



**ODISHA POWER TRANSMISSION CORPORATION LIMITED**

**OFFICE OF THE SR. GENERAL MANAGER**

**CENTRAL PROCUREMENT CELL**

**JANAPATH, BHUBANESWAR-751022**

**TEL NO. 0674-2541801 FAX NO. 0674-2542964**

**TENDER SPECIFICATION NO.**

**SR.GM-CPC-TENDER- CONDUCTOR-54/2014-15**

**TOWARDS PROCUREMENT OF CONDUCTOR**

<b>Lot</b>	<b>Conductor</b>	<b>Unit</b>	<b>Requirement 2014-15</b>	<b>Requirement 2015-16</b>	<b>Total requirement</b>	<b>EMD @1%</b>
i	ACSR Panther	<b>km</b>	113.125	1316	1429.125	20,82,447
ii	ACSR Zebra	<b>km</b>	265.796	482	747.796	19,24,903
iii	ACSR Moose	<b>km</b>	34.25	4	38.25	1,06,838
iv	AAAC Panther	<b>km</b>	0	5	5	7,970
v	AAAC Zebra	<b>km</b>	0	1	1	2,628
vi	AAAC Moose	<b>km</b>	9.6	1	10.6	29,593

**Request for online tender documents: From dt-15.09.2014 (10.00 Hrs) to dt-  
14.10.2014(12.00 Hrs)**

**Last date of submission of Online tender: Up to 13.00 Hrs of dt-14.10.2014**

**Date of opening of Tender : 14.10.2014 at 15.00 Hrs**

## NOTICE INVITING TENDER

ODISHA POWER TRANSMISSION CORPORATION LTD.,  
REGD. OFFICE: JANPATH, BHUBANESWAR – 751 022,

ODISHA, INDIA.

### e-TENDER NOTICE NO- CPC-54/2014-15.

For and on behalf of the ODISHA POWER TRANSMISSION CORPORATION LTD., the undersigned invites bids from reputed manufacturers under two-part bidding system in e- tendering mode only as per the following details.

Lot	Conductor	Unit	QTY.	EMD @1% of Estd. Cost.	Last date of submission	Date of opening of Tender
i	ACSR Panther	km	1429.125	20,82,447	Up to 13.00 Hrs of Dt. 14.10.2014	On Dt.14.10.2014 at 15.00 Hrs.
ii	ACSR Zebra	km	747.796	19,24,903		
iii	ACSR Moose	km	38.25	1,06,838		
iv	AAAC Panther	km	5	7,970		
v	AAAC Zebra	km	1	2,628		
vi	AAAC Moose	km	10.6	29,593		

The bidders can view the tender documents from website free of cost. The interested bidders would be required to enrol themselves on the tender portal [www.tenderwizard.com/OPTCL](http://www.tenderwizard.com/OPTCL). Complete set of bidding documents are available at [www.tenderwizard.com/OPTCL](http://www.tenderwizard.com/OPTCL) from Dt.15.09.2014 (10.00 Hrs) to Dt.14.10.2014 (12.00 Hrs). Interested manufacturers may visit OPTCL's official web site <http://www.optcl.co.in> and [www.tenderwizard.com/OPTCL](http://www.tenderwizard.com/OPTCL) for detail specification.

N.B:-All subsequent addendums / corrigendums to the tender shall be hosted in the OPTCL's official web site <http://www.optcl.co.in> and [www.tenderwizard.com/OPTCL](http://www.tenderwizard.com/OPTCL) only.

SENIOR GENERAL MANAGER [C.P.C.]

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

The bidders who want to submit bid shall have to pay **Rs. 10,500/- (Rupees Ten thousand five hundred only)**- non refundable including VAT @ 5%) towards the tender cost, in the form of Demand draft/Cash only, drawn in favour of the D.D.O Head qrs, OPTCL, Bhubaneswar.

The bidders shall have to pay nonrefundable amount of **Rs. 5618/- (Rupees Five thousand six hundred & eighteen only)** towards the tender processing fee to K.S.E.D.C.Ltd, in e-payment mode. The e-payment of above amount is to be made to enable the bidder to download the bid proposal sheets and bid document in electronic mode.

The bidders shall scan the Demand Draft/Pay order/ Bank guarantee, towards EMD/ notarised hard copy of valid registration as local MSE(if any) and upload the same in the prescribed form in .gif or .jpg format in addition to sending the original as stated above.

The prospective bidders are advised to register their user ID, Password, company ID from website [www.tenderwizard.com/OPTCL](http://www.tenderwizard.com/OPTCL) by clicking on hyper link "Register Me".

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

***Minimum qualification criteria of bidders: AS STIPULATED IN SECTION-II, PART-I (G.T.C.C) OF THE TENDER SPECIFICATION.***

**SENIOR GENERAL MANAGER**

**CENTRAL PROCUREMENT CELL**

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## COMMERCIAL SPECIFICATION.

### PART-I

### SECTION-I

### INSTRUCTIONS TO TENDERER

#### 1. Submission of Bids: -

The bidder shall submit the bid in Electronic Mode only i.e. [www.tenderwizard.com/OPTCL](http://www.tenderwizard.com/OPTCL). The bidder must ensure that the bids are received in the specified website of the OPTCL by the date and time indicated in the Tender notice. Bids submitted by telex/telegram will not be accepted. No request from any bidder to the OPTCL to collect the Bids in physical form will be entertained by the OPTCL.

The OPTCL reserves the right to reject any bid, which is not deposited according to the instruction, stipulated above. The participants to the tender should be registered under ODISHA Sales Tax, Act, VAT Act / Central sales Tax Act.

- I. For all the users it is mandatory to procure the Digital Signatures.
- II. Contractors / Vendors / Bidders / Suppliers are requested to follow the below steps for **Registration**:
  - a. Click "Register", fill the online registration form.
  - b. Pay the amount of Rs. 2247/- through DD in Favour of KSEDCL Payable at Bangalore.
  - c. Send the acknowledgment copy for verification.
  - d. As soon as the verification is being done the e-tender user id will be enabled.
- III. After viewing Tender Notification, 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.
- IV. If any Bidder wants to participate in the tender he will have to follow the instructions given below:
  - a. 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).
  - b. Click / Double Click to open the Microsoft Internet Explorer (This icon will be located on the Desktop of the computer).
  - c. Go to Start > Programs > Internet Explorer.
  - d. Type [www.tenderwizard.com/OPTCL](http://www.tenderwizard.com/OPTCL) in the address bar, to access the Login Screen.

- e. Enter e-tender User Id and Password, click on "Go".
  - f. Click on "Click here to login" for selecting the Digital Signature Certificate.
  - g. Select the Certificate and enter DSC Password.
  - h. Re-enter the e-Procurement User Id Password
- V. To make an request for Tender Document Bidders will have to follow below mentioned steps.
- Click "Un Applied" to view / apply for new tenders.
  - Click on Request icon for online request.
- VI. After making the request Bidders will receive the Tender Documents which can be checked and downloaded by following the below steps:
- Click to view the tender documents which are received by the user.
  - Tender document screen appears.
  - Click "Click here to download" to download the documents.
- VII. After completing all the formalities Bidders will have to submit the tender and they must take care of following instructions.
- Prior to submission, verify whether all the required documents have been attached and uploaded to the particular tender or not.
  - Note down / take a print of bid control number once it displayed on the screen
- VIII. Tender Opening event can be viewed online.
- IX. Competitors bid sheets are available in the website for all.
- X. **For any e-tendering assistant contact help desk number mentioned below.**
- Bangalore – 080- 40482000.

The participants to the tender should be registered under ODISHA Sales Tax, Act,VAT Act/Central sales Tax Act.

**2. Division of Specification.**

The specification is mainly divided into two parts viz. Part-I & Part-II.

**Part-I Consists of**

- |                   |   |
|-------------------|---|
| [i] Section-I     | Instruction to Tenderers.               |
| [ii] Section-II   | General Terms & conditions of contract. |
| [iii] Section-III | Schedules and forms etc.                |
| [iv] Section-IV   | Technical Specification.                |

**Part-II Consists of**

- [i] Abstract of price components as per Annexure-IV
- [ii] Schedule of prices as per Annexure-V

**3. Tenders shall be in Two Parts.**



The Tenderers are required to submit the tenders in two parts viz. Part-I ( Techno commercial) & Part-II (Price bid).

The Tenderers are required to submit the tenders in two parts Part-I, technical and commercial and Part-II "Price Bid".

**4. Opening of Bids.**

[a] The part-I shall be opened on the date and time fixed by the OPTCL for opening of bids in Electronic mode in presence of such of the Tenderers or their authorized representatives [limited to one person only] on the due date of opening of tender who opt remain present. After scrutiny of the technical particulars and other commercial terms, clarifications, if required, shall be sought for from the bidders. The Tenderers shall be allowed 15 days' time for such activity.

[b] On receipt of technical clarification, the bids shall be reviewed, evaluated and those not in conformity with the technical Specification / qualifying experience, shall be rejected. If any of the technical proposal requires modification to make them comparable, discussion will be held with the participating bidders.

All the responsive bidders shall be given opportunity to submit the revised technical and revised price proposals as a follow up to the clarification (modification if any) on the technical proposals. The qualified bidders shall be given opportunity to submit revised price proposals within 15 days from the date of such discussion or within time frame mutually agreed, whichever is earlier.

[c] When the revised price proposals are received, the original price proposals will be returned to the bidders unopened along with their original technical proposals. Only the revised technical and price proposals will be considered for bid evaluation. The price bids [Part-II] of such of the Tenderers, whose tenders have been found to be technically and commercially acceptable, including those supplementary revised price bids, submitted subsequently, shall be opened in the presence of the bidder's representative on a date and time which will be intimated to all technically and commercially acceptable Tenderers.

[d] The bidders are required to furnish sufficient information to the Purchaser to establish their qualification, capacity to manufacture and/or supply the materials/perform the work. Such information shall include details of bidder's experience, its financial, managerial and technical capabilities.

[e] The bidders are also required to furnish details of availability of appropriate technical staff and capability to perform after sales services. The above information shall be considered during scrutiny and evaluation of bids and any bid which does not satisfactorily meet these requirements, shall not be considered for price bid evaluation.

- [f] The price bids of the technically and otherwise acceptable bids shall only be evaluated as per the norms applicable in terms of this Specification.

**5. Purchaser's Right Regarding Alteration of Quantities Tendered.**

The Purchaser may alter the quantities of materials/equipment at the time of placing orders. Initially the purchaser may place orders for lesser quantity with full freedom to place extension orders for further quantity under similar terms and conditions of the original orders. Orders may also be split among more than one tenderer for any particular item, if considered necessary in the interest of the Purchaser to get the goods/equipment earlier.

**6. Procedure and opening time of tenders.**

Tenders will be opened in the office of the Senior General Manager [C.P.C.] on the specified date and time in presence of the Tenderers or their authorized representatives [limited to one person only] in case of each bidder who may desire to be present, at the time of opening the bids.

**7. Bidder's Liberty to deviate from Specification.**

The Tenderer may deviate from the specification while quoting, if in his opinion, such deviation is in line with the manufacturer's standard practice and conducive to a better and more economical offer. All such deviations should however be clearly indicated giving full justifications for such deviation. [Read with Clause-9, Section-II of the Specification].

**8. Eligibility for submission of bids.**

Only those manufacturers who have deposited the cost of tender specification are eligible to participate in the tender. They should submit the money receipt as a proof of such payment. The local Micro and small Enterprises(MSEs) registered with respective DICs, Khadi, Village, Cottage & Handicrafts Industries, OSIC and NSIC can participate without payment of the cost of tender specification

**9. Purchaser's right to accept/reject bids:**

The purchaser reserves the right to reject any or all the tenders without assigning any reasons what so ever if it is in the interest of OPTCL, under the existing circumstances. [Read with clause-10, Section-II of the specification].

**10. Mode of submission of Tenders.**

[A] Tenders shall be submitted in electronic mode only.  
(www.tenderwizard.com/OPTCL)

[B] **Telegraphic or FAX tenders** shall not be accepted under any circumstances.

**11. Earnest money deposit:**

The tender shall be accompanied by Earnest Money deposit of value specified in the notice inviting tenders against each lot / bid. Tenders without the required EMD as indicated at **Annexure-VIII** will be rejected outrightly

The local Micro and small Enterprises(MSEs) registered with respective DICs, Khadi, Village, Cottage & Handicrafts Industries, OSIC and NSIC can participate by submitting Earnest Money Deposit @ fifty percent of the amount indicated in the Notice Inviting Tender.

The earnest money deposit shall be furnished in one of the following forms subject to the conditions mentioned below:

- (a) **Cash:**-Payable to drawing & disbursing Officer, OPTCL (Hd.qrs. Office), Bhubaneswar - 751022
- (b) **Bank Draft:** -To be drawn in favour of Drawing & Disbursing Officer, OPTCL [H.Qrs.Office], Bhubaneswar-751 022.
- (c) Bank Guarantee from any Nationalized/Scheduled Bank strictly as per enclosed proforma vide **Annexure-VI** to be executed on non-judicial stamp paper worth Rs.29.00 or as applicable, as per prevailing laws in force and also to be accompanied by the confirmation letter of the issuing Bank Branch.

**NOTE:**

- (i). The validity of the EMD in the form of Bank Guarantee shall be at least for 240 days from the date of opening of tender failing which the tender will be liable for rejection.
- (ii) No interest shall be paid on the Earnest Money Deposit.
- (iii) E.M.D. in shape of cash may be submitted up to Rs. 25,000/- (Rupees Twenty-five) Thousand) only. Above Rs. 25,000/- (Rupees Twenty-five thousand) the Earnest Money Deposit shall be furnished in any one of the forms indicated above (i.e. Through Bank Draft, Bank Guarantee/ National Savings Certificate).
- (iv) No adjustment towards EMD shall be permitted against any outstanding amount with the **ODISHA POWER TRANSMISSION CORPORATION LTD.**
- (v) The chart showing particulars of EMD to be furnished by Tenderers of different categories is placed at **Annexure-VIII.**
- (vi) In the case of un- successful tenderer, the EMD will be refunded after the tender is decided. In the case of successful Tenderer, this will be refunded only after furnishing of security money referred to at clause-19of Section-II.
- (vii) Suits, if any, arising out of this clause shall be filed in a Court of law to which the jurisdiction of High Court of ODISHA extends.
- (vii) EMD will be forfeited if the tenderer fails to accept the letter of intent and/or purchase order issued in his favour or to execute the order, placed on them.
- (viii) Tenders not accompanied by Earnest Money shall be disqualified.

**12. Validity of the Bids: -**

The tenders should be kept valid for a period of **180** days from the date of opening of the tender, failing which the tenders will be rejected.

**13. PRICE: -**

[i] The quoted Ex-works price shall be variable as per IEEMA PVC. The IEEMA variation formula in force at the time of bidding will remain the same throughout the execution and completion of the order.

[ii] If the date of delivery, as defined in the PV formula is beyond the contractual delivery date, then the scheduled delivery date or the actual delivery date whichever is advantageous to the Purchaser will form the basis for the calculation of price variation.

**14. Revision of tender price by Bidders: -**

[a] After opening of tenders and within the validity of period, no reduction or enhancement in price will be entertained. If there is any change in price, the tender shall stand rejected and the EMD deposited shall be forfeited.

[b] After opening of price bid if the validity period is not sufficient to place purchase order, the tenderer may be asked by the purchaser to extend the validity period of the bid under the same terms and condition as per the original tender.

However, the tender are free to change any or all conditions including price except delivery period of their bids at their own risk, if they are asked by the purchaser to extend the validity period of the bid prior to opening of price bid.

**15. Tenderers to be fully conversant with the clauses of the Specification: -**

Tenderers are expected to be fully conversant with the meaning of all the clauses of the specification before submitting their tenders. In case of doubt regarding the meaning of any clause, the tenderer may seek clarification in writing from the Senior General Manager (Central Procurement Cell) OPTCL. This, however, does not entitle the Tenderer to ask for time beyond due date, fixed for receipt of tender.

**16. Documents to Accompany Bids.**

Tenderers are required to submit tenders in the following manner:

**Part-I of the Tender shall Contain the following documents.**

[i] Declaration Form. [As per Annexure-I]

[ii] Earnest Money. [As per **Annexure-VIII**]

[iii] Technical specification and Guaranteed Technical Particulars conforming to the Purchaser's Specification along with drawings, literatures and all other required Annexures, duly filled in.

[iv] Photostat copies of type test certificates of materials/equipments offered as stipulated in the Technical Specification.

[v] Abstract of Terms & conditions in prescribed proforma as per **Annexure-II**.

