scope of supply should also include the provision of type test. Purchaser reserves the right to waive type tests as indicated in the section on Quality Assurance, Inspection and Testing in this specification.

1.4 The transformer 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 Purchaser shall have the power to reject any work or material, which, in his judgment, is not in full accordance therewith.

2. CODES & STANDARDS

2.1 Except where modified by this specification, the transformers shall be designed, manufactured and tested in accordance with the latest editions of the following standards. The Bidder may propose alternative standards, provided it is demonstrated that they give a degree of quality and performance equivalent to or better than the referenced standards. Whether to accept or reject any alternative standard shall be adjudged by the Purchaser. The Bidder shall furnish a copy of the alternative standard proposed along with the bid. If the alternative standard is in a language other than English, an English translation shall be submitted with the standard. In the case of conflict the order of precedence shall be
1) IEC or ISO Standards, 2) Indian Standards, 3) other alternative standards.

<table>
<thead>
<tr>
<th>IEC/ISO</th>
<th>Indian Standard</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC 71</td>
<td>IS 2026</td>
<td>Power Transformers.</td>
</tr>
<tr>
<td>IEC 76</td>
<td>IS 1180(Part-1)</td>
<td>Three Phase Distribution Transformers 63KVA,11/0.433KV(Non-Sealed Type)</td>
</tr>
<tr>
<td>IEC 137</td>
<td>IS 2099</td>
<td>Bushing for Alternating Voltages above 1000V.</td>
</tr>
<tr>
<td>IEC 296</td>
<td>IS 6792</td>
<td>Method of determination of electric strength of insulating oils.</td>
</tr>
<tr>
<td>IEC 354</td>
<td>IS 6600</td>
<td>Loading Guide for oil immersed Transformers</td>
</tr>
<tr>
<td>IEC 437</td>
<td>IS 6792</td>
<td>Radio Influence Voltage Measurement.</td>
</tr>
<tr>
<td>IEC 551</td>
<td>IS 6792</td>
<td>Determination of Transformer and Reactor Sound Levels.</td>
</tr>
<tr>
<td>IEC 616</td>
<td>IS 6792</td>
<td>Terminal and Tapping markings for power transformers.</td>
</tr>
<tr>
<td>IEC 722</td>
<td>IS 6792</td>
<td>Guide to the Lightning and Switching impulse testing of Power Transformers and Reactors.</td>
</tr>
<tr>
<td>ISO 1460/BS 729</td>
<td>IS 6792</td>
<td>Galvanizing</td>
</tr>
</tbody>
</table>

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

3. **SERVICE CONDITIONS**

The service conditions shall be as follows:

- maximum altitude above sea level: 1,000m
- maximum ambient air temperature: 50°C
- maximum daily average ambient air temperature: 40°C
minimum ambient air temperature \(-5^\circ C\)
maximum temperature attainable by an object exposed to the sun \(60^\circ C\)
maximum yearly weighted average ambient temperature \(32^\circ C\)
maximum relative humidity \(100\%\)
average number of thunderstorm days per annum (isokeraunic level) \(70\)
average number of rainy days per annum \(120\)
average annual rainfall \(1500\) mm
maximum wind pressure \(260\) Kg / \(m^2\)

Environmentally, the region where the equipment will be installed includes coastal areas, subject to high relative humidity, which can give rise to condensation. Onshore winds will frequently be salt laden. On occasions, the combination of salt and condensation may create pollution conditions for outdoor insulators.

Therefore, outdoor material and equipment shall be designed and protected for use in exposed, heavily polluted, salty, corrosive, tropical and humid coastal atmosphere.

4. **SYSTEM CONDITIONS:**
The equipment shall be suitable for installation in supply systems of the following characteristics.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>50 Hz ± 5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal system voltages</td>
<td>11 KV System 11 KV</td>
</tr>
<tr>
<td>LV System 433/250 V</td>
<td></td>
</tr>
<tr>
<td>Maximum system voltages</td>
<td>11 KV System 12 KV</td>
</tr>
<tr>
<td>LV System 476 V</td>
<td></td>
</tr>
<tr>
<td>Minimum LV voltage</td>
<td>(NEC) 392 V</td>
</tr>
</tbody>
</table>

Nominal short circuit apparent power of the system

Insulation levels:
1.2/50 µ sec impulse withstand 11 KV System 95 KV peak (As Per BEE, Clause No.10)

Power frequency one minute withstand 11 KV System 28 KV (rms) (wet and dry)

LV System 3 KV (rms)

Neutral earthing arrangements: LV System Solidly earthed

U. TECHNICAL SPECIFICATION FOR

63 Amp Kit Kat Fuse

As per REC & IS Standard

V. TECHNICAL SPECIFICATION FOR

120 mm sq 3 & ½ core PVC CABLE

As per REC & IS Standard

W. TECHNICAL SPECIFICATION FOR

LT DISTRIBUTION BOX

As per REC & IS Standard