[vi] General Terms & Conditions of supply offer as per Section-II of the Specification.

[vii] List of orders executed for similar materials/equipments during preceding 2 (two) years indicating the customer's name, Purchase Order No. & Date, date of supply and date of commissioning etc.

[viii] Data on past experience **as per Clause-7 of Section-II** of the Specification.

- [ix] Sales tax clearance certificate for the previous year. The permanent account number [PAN] of the firm is required under Income tax Act.
- [x] Audited Balance sheet & profit loss accounts of the bidder, for past (3) three years.
- [xi] Schedule of quantity and delivery in the prescribed Proforma vide Annexure, as appended.
- [xii] List of Orders in hand to be executed.
- [xiii] Deviation schedule.
- [xiv] Notarized hard copy and soft copy of valid registration as local MSE(if any).

**17. Documents/Papers to accompany Part-II Bid.**

- (a) Part – II of the tender shall consist of the following
  - (i) Abstract of Price Component, as per Annexure-IV
  - (ii) Schedule of prices in the prescribed proforma as per Annexure-V

**18. Conditional Offer:**

Conditional offer shall not be accepted.

**19. General: -**

- (i) In the event of discrepancy or arithmetical error in the schedule of price, the decision of the purchaser shall be final and binding on the Tenderer.
- (ii) For evaluation, the price mentioned in words shall be taken if there is any difference in figures and words in the price bid.
- (iii) Notice inviting tender shall form part of this specification.
- (iv) The price bids of the technically and otherwise acceptable bids shall only be evaluated. The EMD of others, if any, shall be returned to the bidders.
- (v) Tenderer can offer any lot or all the lots of the tender, if there are more than one lots. But the tender (bid) must be furnished separately for each lot. For each lot, the tenderer has to submit PART-I & PART-II of the bids separately.
- (vi) It should be distinctly understood that the part-II of the bid shall contain only details/documents relating to price, as outlined in clause-17 mentioned herein above. Inclusion of any of the documents/information etc. shall render the bid liable for rejection.

***20.0 Expenses in respect of OPTCL's representative for witnessing the inspection & testing of the offered equipment/materials at the inspection and testing site.***

The testing and inspection of the equipment/ materials at manufacturer works are in the scope of work of the Contractor/Supplier.

OPTCL inspecting officer, on receipt of offer for inspection from the contractor/supplier, proceeds to the manufacturer works to witness the Type/Acceptance/Routine test.

**Important:**

It is hereby informed to all the bidders that the relevant clauses of the contract specification, pertaining to inspection and testing of equipment/materials, are hereby supplemented with following additional terms and conditions.

*The expenses under the following heads, in respect of OPTCL's representative for witnessing the inspection & testing of the offered equipment/materials at the inspection and testing site, shall be borne by the contractor / supplier.*

**a) Hotel Accommodation:**

I. Single room accommodation in 4 star hotel for the OPTCL inspecting officer of the rank of Assistant General Manager (Grade E-6) and above.

II. Single room accommodation in 3 star hotel for the OPTCL inspecting officer of the rank below Assistant General Manager (Grade E-6).

**N.B.:** It is the responsibility of the contractor to arrange the hotel accommodation matching with their inspection and testing schedule, so that the inspecting officer can check-in the hotel one day prior to the date of inspection and check out after the completion of the inspection, subject to availability of the return travel ticket. In case of extended duration of inspection or non-availability of the return travel ticket, Contractor/supplier/manufacturer shall arrange for the extended stay of the inspecting officer in the Hotel accordingly. In case there is no hotel with prescribed standard in and around the place of inspection, the contractor/supplier/manufacturer shall suggest alternative suitable arrangement at the time of offer for inspection, which is subjected to acceptability of OPTCL inspecting officer.

**b) Journey of the inspecting officer:**

(i) To and fro travel expenditure from the Head Quarters of the inspecting officer to the place of inspection/testing shall be borne by the contractor/supplier/manufacturer.

Journey from the Head Quarters of the inspecting officer to the nearest Air Port by train (1st/IIInd A.C) & A/C Taxi then by Air to the place of inspection/testing or to the nearest place of inspection/testing and then by train (1st/IIInd A.C) & A/C taxi to the place of inspection/testing shall be arranged by the contractor/supplier/manufacturer.

(ii) For train journey, inspecting officer of the rank Assistant General Manager and above shall be provided with 1st class AC ticket and inspecting officer below the rank of Assistant General Manager shall be provided with 2nd class AC ticket.

(iii) The Air-ticket / train-ticket booking/cancellation is the responsibility of the contractor / supplier.

(iv) Moreover, if during the journey there is an unavoidable necessity for intermediate travel by road/ waterway/sea-route, the contractor/supplier shall provide suitable conveyance to the inspecting officer for travel this stretch of journey or bear the cost towards this. Any such possibilities shall be duly intimated to OPTCL at the time of their offer for inspection.

**c) Local Conveyance:**

At the place of the inspection/testing, for local journey of the inspecting officer between Hotel and inspection/testing site and or any other places, Air-conditioned four wheeler vehicle in good condition shall be provided by the contractor/supplier/manufacturer.

**d) Following points are also to be considered:**

(i) All the above expenses shall be deemed to be included in the bidder's quoted price for that supply item. Bidder shall not be eligible to raise any extra claim in this regard.

(ii) Contractor/supplier/manufacturer may assume that only in 40% of the inspection and testing offer cases, OPTCL inspecting officer, not below the rank of Assistant General Manager will witness the inspection and testing.

(iii) In case of inspection and testing of some critical equipment/materials like Power transformers, OPTCL may depute more than one inspecting officer.

(iv) Contractor/supplier/manufacturer shall judiciously plan the inspection/testing schedule and place of inspection/testing, so that optimum number of inspection/testing and minimum time shall be required to cover all the equipment/materials of the relevant contract package.

**(v) It shall be the responsibility of the Contractor/Supplier to organize the above tour related matters of OPTCL inspecting officer including the matters related to overseas inspection/testing, if any.**

PART-I

SECTION-II

**GENERAL TERMS AND CONDITIONS OF CONTRACT [G.T.C.C.]**

1. **Scope of the contract:**

The scope of the contract shall be to design, manufacture, supply of equipments as per the specification at the consignee's site, and rendering services in accordance with the enclosed technical specification and bill of quantity.

2.0 **Definition of terms:**

For the purpose of this specification and General Terms and Conditions of contract [GTCC], the following words shall have the meanings hereby indicated, except where otherwise described or defined.

2.1 "The Purchaser" shall mean the Senior General Manager[Central Procurement Cell] for and on behalf of ORISSA POWER TRANSMISSION CORPORATION LTD., Bhubaneswar.

2.2 "The Engineer" shall mean the Engineer appointed by the Purchaser for the purpose of this contract.

2.3 "Purchaser's Representative" shall mean any person or persons or consulting firm appointed and remunerated by the Purchaser to supervise, inspect, test and examine workmanship and materials of the equipment to be supplied.

2.4 "The supplier" shall mean the bidder whose bid has been accepted by the purchaser and shall include the bidder's executives, administrators, successors and permitted assignees.

2.5 "Equipment" shall mean and include all machinery, apparatus, materials, and articles to be provided under the contract by the suppliers.

2.6 "Contract Price" shall mean the sum named in or calculated the bid.

2.7 "General Condition" shall mean these General Terms and Conditions of Contract.

2.8 "The Specification" shall mean both the technical as well as commercial parts of the specification annexed to or issued with GTCC and shall include the schedules and drawings, attached thereto as well as all samples and pattern, if any.

2.9 "Month" shall mean "Calendar month".

2.10 "Writing" shall include any manuscript, type written, printed or other statement reproduction in any visible form and whether under seal or under hand.

2.11 "FOR Destination costs" shall mean the cost of equipment and material at the consignee's store/site. The cost is inclusive of Excise duty, Sales tax and other local taxes, packing, forwarding and insurance and freight charges.

2.12 The term "Contract document" shall mean and include GTCC, specifications, schedules, drawings, form of tender, Notice Inviting Tender, covering letter, schedule of prices or the final General Conditions, any special conditions, applicable to the particular contract.

2.13 Terms and conditions not herein defined shall have the same meaning as are assigned to them in the Indian Contract Act, failing that in the Orissa General Clauses Act.

3. **Manner of execution:**

All equipments supplied under the contract shall be manufactured in the manner, set out in the specification or where not set out, to the reasonable satisfaction of the Purchaser's representative.

4. **Inspection and Testing:**

- [i] The purchaser's representative shall be entitled at all reasonable times during manufacture to inspect, examine and test at the supplier's premises, the materials and workmanship of all equipments/materials to be supplied under this contract and if part of the said equipment/material is being manufactured in other premises, the supplier shall obtain for the purchaser's representative permission to inspect, examine and test as if the equipment/material were being manufactured in the contractor's premises. Such inspection, examination and testing shall not relieve the supplier from his obligations under the contract.
- [ii] The Supplier shall give to the purchaser adequate time/notice (at least clear 15 days for inside the state suppliers and 20 days for outside the state suppliers) in writing for inspection of materials indicating the place at which the equipment/material is ready for testing and inspection and shall also furnish the shop Routine Test Certificate, Calibration certificates of Testing instruments, calibrated in Govt. approved laboratory with authenticity letter of that laboratory along with the offer for inspection. A packing list along with the offer, indicating the quantity which can be delivered in full truck load/Mini truck load to facilitate issue of dispatch instruction shall also be furnished.
- [iii] Where the contract provides for test at the Premises of the supplier or any of his sub-vendors, the supplier shall provide such assistance, labour, materials, electricity, fuel and instruments, as may be required or as may be reasonably demanded by the Purchaser's representative to carryout such tests efficiently. The supplier is required to produce shop routine test Certificate, calibration certificates of Testing Instruments before offering their materials/equipment for inspection & testing. The test house/laboratory where tests are to be carried out must be approved by the Govt. A letter pertaining to Govt. approved laboratory must be furnished to the purchaser along with the offer for inspection.
- [iv] After completion of the tests, the Purchaser's representative shall forward the test results to the Purchaser. If the test results conform to the specific standard and specification, the Purchaser shall approve the test results and communicate the same to the supplier in writing. The supplier shall provide at least five copies of the test certificates to the Purchaser.
- [v] The Purchaser has the right to have the tests carried out at his own cost by an independent agency whenever there is dispute regarding the quality of supply.
- [vi] If the firm fails to present the offered items for inspection/testing as per their inspection call due to any reason(s) during the visit of inspecting officer at the testing site ,the firm shall have to bear all expenses towards repetition of inspection and testing of the total offered quantity or part thereof.

5. **Training facilities.**

The supplier shall provide all possible facilities for training of Purchaser's Technical personnel, when deputed by the Purchaser for acquiring first hand knowledge in assembly of the equipment, its erection, commissioning and for its proper operation & maintenance in service, wherein it is thought necessary by the purchaser.

6. **Rejection of Materials.**

In the event any of the equipments/material supplied by the manufacturer is found defective due to faulty design, bad workmanship, bad materials used or otherwise not in conformity with the requirements of the Specification, the Purchaser shall either reject the equipment/material or ask the supplier in writing to rectify or replace the defective equipment/material free of cost to the purchaser. The Supplier on receipt of such notification shall either rectify or replace the defective equipment/material free of cost to the purchaser within 15 days from the



date of issue of such notification by the purchaser. If the supplier fails to do so, the Purchaser may:-

- [a] At its option replace or rectify such defective equipments/materials and recover the extra costs so involved from the supplier plus fifteen percent and/or.
- [b] Terminate the contract for balance work/supplies, with enforcement of penalty Clause as per contract for the un-delivered goods and with forfeiture of Performance Guarantee/ Composite Bank Guarantee.
- [c] Acquire the defective equipment/materials at reduced price, considered equitable under the circumstances.

7. **Experience of Bidders:**

7. **Experience of Bidders:**

The bidders should furnish information regarding experience particularly on the following points:

- [i] Name of the manufacturer:
- [ii] Standing of the firm and experience in manufacture of equipment/material quoted:
- [iii] Description of equipment/material similar to that quoted, supplied and installed during the last two years with the name(s) of the Organisations to whom supplies were made wherein, at least one (1) certificate shall be from a state/central P.S.U.
- [iv] Details as to where installed etc.
- [v] Testing facilities at manufacturer's works.
- [vi] If the manufacturer is having collaboration with another firm [s], details regarding the same.
- [vii] A list of purchase orders of identical material/equipments offered as per technical specification executed during the last two years along with users certificate. User's certificate shall be legible and must indicate, user's name, address, designation, place of use, and satisfactory performance of the equipment/materials for at least two years from the date of commissioning. Wherein at least one (1) certificate shall be from a State/Central or P.S.U. Bids will not be considered if the past manufacturing experience is found to be un-satisfactory or is of less than 2 (two) years on the date of opening of the bid and bids not accompanying user's certificate will be rejected.

8. **Language and measures:**

All documents pertaining to the contract including specifications, schedule, notices, correspondence, operating and maintenance instructions., drawings or any other writing shall be written in English language. The metric system of measurement shall be used exclusively in this contract.

9. **Deviation from specification:**

It is in the interest of the tenderers to study the specification, specified in the tender schedule thoroughly before tendering so that, if any deviations are made by the Tenderers, (both commercial and Technical), the same are prominently brought out on a separate sheet under heading "Deviations Commercial" and "Deviations Technical".

A list of deviations shall be enclosed with the tender. Unless deviations in scope, technical and commercial stipulations are specifically mentioned in the list of deviations, it

shall be presumed that the tenderer has accepted all the conditions, stipulated in the tender specification, notwithstanding any exemptions mentioned therein.

10. **Right to reject/accept any tender:**

The purchaser reserves the right either to reject or to accept any or all tenders if the situation so warrants in the interest of the purchaser. Orders may also be split up between different Tenderers on individual merits of the Tenderer. The purchaser has exclusive right to alter the quantities of materials/ equipment at the time of placing final purchase order. After placing of the order, the purchaser may defer the delivery of the materials. It may be clearly understood by the Tenderer that the purchaser need not assign any reason for any of the above action [s].

11. **Supplier to inform himself fully:**

The supplier shall examine the instructions to tenderers, general conditions of contract, specification and the schedules of quantity and delivery to satisfy himself as to all terms and conditions and circumstances affecting the contract price. He shall quote price [s] according to his own views on these matters and understand that no additional allowances except as otherwise provided there in will be admissible. The purchaser shall not be responsible for any misunderstanding or incorrect information, obtained by the supplier other than the information given to the supplier in writing by the purchaser.

12. **Patent rights Etc.**

The supplier shall indemnify the Purchaser against all claims, actions, suits and proceedings for the infringement of any patent design or copy right protected either in the country of origin or in India by the use of any equipment supplied by the manufacturer. Such indemnity shall also cover any use of the equipment, other than for the purpose indicated by or reasonably to be inferred from the specification.

13. **Delivery:-**

[a] Time being the essence of the contract; the equipment shall be supplied within the delivery period, specified in the contract. The Purchaser, however, reserves the right to reschedule the delivery and change the destination if required. The delivery period shall be reckoned from the date of placing the Letter of Intent/Purchase order, as may be specified in LOI/Purchase order.

[b] The desired delivery period shall be as indicated at Annexure-III (Quantity & Delivery Schedule) of Section-IV (Technical Specification).

14. **Despatch instructions.**

I] The equipments/ materials should be securely packed and dispatched directly to the specified site at the supplier's risk by Road Transport only.

II] **Loading & unloading of Ordered Materials.**

It will be the sole responsibility of the supplier for loading and unloading of materials both at the factory site and at the destination site/store.

The Purchaser shall have no responsibility on this account.

15. **Supplier's Default Liability.**

[i] The Purchaser may, upon written notice of default to the supplier, terminate the contract in circumstances detailed hereunder.

[a] If in the judgement of the Purchaser, the supplier fails to make delivery of equipment/material within the time specified in the contract or within the period for which if extension has been granted by the Purchaser in writing in response to written request of the supplier.

- [b] If in the judgement of the Purchaser, the supplier fails to comply with any of the provisions of this contract.
- [ii] In the event, Purchaser terminates the contract in whole or in part as provided in Clause-15 (l) of this section, the Purchaser reserves the right to purchase upon such terms and in such a manner as he may deem appropriate in relation to the equipment/material similar to that terminated and the supplier will be liable to the Purchaser for any additional costs for such similar equipment/material and/or for penalty for delay as defined in clause-22 of this section until such reasonable time as may be required for the final supply of equipment.
- [iii] In the event the Purchaser does not terminate the contract as provided in clause 15(l) of this Section, supplier shall be liable to the Purchaser for penalty for delay as set out in Clause-22 of this section until the equipment is accepted. This shall be based only on written request of the supplier and written willingness of the Purchaser.

16 **Force Majeure:**

The supplier 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, floods, epidemics, Quarantine restrictions, strikes, Freight Embargo and provided that the supplier shall within Ten (10)days from the beginning of delay on such

account notify the purchaser in writing of the cause of delay. The purchaser shall verify the facts and grant such extension, if facts justify .

17. **Extension of time:-**

If the delivery of equipment/material is delayed due to reasons beyond the control of the supplier, the supplier shall without delay give notice to the purchaser in writing of his claim

for an extension of time. The purchaser on receipt of such notice may or may not agree to extend the contract delivery date as may be reasonable but without prejudice to other terms and conditions of the contract.

18. **Guarantee period: -**

[i] The stores covered by this specification should be guaranteed for satisfactory operation and against defects in design, materials and workmanship for a period of at least 18 [eighteen] months from the last date of delivery or 12 [twelve] months from the date of commissioning whichever is earlier. The above guarantee certificate shall be furnished in triplicate to the purchaser for his approval. Any defect noticed during this period should be rectified by the

supplier free of cost to the purchaser provided such defects are due to faulty design, bad workmanship or bad materials used, within one month upon written notice from the purchaser failing which provision of clause 22 (ii) shall apply.

[ii] Equipment/material failed or found defective during the guarantee period shall have to be guaranteed after repair/replacement for a further period of 12 months from the date of commissioning or 18 months from the date of receipt at the store/site after such repair/replacement which ever is earlier . The Bank Guarantee is to be extended accordingly. Date of delivery as used in this clause shall mean the date on which the materials are received in OPTCL'S stores/site in full & good condition which are released for Despatch by the purchaser after due inspection.

19 **B.G. towards security deposit, 100% payment and performance guarantee:**

[i] For manufacturers situated Inside & out side the state of Orissa.

A Composite Bank Guarantee as per the Proforma enclosed at Annexure-VII of the specification for 10% [ten percent] of the total FORD cost of the purchase order (In case of successful bidder who is a local Micro and small Enterprise (MSEs) registered with respective DICs, Khadi, Village, Cottage & Handicrafts Industries, OSIC and NSIC 5% (five percent)), shall be furnished from any nationalized/scheduled bank having a place of business at Bhubaneswar, to the office of Sr. General Manager [Central Procurement Cell] OPTCL within 15 days from the date of issue of the purchase order, . The BG shall be executed on non judicial stamp

paper worth of Rs.29.00 [Rupees twenty nine] only or as per the prevalent rules, valid for a period of 20 months from the last date of stipulated delivery period, for scrutiny and acceptance, failing which the supply order will be liable for cancellation without any further written notices. The BG should be accompanied by a confirmation letter from the concerned bank and should have provision for encashment at Bhubaneswar, before the Bank Guarantee is accepted and all concerned intimated. The B.G should be revalidated as and when intimated to you to cover the entire guarantee period.

- [ii] No interest is payable on any kind of Bank Guarantee.
- [iii] In case of non-fulfillment of contractual obligation, as required in the detailed purchase order/Specification, the composite Bank guarantee shall be forfeited.

**20. Import License**

In case imported materials are offered, no assistance will be given for release of Foreign Exchange. The firm should arrange to import materials from their own quota. Equipment of indigenous origin will be preferred.

**21. (A) Terms of Payment.**

- [i] 100% value of each consignment with 100% Excise duty, Entry Tax, if any, and sales tax in full as applicable along with freight & Insurance charges will be paid on receipt of materials in good condition at stores/desired site and verification thereof, subject to furnishing & approval of Composite Bank Guarantee, as laid down under clause-19 of this specification & on prior approval of guarantee certificate & Test certificate by the Purchaser.
- [ii] **Payment of Freight & Insurance charges and Entry Tax.**  
Freight & Insurance Charges & Entry Tax if any, incorporated in the Purchase contract shall be paid after receipt of materials at stores/desired site in good condition and on production of authenticated documentary evidence, otherwise no Freight, Insurance charges & entry tax if any shall be payable.
- [B] The supplier shall furnish Composite Bank Guarantee of appropriate amount to OPTCL, covering 10% of F.O.R. Destination cost of the purchase order from any nationalized/scheduled bank well in advance (within 15 days from the date of issue of the purchase order) before dispatch of materials.

**22. Penalty for Delay in Completion of Contract**

- (i) If the Supplier fails to deliver the materials/equipment's within the delivery schedule, specified in the contract including delivery time extension, if any, granted thereto, the Purchaser shall recover from the Supplier, penalty for a sum

of half per cent (0.5 per cent) of the Ex-works price of the un-delivered equipment's/materials for each calendar week of delay or part thereof. For this purpose, the date of receipted challan shall be reckoned as the date of delivery. The total amount of penalty shall not exceed five per cent (5%) of the ex-works price of the unit or units so delayed. Equipment will be deemed to have been delivered only when all its components, accessories and spares as per technical Specification are also delivered. If certain components, accessories and spares are not delivered in time, the equipment's/materials will be considered delayed until such time as the missing parts are delivered.

- (ii) If the Supplier fails to rectify/replace the equipment/material within 30 days from the date of intimation of the defect, so noticed by the purchaser within the guarantee period, then the penalty for sum of one half of the one percent (0.5%) of the total purchaser order amount for each calendar week of delay or part thereof shall be recovered by the purchaser within the guarantee period. For this purpose, penalty date will start from the 30<sup>th</sup> day from the date of issue of letter on defectiveness of equipment/material so supplied, by the purchaser. The total amount of penalty in this case shall not exceed 10% (TEN PERCENT) of the purchase order amount. The purchase order amount shall mean ex-works price + Freight & insurance and all taxes & duties. If the defects, so intimated will not be rectified by the supplier within the guarantee period, then whole of the B.G. will be forfeited by the purchaser, without any intimation to the supplier.

23. **Insurance**

The Supplier shall undertake insurance of stores covered by this Specification unless otherwise stated. The responsibility of delivery of the stores at destination in good condition rests with the Supplier. Any claim with the Insurance Company or transport agency arising due to loss or damage in transit has to be settled by the supplier. The Supplier shall undertake free replacement of materials damaged or lost, which will be reported by the consignee within 30 days of receipt of the materials at destination without awaiting for the settlement of their claims with the carriers and underwriters.

24. **Payment Due from the Supplier.** \_\_\_\_\_ All costs and damages, for which the supplier is liable to the purchaser, will be deducted by the purchaser from any money, due to the supplier, under any of the contract (s), executed with OPTCL.

25. **Sales Tax clearance certificate and Balance sheet and profit & Loss Account:**

- i. Sales Tax clearance certificate for the previous year shall be enclosed with the tender.
- ii. Audited Balance Sheet and Profit & Loss Account of the bidder for the previous three years shall be enclosed to assess the financial soundness of the bidder(s).

26. **Certificate of Exemption from Excise Duty/Sales tax.**

Offers with exemption from Excise duty including sales tax shall be accompanied with authenticated proof of such exemption. Authenticated proof for this clause shall mean attested Photostat copy of exemption certificate. Any claim towards

Excise duty/ Sales Tax shall be paid on actual basis subject to production of authenticated documentary evidence.

**27. Supplier's Responsibility.**

Notwithstanding anything mentioned in the Specification or subsequent approval or acceptance by the Purchaser, the ultimate responsibility for design, manufacture, materials used and satisfactory performance shall rest with the Tenderers. The Supplier(s) shall be responsible for any discrepancy noticed in the documents, submitted by them along with the bid(s)

**28. Validity.**

Prices and conditions contained in the offer should be kept valid for a minimum period of 180 days from the date of opening of the tender, failing which the tender shall be rejected.

**29. EVALUATION:**

- I) **TECHNO-COMMERCIAL BID:**-All the bids, which are opened and considered for evaluation will be checked for qualification requirements as per clause No.30 and stipulations in outright rejection clause No.34 of this section of the specification. Such of the bid(s), which do not meet the qualification requirements and stipulations as per outright rejection clauses, will not be evaluated further. The bid is to be checked for its conformity to the technical specification. If it does not meet the technical specification, the bid will not be evaluated further. However, if in the opinion of the purchaser, the bidder has offered equipment/material better than that, specified in the technical specification; the same may be taken into consideration.

Further, the purchaser may enquire from the bidder in writing for any clarification on the bid. The response of the bidder will also be in writing. However, no change in the prices or substance of the bid will be sought, offered or permitted.

- II) **PRICE BID:** - Evaluation of price bids will be on the basis of the FOR DESTINATION PRICE (By road Transport) including Excise duty, Sales Tax and other levies, as may be applicable. The FORD PRICE shall consist of the following components.

- a) Ex-works price
- b) Packing and Forwarding charges.
- c) Freight
- d) Insurance
- e) Excise duty.
- f) Sales Tax.
- g) Entry Tax.
- h) Other statutory levies, if any.
- i) Mandatory spares, if any for maintenance of equipment(At the discretion of

the purchaser)

- j) Test charges if any
- k) Supervision of erection, testing and commissioning charges including service tax, if any.
- l) Any other items, as deemed proper for evaluation by the purchaser
- m) Loading factors will be taken into account during evaluation if prices of some of items not quoted.

**N.B:** - Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price will be corrected. If there is a discrepancy between the Total Bid Amount and the sum of the total prices, the sum of the total prices shall prevail and the total bid amount will be corrected.

III) **Weightage shall be given to the following factors in the Evaluation and comparison of Bids: -**

In comparing bids and in making awards, the purchaser will consider other factors such as compliance with the specification, minimum qualification criteria as per clause -30, outright rejection of tenders clause-34 of this tender, relative quality, adaptability of suppliers or services, experiences, financial soundness, record of integrity in dealings, performance of materials/equipments earlier supplied, ability to furnish repairs and maintenance services, the time of delivery, capability to perform including available facilities such as adequate shops, plants, equipment and technical organization.

30. **Minimum Qualification Criteria of Bidders: -**

All the prospective bidders are requested to note that their bids for tendered equipment/material can only be considered for evaluation if :-

- i. The bidder should have manufacture and supply experience of the above rated or higher capacity equipments/materials for a minimum period of 02(Two) years as on the date of opening of the Tender.
- ii. At least 50 % of the tendered quantity of the above rated or higher capacity equipments/materials should have been supplied within the above stipulated period.
- iii. The above rated or higher capacity equipments/materials should have at least 02(Two) years successful performance from the date of commissioning. **At least one of the performance certificates shall be submitted from Govt. of India/ state Govt.(s) or their undertakings.**

- iv. The bidder should have conducted type tests on the tendered equipments in Govt. approved laboratory within the 05(Five) years from the date of opening of tender.
31. **Jurisdiction of the High Court of Odisha.**  
Suits, if any, arising out of this contract shall be filed by either Party in a court of Law to which the jurisdiction of High court of Odisha extends.
32. **Correspondences.**
- i) Any notice to the supplier under the terms of the contract shall be served by Registered Post or by hand at the Supplier's Principal Place of Business.
- ii) Any notice to the Purchaser shall be served at the Purchaser's Principal Office in the same manner.
33. **Official Address of the Parties to the Contract**  
The address of the parties to the contract shall be specified:-
- [i] **Purchaser:** Senior General Manager (CPC), OPTCL,  
Bhubaneswar-751022 (Odisha)  
Telephone No. 0674 - 2541801  
FAX No. 0674 - 2542964
- [ii] **Supplier:** Address  
Telephone No.  
Fax No.
34. **Outright Rejection of Tenders.**  
Tenders shall be out rightly rejected if the followings are not complied with: –
- i. The tenderer shall submit the bid in electronic mode only and shall submit the tender cost on or before the date and time of opening of technical bid. In case of local Micro and small Enterprises(MSEs) registered with respective DICs, Khadi, Village, Cottage & Handicrafts Industries, OSIC and NSIC participating in the tender they have to submit notarised hard copy of valid registration as local MSE as above on or before the date and time of opening of technical bid.
- ii. The tenderer shall submit the bid in electronic mode only
- iii. The Tender shall not be submitted telegraphically or by Fax.
- iv. The prescribed EMD shall be submitted on or before the last date and time of submission of bid. Earnest Money Deposit should be valid for a period of 240 days from the date of tender opening, if furnished in shape of EMD BG.
- v. The tender shall be kept valid for a minimum period of 180(One Hundred Eighty) days from the date of opening of tender.



- vi. The Tender shall be submitted in two parts, as specified.
  - vii. The Tenders shall be accompanied by a list of major supplies effected prior to the date of opening of tender. Data of at least 02(Two) years shall be furnished(Scanned copies to be uploaded).
  - viii. The tenderer shall upload the scanned copy of latest type test certificates (for the tests, carried out on the tendered equipment, being offered). Such type tests should have been conducted within last five years from the date of opening of this tender in a Government approved laboratory/CPRI in presence of any Government Organisation's representative(s).
  - ix. The schedule of price should be filled up fully to indicate the break-up of the prices including taxes and duties. Incomplete submission of this schedule will make the tender liable for rejection; vide Clause No. 4 (ii) of Part-II.
  - x. The Tenderer should quote "VARIABLE PRICE" only and the price should be kept valid for a minimum period of 180(One Hundred Eighty) days from the date of opening of the Tender.
  - xi. The tenderer shall upload the scanned copy of legibly written user's certificate to prove the satisfactory operation of the offered equipments/materials for a minimum period of 02 (Two) years from the date of commissioning as per the tender specification. User's certificate shall include the detailed address of the user with Equipment/Material, Name and type as per this specification, number of years of satisfactory use/operation & date of issue of this user's certificate with official seal written in English only & clearly visible must be furnished. At least one of the user's certificates shall be from state or Central Govt. or their Undertakings.
  - xii. Guaranteed Technical Particulars and Abstract of Terms and Conditions should be filled in completely.
35. **Documents to be treated as confidential.**  
The supplier shall treat the details of the specification and other tender documents as private and confidential and these shall not be reproduced without written authorization from the Purchaser.
36. **CONTACTING THE PURCHASER: -**
- (a) Subject to Clause No.4 (opening of bids) of part-I, Section-I (Instruction to Tenderer),  
no bidder shall contact the purchaser on any manner, relating to its bid, from the time of bid opening to the time, the contract is awarded.

- (b) Any effort by a Bidder to influence the purchaser in the purchaser's bid evaluation, bid comparison or contract award decisions may result in the rejection of the Bidder's bid.

37. **Scheme/Projects**

The materials/equipment covered in this specification shall come under "O&M Works".

**PART-I**  
**SECTION-III**  
**[LIST OF ANNEXURES]**

The following schedules and proforma are annexed to this specification and contained in Section-III as referred to in the relevant clauses.

1.	Declaration form	ANNEXURE-I
2.	Abstract of General Terms & Conditions of contract.	ANNEXURE-II
3.	Schedule of Quantity and Delivery.	ANNEXURE-III
4.	Abstract of price component	ANNEXURE-IV
5.	Schedule of prices to accompany Part-II	ANNEXURE-V
6.	Bank Guarantee form for Earnest Money Deposit.	ANNEXURE-VI
7.	Composite Bank Guarantee form for security deposit, payment and performance.	ANNEXURE-VII
8.	Chart showing particulars of E.M.D.	ANNEXURE-VIII
9.	Data on Experience.	ANNEXURE-IX
10.	Schedule of Spare parts	ANNEXURE-X
11.	Schedule of Installations	ANNEXURE-XI
12.	Schedule of Deviation.	ANNEXURE-XII

**ANNEXURE - I**  
**DECLARATION FORM**

To

The Sr. General Manager (CPC)  
OPTCL Head Qrs.BBSR,751022

Sub:- Tender Specification No-\_\_\_\_\_

Sir,

1. Having examined the above specification together with terms & conditions referred to therein \* I/We the undersigned hereby offer to supply the materials/equipments covered therein complete in all respects as per the specification and General conditions, at the rates, entered in the attached contract schedule of prices in the Tender.
2. \* I/We hereby undertake to have the materials/equipments delivered within the time specified in the Tender.
3. \* I/We hereby guarantee the technical particulars given in the Tender supported with necessary reports from concerned authorities.
4. \* I/We certify to have submitted the bid electronically by remitting \*cash/money order/D.D./ remitting the cost of tender, herewith and this has been acknowledged by your letter/ money receipt No.....Dated,
5. In the event of Tender, being decided in \*my/our favour, \* I/We agree to furnish the Composite B.G. in the manner, acceptable to ODISHA POWER TRANSMISSION CORPORATION LTD., and for the sum as applicable to \*me/us as per clause-19 of section-II of this specification within 15 days of issue of letter of intent/purchase order failing which \*I/We clearly understand that the said letter of Intent/Purchase order will be liable to be withdrawn by the purchaser, and the EMD deposited by us shall be forfeited by OPTCL.

Signed this                      day of    2014

Yours faithfully

Signature of the Tenderer  
with seal of the company

[ This form should be dully filled in by the tenderer and uploaded at the time of submission of tender.]

\* (Strikeout whichever is not applicable).

**N.B:- The annexure is to be filled up & uploaded as PDF**

**ANNEXURE-II**

**ABSTRACT OF GENERAL TERMS AND CONDITIONS OF CONTRACT [COMMERCIAL] TO  
ACCOMPANY PART-I**

1	Whether the material/equipment offered conforms to the OPTCL'S specification (If not, specify the deviations in Annexure).	Yes/No
2	(a) The tenderer shall submit the bid in electronic mode only and shall submit the tender cost on or before the date and time of opening of technical bid. In case of local Micro and small Enterprises (MSEs) registered with respective DICs, Khadi, Village, Cottage & Handicrafts Industries, OSIC and NSIC participating in the tender they have to submit notarised hard copy of valid registration as local MSE as above on or before the date and time of opening of technical bid.  (b) Earnest money furnished.  (A) Bank Guarantee, (B) Bank Draft.	Submitted/Not submitted
3	Manufacturer's supply experience including user's certificate uploaded or not. [As per clause No.7 of Section-II.]	Yes/No
4.a.i	Commercial Deviations to the specification if any	Yes/No
4.a.ii	If Yes, [list uploaded or not, As per clause-9 of the Section-II]	Yes/No
4.b.i	Technical Deviations to the specification if any	Yes/No
4.b.ii	If Yes, list uploaded or not, As per clause-9 of the Section-II	Yes/No
5	Delivery <u>(Period in months from the date of issue of PO)</u>	
6	Guarantee: - Whether agreeable to OPTCL's terms [As per clause-18 of Section-II].	Yes/No
7	Whether agreeable to furnish Composite B.G. in case his tender be successful [As per clause-19 of Section-II]	Yes/No
8	Terms of payment:- Whether agreeable to OPTCL's terms or not [As per clause-21 of Section-II]	Yes/No
9	Nature of price:- VARIABLE	Yes/No
10	Penalty: - Whether agreeable to OPTCL's terms or not (As per clause- 22 of Section-II)	Yes/No

11	Whether STCC/ P&L A/C, Balance Sheet for the required period are uploaded as per clause-25 of Section-II	Yes/No
12	Validity: - Whether agreeable to OPTCL's terms or not[As per clause-28 of Section-II]	Yes/No
13.a	Whether ED is included / excluded and shown separately.	Included/Excluded
13.b	% of ED(On Ex-Works price) as well as L.S indicated.	Yes/No
13.c	If NIL/EXEMPTED please specify with validity period of such exemption.	
14.a	Whether ST is included/excluded in Ex-works price	Included/Excluded
14.b	% of ST (On Ex-Works price +ED+Edu. Cess)	
15	Whether recent type test certificates from any Government approved laboratory is uploaded or not. [As per clause-30[viii] of section-II]	Yes/No
16	Whether guaranteed technical particulars are uploaded or not	Yes/No
17	Whether dimensional design/drawings uploaded or not	Yes/No
18	Whether materials are ISI/ISO marked.	Yes/No
19	Manufacturer's name and it's trademark	
20	Whether registered under Odisha Sales Tax Act/Central sales Tax Act	Yes/No
21	Whether declaration form, duly filled in, uploaded or not	Yes/No

Place:

Date:

Signature of the Tenderer  
with seal of the company.

**ANNEXURE-III**

**SCHEDULE OF QUANTITY AND DELIVERY**

(To be filled up by the tenderer)

Lot No.	Description of materials	Quantity required.	Desired delivery	Destination.	Remarks.
1.	2.	3.	4.	5.	6.
i	ACSR Panther	1429.125	As per technical specification (Annexure-III)	OPTCL Stores/Sites within State of Odisha.	
ii	ACSR Zebra	747.796			
iii	ACSR Moose	38.25			
iv	AAAC Panther	5			
v	AAAC Zebra	1			
vi	AAAC Moose	10.6			

Place:

Date:

Signature of Tenderer  
with seal of Company.

**N.B:- The annexure is to be filled up & uploaded as PDF**

**ANNEXURE- IV**  
**ABSTRACT OF PRICE COMPONENT**

1	Price basis	F.O.R. Purchaser's destination Stores/sites.
2	Packing & forwarding	
3	Rate of Insurance charges	
4	Rate of Freight charges	
5	Rate of excise duty	
6	Rate of sales Tax	
7	Rate of other taxes/levies /duties etc.	
8	Rate of entry tax.	
9.	Rate of Service Tax	
10.	Nature of price.	
11.	Whether MODVAT benefit if any, has been fully passed on to the purchaser.	Yes / No.

*Place*

Date:

Signature of Tenderer  
With seal of company



**ANNEXURE-V**  
**SCHEDULE OF PRICES**

Sl. No	Item Description	Quantity(Unit)	UOM	Unit Ex-Works Price in Rs.	Total Ex-Works Price	Unit Packing & Forwarding Charges	Unit Freight	Unit Insurance
1	2	3	4	5	6=3*5	7	8	9
			KM					

Total Packing, forwarding, F&I Charges	Unit E.D	Unit Service Tax	Unit CST	Unit VAT	Unit Entry Tax	Unit Exit Tax	Total Taxes & duties	Type Test Charges, if any including taxes & duties	Total Amount including packing, forwarding, F&I and all taxes & duties and type test charges
10=3*(7+8+9)	11	12	13	14	15	16	17=3*(11+12+13+14+15+16)	18	18=(6+10+17+18)

Signature of Tenderer  
Name, Designation and Seal

NB: -

1. The tenderer should fill up the schedule properly and in full. The tender will be rejected, if the schedule of price is submitted in incomplete form. No post tender correspondence will be entertained on break-up of prices. Also, the supplier should agree for delivery at sub-station site.
2. In case, where F&I components are not specifically indicated in this schedule, 5% of the ex-works price shall be taken towards F&I components for the purpose of comparison of price.
3. The Tenderer shall certify in the price bid that MODVAT benefit, if any, has been fully passed on to the purchaser while quoting the tender price.
4. Conditional offers will not be acceptable.
5. The bidder is to clearly indicate the period up to which the tax holidays are available to them.
6. **Price bid in any other format other than e-tender mode, will not be acceptable and the offer will be rejected.**
7. Type Test charges if any, shall be indicated, row-wise.
8. All the above charges will be taken into account, during bid price evaluation.

**ANNEXURE-VI**

**PROFORMA FOR BANK GUARANTEE FORM FOR EARNEST MONEY DEPOSIT**

- | Ref | Date | Bank Guarantee No: |
|-----|------|--------------------|
|-----|------|--------------------|
- 
- 1 In accordance with invitation to Bid No.....Dated..... of ODISHA POWER TRANSMISSION CORPORATION LTD [OPTCL] [herein after referred to as the OPTCL for the purchase of \_\_\_\_\_  
Messers\_\_\_\_\_ wish/wished  
Address\_\_\_\_\_wish/wished  
to participate in the said tender and as a Bank Guarantee for the sum of Rs.\_\_\_\_\_[Rupees\_\_\_\_\_]  
Valid for a period of 240 [Two hundred Forty] days is required to be submitted by the Tenderer. 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 the Senior General Manager [Procurement] ODISHA POWER TRANSMISSION CORPORATION LIMITED\_\_\_\_\_  
[Indicate designation of the purchaser]  
an amount not exceeding Rs.\_\_\_\_\_to the OPTCL, 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 the\_\_\_\_\_ on whose behalf this guarantee has been issued.
2. We the \_\_\_\_\_do hereby, further undertake to  
[Indicate the name of the bank]  
pay the amounts due and payable under this guarantee without any demur, merely on a demand from the OPTCL stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the OPTCL 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. \_\_\_\_\_

3. We, the \_\_\_\_\_ Bank undertake to pay the OPTCL any money so demanded not withstanding any dispute or disputes so raised by the contractor [s] in any suit or proceeding instituted/pending before any Court or Tribunal relating thereto, our liability under this present 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 \_\_\_\_\_ further agree that the

[Indicate the name of the bank]

guarantee herein Contained shall remain in full force and effect during the aforesaid period of 240 [Two hundred forty] days and it shall continue to be so enforceable till all the dues of the OPTCL under or by virtue of the said Bid have been fully paid and its claims satisfied or discharged or till Managing Director, ODISHA POWER TRANSMISSION CORPORATION LIMITED 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 \_\_\_\_\_ we shall be discharged from all liability under this guarantee thereafter.

5. We, the \_\_\_\_\_ further agree with the OPTCL that the

[Indicate the name of the bank]

OPTCL 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 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 OPTCL 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 OPTCL or any indulgence by the OPTCL 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, \_\_\_\_\_lastly undertake not revoke this Guarantee

[Indicate the name of the bank]

during its currency except with the previous consent of the OPTCL in writing.

8. We, the \_\_\_\_\_ Bank further agree that this guarantee shall also be invocable at \_\_\_\_\_ branch at Bhubaneswar in the State of Odisha.

Dated \_\_\_\_\_ Day of \_\_\_\_\_

Notwithstanding contained herein above,

- i) Our liability under this Bank Guarantee shall not exceed Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_).
- ii) This bank Guarantee shall be valid upto \_\_\_\_\_.
- iii) We are liable to pay the guarantee amount or any part thereof under this bank Guarantee only, if you serve upon us at Bhubaneswar in the state of Odisha, a written claim or demand on or before \_\_\_\_\_.

Witness ((Signature, names & address)

1.

2

For \_\_\_\_\_

[Indicate the name of Bank]

**ANNEXURE-VII**

**PROFORMA FOR COMPOSITE BANK GUARANTEE FOR SECURITY DEPOSIT, PAYMENT  
AND PERFORMANCE**

This Guarantee Bond is executed this \_\_\_\_\_ day of \_\_\_\_\_ 2014 by us  
the \_\_\_\_\_ Bank at  
\_\_\_\_\_ P.O. \_\_\_\_\_ P.S. \_\_\_\_\_ District \_\_\_\_\_ State \_\_\_\_\_

1. WHEREAS the ODISHA POWER TRANSMISSION CORPORATION LIMITED, a body corporate, constituted under the Electricity Act 2003 [hereinafter called "the OPTCL" which shall include its successors and assigns has placed orders No. \_\_\_\_\_ Date \_\_\_\_\_ [hereinafter called "The Agreement"] on M/s. \_\_\_\_\_ [herein after called "The Supplier"] which shall include its successors and assigns for supply of materials.

AND WHERE AS the supplier has agreed to supply materials to the OPTCL in terms of the said agreement AND

WHEREAS the OPTCL has agreed [1] to exempt the supplier from making payment of Security [2] to release 100% payment of the cost of materials as per the said agreement and [3] to exempt from performance guarantee on furnishing by the Supplier to the OPTCL, a Composite bank Guarantee of the value of \*10 % [ten percent] of the FORD price

\*Strike out, whichever is not applicable.

NOW THEREFORE, in consideration of the OPTCL having agreed [1] to exempt the Supplier from making payment of Security [2] releasing 100% payment to the Supplier and [3] to exempt from furnishing performance guarantee in terms of the said agreement as aforesaid, we, the \_\_\_\_\_ [Bank][hereinafter referred to as 'the Bank'] do hereby undertake to pay to the OPTCL an amount not exceeding Rs. \_\_\_\_\_ [Rupees \_\_\_\_\_] against any loss or damage caused to or suffered by or would be caused to or suffered by the OPTCL by reason of any breach by the said Supplier [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 this guarantee without any demur, merely on demand from the OPTCL stating that the amount claimed is due by way of loss or damage caused to or suffered by the OPTCL by reason of any breach by the said

Supplier [s] of any of the terms or conditions, contained in the said agreement or by reason of the supplier'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 \_\_\_\_\_]

3. We the \_\_\_\_\_ (Bank) also undertake to pay to the OPTCL any money so demanded notwithstanding any dispute or disputes raised by the supplier [s] in any suit or proceeding instituted/pending before any Court or Tribunal relating thereto our liability under this present 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, ( \_\_\_\_\_ Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be so enforceable till all the dues of the OPTCL under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till Managing Director, ODISHA POWER TRANSMISSION CORPORATION LIMITED certifies that the terms and conditions of the said agreement 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, ( \_\_\_\_\_ Bank) further agree that the OPTCL 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 Supplier [s] and we shall not be relieved from our liability by reason of any such variations or extension being granted to the said supplier [s] or for any forbearance, act or omission on the part of the OPTCL or any indulgence by the OPTCL to the said Supplier [s] or by any such matter or thing whatsoever which under the law relating to sureties would, but for these provisions, 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 and supplier [s].

7. We, [\_\_\_\_\_ Bank] lastly undertake not to revoke this guarantee during its currency except with the previous consent of the OPTCL in writing.
8. We, the \_\_\_\_\_ Bank further agree that this guarantee shall also be invocable at branch at Bhubaneswar in the State of Odisha.

Dated \_\_\_\_\_ Day of \_\_\_\_\_

Notwithstanding contained herein above,

- i) Our liability under this Bank Guarantee shall not exceed Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_).
- ii) This bank Guarantee shall be valid upto \_\_\_\_\_.
- iii) We are liable to pay the guarantee amount or any part thereof under this bank Guarantee only, if you serve upon us at Bhubaneswar in the state of Odisha, a written claim or demand on or before \_\_\_\_\_.

For \_\_\_\_\_  
[Indicate the name of the bank]

Witness (Name, Signature & Address)

- 1.
- 2.



**ANNEXURE- VIII**

**CHART SHOWING PARTICULARS OF EARNEST MONEY DEPOSIT FURNISHABLE BY  
TENDERERS**

1.	Central and State Government Undertakings	Exempted
2.	All other inside & outside state units.	The amount of EMD as specified in the specification /Tender Notice in shape of bank guarantee /DD.

NB: - REFUND OF E.M.D.

[a] In case of unsuccessful tenderers, the EMD will be refunded immediately after the tender is decided. In case of successful tenderer, this will be refunded only after furnishing of Composite Bank Guarantee referred to in clause No.19 of Section-II of this specification.

Suits, if any, arising out of EMD shall be filed in a court of law to which the jurisdiction of High Court of ODISHA extends.

[b] Earnest Money will be forfeited if the tenderer fails to accept the letter of intent/purchase order, issued in his favour or revises the bid price[ s] within the validity period of Bid.

**N.B:- The annexure is to be filled up & uploaded as PDF**

**ANNEXURE-IX**

**DATA ON EXPERIENCE**

Sl. No	PARTICULARS	
[a]	Name of the manufacturer:	
[b]	Standing of the firm as manufacturer of equipment quoted	
[c]	Description of equipment similar to that quoted [supplied and installed during the last two years with the name(s) of the Organisations to whom supplies were made]	
[d]	Details as to where installed etc.	
[e]	Testing facilities at manufacturer's works	
[f]	If the manufacturer is having collaboration with another firm, details regarding the same & present status	
[g]	A list of purchase orders, executed during last three years	
[h]	A list of similar equipments of specified KVA rating, voltage class, Impulse level, short circuit rating, designed, manufactured, tested & commissioned which are in successful operation for at least two years from the date of commissioning with legible users certificate. Users full complete postal address / fax / phone must be indicated (Refer Clause No. 7 of the part - I, section - II of the specification.	

Place:

Date:

Signature of tenderer

Name, Designation, Seal

**N.B:- The annexure is to be filled up & uploaded as PDF**

**ANNEXURE-X**

**SCHEDULE OF SPARE PARTS FOR FIVE YEARS OF NORMAL OPERATION &  
MAINTENANCE**

SL. No	Particulars	Quantity	Unit delivery rate	Total price

Place:

Date:

Signature of Tenderer

Name, Designation, Seal

**N.B:- The annexure is to be filled up & uploaded as PDF**

**ANNEXURE-XI**

**SCHEDULE OF INSTALLATIONS**

Rated MVA	Rated Voltage	Place of Installation & complete postal address	Year of commissioning

Place:

Date:

Signature of Tenderer  
Name, Designation, Seal

**N.B:- The annexure is to be filled up & uploaded as PDF**

**ANNEXURE-XII**  
**SCHEDULE OF DEVIATION**

**A. TECHNICAL.**

Sl.No.	Requirements/ Equipment.	Specification Clause No.	Deviations.	Remarks

It is hereby confirmed that except for deviation mentioned above, the offer conforms to all the other features specified in Technical Specification Section \_\_\_\_ of this Bid document.

Place:

Signature of the Bidder.

Date:

Name:

Business address:

**B. COMMERCIAL.**

Sl.No.	Requirements/ Equipment.	Specification Clause No.	Deviations.	Remarks

It is hereby confirmed that except for deviation mentioned above, the offer conforms to all the other features specified in Commercial Specification Section \_\_\_\_ of this Bid documents.

Place:

Signature of the

Bidder.

Date:

Name:

Business address:

**N.B:- The annexure is to be filled up & uploaded as PDF**

## SECTION -IV

### TECHNICAL SPECIFICATION OF ACSR PANTHER' 'ZEBRA' AND MOOSE 'CONDUCTOR

#### 1. SCOPE :-

This specification provides for the manufacture, testing, supply and delivery at destination of the steel cored aluminium conductors as per Appendix –I attached.

#### 2. STANDARDS :-

2.1. The conductors shall comply in all respects to the clauses of this specification as indicated below & with the Indian Standard Specification, international standards with latest amendments. Some of the standards are:-

- i) IS 398 – Specification for Aluminium Conductor for overhead transmission purposes.  
IS 398, Part-II-Aluminium conductors for overhead Transmission purpose – Specification.
- ii) IS 1521, 1972 – Method of tensile testing of steel.
- iii) IS 1778-1989- Reel & drums for bare conductors.

#### 3. MATERIALS :-

3.1 The material offered shall be of best quality and workmanship. The steel Cored Aluminium conductor strands will consist of hard-drawn aluminium wire manufactured from 99.5% pure electrolytic aluminium rods of E.C. Grade. The steel wire shall be made from materials produced either by the acid or basic open hearth process or by electric process. No steel wire drawn from pressmen process shall be used. The steel wire shall not contain sulphur or phosphorus exceeding 0.035 percent, and the total of sulphur and phosphorus shall not exceed 0.085 percent.

3.2 The steel wires shall be evenly and uniformly coated with Zinc complying with Indian Standards 4826-1979 specification for galvanized coating on round steel wires. The uniformity of Zinc coating and the weight of coating shall be in accordance with Appendix – II. The coating on the galvanized steel wires may be applied by the hot process or the electrolytic process.

#### 4. SIZE :-

The size of steel-cored Aluminium Conductors shall be as given in Appendix-I. The resistance and weights shall be in accordance with the values given in the same appendix.

**5. TOLERANCES :-**

5.1 The following tolerances shall be permitted on standard diameter of aluminium wires. Tolerance on standard diameter of aluminium wire  $\pm 1$  percent wires.

Note :- The cross-section of any wire shall not depart from circularity by more than an amount corresponding to a tolerance of 2 percent on the standard diameter.

5.2 A tolerance of + 2 percent shall be permitted on the standard diameter of the galvanized steel wires. The variation from the approximate weights shall not be more than plus or minus 5 percent.

**6. MECHANICAL PROPERTIES :-**

The value of the final modulus of elasticity for steel cored aluminium conductor in the average of values obtained from actual stress strain tests. The coefficient of linear expansion for steel Cored Aluminium Conductors has been calculated on the basis of coefficient of linear expansion of  $23.0 \times 10^{-6}$  per degree centigrade of aluminium and  $11.5 \times 10^{-6}$  per degree centigrade for steel and represents only the average values. These values shall however, be given by the bidder under the guaranteed technical particulars.

**7. SURFACE CONDITIONS :-**

The wires shall be smooth and free from inequalities, spills and splits. The surface conductor shall be free from points, sharp-edges, abrasions or other departures from smoothness or uniformity of surface contour that would increase radio interference and corona losses. When subjected to tension up to 50% of the ultimate strength of the conductor, the surface shall not depart from its cylindrical form nor any part of the component, parts or strands, move relative to each other in such a way as to get out of place and disturb the longitudinal smoothness of the conductor.

**8. JOINTS IN WIRES :**

8.1 Aluminium wires : No joints shall be permitted in the aluminium wires in the outermost layer of the ACSR conductor. Joints in the inner layers are permitted, in addition to those made in the base rod or wire before final drawing, but no two such joints shall be less than 15 meter apart in the complete stranded conductor. Such joints shall be made by cold pressure butt-welding.

Joints are not permitted in the outermost layer of the conductor in order to ensure a smooth conductor finish and reduce radio interference levels and corona losses on the extra high voltage lines.

**8.2 Galvanized steel wire:** - There shall be no joints except those in the base rod or wire before final drawing, in steel wires forming the core of the steel-reinforced aluminium conductor.

Joints have not been permitted in the steel wires after drawing in order to avoid reduction in the breaking strength of the conductor that may occur as a result of failure of the joints.

## **9. STRANDING :-**

9.1 The wires used in construction of a stranded conductor shall before stranding, satisfy all requirements of IS-398 / (part-II) 1976 with latest amendments. For steel-cored aluminium conductors the lay ratio of the different layers shall be within the limits given under Appendix – I).

9.2 For all, constructions, each alternate layer shall be stranded in opposite directions. The wires in each layer shall be evenly and closely stranded round the under laying wire or wires. The final layer of wires shall have a right hand lay.

## **10. PACKING AND MARKING :-**

10.1 The conductor shall be wound in non-returnable reels or drums conforming to Indian Standard 1978-1961 specification for Reels and Drums for Bare Wire, or any other authoritative standard and marked with the following :-

- |                                |   |
|--------------------------------|---|
| a) Trade name, if any          | b) Contract / Award letter Number                 |
| c) Name of Manufacturer        | d) Name & Address of Consignee                    |
| e) Drum Number                 | f) Length of conductor                            |
| g) Size of Conductor           | h) Gross Weight of drum with conductor            |
| i) Weight of empty drum        | j) Net and gross weight of conductor with lagging |
| k) Arrow marking of un-winding |   |

10.2 The reel shall be of such construction as to assure delivery of conductor in the field from displacement and damage and should be able to withstand all stresses due to handling and the stringing operations so that conductor surface is not dented, scratched or damaged in any way during manufacture, transport and erection. The conductor shall be properly lagged on the drums and the method of lagging to be employed should be clearly stated. It should be stocked to suit the reel and held in place by steel strapping. Lagging shall not be nailed or bolted in place.



10.3 The conductor drum should be suitable for wheel mounting. Before reeling, the cardboard or other suitable material shall be secured to the drum and inside flanges of the drums. After reeling the conductor, the exposed surfaces should be wrapped with suitable soft material to prevent the conductor from dirt and grit. Any space between the drum lagging and conductor should be suitably filled with soft filler material compactly packed. The conductor drum shall be made as per the relevant IS.

**11. LENGTHS :-**

11.1 The conductor shall be supplied in the standard lengths as below with a permitted variation of 5%. Not less than 90% of the total quantity of the conductor shall be supplied in the standard lengths. Thus the quantity of the conductor in lengths shorter than standard ones shall not exceed 10% of the total quantity to be supplied. Further no single conductor lengths in respect of such 10% (maximum supply) in random lengths, shall be shorter than 50% of the standard lengths.

<u>Type of Conductor</u>	<u>Length per drum</u>
MOOSE ACSR	1.1 K.M
ZEBRA ACSR	1.1 K.M
PANTHER ACSR	2.2 K.M

**12. TESTS AND TEST CERTIFICATES :-**

The following type tests (& any other tests if purchaser decides to do), shall be conducted on the conductor at any Govt. approved laboratory or CPRI, in presence of the representatives of OPTCL, on the samples collected and sealed by the representative of OPTCL from the manufactured & offered drums of conductor at random at free of cost to OPTCL or firm may quote their test charges which will be taken in to account during bid price evaluation. If test charges will not be quoted by the firm, it will be treated as nil during bid price evaluation & firm have to do the type tests at free of cost to OPTCL. **Also the tenderer shall furnish valid type test reports, the tests are as per the IS 398 (Part-2) conducted in any govt. approved laboratory or CPRI within last 5 years, from the date of opening of the bid (Techno-commercial) document, without which their bids will not be considered for evaluation.**

12.1 Individual wire and finished steel cored Aluminium Conductor shall be subjected to before dispatch from the works, to the tests as per the provision of the Indian standard Specification 398 (Part-II-1976) with the latest amendments & as per the tests indicated in this specification below.

- 12.2 Samples for individual wires for test shall be taken before stranding form not less than 10 percent of the spiels in the case of aluminium wire and ten percent of the wire coils in the case of steel wires. If samples are taken after stranding, they shall be obtained by cutting 5 meters from the outer end of the finished conductor from not more than 10 percent of the finished reels.
- 12.3 The mechanical tests shall be carried out on single wires only.
- 12.4 The tensile test shall apply to wire of all diameters forming part of steel cored aluminium conductors. If it is not possible to test the component wires before stranding the test may be made on wire taken from stranded conductors. The tensile strength of any of the wires shall not be less than the minimum values given in Appendix-II.
- 12.5 A suitable tensile testing machine shall be used, the accuracy of which can easily be checked and the machine adjusted if necessary. The test sample before being placed in the machine, shall be straightened, if necessary in such a way as to cause the minimum alteration in its physical properties.

The load shall be applied gradually and rate of separation of the jaws of the testing machine shall not be greater than 10cm/min and less than 2.5cm/min.

#### **A) TYPE TESTS**

##### **12.6 Wrapping Test :-**

- 12.6.1 Samples of aluminium wires shall be wrapped round a wire of its own diameter to form a close helix of eight turns. Six turns shall then be unwrapped and again clearly wrapped in the same direction as before. The wire shall not break.
- 12.6.2 Samples of steel wires shall be closely wrapped eight times round a mandrel of diameter equal to four times the wire diameter. Six turns shall then be unwrapped and again closely wrapped in the same direction as before. The wire shall not break.

##### **12.7 Galvanizing Test :-**

- 12.7.1 The uniformity of zinc coating and the weight of coating shall be as given in **Appendix-II** and shall be determined according to Indian Standard Specification **4826-1979** with latest amendments.
- 12.7.2 This test shall be made whenever practicable, on wires before stranding and before the specimen has been bent, straightened or tested in any other way.

##### **12.8 Ductility Test :-**

This test shall be made on galvanized steel wires only by any of the proceedings given in 12.8.1 and 12.8.2.

##### **12.8.1 Torsion Test :-**

One specimen cut from each of the sample shall be gripped at its ends in two vices, one of which shall be free to move longitudinally during the test. A small tensile bond not exceeding 2% of the breaking load of the wire, shall be applied to the sample during testing. The specimen shall be twisted by consisting one of the vices to revolve until fracture occurs and the number of twists shall be indicated by a counter or other suitable device. The rate of twisting shall not exceed 60 rev/min.

When tested before stranding, the number of complete twists before fracture occurs shall not be less than 18 on a length equal to 100 times the diameter of the wire. The fracture shall show a smooth surface at right angles, to the axis of the wire.

When tested after stranding, the number of complete twists before fracture occurs shall be not less than 16 on a length equal to 100 times the diameter of the wire. The fracture shall show a smooth surface at right angles to the axis of the wire.

#### **12.8.2 Elongation Test:-**

The elongation of one specimen cut from each of the samples shall be determined. The specimen shall be straightened by hand and on original gauge length of 200 mm shall be marked on the wire. A tensile load shall be applied as described in 12.5 and the elongation shall be measured after the fractured ends fitted together. If the fracture occurs outside the gauge marks, or within 25 mm of either mark and the required elongation is not obtained, the test shall be disregarded and another test made. When tested before stranding, the elongation shall be not less than 4 percent. When tested after stranding, the elongation shall be not less than 3.5 percent.

#### **12.9 Surface Condition Test :-**

A sample of the finished conductor having a minimum recommended length of 5 meters with compression type dead end clamps compressed on both ends in such a manner as to permit the conductor to take its normal straight line shape, shall be subject to a tension of 50% of the UTS of the conductor. The surface shall not depart from its cylindrical shape nor shall the strands move relative to each other so as to get out of place or disturb the longitudinal smoothness of conductor. The measured diameter at any place shall be not less than the sum of the minimum specified diameters of the individual aluminium and steel strands.

#### **12.10 Ultimate strength (UTS) Test on Stranded Conductor :-**

Circles perpendicular to the axis of the conductor shall be marked at two places on a sample of conductor of minimum 5 m length suitably compressed with dead end clamps at either end. The load shall be increased at as steady rate up to specified 50% of UTS and held for one minute. The circles drawn shall not be distorted due to

Relative movement of strands. Thereafter the load shall be increased at a steady rate to the minimum UTS specified in Appendix-I and held for one minute. The applied load shall then be increased until the failing load is reached and the value recorded.

**12.11 Corona Extinction Voltage Test:-**

One sample of conductor of 5m length shall be strung. In case of twin conductor, two samples shall be arranged with the actual sub-conductor spacing between them. This sample assembly when subjected to power frequency voltage shall have a corona extinction voltage of not less than 320 KV (rms) for 400 KV and 176 KV (rms) for 220 KV system line to ground under dry condition. There shall be no evidence of corona on any part of sample when all possible sources of corona are photographed in a darkened room. The test shall be conducted without corona control rings. The voltage shall be corrected for standard atmospheric conditions.

**12.12 Radio Interference Voltage Test:-**

Under the conditions as specified in 12.11 above, the conductor samples shall have a radio interference voltage level below 1500 microvolts at one MHZ when subjected to 50 HZ AC voltage of 1.1 times maximum line to ground voltage under dry condition. This test may be carried out with corona control rings and arcing horns.

**12.13 D.C. Resistance Test on Stranded Conductor:-**

On a conductor sample of minimum 5 m length two contact clamps shall be fixed with a pre-determined bolt torque. The resistance shall be measured by a Kelvin double bridge by placing the clamps initially zero meter and subsequently one meter apart. The test shall be repeated at least five times and the average value recorded. The value obtained shall be corrected to the value at 20 degree centigrade as per clause No. 12.8 of IS : 398 (part V). The resistance corrected at 20 degree centigrade shall conform to the requirements of this specification.

**12.14 Stress-Strain Test:-**

12.14 (i) This test is contemplated only to collect the creep data of the conductor from the supplier. A sample of conductor of minimum 10 metres length shall be suitably compressed with dead end clamps.

12.14 (ii) **Test Set-up**

(a) The test sample shall be supported in a trough over its full length and the trough adjusted so that the conductor will not be lifted by more than 10 mm under tension. This shall be ascertained by actual measurement.

(b) The distance between the clamp and the sleeve mouth shall be monitored with callipers during the test to ensure that, after the test, it does not change by more than 1 mm +/- 0.1 mm from the value before the test.

(c) The conductor strain shall be evaluated from the measured displacements at the two ends of the gauge length of the sample. The gauge reference targets shall be attached to the clamps which lock the steel and aluminium wires together. Target plates may be used with dial gauges or displacement transducers and care shall be taken to position the plates perpendicular to the conductor. Twisting the conductor, lifting it and moving it from side-to-side by the maximum amounts expected during the test should introduce no more than 0.3 mm error in the reading.

#### 12.14 (iii) **Test Loads for Complete Conductor**

The loading conditions for repeated stress-strain tests for complete conductor shall be as follows:-

(a) 1 KN load shall be applied initially to straighten the conductor. The load shall be removed after straightening and then the strain gauges are to be set at zero at zero tension.

(b) For non-continuous stress-strain data, the strain reading at 1 KN intervals at lower tensions and 5 KN intervals above 30% of UTS shall be recorded.

(c) The sample shall be reloaded to 50% of UTS and held for 1 hour. Readings are to be noted after 5, 10, 15, 30, 45 and 60 minutes during the hold period. The load shall be released after the hold period.

(d) Reloading up to 70% UTS shall be done and held for 1 hour. Readings are to be noted after 5, 10, 15, 30, 45 and 60 minutes and then the load shall be released.

(e) Reloading up to 85% of UTS shall be done and hold for 1 hour. Readings are to be noted after 5, 10, 15, 30, 45 and 60 minutes and then the load shall be released.

(f) Tension shall be applied again and shall be increased uniformly until the actual breaking strength is reached. Simultaneous readings of tension and elongation shall be recorded up to 90% of UTS at the intervals described under Clause 12.14 (iii) (e).

#### 12.14 (iv) **Test Loads for Steel core Only**

The loading conditions for repeated stress-strain tests for the steel core of ACSR shall be as follows:-

(a) The test shall consist of successive application of load applied in a manner similar to that for the complete conductor at 30%, 50%, 70% and 85% of UTS.

(b) The steel core shall be loaded until the elongation at the beginning of each hold period corresponds to that obtained on the complete conductor at 30%, 50%, 70% and 85% of UTS respectively.

#### 12.14 (v) **Stress Strain Curves**

The design stress-strain curve shall be obtained by drawing a smooth curve through the 0.5 and 1 hour points at 30%, 50% and 70% of UTS loadings. The presence of any aluminium slack that can be related to any observed extrusion entering the span from the compression dead ends shall be removed from the lower ends of the design curves. **Both the laboratory and design stress-strain curves shall be submitted to the purchaser along with test results.** The stress-strain data obtained during the test shall be corrected to the standard temperature i.e. 20 degree centigrade.

#### 12.15. **Chemical Analysis of Zinc**

Samples taken from the Zinc ingots shall be chemically / spectrographically analyzed. The same shall be in conformity to the requirements stated in this specification.

#### 12.16 **Chemical Analysis of Aluminium and Steel**

Samples taken from the Aluminium ingots / coils / strands shall be chemically / spectrographically analyzed. The same shall be in conformity to the requirements stated in this specification.

### **ROUTINE / ACCEPTANCE TESTS**

#### 12.17 **Visual and Dimensional Check on Drums**

The drums shall be visually and dimensionally checked to ensure that they conform to the requirements of this specification.

#### 12.18 **Visual Check for Joints, Scratches etc.**

Conductor drums shall be rewound in the presence of the inspector. The inspector shall visually check for scratches, joints, etc. and that the conductor generally conforms to the requirements of this specification.

#### 12.19 **Dimensional Check of Steel and Aluminium Strands**

The individual strands shall be dimensionally checked to ensure that they conform to the requirements of this specification.

#### 12.20 **Check for Lay-ratios of various Layers**

The lay-ratios of various layers shall be checked to ensure that they conform to the requirements of this specification.

### **12.21 Breaking load test on welded Aluminium strand & Individual wires**

Two Aluminium wires shall be welded as per the approved quality plan and shall be subjected to tensile load. The welded point of the wire shall be able to withstand the minimum breaking load of the individual strand guaranteed by the supplier

### **12.22 Ductility Test**

### **12.23 Wrapping test**

### **12.24 Resistance test**

### **12.25 Galvanising test**

### **13. RETEST AND REJECTION :-**

13.1 Each coil or spool selected for testing shall be tested for compliance with the requirements of Indian Standard Specification 398 (part-II) 1976 with latest amendment if any selected coil or spool not fulfill any of the test requirements, that particular coil or spool shall be withdrawn. In respect of each failure, two test pieces shall be selected from two different coils in the lot & subjected to the test under which the failure occurred. If either of the two retest pieces fails to pass that test, the lot concerned shall be rejected.

If samples are taken for test after stranding and if any selected reel fails in the retest, the manufacturer may test each and every reel and submit them for further inspection. All rejected materials shall be suitably marked and segregated.

### **14. GUARANTEED TECHNICAL PARTICULARS :-**

The bidder shall fill in the guaranteed technical particulars in the Performa at Appendix-IV and submit the same with his tender, without which bid will not be considered.

### **15. SAG TENSION CHARTS AND SAG TEMPLATES :-**

The contractor shall supply each six copies of sag tension charts and sag templates in respect of each type of the steel core aluminium conductor. The Contractor shall also supply sag template in celluloid which shall be subject to the approval by the purchaser and without involving any extra charges. The design data of the lines on which these conductors will be used are given in Appendix-III.

### **16. SCHEDULE OF REQUIREMENTS, DESIRED DELIVERY :-**

16.1 The schedule of requirements and desired deliveries are indicated in Annexure-III (Schedule of Quantity & Delivery), Section – III of the Tender Specification. The purchaser reserves the right to order the entire quantity of Conductors as specified or part of the total quantity of Conductor specified.

**A P P E N D I X - I**

Sl.No	Description.	Panther ACSR	ZEBRA ACSR	Moose ACSR
1	Size of conductor	30/7/3.00 mm	54/7/3.18 mm	54/7/3.53 mm
2	Stranding and wire diameter			
	Aluminium	30/3.00 mm	54/3.18 mm	54/3.53 mm
	Steel	7/3.00 mm	7/3.18 mm	7/3.53 mm
3	Sectional area of Aluminium	212.10 sq. mm	428.9 sq. mm	528.5 sq.mm
4	Approximate total mass	974 Kgs / KM	1622 Kgs / KM	2004 Kgs / KM
5	Calculated resistance at 20oC Max	0.139 Ohms / Km	0.06868 Ohms / Km	0.05552 Ohms / Km
6	Calculated breaking load of Composite conductor (U.T.S.) (Min)	89.67 KN	130.32 KN	160.20 KN
7	Lay Ratio:- Steel Core	Max - 28 Min - 13	Max - 28 Min - 13	Max - 18 Min - 16
	Aluminum Layers			
	12 Wire Layer (Innermost Layer)	Max - 16 Min - 10	Max - 17 Min - 10	Max - 14 Min - 12
	18 Wire Layer (Lay immediately beneath outside Layer)	Max- 14 Min - 10	Max- 16 Min - 10	Max - 13 Min - 11
	24 wire layer (outside layer)	-----	Max - 14 Min - 10	Max - 12 Min - 10
8	Modulus of elasticity	0.815 x 10 <sup>6</sup> Kg x CM <sup>2</sup> (80 GN per sq. meter)	0.7036 x 10 <sup>6</sup> Kg x CM <sup>2</sup> (69 GN per sq. meter)	0.7036 x 10 <sup>6</sup> Kg x CM <sup>2</sup> (69 GN per sq. meter)
9	Co-efficient of linear expansion Of conductor per degree centigrade	17.8 x 10 <sup>-6</sup> /°C	19.3 x 10 <sup>-6</sup> /°C	19.3 x 10 <sup>-6</sup> /°C
10	10. Standard area of Cross Section in Sq.mm of conductor	261.5 mm <sup>2</sup>	484.5 mm <sup>2</sup>	597.0 sq.mm
11	Diameter of complete conductor	21.00mm	28.62 mm	31.77 mm



**A P P E N D I X - II**

**Solid Steel and Aluminium Wires used in Steel cored**

**Aluminium Conductors**

Sl. No	Description.	Panther ACSR		ZEBRA ACSR		Moose ACSR	
		Steel	Alum.	Steel	Alum.	Steel	Alum.
1	Standard (in mm).	3.0	3.0	3.18	3.18	3.53	3.53
	Maximum (in mm)	3.06	3.03	3.24	3.21	3.60	3.55
	Minimum (in mm)	2.94	2.97	3.12	3.15	3.46	3.41
2	Cross sectional area of nominal diameter.	7.069 mm <sup>2</sup>	7.069 mm <sup>2</sup>	7.942 sq. mm	7.942 sq. mm	9.791 sq. mm	9.791 sq. mm
3	Weight	55.13 Kg/KM	19.11 Kg/KM	61.95 Kg / Km	21.47 Kg / Km		
4	Minimum tensile strength	As per relevant ISS					
5	Minimum breaking load before stranding	10.43 KN	1.29 KN	10.43 KN	1.29 KN	12.86	1.57
6	Minimum breaking load after stranding	8.83 KN	1.11 KN	9.91 KN	1.23 KN	12.22	1.49
7	Zinc coating of steel Strands						
	Number and duration of dips	3 (1 Min. dip)		3 (1 Min. dip)		3 (1 Min. dip)	
	Minimum Weight of Coating ( gm / m <sup>2</sup> )	As per IS-4826-1979		260		260	
8	Maximum resistance at 20°C of Aluminium strands (Ohms/Km)		4.079	3.626	2.974		2.921
9	Purity of aluminium rod		99.5%		99.5%		99.5%

### APPENDIX - III

Sl.No	Description.	Panther ACSR	ZEBRA ACSR	Moose ACSR
1	Conductor	Steel cored Aluminium	Steel cored Aluminium	Steel cored Aluminium
2	(a) Copper equivalent	130 sq.mm		
	(b) Stranding	30/7/3.00 mm	54/7/3.18 mm	54/7/3.53 mm
3	Normal Span	320 Meters	320 Meters	320 Meters
	Wind Span	320 Meters	320 Meters	320 Meters
	Weight Span (a) Max	500 Meters	500 Meters	500 Meters
	(b) Min	50 Meters	50 Meters	50 Meters
4	Wind Pressure on full Project area	52 Kgf per M2	52 Kgf per M2	52 Kgf per M2
5	Temperature (a) Minimum	5°C	5°C	5°C
	(b) Maximum	67°C	67°C	67°C
	(c) Every day	32°C	32°C	32°C
6	Factors of safety: Minimum			
	(i)Every day temperature And no wind	4.00	4.00	4.00
	(ii) Minimum temperature And 2/3 maximum wind :	2.00	2.00	2.00
	(iii)Every day Temperature and Full wind (This is as per Indian Electricity Rules, 1956).	2.00	2.00	2.00
7	Relative Humidity Maximum	100 Per cent	100 Per cent	100 Per cent
	Minimum	60 Per cent	60 Per cent	60 Per cent
8	Isoceramic level	100 Years	100 Years	100 Years
9	Number of rainy days per year	100 Days	100 Days	100 Days
10	Average rainfall per year Approx.	1150 mm.	1150 mm.	1150 mm.
11	Altitude	Less than 350 Meters	Less than 350 Meters	Less than 350 Meters

**APPENDIX - IV**

**Guaranteed Technical Particulars of Conductor**

<b>Sl.No</b>	<b>Description</b>	<b>PANTHER</b>	<b>ZEBRA</b>	<b>MOOSE</b>
1	Code Word			
2	2.Maker's name address and Country.			
	a) Aluminium rods			
	b) Steel Wire / rods			
	c) Complete Conductor			
3	Stranding and wire diameter			
	a) Aluminium			
	b) Steel			
4	Standard nominal copper Area in sq.mm			
5	Calculated equivalent Aluminium area in sq.mm			
6	Actual aluminium area In sq.mm			
7	Standard area of cross section In sq.mm			
	a) Aluminium strand			
	b) Steel Strand			
	c) Conductor			
8	Diameter of complete Conductor in mm			
9	Minimum ultimate tensile strength of strand, in Kg/sq.mm. Before tranding and after stranding for			
	a) Aluminium strand			
	b) Steel Strand			
10	Guaranteed ultimate tensile Strength of conductor in Kg.			
11	Minimum breaking load in Kg. Before stranding and			

	after Stranding for			
	a) Aluminium strand			
	b) Steel Strand			
12	Purity of aluminium rods.			
13	Zinc coating of steel strand			
	a)Uniformity of coating number and / duration of dips			
	b)Minimum weight of coating gm/sq.mm			
14	Weight in Kg. Per K.M.			
	a) Aluminium			
	b) Steel			
	c) Conductor			
15	Resistance in ohms per Km. At 20°C.			
16	Continuous maximum current Rating of conductor in still Air at 45°C ambient temperature, Considering temp. rise of 50°C.			
17	Modulus of elasticity of Conductor.			
18	Co-efficient of linear expansion Per degree centigrade of.			
	a) Aluminium strand.			
	b) Steel Strand			
	c) Conductor			
19	Percentage of carbon in steel wire			
20	Standard length of each Piece in Km			
21	Initial and final sags and Tension and stringing			

	charts, Whether furnished			
22	Tolerance, if any on standard length			
23	Number of standard length in one reel			
24	Dimensions of the reel in cms.			
25	Weight of the Conductor In one reel in Kg.			
26	Weight of the reel in Kg.			
27	Gross weight of the reel Including weight of the conductor			
28	Whether the conductor will be manufactured as per the relevant Indian Standard Specification & as per Section-IV 'technical specification' of this specification			
29	Whether the conductor will be Tested As per the relevant Indian Standard Specification & as per Section-IV 'Technical specification' of this specification. (Clause-12 of Section - IV of Technical Specification)			
30	Other particulars, if any.			

Signature of the Tenderer

Address

**ORISSA POWER TRANSMISSION CORPORATION LTD**

**SECTION - IV**

**TECHNICAL SPECIFICATION**

**FOR**

**LOT-IV- ALL ALUMINIUM ALLOY CONDUCTOR 'PANTHER' (37/3.15 MM)**

**LOT-V- ALL ALUMINIUM ALLOY CONDUCTOR 'ZEBRA' (37/4 MM)**

**LOT-VI- ALL ALUMINIUM ALLOY CONDUCTOR 'MOOSE (61/3.45 MM)**

**1. TECHNICAL SPECIFICATION**

**2. GUARANTEED TECHNICAL PARTICULARS**

**3. SCHEDULE OF REQUIREMENT AND**

**DESIRED DELIVERIES**

**SECTION - IV**

**TECHNICAL SPECIFICATION**

**FOR**

**LOT-I- ALL ALUMINIUM ALLOY CONDUCTOR**

**SIZE: 37/3.15 MM, 37/4 MM& 61/3.66 MM**

**1.1 GENERAL**

This specification covers manufacture, testing supply and delivery at destination of "AAAC PANTHER, ZEBRA& MOOSE (SIZE: 37/3.15 MM, 37/4 MM & 61/3.45 MM)" as per clauses of this section requiredfor Transmission lines.

**1.2 STANDARDS**

The AAA conductor shall confirm to the clauses of this specification as indicated below & in addition to the following Indian Standards/International Standards which shall mean latest revisions, amendments/changes adopted and Published.

i) IS: 398 - Specification for Aluminium conductors for overheadtransmission purposes.

ii)IS:398 Part IV- Aluminium Alloy stranded conductor(Aluminium Magnesium Silicon type).

iii) IS:1521 : 1972 - Method of Tensile Testing of steel

iv) IS :1778-1980- Reel and drums for bare conductors.

v) IS 9997-1991- Aluminium Alloy Redraw Rods – For electrical purpose

**1.3 TECHNICAL PARTICULARS OF CONDUCTOR:**

The guaranteed technical particular of conductor shall be as under:

COMPOSITE CONDUCTOR:-All Aluminium Alloy Conductor of  
 SIZE: 37/3.15 MM, 37/4 MM & 61/3.45 MM

	DESCRIPTION	AAAC PANTHER	AAAC ZEBRA	AAAC MOOSE
1	Nominal Aluminium Alloy area	288 mm <sup>2</sup>	465 mm <sup>2</sup>	570 mm <sup>2</sup>
2	Stranding and wire diameter - Aluminium Alloy	37/3.15 MM	37/4 mm	61/3.45 MM
3	No. of aluminium alloy Strands	Centre Wire 1 1st layer 6 2nd layer 12 3rd layer 18 4th layer -	Centre Wire 1 1st layer 6 2nd layer 12 3rd layer 18 4th layer -	Centre Wire 1 1st layer 6 2nd layer 12 3rd layer 18 4th layer -24
4	Sectional area of aluminium alloy	288 mm <sup>2</sup>	465 mm <sup>2</sup>	570 mm <sup>2</sup>
5	Approximate overall diameter	22.05 mm	28 mm	31.05 mm
6	Approximate weight	794.05 Kg/Km	1280.5 Kg/Km	1573.71 Kg/Km
7	Calculated D.C. resistance at 20deg. C	0.1182 ohm/km.	0.0734 ohm/km.	0.0598 ohm/km.
8	Approximate calculated	84.71 KN(Min)	136.38 KN(Min)	158.66 KN(Min)

	breaking load			
9	Co-efficient of linear expansion of Aluminium alloy	23 x 10 <sup>-6</sup> per deg C	23 x 10 <sup>-6</sup> per deg C	23 x 10 <sup>-6</sup> per deg C
10	Final modulus of elasticity	0.5814x10 <sup>6</sup> kg/cm <sup>2</sup>	0.5814x10 <sup>6</sup> kg/cm <sup>2</sup>	0.5508x10 <sup>6</sup> kg/cm <sup>2</sup>
11	Constant - Mass temp. co-efficient of resistance of aluminium alloy wires measured between two potential points rigidly fixed to the wire at 20 deg.C	0.0036	0.0036	0.0036
12	Electrical volume resistivity at 20degC ohms-mm <sup>2</sup> /meter	0.0325 (max)	0.0325 (max)	0.0325 (max)
13	Density of aluminium alloy wire at 20deg C	2.7kg/dm <sup>3</sup>	2.7kg/dm <sup>3</sup>	2.7kg/dm <sup>3</sup>
14	Lay Ration of Aluminium	Ist layer of 6 wires 17 10 2nd layer of 12	Ist layer of 6 wires 17 10 2nd layer of 12	Ist layer of 6 wires 17 10 2nd layer of 12



	Alloys Layers Maximum Minimum Strands : 37/4 mm	wires 16 10 3rd layer of 18 wires 14 10 4th layer of 24 wires	wires 16 10 3rd layer of 18 wires 14 10 4th layer of 24 wires	wires 16 10 3rd layer of 18 wires 15 10 4th layer of 24 wires14 10
15	Materials	Aluminium alloy	Aluminium alloy	Aluminium alloy
16	Diameter	Standard 3.15 mm Maximum 3.18 mm Minimum 3.12 mm	Standard 4 mm Maximum 4.04 mm Minimum 3.96 mm	Standard 3.45 mm Maximum 3.70 mm Minimum 3.62 mm
17	Cross sectional area for nominal diameter of wire	7.793 mm <sup>2</sup>	12.57 mm <sup>2</sup>	10.52 mm <sup>2</sup>
18	Weight	21.04 kg/Km	33.93 kg/Km	26.41 kg/Km
19	Minimum breaking load	(before stranding) - 2.41 KN  (After Stranding)- 2.29KN	(before stranding) - 3.88KN  (After Stranding)- 3.69KN	(before stranding) - 3.25KN  (After Stranding)- 3.09KN
20	D.C. resistance at 20°C	4.290 ohms/km(max)	2.663 ohms/km(max)	3.187 ohms/km(max)

#### 1.4 MATERIAL:

The material offered shall be of the best quality and workmanship. The ALMELEC (AAAC) shall have accurate chemical composition of Alloy so as to offer excellent corrosion resistance, better strength to weight ratio and improved conductivity. The solution treatment shall be done in a very sophisticated and advanced technology furnace with automatic quenching system. The conductor shall conform to IS-398 (Part IV) with its latest amendments and conform to Clauses of this section-IV.

The conductor shall be capable of withstanding the normal handling necessary for manufacture and erection (such as reeling, unreeling and pulling through stringing sleeves). Under sufficient tension to keep the conductor off the ground etc. without being deformed from a circular cylindrical form in such a way so as **not to increase radio interference and corona loss**.

#### 1.5 TOLERANCE :

a) The following tolerance shall be permitted on standard dia  
Tolerance on standard dia of alloy wire  $\pm$  one per cent.

#### 1.6 SURFACE CONDITIONS :

The surface of the conductor shall be smooth and free from dents, sharp edges, abrasions or other departures from smoothness or uniformity of surface contour that would appreciably increase **radio interference and corona loss**. When subjected to tension up to 50% of the ultimate strength of the conductor, the surface shall neither depart from its general cylindrical form nor any of the component parts or strands move relative to each other in such a way so as to get out of place and disturb the longitudinal smoothness of the conductor. No two joints in any of the inner layers of AAAC shall be less than 15 meters apart and

there shall be no joints in the outermost layer (in addition to those made in the base rod or wire before final drawing). Further the joints shall be made only by cold pressure butt welding and not by resistance butt welding. The tenderers are requested to furnish complete details of cold pressure butt welding. The ultimate tensile strength of joints in aluminium strands made by cold pressure butt-welding shall be minimum 28 kg/mm<sup>2</sup>.

#### 1.7 JOINTS IN STRANDS :

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

**The offers which do not confirm to the above requirement of joint in the outermost layer of the conductor, shall not be considered.**

**1.8 TORSION :**

The makeup and lay of conductor shall be such as to prevent conductor essentially from a tendency to untwist or to spring apart when cut.

**1.9 CLEANING :**

The conductor shall be free from excessive amount of die grease, metal particles and dirt. The tenderer shall describe in complete details the method which proposes to use in formal production to clean the conductor. The effectiveness of the cleaning process shall be subject to verification.

**1.10 STRANDING:**

The wire used in construction of stranded conductor shall before stranding satisfy all the relevant requirements of IS 398 part IV & to this specification. In all construction the **successive layers shall have opposite directions of lay, the outermost layer being right handed**. The wires in each layer shall be evenly and closely stranded. The lay ratio of any layer shall not be greater than the lay ratio of the layer immediately beneath it.

**1.11 TEMPERATURE RISE CURVE OF AAAC.**

The tenderer shall furnish curves for the alternating current in amperes at 50 cycles V/s. temp. rise in degree centigrade for AAAC of tendered size. The ambient temperature is to be taken as 40°C & current values for conductor temp. of 60deg centigrade(ambient temp. 40° + temperature rise of 20°C above ambient) & similarly for 65 deg.C ,70deg.Cetc in steps of 5deg C up to 100deg C are to be submitted in guaranteed technical particulars of this specification. **The tenderers shall also enclose a graph showing the current carrying capacity at different temperatures.**

**1.12 PACKING AND MARKING:**

The conductor shall be wound in non-returnable reels or drums of well-seasoned wood conforming **strictly to Indian standard 1778**with its latest amendments. "Specification for Reels and Drums for Bare Wire". Only one conductor length shall be packed on each drum. The reels shall be of such construction so as to ensure delivery of conductor in the fields free from displacement and damage and should be able to withstand all stresses due to any subsequent Road or Rail transport, storage, handling and the stringing operations so that conductor surface is not dented, scorched or damaged in any way during manufacture, transport and erection. The conductor shall be preferably lagged on the drums and the method of lagging to be employed may be clearly stated in the tender. It should be stocked

to suit the reel and held in place by steel strapping. The conductor drum should be suitable for wheel mounting. Before reeling the cardboard or other suitable material shall be secured to the drum and inside flanges of the drum. After reeling the conductor, the exposed surfaces should be wrapped with suitable soft material to prevent the conductor from dirt and grit. Any space between the drum lagging and conductor should be suitably filled with soft, filler material compactly packed.

All the drums shall be painted inside and outside with aluminium paint. All reels shall have a layer of water-proof paper polyethylene film around the drums under the cable and another layer over the cable and under the lagging. The wooden drums shall be robust and shall be capable of being mounted on tension stringing equipment which shall be power operated.

1.13 **STANDARD LENGTH:** The conductor shall be supplied in the standard lengths as below with a permitted variation of 5%. Not less than 90% of the total quantity of the conductor shall be supplied in the standard lengths. Thus the quantity of the conductor in lengths shorter than standard ones shall not exceed 10% of the total quantity to be supplied. Further no single conductor lengths in respect of such 10% (maximum supply) in random lengths shall be shorter than 50% of the standard lengths.

Type of Conductor	Length per drum
MOOSE AAAC	1.1 K.M
ZEBRA AAAC	1.1 K.M
PANTHER AAAC	2.2 K.M

#### 1.14 TESTS

1.14.1 **TYPE TEST** : : After complete manufacture of the ordered conductors ,the following type tests as indicated bellow ,(& any other tests if purchaser decides to do), shall be conducted on the conductor , at any Govt. approved laboratory or CPRI/Tag Corporation , Chennai in presence of the representatives of OPTCL on the samples collected and sealed by the representative of OPTCL from the manufactured drums of conductor at random **at free of cost to OPTCL ; or firm may quote their test charges which will be taken in to account during bid price evaluation.** If test charges will not be quoted by the firm, it will be presumed that the firm will conduct the type tests, as indicated below **at free of cost to OPTCL.**& test charges will be treated as nil during price bid evaluation. The bidder shall conduct all the type tests mentioned below in presence of Inspecting officer of OPTCL on the samples selected by OPTCL inspecting officer **for each 200 kms of conductor or part thereof at their cost if order will be decided in their favour or they may quote their test charges which will be taken in to account during bid price evaluation. Also the**

tenderer shall furnish valid type test reports, the tests are as indicated below conducted in any govt. approved laboratory or CPRI or Tag corporation, Chennai within last 5 years, from the date of opening of the bid (Techno-commercial) document, without which their bids will not be considered for evaluation.

**1.14.1.1 Ultimate Strength Test: -**

Circles perpendicular to the axis of the conductor shall be marked at two places on a sample conductor of minimum 5m length suitably compressed with Tension Clamps at either end. The load shall be increased at a steady rate up to 79.9 KN and held for one minute. The circles drawn shall not be distorted due to relative movement of strands. Thereafter the load shall be increased at a steady rate to 136.38 KN and held for one minute. The conductor sample shall not fail during this period. The applied load shall then be increased until the failing load is reached and the value recorded.

**1.14.1.2 Corona Extinction voltage Test:-**

One sample of conductor of 5m length shall be strung with suitable fittings without corona ring. The sample shall be subjected to 50 HZ phase to ground voltage simulating the maximum surface gradient as obtaining on the line corresponding to rms value depending upon the rating of the system phase to ground under dry condition. There shall be no evidence of corona on any part of the sample when all possible sources of corona are photographed in a darkened room. Corresponding inception and extinction voltage shall also be measured.

**1.14.1.3 Radio interference voltage test:-**

Under the conditions as specified under (2) above, the conductor Samples shall have a radio interference voltage level below 1000 microvolts at one MHZ when subjected to 50 HZ AC voltage of the rms value depending upon the rating of the system to ground under dry condition. This test may be carried out with arcing horns.

**1.14.1.4 D.C. Resistance Test:-**

On a conductor sample of minimum 5m length two contact-clamps shall be fixed. The resistance shall be measured by a Kelvin double bridge by placing the clamps initially zero meter and subsequently one meter apart. The test shall be repeated at least five times and the average value recorded. The value obtained shall be corrected to the value at 20 deg. C as per IS : 398-(Part IV) with latest amendments. The resistance corrected at 20 deg. C shall confirm to the requirement of this specification.

**1.14.1.5 Stress-Strain Test:-**

**Sample Length:-**

A 10.0 m gauge length, preferably longer to increase accuracy, of the complete conductor shall be given tensile stress-strain to obtain representative repeated stress-strain curves.

Test Temperature: - The temperature of the sample shall be at room temperature e.g. at  $20 \pm 2^\circ\text{C}$ . Temperature readings shall be taken at beginning and end of each held period. Different temperatures can be considered if appropriate corrections are applied. (Correct by a factor  $(T_I - T_O) \times$ ).

Sample Preparation:-

Great care shall be taken in the preparation of test samples. The sample preparation shall be as follows:

Before removing the sample from the reel, install a bolted clamp 5\_+ 1 mm from the friction taped end. The clamp shall apply sufficient pressure to prevent relative wire movements in the conductor.

Unwind the desired length of the conductor from the reel and install another bolted clamp at the required distance from the first clamp. Apply friction tape and cut the conductor at a distance from the clamp just far enough to allow room for installing Tension Clamp fittings.

Roll the test sample into a 2m diameter coil and transport it to the test laboratory if necessary. Standard Tension Clamp fittings approved by the purchaser shall be used for stress-strain tests. The wires shall not be unwound, cleaned or greased prior to application of the deadened compression fittings.

Test Set-up:

The test sample shall be supported in a trough over its full length and the trough adjusted so that the conductor will not lift by more than 10 mm when under tension. This shall be ascertained by measurement rather than by tensioning the conductor. The distance between the clamp and the sleeve mouth shall be monitored with callipers during the test to ensure that, after the test, it does not

change by more than 1 mm from the value before the test (During the test the distance may change by more than 1 mm).

The conductor strain shall be evaluated from the measured displacements at the two ends of the gauge length of the strand. The gauge reference targets shall be attached to the bolted clamps which lock the aluminium alloy wires together. Target plates may be used with dial gauges for displacement transducers and care shall be taken to position the plate's perpendicular to the conductor. Twisting the conductor, lifting it and moving it from side-to-side by the maximum amounts expected during the test should introduce no more than 0.3 mm error in the reading.

Note : Slack may cause the outer lay wires to bulge outwards by several millimetres. The bulge disappears at higher tensions and reappears when the tension is relieved.

#### Test Loads for Complete Conductor

The loading conditions for repeated stress-strain tests for a complete conductor shall be as follows :-

Load initially to 1 KN tension to straighten the conductor. After straightening remove the load and set the strain gauges to zero at a zero tension. For non-continuous stress-strain data recordings, take the strain readings at 1 KN intervals at the lower tensions and at 5 KN intervals above 30% UTS.

Load to 30% UTS and held for 0.5 hour. Take readings after 5,10,15 and 30 minutes during the hold period. Release to initial load.

Reload to 50% UTS and held for 1 hour. Take readings after 5, 10, 15, 30, 45 and 60 minutes. Release to initial load.

Reload to 70% UTS and held for 1 hour. Take readings after 5, 10,15, 30, 45 and 60 minutes. Release to initial load.

Reload to 85% UTS and hold for 1 hour. Take reading after 5,10,15,30, 45 and 60 minutes. Release to initial as per previous loading.

After the fourth application of load, again apply tension, increasing uniformly until the actual breaking strength reached. Simultaneous reading of tension and elongation shall be taken up to 90 percent UTS at the same intervals as per previous loading.

#### Stress Strain Curves

Obtain the design stress-strain curves by drawing a smooth curve through the 0.5 and 1 hour points at 30, 50 and 70% UTS loading.

Remove from the lower end at the design curves the presence of any conductor slack that can be related to any observed extrusion entering the span from the compression deadens.

Both the laboratory and design stress-strain curves shall be submitted to the purchaser.

**1.14.1.6- Chemical Analysis of Aluminium Alloy:-** Samples taken from the Aluminium Alloy coils/Strands of the conductor shall be chemically or spectrographically analysed . The same shall be in conformity to IS 9997:1991-

(Aluminium alloy redraw wires.)

#### **1.14.2 ROUTINE/ACCEPTANCE TEST :-**

After complete manufacture of the ordered conductors the following routine/acceptance tests shall be conducted on the samples in presence of the Inspecting officer and the values should confirm to IS :398-Part-IV & to this specification. But before conduction of routine/type tests, the bidder(manufacturer) when offer for inspection & testing at their

factory, then they must furnish calibration reports of equipment's/instruments/meters to be used during testing with serial No, make, range, accuracy class ,calibration status with test name where it will be used . Only after full satisfaction of the purchaser, purchaser may direct the manufacturer to conduct the routine & acceptance tests at their factory or else purchaser may direct to conduct these tests at Govt. or govt. authorized Test house.

**1.14.2.1 Visual and Dimensional check on drums:**

The drums shall be visually and dimensionally checked to ensure that they confirm to the requirements of this specification.

**1.14.2.2 Visual Check for Joints, Scratches etc.** Conductor drums shall be rewound in the presence of the inspector. The inspector shall visually check for scratches, joints etc. and that the conductor generally confirm the requirements of this specification.

**1.14.2.3 Dimensional check on Aluminium Alloy Strands:**

The individual strands shall be dimensionally checked to ensure that they confirm to the requirement of this specification.

**1.14.2.4 Lay Ratio Test of various Layers:**

The Lay-ratios of various layers shall be checked to ensure that they confirm to the requirements of this specification.

**1.14.2.5 Elongation Test:**

The test procedure shall be as specified in IS-398 (Part-IV)-1979, 1994 & with its latest amendments. The material shall confirm to the requirements of this specification.

**1.14.2.6 Breaking load Test on welded Aluminium Alloy Strand:**

The aluminium alloy wires shall be welded and shall be subjected to tensile load. The welded point of the wire shall be able to withstand the minimum breaking load of the individual strand guaranteed by the bidder.

**1.14.2.7 Breaking load test on Alloy strand:**

The tensile test shall apply to all wires of AAAC. The tensile strength of any of the wires shall not be less than the values given in the technical particulars mentioned above. When an automatic tensile testing machine is used the load shall be applied gradually and rate of separation of the jaws of the testing machine shall not be less than 25 mm/minute and not greater than 100 mm/minute.

**1.14.2.8 Resistance Test:**

As per IS: 398-IV (latest amendments)the measurement of resistance shall be made on strands of AAAC, and shall be carried out to an accuracy of at least one part in a thousand and confirm to the specified values. Certificates as to the accuracy of the apparatus shall be



provided and either party shall have the right to satisfy himself that the apparatus and method of testing are correct.

1.14.2.9 **-Wrap test** on aluminium alloy strands will be carried out as per IEC-

**1.15 RE-TEST AND REJECTION:**

Each drum or reel selected for testing shall be tested for compliance with the requirements of this specification & IS 398-P-IV-1976, 1994 and its latest amendments if any, or any other equivalent authoritative standard. Should any selected drum or reel not fulfil any of the test requirements, that particular drum or reel shall be withdrawn? In respect of each failure, two test pieces shall be selected from two different drums in the lot and subjected to the test under which the failure occurred. If either of the two-re-test pieces fails to pass that test, the drum or reel concerned shall be rejected. All rejected drums shall be suitably marked and segregated. Purchaser has got the option that if any selected drum or reel does not fulfil any test requirements of this specification & IS then he may reject the entire Lot of conductors ordered on the manufacturer without going for retesting.

**1.16 TEST CERTIFICATE:**

**Valid Type test certificates (Type tests as indicated in this specification) from any Govt. approved Laboratory conducted within last 5 years from the date of opening of this techno-commercial part of this bid document shall be furnished along with the offer, Without which bids will not be considered for evaluation.** The bidder shall conduct all the type tests mentioned above in presence of Inspecting officer of OPTCL on the samples selected by him **for each 200 kms of conductor or part there of at their cost if order will be decided in their favour** or they may quote their test charges which will be taken in to account during bid price evaluation. Test certificates in triplicate furnishing the results of various tests mentioned above and Routine Tests as per this specification & IS 398 (Part-IV) shall be forwarded and got approved before the bills are submitted. Besides the tests called for in the specification, the purchaser reserves the right to have such tests he desires to be carried out at his own expenses to satisfy himself that the materials confirm to the requirements of this specification. The materials shall be rejected if the test results are not satisfactory. The test certificates for routine& type tests shall clearly state the designated numbers of drums and net length of the conductor in each drum. The certificate shall clearly indicate the minimum values of diameters and lay ratios admissible in addition to the actual measured values to facilitate checking of test certificates.

**1.17 INSPECTION :**

The purchaser's representative shall, at all times, be entitled to have access to the works and all places of the manufacturer, where the conductor shall be made or prepared and the

representative shall have full facilities for unrestricted inspection of Contractor's works, the raw materials, the manufacture of the conductor and for conducting necessary tests as detailed herein before. The Contractor shall keep the purchaser informed well in advance of the time of starting and of progress of manufacture of conductor at its various stages, so that arrangement could be made for inspection. No conductor shall be dispatched from its point of manufacture before it has been satisfactorily inspected and tested and release order is issued by the Sr. G.M, CPC, OPTCL, Bhubaneswar for dispatch, unless the inspection is waived off by the purchaser in writing. For inspection & testing contractor shall give to the purchaser adequate time /notice (at least clear 15 days for inside state suppliers & 20 days for outside state suppliers ) for offer for inspection along with the calibration reports of the test equipment's to be used during testing for deputing officers for such inspection.

#### **1.18 SCHEDULE OF REQUIREMENTS, DESIRED DELIVERY**

The schedule of requirements and desired deliveries are indicated in **ANNEXURE-III..**

The purchaser reserves the right to order entire quantity of conductors shown or part of the quantity or increase quantity to double shown in Schedule-B, on one or more bidders.

#### **1.19 GUARANTEED TECHNICAL PARTICULARS :**

The guaranteed technical particulars of the conductor shall be furnished by the tenderer as called for in **Schedule - 'A'**

#### **1.20 DEPARTURE FROM TECHNICAL SPECIFICATION :**

Any departure from the required technical particulars of conductor as given in Section-IV of this specification shall be clearly pointed out by the tenderer / bidder.

#### **1.21 MARKING :**

Each drum shall have following information stenciled on it, indelible ink alongwith other essential data :-

- a) Contract/ Specification No.
- b) Name and address of the consignee.
- c) Name of the destination store/place.
- d) Maker's name and address & trade-mark.
- e) Drum number.
- f) Name & size of the conductor
- g) Length of the conductor in meters.
- h) Gross weight of the drum with protective Lagging including conductor.
- i) Weight of the empty drum with protective lagging.

- j) Net weight of the conductor.
- k) Arrow marking for unwinding.
- l) Position of the conductor end.
- m) Lot number.
- n) Date of packing.

#### 1.22. **SAG TENSION CHARTS AND SAG TEMPLATES :**

The Contractor shall supply each six copies sag tension charts and sag templates in respect of the conductor. The Contractor shall also supply sag templates in celluloid. The Contractor shall also supply sag template in celluloid which shall be subject to the approval by the purchaser and without involving any extra charges. The design data of the lines on which these conductors will be used are given in Schedule – C.

#### 1.23.1 **PACKING OF CONDUCTOR**

The conductor shall be wound on non-returnable drums strong enough and provided with lagging of adequate strength, constructed to protect the conductor against all damage and displacement during transit, storage and subsequent handling and stringing operation in the field. The drums shall generally conform to IS : 1778 as amended up-to-date.

1.23.2 Only one conductor length shall be packed on each drum.

1.23.3 The drums shall be suitable for wheel mounting.

1.23.4 The general construction of drums shall be suitable for letting off the conductor under controlled tension of the order of 300 Kg.Minimum.

#### 1.24 **CONSTRUCTION OF DRUMS:**

##### 1.24.1 **Wooden Components:**

1.24.1.1 All wooden components shall be manufactured out of seasoned soft wood free from defects that may materially weaken the component parts of the drums. Preservative treatment shall be applied to the entire drum with preservatives of such a quality which is not harmful to the conductor.

##### 1.24.2 **Flanges :**

1.24.2.1 The flanges shall be of three-ply construction with each ply at right angle to the other and nailed together. The nails shall be driven from the inside face of the flange, punched and then clenched on the outer face. The thickness of each ply shall not vary by more than 2 mm from that indicated in the figure. There shall be at least 3 nails per plank of ply with maximum nail spacing of 70-75 mm.

1.24.2.2 Where a slot is cut in the flange to receive the inner end of the conductor, the entrance shall be in line with the periphery of the barrel.

##### 1.24.3 **SPINDLE HOLE :**

1.24.3.1 Spindle hole shall be provided at the centres of the middle planks of the plies and spindle plates with 100 mm. Diameter holes shall be fitted on either side of both the flanges.

**1.24.4 BARREL-END SUPPORTS:**

The end supports shall be securely fixed to the flanges by nailing and may be of disc or segmental type. The middle barrel support of two-ply construction of disc type with a 100 mm. Diameter hole concentric with the holes in the flanges shall be provided at the centers of the barrel support.

**1.25 BARREL :**

1.25.1 The wooden battens used for making the barrel of the conductor shall be of segmental type. These shall be nailed to the barrel supports with at least two nails. The battens shall be closely butted and shall provide a round barrel with smooth external surface. The edges of the battens shall be rounded or chamfered to avoid damage to the conductor.

**1.26 BARREL STUDS:**

1.26.1 Barrel studs shall be used for the construction of drums. The flanges shall be holed and the barrel supports slotted to receive them. The barrel studs shall be threaded over a length, on either end, sufficient to accommodate washers, spindle plants and nuts for fixing flanges at the required spacing.

**1.27 IRON COMPONENTS:**

1.27.1 Normally, the butts on the studs shall stand proud of flanges. All the nails used on the inner surface of the flanges and the drums barrel shall be counter sunk. The ends of barrel shall generally be flush with the top of the butts.

**1.28 PROTECTIVE ARRANGEMENT:**

1.28.1 The inner cheeks of the flanges and drum barrel surface shall be painted with bitumen based paint.

1.28.2 Before reeling, card board or double corrugated or thick bituminous water-proof bamboo paper shall be secured to the drum barrel and inside of flanges of the drums by means of a suitable adhesive material. These protective wrappings and the adhesive material used shall be of a quality which is not harmful to the conductor.

1.28.3 After reeling the conductor, the exposed surface of the outer layer of the conductor shall be wrapped with water-proof, thick, bituminised bamboo paper to prevent the conductor from dirt, grit and damage during transport and handling.

1.28.4 After application of bituminised paper, protective lagging or circumferential battens of 15 mm. Thickness shall be provided suitably where conditions warrant such provision in

order to protect conductor from damage during transit in the event of breakage/detachment of the external protective lagging.

1.28.5 Minimum space of 125 mm shall be provided between the inner surface of the external protective lagging and outer layer of the conductor.

1.28.6 The thickness of the external protective lagging or circumferential battens shall be sufficient to withstand transit hazards. Each batten shall be securely nailed across a grain as far as possible to the flange edges with at least 2 nails per end. The length of the nails shall be not less than twice the thickness of the battens. The nails shall not protrude above the general surface and shall not have

exposed sharp edges or allow the battens to be released due to corrosion.

1.28.7 Outside the protective lagging there shall be minimum of two binders consisting of hoop iron or galvanized steel wire. Each protective lagging shall have two recesses to accommodate hoop binders.

1.28.8 The conductor ends shall be properly sealed and secured with the help of U – nails or bolts on the side of one of the flanges to avoid loosening of the conductor layers during transit handling.

**SCHEDULE -A**

**GUARANTEED TECHNICAL PARTICULARS OF THE AAA CONDUCTOR TO BE FURNISHED BY THE TENDERER.**

Sl.No	Description.	37/3.15 MM	37/4 MM	61/3.45 MM
1	MAKER'S NAME AND ADDRESS  FOR			
	i) Aluminium alloy rods			
	ii) Complete conductor.			
2	SPECIFICATION TO WHICH			
	i) Raw materials pertain			
	ii) Whether Conductors are to be Manufactured as per the relevant Indian standard (IS) & as per the technical specification at section			

	IV above.			
	iii) Whether Conductors are to be Tested as stipulated in the technical specification at section IV above.			
3	<b>PARTICULARS OF ALUMINIUM ALLOY STRANDS</b>			
	i) Diameter			
	a) Standard (mm)			
	b) Maximum (mm)			
	c) Minimum (mm)			
	ii) Bared Sectional Area (Sq. mm)			
	iii) Weight per KM			
	a) Standard (Kg)			
	b) Maximum (Kg)			
	c) Minimum (Kg)			
	IV) Minimum ultimate Tensile strength (Kg)			
	V) Minimum Breaking load For wire of			
	a) Standard dia (Kg)			
	b) Minimum dia (Kg)			
	vi) Final stress in Aluminium alloy Wires (Kg/Sq.mm)			

	vii) Calculated resistance Per KM. at 20° C when Corrected to standard Weight.			
	a) Standard (Ohm)			
	b) Maximum (Ohm)			
	viii) Have you got machinery For cold pressure butt Welding.			
	ix) Type of welding which Will be adopted for Making joints in inner Layer of aluminium Alloy strands.			
	x) Please confirm that  There will not be Any joint in outer Most layer of conductor (Please see clause 3.7 Of section .IV)			
	xi) Please give the  Following particulars  In respect of the joints  In aluminium strands.			
	a) Electrical resistance			
	b) Elongation			
	c) Ultimate tensile strength  (in Kg/mm <sup>2</sup> )			
4	Particulars of AAAC			

	i) Code words, if any			
	ii) Copper equivalent area (Sq. mm)			
	iii) Stranding, lay and wire Diameter.			
	IV) Nominal overall diameter Of complete conductor (mm)			
	v) Approximate total Weight per km.			
	vi) Guaranteed ultimate Tensile strength (Kg.)			
	vii) Calculated DC resistance Per km of conductor when Corrected to standard Weight at 20° C (Ohm)			
	viii) Nominal Aluminum alloy Area (Sq.mm)			
	ix) Sectional area of Aluminium alloy (Sq.mm)			



	x) Total sectional area (Sq. mm)			
	xi) Mean Lay-ratio:			
	a) First aluminium Alloy layer			
	b) Second Aluminium Alloy layer			
	c) Third aluminium Alloy layer			
	d) Fourth aluminium Alloy layer			
	xii) Calculated percentage Increase in length			
	a) First aluminium Alloy layer			
	b) Second aluminium Alloy layer			
	b) Third aluminium Alloy layer			
	c) Fourth aluminium Alloy layer			
	xiii) Equivalent modulus of elasticity (Average			

	values form actual stress strain curves)			
	a) Aluminium alloy (kg/cm <sup>2</sup> )			
	b) AAAC size 37/4mm			
	xiv) Coefficient of linear Expansion.			
	a) Aluminium alloy Per 0°C			
	b) AAA Conductor per 0°C)			
	xv) a) Continuous maximum current rating of conductor in still air at 40°C ambient temperature (amp)			
	b) Temperature rise for the above current (°C)			
	d) Continuous Current rating of Conductor at 65, 75 & 90 degree Centigrade			
5	i) Standard length of each Piece of conductor (km)			
	ii) Tolerance in length (in per cent)			
	iii) Random length in per cent of ordered quantity.			
	iv) Minimum length of Random length (meter)			

	v) No, of standard length in one reel			
6	Dimensions of the reel In cms .& thickness of Lagging.			
7	Weight of conductor in One reel in Kg.			
9	Weight of the reel in Kg.			
9	Gross weight of reel including weight of Conductor in Kgs.			
10	Licence number of I.S.I. Certification name			
11	Temperature rise curve of conductor furnished Or not			
12	Type test reports as Indicated in the technical Section. IV furnished or Not.			
13	Creepage of the conductor At a tension 25% of the Breaking strength within a  Period of 20 years and Detail calculation of Creepage.			
14	14. Other particulars if any			

Date :

Place :

Full Signature of the Tenderer With seal

**ANNEXURE-III****SCHEDULE OF QUANTITY AND DELIVERY**

(To be filled up by the tenderer)

Lot No.	Description of materials	Quantity required. 2014-15	Quantity required. 2015-16	Desired delivery for 2014-15	Desired delivery for 2015-16	Destination.	Remarks.
1.	2.		3.	4.		5.	6.
i	ACSR Panther	113.125 KM	1316 KM	Delivery to be completed within 3 months from the date of issue of the purchase order.	Delivery to be completed within 3 months from 01/04/2015.	OPTCL Stores/ Sites within State of Odisha.	
ii	ACSR Zebra	265.796 KM	482 KM				
iii	ACSR Moose	34.25 KM	4 KM				
IV	AAAC PANTHER' (37/3.15 MM)	Nil	5 KM				
V	AAAC ZEBRA' (37/4 MM)	Nil	1 KM				
VI	AAAC MOOSE (61/3.45 MM)	9.6 KM	1.0 KM				

Place:

Date:

Signature of Tenderer  
with seal of Company.

## **SCHEDULE - C**

1. conductor.

a) Nominal area 465 Sq.mm Zebra

b) Stranding 37/4 mm

2. Normal Span 320 meters

Wind Span 320 meters

2.1 Wind Span

a) Max. 500 meters

c) Min. 50 meters

2. Wind Pressure on full

Projected area. 4/52 kg per m<sup>2</sup>

3. Temperature

a) Minimum 5°C

b) Maximum 67°C

c) Every day 32°C

4. Factors of safety : Minimum

i) Every day temperature and non wind. 4.00

ii) Minimum temperature and 2/3 maximum wind : 2.00

iii) Every day Temperature and full wind 2.00

This is as per Indian Electricity Rules, 1956

5. Relative Humidity.

Maximum 100 percent

Minimum 60 percent

6. Isoceramic level 100/Years

7. Number of rainy days per year 100 days

8. Average rainfall per year 1150 mm Approx.

9. Altitude Less than 350 Meters

**PART – II  
PRICE BID**

1. **PRICE:**

- (i) Bidders are required to quote their price(s) for goods offered indicating they are "VARIABLE" as per IEEMA PV.
- (ii) The prices quoted shall be FOR Destination only at the consignee's site/store inclusive of packing, forwarding, Freight & Insurance. In addition, the break-up of FOR Destination price shall be given as per schedule of Prices in Annexure-V of Section - III. The Tenderer has to certify in the price bid that MODVAT benefit if any, has been fully passed on to the Purchaser, while quoting the tender prices.

2. **INSURANCE:**

Insurance of materials/equipment's covered by the Specification should normally be done by the Suppliers with their own Insurance Company unless otherwise stated. The responsibility of delivery of the materials/equipment's at destination stores/site in good condition rests with the Supplier. Any claim with the Insurance Company or Transport agency arising due to loss or damage in transit has to be settled by the Supplier. The Supplier shall undertake free replacement of equipment's/materials damaged or lost which will be reported by the Consignee within 30 days of receipt of the equipment's/materials at Destination without awaiting for the settlement of their claims with the carriers and underwriters.

3. **CERTIFICATE FOR EXEMPTION FROM EXCISE DUTY/SALES TAX:**

Offers with exemption from excise Duty/ Sales tax shall be accompanied with authenticated proof of such exemption. Authenticated proof for this clause shall mean attested Photostat copy of exemption certificates, attested by Gazetted Officers of State or Central Government.

4. **PROPER FILLING UP OF THE PRICE SCHEDULE:**

- (i) In case, where Freight & Insurance charges are not furnished, 5% of the Ex-works price shall be considered as the freight & Insurance charges.
- (ii) The tenderer should fill up the price schedule in line with Annexure-V of Section-III in e-tender mode, properly and in full. The tender may be rejected if the schedule of price is submitted in incomplete form as per clause-34(ix) of Section-II of the Specification.

5. **NATURE OF PRICE INDICATED IN SPECIFICATION SHALL BE FINAL.**

The nature of price indicated in the Clause-13, Section - I of PART -I of the Specification shall be final and binding.